Appendix E Part 6

Public Comment Report (Public Comment Report November 2011)

UNITED STATES DEPARTMENT OF INTERIOR
BUREAU OF INDIAN AFFAIRS

Horseshoe Grande EIS

Public Comment Report

NOVEMBER 2011

This page is intentionally blank.

Table of Contents

SECTION 1 General Comments and Master Responses 1

1.1 NEPA Procedural Issues 2
1.1.1 General EIS Issues 2
1.1.2 Extension of the Comment Period 2
1.1.3 Scoping 2
1.1.4 Cooperating Agency 3
1.2 Non-NEPA Issues 3
1.2.1 Expressions of Opinion 3
1.2.2 Matters beyond the Scope of the EIS 4
1.3 Purpose and Need 5
1.4 Alternatives 8
1.5 General Environmental Concerns 12
1.6 Land Resources 12
1.7 Water Resources 15
1.7.1 Impacts to Flooding and Runoff 15
1.7.2 Impacts to Water Supply and Water Quality 20
1.7.3 Impacts to Groundwater 23
1.8 Air Quality 23
1.8.1 Air Quality – Construction Impacts 23
1.8.2 Air Quality – Operational Impacts 28
1.9 Biological Resources 29
1.10 Cultural and Paleontological Resources 31
1.10.1 Cultural Resources 31
1.10.2 Paleontological Resources 32
1.11 Economic and Socioeconomic Conditions 34
1.11.1 Economic and Fiscal Resources 34
1.11.2 Environmental Justice 40
1.12 Resource Use Patterns 42
1.12.1 Transportation Networks 42
1.12.2 Land Use 57
1.13 Public Services 62
1.13.1 Water Supply 63
1.13.2 Wastewater Service 64
1.13.3 Solid Waste Service 65
1.13.4 Electricity and Natural Gas 65
1.13.5 Law Enforcement 66
1.13.6 Fire Protection and Emergency Medical Services 70
1.13.7 School Services 73
1.14 Other Values 74
1.14.1 Hazardous Materials 74
1.14.2 Noise 75
1.14.3 Visual Resources 82
1.14.4 Recreational Resources 83
1.15 Cumulative Effects 84
1.16 Indirect Effects 85
1.17 Growth-Inducing Effects 86
1.18 Mitigation Measures 86

SECTION 2 Comment Log, Written Comments, and Public Hearing Transcript 86

SECTION 3 Detailed Responses to Public Comments 98

3.1 Detailed Responses to Comment Letters Submitted by Agencies and organizations 98
3.1.1 Agency/Organization Comment Letter #A01 98
3.1.2 Agency/Organization Comment Letter #A02 112
3.1.3 Agency/Organization Comment Letter #A03 126
3.1.4 Agency/Organization Comment Letter #A04 126
3.1.5 Agency/Organization Comment Letter #A05 126
3.1.6 Agency/Organization Comment Letter #A06 129
3.1.7 Agency/Organization Comment Letter #A07 129
3.1.8 Agency/Organization Comment Letter #A08 130
3.1.9 Agency/Organization Comment Letter #A09 132
3.1.10 Agency/Organization Comment Letter #A10 133
3.1.11 Agency/Organization Comment Letter #A11 134
3.1.12 Agency/Organization Comment Letter #A12 135
3.1.13 Agency/Organization Comment Letter #A13 136
3.1.14 Agency/Organization Comment Letter #A14 136
3.1.15 Agency/Organization Comment Letter #A15 137
3.1.16 Agency/Organization Comment Letter #A16 138
3.1.17 Agency/Organization Comment Letter #A17 140
3.1.18 Agency/Organization Comment Letter #A18 140
3.1.19 Agency/Organization Comment Letter #A19 141
3.1.20 Agency/Organization Comment Letter #A20 141
3.1.21 Agency/Organization Comment Letter #A21 142
3.1.22 Agency/Organization Comment Letter #A22 142
3.1.23 Agency/Organization Comment Letter #A23 144
3.1.24 Agency/Organization Comment Letter #A24 144
3.1.25 Agency/Organization Comment Letter #A25 145
3.1.26 Agency/Organization Comment Letter #A26 147
3.1.27 Agency/Organization Comment Letter #A27 147
3.1.28 Agency/Organization Comment Letter #A28 147
3.1.29 Agency/Organization Comment Letter #A29 148
3.1.30 Agency/Organization Comment Letter #A30 149
3.1.31 Agency/Organization Comment Letter #A31 158
3.1.32 Agency/Organization Comment Letter #A32 162
3.1.33 Agency/Organization Comment Letter #A33 162
3.1.34 Agency/Organization Comment Letter #A34 163
3.1.35 Agency/Organization Comment Letter #A35 164
3.1.36 Agency/Organization Comment Letter #A36 164
3.2 Detailed Responses to Letters Submitted by Individuals 172
3.2.1 Individual Letter 1 172
3.2.2 Individual Letter 2 172
3.2.3 Individual Letter 3 172
3.2.4 Individual Letter 4 172
3.2.5 Individual Letter 5 172
3.2.6 Individual Letter 6 172
3.2.7 Individual Letter 7 173
3.2.8 Individual Letter 8 173

3.2.9 Individual Letter 9 173
3.2.10 Individual Letter 10 173
3.2.11 Individual Letter 11 173
3.2.12 Individual Letter 12 174
3.2.13 Individual Letter 13 174
3.2.14 Individual Letter 14 174
3.2.15 Individual Letter 15 174
3.2.16 Individual Letter 16 174
3.2.17 Individual Letter 17 175
3.2.18 Individual Letter 18 175
3.2.19 Individual Letter 19 175
3.2.20 Individual Letter 20 175
3.2.21 Individual Letter 21 175
3.2.22 Individual Letter 22 175
3.2.23 Individual Letter 23 176
3.2.24 Individual Letter 24 176
3.2.25 Individual Letter 25 176
3.2.26 Individual Letter 26 177
3.2.27 Individual Letter 27 177
3.2.28 Individual Letter 28 177
3.2.29 Individual Letter 29 178
3.2.30 Individual Letter 30 178
3.2.31 Individual Letter 31 178
3.2.32 Individual Letter 32 178
3.2.33 Individual Letter 33 178
3.2.34 Individual Letter 34 178
3.2.35 Individual Letter 35 178
3.2.36 Individual Letter 36 179
3.2.37 Individual Letter 37 179
3.2.38 Individual Letter 38 179
3.2.39 Individual Letter 39 180
3.2.40 Individual Letter 40 180
3.2.41 Individual Letter 41 180
3.2.42 Individual Letter 42 180
3.2.43 Individual Letter 43 180
3.2.44 Individual Letter 44 180
3.2.45 Individual Letter 45 180
3.2.46 Individual Letter 46 181
3.2.47 Individual Letter 47 181
3.2.48 Individual Letter 48 181
3.2.49 Individual Letter 49 181
3.2.50 Individual Letter 50 182
3.2.51 Individual Letter 51 182
3.2.52 Individual Letter 52 182
3.2.53 Individual Letter 53 182
3.2.54 Individual Letter 54 187
3.2.55 Individual Letter 55 187
3.2.56 Individual Letter 56 187
3.2.57 Individual Letter 57 187
3.2.58 Individual Letter 58 187
3.2.59 Individual Letter 59 190
3.2.60 Individual Letter 60 190

3.2.61 Individual Letter 61 191
3.2.62 Individual Letter 62 191
3.2.63 Individual Letter 63 191
3.2.64 Individual Letter 64 191
3.2.65 Individual Letter 65 191
3.2.66 Individual Letter 66 191
3.2.67 Individual Letter 67 192
3.2.68 Individual Letter 68 192
3.2.69 Individual Letter 69 192
3.2.70 Individual Letter 70 192
3.2.71 Individual Letter 71 192
3.2.72 Individual Letter 72 192
3.2.73 Individual Letter 73 192
3.2.74 Individual Letter 74 193
3.2.75 Individual Letter 75 193
3.2.76 Individual Letter 76 193
3.2.77 Individual Letter 77 193
3.2.78 Individual Letter 78 193
3.2.79 Individual Letter 79 193
3.2.80 Individual Letter 80 193
3.2.81 Individual Letter 81 194
3.2.82 Individual Letter 82 194
3.2.83 Individual Letter 83 194
3.2.84 Individual Letter 84 194
3.2.85 Individual Letter 85 194
3.2.86 Individual Letter 86 194
3.2.87 Individual Letter 87 194
3.2.88 Individual Letter 88 195
3.2.89 Individual Letter 89 195
3.2.90 Individual Letter 90 195
3.2.91 Individual Letter 91 195
3.2.92 Individual Letter 92 195
3.2.93 Individual Letter 93 195
3.2.94 Individual Letter 94 195
3.2.95 Individual Letter 95 195
3.2.96 Individual Letter 96 196
3.2.97 Individual Letter 97 196
3.2.98 Individual Letter 98 196
3.2.99 Individual Letter 99 196
3.2.100 Individual Letter 100 196
3.2.101 Individual Letter 101 196
3.2.102 Individual Letter 102 196
3.2.103 Individual Letter 103 197
3.2.104 Individual Letter 104 197
3.2.105 Individual Letter 105 197
3.2.106 Individual Letter 106 197
3.2.107 Individual Letter 107 197
3.2.108 Individual Letter 108 197
3.2.109 Individual Letter 109 197
3.2.110 Individual Letter 110 198
3.2.111 Individual Letter 111 198
3.2.112 Individual Letter 112 198

3.2.113 Individual Letter 113 198
3.2.114 Individual Letter 114 198
3.2.115 Individual Letter 115 198
3.2.116 Individual Letter 116 198
3.2.117 Individual Letter 117 198
3.2.118 Individual Letter 118 199
3.2.119 Individual Letter 119 199
3.2.120 Individual Letter 120 199
3.2.121 Individual Letter 121 199
3.2.122 Individual Letter 122 199
3.2.123 Individual Letter 123 199
3.2.124 Individual Letter 124 199
3.2.125 Individual Letter 125 200
3.2.126 Individual Letter 126 200
3.2.127 Individual Letter 127 200
3.2.128 Individual Letter 128 200
3.2.129 Individual Letter 129 200
3.2.130 Individual Letter 130 200
3.2.131 Individual Letter 131 200
3.2.132 Individual Letter 132 200
3.2.133 Individual Letter 133 201
3.2.134 Individual Letter 134 201
3.2.135 Individual Letter 135 201
3.2.136 Individual Letter 136 201
3.2.137 Individual Letter 137 201
3.2.138 Individual Letter 138 201
3.2.139 Individual Letter 139 201
3.2.140 Individual Letter 140 202
3.2.141 Individual Letter 141 202
3.2.142 Individual Letter 142 202
3.2.143 Individual Letter 143 202
3.2.144 Individual Letter 144 202
3.2.145 Individual Letter 145 202
3.2.146 Individual Letter 146 202
3.2.147 Individual Letter 147 203
3.2.148 Individual Letter 148 203
3.2.149 Individual Letter 149 203
3.2.150 Individual Letter 150 203
3.2.151 Individual Letter 151 203
3.2.152 Individual Letter 152 203
3.2.153 Individual Letter 153 203
3.2.154 Individual Letter 154 204
3.2.155 Individual Letter 155 204
3.2.156 Individual Letter 156 204
3.2.157 Individual Letter 157 204
3.2.158 Individual Letter 158 204
3.2.159 Individual Letter 159 204
3.2.160 Individual Letter 160 204
3.2.161 Individual Letter 161 205
3.2.162 Individual Letter 162 205
3.2.163 Individual Letter 163 205
3.2.164 Individual Letter 164 205

3.2.165 Individual Letter 165 205
3.2.166 Individual Letter 166 205
3.2.167 Individual Letter 167 205
3.2.168 Individual Letter 168 206
3.2.169 Individual Letter 169 206
3.2.170 Individual Letter 170 206
3.2.171 Individual Letter 171 206
3.2.172 Individual Letter 172 206
3.2.173 Individual Letter 173 206
3.2.174 Individual Letter 174 206
3.2.175 Individual Letter 175 207
3.2.176 Individual Letter 176 207
3.2.177 Individual Letter 177 207
3.2.178 Individual Letter 178 207
3.2.179 Individual Letter 179 207
3.2.180 Individual Letter 180 207
3.2.181 Individual Letter 181 207
3.2.182 Individual Letter 182 208
3.2.183 Individual Letter 183 208
3.2.184 Individual Letter 184 208
3.2.185 Individual Letter 185 208
3.2.186 Individual Letter 186 208
3.2.187 Individual Letter 187 208
3.2.188 Individual Letter 188 208
3.2.189 Individual Letter 189 209
3.2.190 Individual Letter 190 209
3.2.191 Individual Letter 191 209
3.2.192 Individual Letter 192 209
3.2.193 Individual Letter 193 209
3.2.194 Individual Letter 194 209
3.2.195 Individual Letter 195 209
3.2.196 Individual Letter 196 210
3.2.197 Individual Letter 197 210
3.2.198 Individual Letter 198 210
3.2.199 Individual Letter 199 210
3.2.200 Individual Letter 200 210
3.2.201 Individual Letter 201 210
3.2.202 Individual Letter 202 210
3.2.203 Individual Letter 203 211
3.2.204 Individual Letter 204 211
3.2.205 Individual Letter 205 211
3.2.206 Individual Letter 206 211
3.2.207 Individual Letter 207 211
3.2.208 Individual Letter 208 211
3.2.209 Individual Letter 209 211
3.2.210 Individual Letter 210 212
3.2.211 Individual Letter 211 212
3.2.212 Individual Letter 212 212
3.2.213 Individual Letter 213 212
3.2.214 Individual Letter 214 212
3.2.215 Individual Letter 215 213
3.2.216 Individual Letter 216 213

3.2.217 Individual Letter 217 213
3.2.218 Individual Letter 218 213
3.2.219 Individual Letter 219 213
3.2.220 Individual Letter 220 214
3.2.221 Individual Letter 221 214
3.3 Detailed Responses to Comments Submitted at the August 5, 2009 Public Hearing 215
3.3.1 TC-001 215
3.3.2 TC-002 215
3.3.3 TC-003 215
3.3.4 TC-004 215
3.3.5 TC-005 215
3.3.6 TC-006 215
3.3.7 TC-007 215
3.3.8 TC-008 215
3.3.9 TC-009 215
3.3.10 TC-010 215
3.3.11 TC-011 215
3.3.12 TC-012 215
3.3.13 TC-013 216
3.3.14 TC-014 216
3.3.15 TC-015 216
3.3.16 TC-016 216
3.3.17 TC-017 216
3.3.18 TC-018 216
3.3.19 TC-019 216
3.3.20 TC-020 216
3.3.21 TC-021 216
3.3.22 TC-022 216
3.3.23 TC-023 216
3.3.24 TC-024 216
3.3.25 TC-025 217
3.3.26 TC-026 217
3.3.27 TC-027 217
3.3.28 TC-028 217
3.3.29 TC-029 217
3.3.30 TC-030 217
3.3.31 TC-031 217
3.3.32 TC-032 217
3.3.33 TC-033 217
3.3.34 TC-034 217
3.3.35 TC-035 217
3.3.36 TC-036 217
3.3.37 TC-037 218
3.3.38 TC-038 218
3.3.39 TC-039 218
3.3.40 TC-040 218
3.3.41 TC-050 218
3.3.42 TC-051 218
3.3.43 TC-052 218
3.3.44 TC-053 218
3.3.45 TC-054 218

3.3.46 TC-055 218
3.3.47 TC-056 218
3.3.48 TC-057 218
3.3.49 TC-058 218
3.3.50 TC-059 218
3.3.51 TC-060 219
3.3.52 TC-061 219
3.3.53 TC-062 219
3.3.54 TC-063 219
3.3.55 TC-064 219
3.3.56 TC-065 219
3.3.57 TC-066 219
3.3.58 TC-067 219
3.3.59 TC-068 219
3.3.60 TC-069 219
3.3.61 TC-070 219
3.3.62 TC-071 219
3.3.63 TC-072 220
3.3.64 TC-073 220
3.3.65 TC-074 220
3.3.66 TC-075 220
3.3.67 TC-076 220
3.3.68 TC-077 220
3.3.69 TC-078 220
3.3.70 TC-079 220
3.3.71 TC-080 220
3.3.72 TC-081 220
3.3.73 TC-082 220
3.3.74 TC-083 220
3.3.75 TC-084 220
3.3.76 TC-085 221
3.3.77 TC-086 221
3.3.78 TC-087 221
3.3.79 TC-088 221
3.3.80 TC-089 221
3.3.81 TC-090 221
3.3.82 TC-091 221
3.3.83 TC-092 221
3.3.84 TC-093 221
3.3.85 TC-094 221
3.3.86 TC-095 222
3.3.87 TC-096 222
3.3.88 TC-097 222
3.3.89 TC-098 222
3.3.90 TC-099 222
3.3.91 TC-100 222
3.3.92 TC-101 222
3.3.93 TC-102 222
3.3.94 TC-103 222
3.3.95 TC-104 222
3.3.96 TC-105 222
3.3.97 TC-106 222

3.3.98 TC-107 223
3.3.99 TC-108 223
3.3.100 TC-109 223
3.3.101 TC-110 223
3.3.102 TC-111 223
3.3.103 TC-112 223
3.3.104 TC-113 223
3.3.105 TC-114 223
3.3.106 TC-115 223
3.3.107 TC-116 223
3.3.108 TC-117 223
3.3.109 TC-118 223
3.3.110 TC-119 224
3.3.111 TC-120 224
3.3.112 TC-121 224
3.3.113 TC-122 224
3.3.114 TC-123 224

SECTION 1

General Comments and Master Responses

S E C T I O N 1

General Comments and Master Responses

The extended comment period for the Soboba Band of Luiseño Indians Horseshoe Grande Fee-to-Trust Project Draft Environmental Impact Statement (DEIS) occurred between July 2, 2009 and September 15, 2009. During the comment period, the Bureau of Indian Affairs (BIA) received 257 total comment letters. Of this total, 8 letters were from organizations, 28 letters were from public agencies, and 221 letters were from the general public. Verbal comments were also submitted at a public hearing held on August 5, 2009.

Pursuant to the National Environmental Policy Act (NEPA), Section 1503.4(b), "the lead agency shall consider and respond to all substantive comments received on the EIS (or summaries thereof where the response has been exceptionally voluminous)." BIA responds to both written and verbal comments in this appendix to the Final EIS (FEIS). The responses to the comments are organized in the three sections described below. Also below is a summary of how the comments received were organized and provided with a response.

Comment Organization

Letters received via mail or fax and statements transcribed at the public hearing were organized by assigning a letter number to each letter. If a letter was from an agency or organization it was labeled with an "A" before its letter number. After assigning letter numbers, comments were read for theme or concern. Individual substantive comments were identified in both the letters and the public hearing transcript, and were assigned comment numbers. The comment numbers are shown in brackets on the letters and transcript in Section 2.

Section 1

Section 1 provides a master response for each comment group. The master response addresses the general theme of the comment group. Some comments were not able to be allocated to a comment group. These comments are addressed in Section 3 with individual responses.

Section 2

Section 2 is a Comment Log, which lists the names of individuals, agencies, and organizations that submitted written and verbal comments. Copies of all public comment letters received during the public comment period are also included in Section 2, as well as the transcript of the public hearing held on August 5, 2009.

Section 3

Section 3 contains individual responses to each comment. As stated, individual substantive comments within the comment letters and the public hearing transcript have been bracketed and

numbered. Individual responses are provided for each bracketed comment number. Where appropriate, comment responses refer to other individual responses or to master responses.

The EIS has been modified where appropriate in response to comments, and the nature and the location of the EIS modification identified in the response.

1.1 NEPA PROCEDURAL ISSUES

1.1.1 General EIS Issues

Summary of Comments: The DEIS contained deficiencies, discrepancies, omissions, suspect methodology, false and misleading statements, confusing and possibly purposely deceitful language, and incomplete sections. The DEIS does not present a thorough analysis with unbiased information, contains inaccurate information, and fails to represent the true nature of the environmental effects of the project.

Response: This public comment report contains responses to comments that refer to a specific concern. One of the primary purposes of the NEPA process is to improve the quality of the EIS using the response-to-comment process. General comments regarding the quality of analysis within the DEIS are noted and addressed by responding to specific topical comments.

1.1.2 Extension of the Comment Period

Summary of Comments: The BIA received numerous requests for an extension of the original comment period. Given the length and complexity of the DEIS and alleged deficiencies within the DEIS, the comment period should be extended to allow for adequate review of the DEIS and the submission of comments.

Response: Pursuant to Section 1506.10 of the Council of Environmental Quality's Regulations for Implementing NEPA, the lead agency (in this case, BIA) shall provide a minimum of 45 days for comment on draft environmental effect statements. The Notice of Availability for the DEIS provided a 75-day public comment period, thereby granting a 30-day extension to the typical 45-day public comment period. The comment period started July 2, 2009 and ended September 15, 2009. Pursuant to Section 1506.10(d), failure to file timely comments shall not be a sufficient reason for extending prescribed periods.

1.1.3 Scoping

Summary of Comments a: Copies of the public letters received by the BIA during the public scoping period should not have been sent to the Tribe.

Response a: The term "scoping" refers to the formal public comment and involvement period, which determines the range of issues and alternatives to be assessed during the environmental review process (CEQ Regulations for implementing NEPA, §1501.7). The Notice of Intent (NOI) published in the Federal Register on December 14, 2007, in soliciting public comment on the proposed project, stated the following: "Before including your address, phone number, e-mail address or other personal identifying information, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so." Comments submitted during the scoping period – as well as those comments on the DEIS submitted during the public comment period – are a matter of public record. When requested by the commenter, personal identifying information in a comment was redacted prior to inclusion of the comment in the Scoping Report.

Summary of Comments b: The verbal comments submitted at the January 8, 2008 Public Scoping Meeting were not recorded.

Response b: The Public Scoping Meeting minutes were included as Appendix F of the Scoping Report.

1.1.4 Cooperating Agency

Summary of Comments: The BIA has not consulted sufficiently with local and state agencies. In particular, the BIA has failed to adequately address the City of San Jacinto's (City) input as a Cooperating Agency.

Response: As part of the scoping process, the BIA may request that another agency having jurisdiction by law, or having special expertise with respect to anticipated environmental issues, be a "Cooperating Agency". Cooperating agencies participate in the scoping process and, on BIA's request, may develop information to be included in the EIS.

On December 12, 2007, BIA sent out Cooperating Agency letters to the following agencies: Riverside County, U.S. Environmental Protection Agency (EPA), the National Indian Gaming Commission (NIGC), City of San Jacinto (City), USFWS, and the California Department of Transportation (Caltrans). The City and EPA agreed to participate as Cooperating Agencies. Cooperating Agencies were issued a copy of the Administrative EIS, and both the City and EPA subsequently submitted comments to the BIA. These comments were reviewed and taken into consideration in the DEIS. In addition, throughout the 75-day public comment period, occurring July 2, 2009 through September 15, 2009, Cooperating Agencies were afforded another opportunity to comment on the DEIS.

In its verbal comments submitted at the August 5, 2009 public hearing, the City requested a meeting with the BIA. In response, the BIA, its consultants, and the Tribe met with the City on December 2, 2009, to afford the City the opportunity to clarify its previously submitted comments. In addition, the meeting set a framework for future technical meetings. Technical meetings to discuss socioeconomic and fiscal effects, public safety, and traffic issues were held on the following dates:

- Socioeconomic and Fiscal Effects: January 21, 2010
- Public Safety Effects: January 28, 2010
- Traffic Effects: March 3, 2010

The EIS considers the input provided by the City during these meetings.

1.2 NON-NEPA ISSUES

1.2.1 Expressions of Opinion

Summary of Comments: Some comments received were expressions of opinion either for or against the Proposed Action and Alternatives. Two sets of signatures were received petitioning against the project. A collection of 381 signatures were presented in one petition and 19 signatures in the additional petition. Some commenters asked that the project be put to a vote.

Other comments were made on the perceived relationship between the federal government and the Tribe, the Tribe and the City, and the Tribe and neighboring communities. Some comments alleged that the Tribe was trying to capitalize on abuses committed against the Tribe in the past and stated that BIA must not make environmental decisions based on sensitive issues of the past. Other commenters described their perception of Tribal culture. Some comments described a perceived indifference of the Tribe to

residents' expressed concerns over the environmental effects of current and proposed Tribal operations. Other commenters stated that the Tribe might construct an entirely different project upon approval of the fee-to-trust action.

Some comments expressed support for Tribal economic development and the pursuit of self-sufficiency, condemned alleged racial overtones of some of the public comments submitted, and highlighted the Tribe's positive contributions to the community. One comment stated that the residential communities were developed next to the Reservation without considering the effects to the Tribe.

Response: Expressions of opinion are noted and made part of the administrative record. There are two minimum requirements to warrant a response in the FEIS: 1) the comments must raise a substantive environmental issue, and 2) they must also be related to either the decisions to be made by the Federal agencies based on the FEIS, or to the expected result of these decisions, i.e. the project. Where these expressions of opinion result in specific environmental concerns, other topical categories address these concerns. Responses are not required for comments expressing a general opinion, for or against, the project or project proponent if those comments do not also raise a substantive environmental issue.

1.2.2 Matters beyond the Scope of the EIS

1.2.2.1 Governor Schwarzenegger's Proclamation on Tribal Gaming

Summary of Comments: The Governor's May 2005 Proclamation on Indian Gaming (Proclamation) has implications for the proposed project. The Proclamation states the Governor's opposition to "proposals for the federal acquisition of lands within an urbanized area where lands sought to be acquired in trust are to be used to conduct or facilitate gaming." The proposed project is located in an urbanized area and should be subject to the Proclamation.

Response: The Governor's Proclamation contains a list of the "urbanized areas" to which the Proclamation applies. Neither the City of San Jacinto nor the City of Hemet appear on the list.

1.2.2.2 Indian Gaming Regulatory Act (P.L. 100-497)

Summary of Comments: The Tribal-State Compact stipulates that land used for gaming or ancillary developments to enhance gaming must meet the standards of IGRA. However, the proposed project is off-Reservation and would therefore violate IGRA.

Response: IGRA generally prohibits gaming on lands acquired for Indians in trust by the Secretary of the Interior after the date of enactment, October 17, 1988. There is an exception for lands that were contiguous to Reservation boundaries on that date. The Project Site qualifies for this exception. *See* 25 U.S.C. §2719(a)(1).

1.2.2.3 Other Legal Issues

Summary of Comments: In the recent U.S. Supreme Court ruling of *Carcieri v. Salazar*, the Secretary of the Interior could not approve a fee-to-trust request made by the Narragansett Tribe because the Tribe was not a federally recognized Tribe before the ratification of the Indian Reorganization Act in 1934. Because there exist outstanding questions regarding the decision, all fee-to-trust acquisitions in California should be postponed until these questions are answered.

Response: The ruling of the U.S. Supreme Court in *Carcieri v. Salazar,* 129 S. Ct. 1058 (2009), only applies to Tribes that were not Federally recognized at the time the Indian Reorganization Act was enacted in 1934. The Soboba Tribe has been Federally recognized since 1883 (Federal Register, Vol. 70,

No. 226, p. 71194, November 25, 2005). Therefore, the case is not applicable to this proposed fee-to-trust acquisition.

1.2.2.4 CEQA Compliance

Summary of Comments: The EIS "must mirror" the California Environmental Quality Act (CEQA) when determining the effects of the project on air quality. Furthermore, the DEIS should have discussed the applicability of California law, including CEQA and Native American burials and remains statutes, to the proposed project.

Response: CEQA applies to projects that require discretionary approval by a state or local government agency in California. The proposed project is a federal project, with the Bureau of Indian Affairs as the lead agency, and does not require approval by state or local agencies. Therefore, CEQA's requirements do not apply to the proposed project. See also Sections 2.8 (Air Quality) and 2.10 (Cultural Resources) of this public comment report for a discussion of the applicability of state and local laws to the proposed project.

1.3 PURPOSE AND NEED

Summary of Comments a: The project could be built on existing Reservation land; therefore, there is no need for additional land. The project could be built on land adjacent to the existing casino or on the Oaks Retreat property. Alternatively, the Tribe could elect to build only the hotel next to the existing golf course; hotel patrons and golfers can travel the one mile distance between the golf course and the existing casino location.

Response a: As described in Section 1.3 of the FEIS, the location of the Project Site would allow the Tribe to fully capitalize on the proposed hotel/casino complex's proximity to the Golf Course and Country Club in order to offer a destination resort, which is a primary reason for proposing the project at this location. In real terms, it is not feasible to relocate the Golf Course and Country Club to the existing gaming parcel. There is not enough developable land to create an 18-hole golf course near the existing casino, nor is it economically feasible to construct an additional golf course near the existing casino with the existing golf course remaining in operation. The purpose of the proposed hotel/casino complex is to diversify the economic enterprises of the Tribe and to allow for these enterprises to compliment by creating a business cluster, or economic synergy. An integrated complex offers customers many possible activities in one location. Thus, the proposed development would act as a destination center for tourists and businesses, while also catering to local interests. The intent of the Tribe is to differentiate its hotel, casino, golf course, and related facilities from those of nearby competing tribes.

Section 1.3 of the FEIS has been amended to clarify the purpose and need of the project, as follows:

> **The Project Site was under the historic, time immemorial control and occupation of the Tribe as part of the Tribe's aboriginal territory.** The **restoration of the Project Site to tribal ownership coupled with the transfer of the Project Site into trust will restore tribal control and administration over part of the Tribe's aboriginal territory that is immediately adjacent to the existing Reservation. In addition, the proposed acquisition w****ould**~~purpose of the Proposed Action is to~~ facilitate the Tribe's need for cultural and social preservation, expression and identity, political self-determination, self-sufficiency, and economic growth by providing an ~~adequate~~ **enhanced** Tribal land base and homeland that:
>
> - is subject to Tribal **management, protection and conservation of the land base, and natural and cultural resources through the Tribe's exercise of governmental powers**~~sovereignty~~;

- allows for a diversified and productive economic base **subject to the Tribe's self determined management and conservation priorities that will** ~~to~~ support the Tribe's financial integrity and well-being of its members **by enhancing the total acreage of the land base and increasing the conservation of natural and cultural resources under tribal jurisdiction and sovereignty**;

- assures the preservation of a homeland **that is restricted against future alienation and immune from state and local taxation and regulation** ~~for Tribal members~~;

- ~~is restricted against future alienation and immune from state and local taxation and regulation;~~

- allows the Tribe to avail itself **of the benefits of** Federal laws that apply to lands held in trust status~~;~~ and **the** ~~allows~~ consolidation of Tribal lands.

~~The DOI and BIA administer over 55 million acres of land held in trust by the U.S. for the benefit of Native Americans, Alaska Natives, and Indian tribes.~~ The statutory authority for acquiring lands in trust status for Indian tribes is provided in the Indian Reorganization Act of 1934 (IRA), with regulations under 25 U.S.C. §465 and codified as 25 C.F.R. Part 151. The Land Acquisition Policy presented in 25 C.F.R. Section 151.3 states that, "land may be acquired for a tribe in trust status when that land is within the tribe's reservation boundaries; or is already owned by the tribe; or the Secretary of the Interior determines that land acquisition is necessary to facilitate tribal self-determination, economic development or Indian housing." **Accordingly, the Tribe considers each of the goals stated above to be essential to the preservation of the Tribe's cultural, social, economic and sovereign well being and achieving these goals provides the basis for taking the land into trust pursuant to 25 U.S.C. § 465 and the implementing regulations under 25 C.F.R. Part 151.**

The need for this acquisition in trust of the Project Site is best understood in the unique context of California Indian history. This history shares many of the same generalities of Indian history in other states. However, the history in California differs remarkably in a few significant respects. First, as to population, even the most conservative estimates underscore the extreme pressure applied to California's Indian population since European contact. In the American period, beginning in 1851, the California Indian population was just over 100,000. By 1890, this population had been reduced to 15,293. That is an 85 percent decline in population in only 39 years.

Second, as to land, in 1848 following the signing of the Treaty of Guadalupe Hidalgo the United States acceded to Mexico's claims of dominion over the California Territory. This territory included over 70,000,000 acres of land to which the California Indians held aboriginal title. A combination of historic events including 18 unratified treaties with the United States and the Act of March 3, 1851, 9 Stat. 631, entitled "An Act to Ascertain and Settle the Land Claims in the State of California," this acreage was vastly reduced to only a miniscule amount. In 1937, the Bureau of Indian Affairs was administering only 368,000 acres on behalf of California Indians.

This history placed in the context of the Soboba Band of Luiseño Indians also demonstrates a stark decline in population as a result of external pressures. In 1891, the Mission Indian Commission reported that there were approximately 200 Soboba Indians living on the reservation. By 1950, there were only 116 Soboba Indians living on the Reservation (Soboba Band of Luiseno Indians v. United States, 37 Ind. Cl. Comm. 326, 425 (1976)).

The need for this trust acquisition is also apparent in the present day statistics of California Indian tribal land held in trust by the U.S. in comparison to the lower 48 states as a whole. Of the approximately 55 million acres of land held in trust by the U.S. for the benefit of Indian tribes and individual Indians, the DOI and BIA currently administer only 451,586 acres of land held in trust by the U.S. for the benefit of 102 Federally-recognized Indian tribes and individual Indians in California as reservation lands, rancherias, and public domain allotments.

Summary of Comments b: The Tribe claims that it wants to preserve ancestral lands, but proposes to develop those lands under the Proposed Action.

Response b: The majority of the Project Site is not proposed for development under the Proposed Action and Alternatives. Of the 534.91± acres of the Project Site, the Proposed Action would develop no more than 55± acres, or 10 percent of the Project Site. Alternative 3 would yield the largest development footprint by developing approximately 67± acres, or approximately 13 percent of the entire Project Site. As described in Section 4.5 of the FEIS, the Proposed Action and Alternatives would not have an effect on any known significant archaeological or historical resources. One historical resource is eligible for the National Register of Historic Places (NRHP) due to its significant association with the local manufacturing. However, this facility is not located within the Development Site outlined in the Proposed Action and Alternatives and would, therefore, not be adversely affected.

Summary of Comments c: A Las Vegas-style high-rise hotel/casino is not the appropriate answer to the Tribe's need for economic development. In addition, the Tribe already has sufficient income from its existing economic ventures to meet the needs of its membership.

Response c: The comment is noted and made part of the administrative record. As described in Section 2.1.1 of the FEIS, the tallest proposed structure (the hotel) would not exceed a height of five stories, or 70 feet above grade, and would not tower over the existing landscape. As presented in the public scoping meeting handout, the top three floors of the proposed hotel would be approximately 38 feet above Soboba Road. According to Section 403 of the 2007 California Building Code, a high-rise building is defined as a building of any type of construction or occupancy having floors (as measured from the top of the floor surface) used for human occupancy located more than 75 feet (22,860 mm) above the lowest floor level having building access. Under this definition, the proposed hotel would not qualify as a high-rise building.

Furthermore, under the principle of Tribal sovereignty and self-determination recognized by the U.S. Supreme Court since 1832 and reaffirmed repeatedly by the U.S. Congress, the Tribe is entitled to exercise its sovereignty over reservation lands and choose how best to manage its territory. *See, e.g.*, *Worcester v. Georgia*, 31 U.S. 515, 559 (1832) (Indian tribes "exercise inherent sovereign authority over their members and territories"); Indian Self-Determination Act of 1975 (Public Law 93-638).

Summary of Comments d: There is no evidence that the Project Site is part of the Tribe's ancestral territory; therefore, the Tribe's need to reacquire aboriginal territory as stated in Section 1.3 of the DEIS is not applicable to the proposed fee-to-trust action.

Response d: See Section 3.5.1 of the FEIS and **Section 1.10.1** of this public comment report for a technical discussion of the Tribe's ancestral territory.

Summary of Comments e: The Tribe contends that it needs the Development Site for the Proposed Action because the existing gaming parcel is in a flood zone. However, according to the FEMA Flood Insurance Rate Map, both sites are within the same Flood Zone X.

Response e: The development restrictions posed by the existing flood easement represent one element that contributes to the overall encumbrance to the current gaming parcel. As observed on Figure 3-4 of

the FEIS, Flood Zone X does extend to both the existing gaming parcel and the Project Site. However, the Project Site is not encumbered by the additional restrictions precluding expansion of the current gaming parcel, which include the surrounding land uses, flood easements surrounding the parcel, and land assignments to Tribal members under Tribal law (see Section 2.3.2 of the FEIS). See Section 2.7 of this report for additional information regarding Water Resources and the effects resulting from the presence of Flood Zone X.

Summary of Comments f: Under Alternatives 2 and 3, the casino would not be relocated. Why, then, would the Project Site need to be placed in trust?

Response f: 25 CFR 151 states that the Secretary of the Interior can accept property into federal trust status on behalf on a Tribe. As stated in Section 1.4 of the FEIS, if the BIA determines that a fee-to-trust proposal meets statutory requirements and the benefits of the Proposed Action outweigh the potential negative effects, it will consider approval of the Tribe's application and take the proposed lands into trust for a Tribe. There are additional criteria a fee-to-trust application must meet, such as a Tribe must own the subject property and demonstrate a purpose and need to exercise its sovereign powers over the subject property. In addition to the execution of sovereignty, there are other benefits which a Tribe realizes with trust lands. Some of these benefits include tax exemptions, removal of land use restrictions, and compliance requirements with only federal regulation. See Section 1.4 of the FEIS for additional discussion of 25 CFR Part 151.

1.4 ALTERNATIVES

Summary of Comments a: The DEIS does not assess a reasonable range of alternatives.

Response a: As stated in Section 2.3, "The National Environmental Policy Act requires ~~that~~ agencies to~~all reasonable alternatives be~~ rigorously explore~~d~~ and objectively evaluate~~d~~ all reasonable alternatives, and for alternatives which were eliminated from detailed study,~~and~~ to briefly discuss the reasons for their having been eliminated~~ing alternatives that were not developed in detail~~ (40 CFR 1502.14). As required by NEPA, the range of alternatives considered in detail includes only those alternatives that would fulfill the purpose and need for the Proposed Action described in Section 1.3**"** of the FEIS.

As discussed in Section 2 of the FEIS, there were six total alternatives considered in the DEIS. Each alternative included the fee-to-trust action, expect for Alternative 4 (No Action Alternative). The alternatives are summarized as follows:

1. Proposed Action A - Hotel/Casino Complex, with realignment of Lake Park Drive
2. Proposed Action B – Hotel/Casino Complex, without realignment of Lake Park Drive
3. Alternative 1 – A reduced version of Proposed Action A
4. Alternative 2 – Hotel and Conference Center Facilities
5. Alternative 3 – Commercial Alternative
6. Alternative 4 - No Action Alternative

The BIA NEPA Handbook (59 IAM 3, §1502.14) states that the "Differences in the proposed action, such as size or location, are appropriate alternatives to consider, but by themselves are not sufficient to meet CEQ regulations. Viable alternatives are other possible means to meet the purpose and need, such as a sports complex instead of a casino to meet the need for tribal income." With the same composition and

magnitude of facilities, Proposed Action A and Proposed Action B were too similar to be considered distinct alternatives. The greatest difference between Proposed Action A and Proposed Action B was the realignment of Lake Park Drive. Alternatives 1-3 were included in the DEIS to present a reasonable range of alternatives to accomplish the purpose and need. Alternative 4 is a mandatory alternative under NEPA.

Section 2.3 has been amended to clarify the alternatives considered but not analyzed, as follows: "Two alternatives were considered but not analyzed in detail for this ~~DEIS~~FEIS. One of the alternatives is a portion of land in an incorporated area of Riverside County that will be deeded in fee to ~~was placed into trust for~~ the Tribe ~~upon passage of~~when the ~~Water Rights~~Soboba Settlement Agreement becomes fully effective; the other alternative ~~was~~ is adjacent to the site of the existing casino. The information below summarizes ~~this~~ these two alternatives and ~~presents~~ briefly discusses the reasons for ~~its~~ their elimination from further review."

Section 2.3 goes on to summarize the two additional alternatives considered for analysis and briefly discusses the reasons for their elimination from further review. As described therein, neither alternative would fulfill the purpose and need for the Proposed Action. Section 2.3.1 and Section 2.3.2 have been amended to provide additional detail and context regarding these two alternatives.

Summary of Comments b: There should be enough developable land on the existing 6,865 acre Reservation to accommodate the project.

Response b: Please see **Section 1.3** of this public comment report for a discussion of the Purpose and Need for the Proposed Action.

Summary of Comments c: Esplanade Avenue should be extended to the Reservation.

Response c: An alternative access point to the Reservation from Esplanade Avenue would require the building of a bridge across the San Jacinto River. While this alternative access would help alleviate traffic from Lake Park Drive, the access route would run parallel to Lake Park Drive and traffic would continue to utilize Ramona Expressway/Mountain Avenue which would not create a significant reduction of traffic except for Lake Park Drive between Ramona Expressway and Soboba Road and Ramona Expressway/Mountain Avenue between Lake Park Drive/Main Street and Esplanade Avenue. It would also create additional traffic effects along Soboba Road from Lake Park Drive to Esplanade Avenue where the alternative access would then be created to cross the San Jacinto River and intersect with Ramona Expressway/Mountain Avenue at Esplanade Avenue.

Summary of Comments d: The Proposed Action and Alternatives should be built on the existing gaming parcel, or land should be acquired adjacent to the parcel for that purpose.

Response d: Please see **Section 1.3** of this public comment report for a discussion of the Purpose and Need for the Proposed Action.

Summary of Comments e: The Proposed Action and Alternatives should be built away from residential areas. Instead, an alternative compatible with the City of San Jacinto General Plan should have been considered.

Response e: One of the purposes of the Proposed Action is to diversify the economic enterprises of the Tribe and to allow for these enterprises to compliment by creating a business cluster, or economic synergy. The Tribe has determined that this commercial development of the Project Site is necessary to fulfill the stated needs of the Tribe. Please see **Section 1.3** for discussion of the Purpose and Need for the

Proposed Action. See also **Section 1.12.2** of this public comment report for a response to comments regarding project consistency with the City of San Jacinto General Plan.

Summary of Comments f: There is a risk that the Tribe would construct an entirely different project upon approval of the fee-to-trust action.

Response f: Speculation about alternative developments falls outside the scope of the NEPA process. See **Section 1.2** of this public comment report for additional information on non-NEPA topics.

Summary of Comments g: Some details of the Proposed Action and Alternatives need to be clarified, including the location of the proposed wastewater treatment plant facility. The Scoping Report states that it would be on the existing Reservation; however, a DEIS map shows the facility is located on a portion of the Project Site.

***Response g*:** The majority of the wastewater treatment facilities (i.e. reactor, percolation ponds) would be located on the existing Reservation (see Figure 2-4 of the EIS). Pipes would need to be installed along Soboba Road to tie-in the proposed facilities. The proposed facilities would be tied into the on-Reservation wastewater treatment plant during the construction phase, when the Development Site is highly disturbed.

Summary of Comments h: Some details of the Proposed Action and Alternatives need to be clarified, including the exact heights of buildings and structures above grade, using more detailed site plans.

Response h: The site plans included in the FEIS are considered conceptual, but accurate enough to perform effects analysis. The size and height of the proposed facilities, as presented in Section 2.0 of the FEIS, are figures used in this environmental analysis.

Summary of Comments i: The location of the second fire station under the Proposed Action and Alternatives needs to be clarified.

Response i: As described in the Draft Operations Plan for Soboba Fire Department (Appendix G of the FEIS) and Section 2.1.1 of the FEIS: The Tribal fire department headquarters would be developed on Soboba Road, towards the southeastern corner of the Project Site, during construction of the hotel/casino complex. The other Tribal fire station would be located near the intersection of Soboba Road and Castile Canyon Road on the existing Reservation.

Summary of Comments j: Is the wastewater treatment plant proposed under Alternative 3?

Response j: At the time of construction, the Tribe will either enter into a contract with Eastern Municipal Water District (EMWD) or construct an on-Reservation wastewater treatment plant (WWTP). This either-or scenario applies to all Alternatives, save for Alternative 4 (No Action Alternative). Additional detail regarding wastewater service options has been added to Section 2.1.1 of the FEIS, as follows:

> **WASTEWATER TREATMENT AND DISPOSAL**
>
> **At the time of construction, the Tribe will either enter into a contract with EMWD for wastewater service or construct an on-Reservation wastewater treatment plant. The Golf Course and Country Club will continue to utilize EMWD services regardless of which wastewater option is pursued. The on-Reservation WWTP is considered a separate but related project to the Proposed Action and Alternatives. However, for purposes of this environmental review, both options are examined. The following describes the operations of each option.**

EMWD SERVICE OPTION

Under this option, wastewater service for the proposed developments will be provided by EMWD. The facilities included in Proposed Action A are expected to generate an average daily flow of 313,000 GPD. EMWD has provided a will-serve letter and confirmed that it has the capacity and capability to service the proposed developments (Appendix E). Wastewater generated by the proposed developments would be processed by EMWD's Hemet/San Jacinto Regional Water Reclamation Facility (RWRF). The Hemet/San Jacinto RWRF currently has a capacity of 11 million GPD, but this facility was awarded approximately $112.6 million to expand facility capacity to 14 million GPD by 2014 (Wesson 2010).[1] Wastewater generated at the proposed facilities will undergo secondary and tertiary treatment and will be sold by EMWD as recycled water. This water will be to the standards of California Title 22 and available for multiple uses, such as irrigation, but not for direct human consumption.

The necessary infrastructure is in place on the Project Site to service the proposed developments. Figure 2-3 provides the location of EMWD pipes in the area of Project Site. As observed, existing EMWD infrastructure traverses the Development Site. The necessary facilities, piping, and connections would be installed during construction, when the Development Site is highly disturbed.

ON-RESERVATION WWTP

Under this option, ~~The~~ the Tribe would construct an on-Reservation tertiary sequencing batch reactor (SBR) ~~wastewater treatment plant (~~WWTP~~)~~ capable of handling 1.2 million gallons per day (GPD). This facility would service the entire Reservation, as well as the facilities under the Proposed Action and Alternatives. Total projected wastewater generation for the year 2030 for Proposed Action A and the Reservation was calculated to be 545,323 GPD. The proposed WWTP would meet California Title 22 requirements for reuse of treated effluent. System reuse of the effluent could include agricultural irrigation, landscape irrigation, filling of decorative water features, surface cleaning (i.e. parking lots), toilet flushing, and fire control. Wastewater would be delivered to the WWTP by a force main from a central plant located on the Project Site and on-Reservation (see **Figure 2-~~3~~4**).

Summary of Comments k: Some details of the Proposed Action and Alternatives need to be clarified, including whether the hotel/casino proposed under Alternative 1 would be lower in height than under the Proposed Action.

Response k: Alternative 1 is a 20 percent reduction of Proposed Action A. The hotel is the tallest structure in both alternatives. Proposed Action A includes the development of a 300 room hotel, while Alternative 1 proposes a 240 room hotel. To perform a conservative effects analysis, Alternative 1 was assumed to be the same height (70 feet above grade) as the Proposed Action.

Summary of Comments l: Past actions of the Tribe, unrelated to the Horseshoe Grande Project, were breaches of the Tribal-State Compact (see Appendix I of the FEIS). Language within the Compact would permit the Tribe to operate two casinos at once, and the Tribe might decide to keep the existing casino in operation once the new casino is fully operational. The Tribal-State Compact should be re-negotiated prior to a fee-to-trust decision. In addition, the Tribal Environmental Ordinance (Ordinance No. GC00-8) is inadequate, which brings into question the Tribe's compliance with the Tribal-State Compact.

[1] The Press Enterprise, "The Sewage Treatment Plant Serving San Jacinto Valley Will Be Upgraded," July 1, 2010. This article is available for viewing online at: http://www.pe.com/localnews/hemet/stories/PE_News_Local_D_eexpand02.20723d1.html

Response l: Neither the State of California nor the National Indian Gaming Commission has ever found the Tribe to be in breach of the Tribal-State Compact. The Compact permits the Tribe to operate a total of 2,000 gaming devices (Compact § 4.3.2.2) in no more than two gaming facilities (Compact § 4.2). Those limitations, as well as the other provisions of the Compact, remain acceptable to the Tribe, making renegotiation of the Compact unnecessary. The Compact requires the Tribe in adopting an environmental protection ordinance to make a good faith effort to incorporate the policies and purposes of the National Environmental Policy Act and the California Environmental Quality Act (Compact § 10.8.1), an obligation which may be enforced against the Tribe by the State. The Tribe adopted such an ordinance in 2000 (Ordinance No. GC00-8), and the State has never questioned its sufficiency under the Compact.

1.5 GENERAL ENVIRONMENTAL CONCERNS

Summary of Comments: The project would have significant detrimental effects to the environment and nearby residential communities. Some comments list potential effects categories (e.g., traffic, noise, air quality) and do not describe the specific effects to environmental resources.

Response: General comments stating that the project would be beneficial or detrimental to the environment are noted and made part of the administrative record. Commenters listing various categories of environmental effects can refer to the specific resource categories that follow in this public comment report for a summary of more specific comments and responses concerning each environmental resource.

1.6 LAND RESOURCES

Summary of Comments a: The proposed construction is in an active fault area where facilities would be subject to fault rupture, landslide/debris flow or settlement. A high-rise building would be especially vulnerable to seismic activity. As summarized, the DEIS fails to address the fact that the Project Site is located within a designated California Alquist-Priolo Earthquake Fault Zone and as such must be evaluated in accordance with the Alquist-Priolo Earthquake Fault Zoning Act. A study must be performed and endorsed by a California licensed geologist and include hazard analysis and mitigation. What mitigation measures are proposed to provide reasonable safety in the event of a major earthquake?

Response a: As described in Section 2.1.1 of the FEIS, the tallest proposed structure (the hotel) would not exceed a height of five stories, or 70 feet above grade, and would not tower over the existing landscape. As presented in the public scoping meeting handout, the top three floors of the proposed hotel would be approximately 38 feet above Soboba Road. According to Section 403 of the 2007 California Building Code, a high-rise building is defined as a building of any type of construction or occupancy having floors (as measured from the top of the floor surface) used for human occupancy located more than 75 feet (22,860 mm) above the lowest floor level having building access. Under this definition, the proposed hotel would not qualify as a high-rise building.

Nevertheless, a building of any height could be affected in the event of seismic activity. A fault investigation and geotechnical study (Appendix L of the FEIS) was conducted by Mr. Greg Chandra of LandMark Geotechnical Engineers and Geologists, who is a registered and licensed engineer with the State of California. The exploration consisted of on-site trench excavations and from available Riverside County GIS data. A map was prepared showing the identified faults and the setback distances in accordance with the Alquist-Priolo Earthquake Fault Zoning Act. With the exception of the parking garage proposed in the northern portion of the property, all structures are located outside of these setback distances in accordance with the Alquist-Priolo Earthquake Fault Zoning Act for human occupancy structures. However, the parking garage is not designed for human occupancy, so the current placement of the parking garage within the designated setback is still in accordance with the Alquist-Priolo Earthquake Fault Zoning Act.

Summary of Comments b: Is the *Preliminary Fault Hazard Evaluation Report* completed by LandMark for the proposed construction adequate? The project should be investigated and analyzed for all possible geologic hazards including slope stability, rock fall hazards, landslide hazards, surface fault rupture, fissures, liquefaction potential, collapsible and/or expansive soils, subsidence, wind and water erosion, debris flows, and ground-shaking potential. Mitigation measures would need to be described where hazards are identified. The geotechnical report and all other geotechnical materials should be appended to the FEIS for public review.

Response b: A comprehensive geotechnical report was prepared by a California licensed engineer (LandMark). The report addresses potential Project Site hazards such as ground-shaking, surface rupture, liquefaction, landslides, volcanic hazards, tsunamis, sieches, flooding, and expansive soil. The report presents recommendations where hazards are identified; these recommendations have been incorporated as mitigation measures within the FEIS in Section 5.1. The LandMark report is appended to the FEIS as Appendix L. Additional detail that summarizes the LandMark report has been added to Section 3.1.1 to better characterize the geologic setting of the Project Site, as follows:

> **The San Jacinto Valley is incorporated within the Perris Plain of southern California. The Perris Plain is a major topographic feature between the San Jacinto (northeast) and Elsinore (southwest) fault zones. The plain is an undulating surface eroded on primarily plutonic igneous rocks and lies 7,000 feet below the summits of the San Jacinto Mountains. The San Jacinto Mountains are located to the northeast and are part of the Peninsular Ranges. The Peninsular Ranges are a northwest-southeast orientated complex of blocks separated by similarly trending faults. They extend 125 miles (200 km) from the Transverse Ranges and the Los Angeles Basin south to the Mexican border and beyond another 775 miles (1,250 km) to the tip of Baja California, Mexico. Faults dominate the structure of the Peninsular Ranges. Major faults are the San Jacinto Fault and related branches within the San Jacinto Fault Zone. The Peninsular Ranges contain extensive pre-Cretaceous igneous rocks associated with the Nevadan plutonism. Recent evidence of tectonic activity includes epicenter swarms, earthquakes (San Jacinto 1918 and Borrego Valley 1968), and alignment of hot springs (Appendix L). The surrounding geology includes the foothills of the San Jacinto Mountains to the north, east, and south and the San Jacinto Fault Zone and river floodplain are to the west.**

Section 4.1.1 has also been amended to reflect the results of the geotechnical investigation, as follows:

1.6.1.1 Geology

In 2007, Landmark Geo-Engineers and Geologists explored the subsurface of the Development Site using two electric cone penetrometer soundings to approximate depths of 50 feet below existing ground surface. The location of these soundings can be found on Plate 2 of **Appendix ~~G~~L**. The findings from the preliminary geotechnical study are summarized throughout this section and can be found in detail in **Appendix ~~G~~L**.

In 2010, ~~Landmark Geo-Engineers and Geologists performed~~ additional tasks were performed related to the geotechnical conditions at the Project Site. Tasks included the following:

- Field exploration and in-situ testing of Development Site soils;
- Laboratory testing for physical and/or chemical properties of Project Site soils; and
- Engineering analysis, evaluation, and recommendations.

The data and information gained from these investigations will be used to develop design criteria prior to the construction phase of ~~the Project~~Proposed Action A.

As stated in **Section 3.1.2**, alluvium (Q_{al}) is present underlying the Development Site. Alluvium consists of unconsolidated stream, river channel, and alluvium fan deposits. More specifically, the Development Site is underlain by interbedded sands, silts, and clays with near surface silty sands, sandy silts, and clayey silts. The near surface soils are expected to have a low shrink-swell expansion rate. The subsurface soils are medium dense to very dense in nature. Analysis performed by LandMark concluded that the soils of Development Site are classified Site Class D or a stiff soil profile under Chapter 16 of the 2007 California Building Code (2006 International Building Code) and generally suitable for construction of the proposed developments.

Groundwater was neither ~~not~~ encountered in the borings during the time of exploration (March – April, 2007) nor in the ten borings advanced in January 2010. Historic groundwater records in the vicinity of the Project Site indicate that groundwater has fluctuated between 128 and 193 feet below the ground surface within the last 14 years according to the Western Municipal Water District and the San Bernardino Valley Municipal District cooperative well measure program records. Therefore, liquefaction is unlikely to be a potential hazard at the site since the groundwater is deeper than fifty feet, the maximum depth that liquefaction is known to occur.

~~LandMark also evaluated the~~The geotechnical investigation~~ed~~ evaluated the potential for other hazards including landslides, volcanic hazards, tsunamis, sieches, and flooding. ~~Landslide hazards were determined to be low to moderate, volcanic hazards are considered low, and the threat of tsunamis, sieches, and flooding is unlikely.~~ Landslides are shown on the A-P earthquake fault zone map (Plate A-5) in the vicinity of the Project Site and there is the possibility of rockfalls from loose rocks on the San Jacinto Mountains (located across Soboba Road to the east of the Project Site) during strong seismic events or heavy rains. No ancient landslides, within the immediate vicinity of the Project Site, are shown on the California Geologic Map, Santa Ana Sheet (see Regional Geologic Map Plate A-3) and no indications of landslides were observed during the site investigation. Therefore, the hazard of landsliding occurring at the Project Site is considered to be low to moderate.

The Project Site is not located in proximity to any known volcanically active area and the risk of volcanic hazards is considered low.

The Project Site does not lie near any large bodies of water, so the threat of tsunami, sieches, or other seismically-induced flooding is unlikely. The Project Site is located within a FEMA 500-year flood zone a (0.2 percent annual chance flood) and is located to the north and east of a FEMA 100-year flood zone (1 percent annual chance flood) located within and in the vicinity of the San Jacinto River Channel (**Appendix L**).

~~Findings regarding potential hazards are summarized in the study performed by LandMark (see **Appendix G**). Section 4 of that report provides recommendations for construction design and for general earthwork operations to be conducted as part of overall Project Site construction~~Mitigation measures are incorporated in **Section 5.9.2** ~~. Specifically, recommendations are described f~~for ~~Project~~Development Site preparation (clearing and grubbing, major and minor building pad preparation, fill slope bench/key preparation, trench backfill, moisture control and drainage, observation and density testing, auxiliary structures foundation preparation), foundations and settlements, deep foundations, slabs-on-grade, concrete mixes and corrosivity, excavations, lateral earth pressures, seismic design, and pavements).

Summary of Comments c: Mitigation measures regarding the safety of patrons in the parking garage and evacuation plans for the hotel need to be described.

Response c: All structures will be constructed under the California Building Code (CBC) seismic parameters based on the Maximum Considered Earthquake (MCE). These parameters are summarized in the geotechnical Report (LandMark). Evacuation plans will be developed following final design and construction of all structures including the parking garage.

Summary of Comments d: Soboba Road frequently washes out during rains. Soils present on the property have eroded into 'mud rivers' in the past.

Response d: Appropriate engineered storm drain infrastructure would be designed and incorporated into all road widening and improvement projects as part of the proposed construction. As described in Section 2.0 of the FEIS (Site Drainage subsection), across the Project Site, the installation of storm drain facilities, including improved channels/culverts, detention basins, and the improvement of Soboba Road would provide a system to control storm water flows, thereby reducing the potential for surface water flooding and provide a means to safely convey such flows through the Project Site for appropriate discharge. Inlets would be placed at appropriate intervals to capture runoff, and convey it to the grassy swales surrounding the Project Site. The grassy swales would accommodate overland drainage to allow the Development Site to drain under overflow conditions. This system would provide adequate storage for a 10-year storm event.

Summary of Comments e: The project fails to analyze the potential for significant paleontological resources and fails to propose appropriate mitigation measures.

Response e: Preliminary soil borings advanced to 50 feet below the ground surface (bgs) did not encounter bedrock. Potential paleontological resources would only be expected at depths where bedrock is encountered. Soil grading and earthwork operations are not planned at depths where bedrock is present; therefore, potential paleontological resources will not be disturbed.

Summary of Comments f: The multitude of issues regarding soil, groundwater, EPA standards, and seismic issues should all be specifically detailed in the FEIS with judicially enforceable mitigation measures already in place and described in the FEIS.

Response f: Comment acknowledged. A comprehensive geotechnical study (see Section 3.1 and Appendix L of the EIS) was performed by LandMark regarding potential seismic hazards present at the Project Site. The work included advancement of soil borings and evaluation of geotechnical conditions and seismic hazards. The report includes recommendations regarding the seismic hazards and soil conditions present at the Project Site, which have been incorporated as mitigation measures within the FEIS in Section 5.1. **Section 1.18** of this public comment report discusses the enforceability of mitigation measures.

1.7 WATER RESOURCES

1.7.1 Impacts to Flooding and Runoff

1.7.1.1 Floodplain Status

Summary of Comments: As delineated on Panel No. 06065C 1490G and 1495G effective August 28, 2008 of the Flood Insurance Rate Maps (FIRM), the Project Site is located within the Zone X-shaded floodplain limits. However, Figure 3-4 of the DEIS depicts the Project Site within Zone X. Furthermore,

the DEIS did not discuss the Hemet Dam inundation area or whether the levees in the Project Area would survive inundation in the event of a dam failure.[2]

Response: Figure 3-4 of the DEIS referenced the then current FIRM (Community-Panel Number 065056 0005 D, revised May 17, 1990) and the Project boundaries. This figure has been updated using the new FIRM that was revised in August 2008 (Community-Panel Number 06065C- 1490G and -1495G). The Project Site is partially within the shaded X zone. This delineation reflects an area that is protected from the 1 percent chance flood event (100-year flood event) by levees. The FIRM also states that this levee is a "Provisionally Accepted Levee". A Provisionally Accepted Levee is a levee that has not been certified by the Federal Emergency Management Agency as being able to withstand flood forces. Under this condition, the area behind the levee is mapped as if the levee did not exist. Once the levee is accepted by FEMA, the area behind the levee will be considered to be protected against the 100-year flood. The status of the levee certification is pending.

The text in Section 3.2.1 of the FEIS has been amended to reflect that the Project is partially in a shaded X zone and not an X zone.

> The improvements contemplated as part of the Proposed Action are located within **a shaded** Zone X on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), **Community-Panel Number 06065C- 1490G and -1495G~~Community-Panel Number 065056 0005 D~~,** revised **August~~May 1~~28,~~7,~~ 2008~~1990~~** (**Figure 3-4**). The relevant part of the **shaded** Zone X definition is "areas protected by levees from 100-year flood". The northwest portion of the Project Site, located within the active channel of the San Jacinto River and not planned for development, is identified as Zone A on the same Community-Panel Map. Zone A is defined as "Areas of 100-year flood; base flood elevations and flood hazard factors not determined." This northwest area is also within the Lake Hemet Dam inundation zone (City of Hemet General Plan, 1992).

During a dam failure the levees will withstand flows up to the 100-year flow as indicated on the FIRM. The northwest portion of the property would still be subject to inundation, as explained in Section 3.2.1 of the FEIS.

Furthermore, Figure 3-5 and detail has been added to Section 3.2.1 to clarify the location and purpose of the flowage and flood easements present of the Project Site, as follows:

> **A flood easement, adopted in 1964, is present on a portion of the Project Site and held by RCFCWCD. The easement was prepared prior to development in the area and before the building of the levee. Figure 3-5 shows the easement as it applies to the Project Site. The conditions of the Project Site have changed since the easement was granted, including the development of the levee along the river to protect the area from a 100-year flood.**

1.7.1.2 Drainage

Summary of Comments: The locations of the Proposed Drainage Facilities would be in conflict with the layout of the proposed building structures. Drainage patterns and runoff from the proposed Development Site need to be clarified. In addition, erosion is a concern due to the location of detention basins outlets, which could potentially effect the existing levee along the eastern bank of the San Jacinto River.

[2] The inundation area represents the potential flooded area that would result from a dam failure of Hemet Dam.

Response: Figures 2-5, 2-8, 2-10, 2-12, and 2-14 of the FEIS has been revised to clearly show the locations of the proposed drainage facilities. The text descriptions of the drainage facilities within each relevant section of the FEIS have also been changed. These facilities have been slightly adjusted for each Alternative to minimize the potential effect to sensitive species and habitat. It should be noted that the drainage plan is schematic and a more detailed design process will be required. The results of the preliminary drainage study (Appendix K to the FEIS) are appropriate for this level of study/design.

The final design of detention basins will acknowledge the levee and incorporate avoidance of effects into the design. This includes a soil buffer between the levee and basin to avoid seepage from the basin into the levee, and bank stabilization measures in the basin nearest to the levee. The outlet of drainage pipes will be designed with outlet protection to avoid conditions that would result in scour or deposition. The outlets will be located such that they are away from facilities and would not effect existing structures such as levees or buildings.

For clarification, Section 4.2.1 has been amended to account for the drainage facilities, as follows:

4.2.1 Drainage

The developments proposed under Proposed Action A would change up to 55 acres of ~~the~~ existing natural vegetation in the watershed and replace it with a designed landscape and impervious surfaces including building structures, parking lots, and roadways. The changes in runoff ~~could~~ resulting from the increase in impervious surface ~~in a variety of effects,~~ includinge increased stream volumes and velocities, increased peak discharges with a shortened time to peak flows, and lessened groundwater contributions during non-precipitation periods. Without mitigation ~~T~~these effects ~~could harm~~ ~~impact~~may effect downstream properties and subject new structures to potential flooding.

The Project Site is currently affected by runoff from a number of unnamed drainage courses northeast of Soboba Road, as described in **Section 3.2.1.** These drainage areas are tributary to the Project Site, and currently affect the use of the Golf Course and the movement of vehicles through the area. A preliminary drainage study (Preliminary Drainage Study) has been completed by Engineering Resources of Southern California, Inc. (ERSC, 2008) for the Project Site in order to ascertain the affects of off-site tributary areas on the proposed developments and to determine potential on-site and off-site effects from the proposed developments. The report, which is contained in **Appendix ~~P~~K**, is summarized below.

The Preliminary Drainage Study evaluated three (3) separate drainage issues:

- First, determine the location and amount of off-site flows tributary to the Project Site. These flows originate east of Soboba Road, as displayed in **Figure 3-5**, and have been identified by drainage sub-areas to ascertain the location and volume of existing stormwater flows.

- Second, determine the additional increase in storm water runoff generated by new development. RCFCWCD ~~dictates~~requires that the developed runoff peak flow cannot exceed the existing peak flow. ~~This element is necessary to ensure that the proposed facilities can convey the combined volume represented by existing and proposed storm water flows.~~ In this instance, onsite flows for the Development Site would be collected, conveyed, and discharged to the golf course ponds to attenuate storm water flows so that peak hour volume is temporarily stored or retained and subsequently discharged further downstream in a controlled manner.~~a storm water basin has been proposed to capture an~~

~~amount of water equal to the incremental increase in volume represented by the additional runoff generated by the proposed project. The water in the basin is to be discharged into the drainage system after the peak storm water flows have subsided, thereby, eliminating the need for increased pipe sizes~~

- Third, develop ~~design~~ a conceptual drainage plan that will capture existing off-site storm water flows along Soboba Road, along with increased flows from the Development Site~~proposed project~~, and direct them safely through the site ~~for~~or discharge into the ~~G~~golf ~~C~~course ponds~~lake~~. This conceptual design is portrayed within **Appendix ~~P~~ K** in addition to proposed facilities as shown in **Figure 2-5**.~~and portions of the plan are summarized below~~

The R~~iverside C~~ounty ~~F~~lood ~~C~~ontrol and ~~W~~ater ~~C~~onservation ~~D~~istrict requires hydrologic conditions ~~storms~~ to be studied using 1-hour, 3-hour, 6-hour, and 24-hour duration events for the 2-year, 5-year, and 10-year period~~return~~ frequencies. Detention basins and basin outlet structures would be ~~are~~ sized to ~~sizing would~~ ensure that none of the above storm events have a higher peak discharge in the post-development condition than in the pre-development condition. In addition, basins and outlet structures must be capable of passing the 100-year storm without damage to the proposed developments or the structure. **Tables 4-1(A)** through **4-1(C)** below provide the results of the hydrologic~~al~~ modeling ~~analysis~~ for the existing and proposed conditions of the Project Site during a 1-Hour, 3-Hour, 6-Hour, and 24-Hour storms, under a 2-Year, 10-Year and 100-Year return period storm events. **Appendix ~~P~~ K** provides greater details ~~on the~~and calculations for the results presented in the following tables.

The Preliminary Drainage Study identified the need for a number of storm drain facilities, including improved channels and ~~/~~culverts, detention basins, and the improvement of drainage along Soboba Road (see **Sections 2.1.1** and **3.2.1**, and **Figures 2-5** and **3-8**). In addition to the use of the golf course ponds, ~~D~~detention basins are primarily proposed to the west of the Development Site and golf course. ~~south of Lake Park Drive around the existing mobile home park, located southwest of the intersection of Lake Park Drive and Soboba Road, and near the planned commercial/retail area.~~ The purpose of the golf course ponds and basins is to ~~provide water quality treatment of storm runoff. The basins will also~~ attenuate storm water flows so that peak hour volume is temporarily stored or retained and subsequently discharged further downstream in a controlled manner. In addition, the ponds and basins will provide water quality treatment of storm runoff. The basins also allow runoff from smaller rainfall events to continue to infiltrate and recharge the groundwater basin. Proposed culverts and pipes would be ~~are~~ designed to convey water through the Project Site for appropriate discharge in accordance with ~~Riverside County~~Riverside County ~~Water Quality Management Plans (WQMP)~~drainage manual. Improvements to Soboba Road include the installation of ~~a~~ culverts/channels ~~on the east side of the roadway~~ and the possible need to curb the median area. The drainage system would collect storm water flows from some of the drainage areas, referred to as Sub-basins in the Preliminary Drainage Study, in channels on the east side of the roadway, where it will be conveyed by culverts to prevent the overtopping of Soboba Road. The culverts would connect to a storm drainage pipe network that would safely pass the flows through the Project Site for discharge to an extended detention basin located to the west of the golf course.

~~As mandated by the WQMP, t~~~~These features must be sized to address peak volume conditions during a 2-Year storm event (see **Table 4-1(a)** above).~~ The projected flood volume during the 2-year, 24-hour storm event is 2.0 Ac-Ft. The incremental increase in volume due to developed conditions is 1.6 Ac-Ft and 2.0 Ac-Ft during the 10-year and 100-year storm, respectively, as displayed in the **Tables 4-1** above. Based on the results noted above it is expected that the golf

course ponds will provided the adequate storage to retain the incremental increase in volume generated by the proposed development as compared to the undeveloped condition, for compliance with the Riverside County drainage manual. ~~The volume provided by the proposed detention basin is 4.0 acre feet under Proposed Action A, and therefore is adequately sized to retain the incremental increase in storm water runoff and is in compliance with WQMPthe drainage manual.~~ Changes to the location of Lake Park Drive or other minor land use modifications would not affect the intent of the drainage system as proposed, although the location and size of the facilities may need to be ~~m~~modified.

~~The drainage system would collect storm water flows from some of the drainage areas, referred to as Sub-basins in the Preliminary Drainage Study, in channels on the east side of the roadway, where it will be conveyed to culverts to prevent the overtopping of Soboba Road. The culverts would allow the water to be conveyed under Soboba Road into a concrete lined channel, which will run along the west side of Soboba Road and will continue in a westerly direction south of Lake Park Drive.~~

The installation of the proposed detention basins, channels, roadway improvements, ~~and~~ culverts, and storm drainage pipe networks would provide a system to control storm water flows, thereby reducing the potential for surface water flooding and providing a means to safely convey such flows through the Project Site for appropriate discharge. Therefore, the incorporation of the proposed developments would reduce the potential effects to less than significant for structures proposed as part of Proposed Action A, along with downstream and off-site drainage systems.

1.7.1.3 Runoff Volume

Summary of Comments: The volume and timing of runoff from the Project Site could affect the San Jacinto River and the underlying groundwater. The proposed impervious surfaces and site grading under the Proposed Action and Alternatives would affect runoff volume in the Project Area. The FEIS should provide the schematics, calculations, and detailed locations of the proposed BMPs.

The hydrologic and water quality effects of the Project would occur in both the Project Area and downstream along the San Jacinto River; therefore, the FEIS should consider both areas.

Response: As described in Section 4.2.1 the FEIS, there will be an increase in runoff volume and peak flow from the Project Site because of the Project. This increase is a consequence of the addition of impervious areas for roads, parking lots, and buildings. The results of the Project drainage study were presented in FEIS Table 4-1 and summarize the runoff from the Project Site for several different size storm events under the Proposed Action and Alternatives. The FEIS also describes best management practices (BMPs) to control the additional runoff generated by the Project.

The drainage report (FEIS, Appendix K) indicated that runoff from the Project Site would increase the volume of runoff available to San Jacinto River because of the Project (see Tables 4-1(a, b, and c). Without the addition of the BMPs, runoff from the proposed facilities is 6.2 cfs for the 100-year, 24-hour storm, compared with 53,000 cfs for the San Jacinto River 100-year event flow. This represents 0.01 percent of the San Jacinto River 100-year flood. However, the proposed facilities will include BMPs such as detention basins and the golf course ponds to collect and treat stormwater runoff, resulting in no net increase in site drainage because of the Project.

The proposed developments include the use of the golf course ponds and detention basins as shown in Figure 2-4, Figure 2-8, Figure 2-10, and Figure 2-12 of the FEIS to treat the runoff and control the incremental volume of runoff generated because of the proposed developments. This volume of detention

basins will be sufficient to capture the incremental increase in runoff from the 100-year, 24-hour storm (Table 4-1(c) of the FEIS).

By collecting and treating runoff from the Project Site, significant effects to the San Jacinto River and downstream areas would not occur (see Section 4.2 of the FEIS). The BMPs are intended to keep the water quality and runoff effects on the Project Site. One type of BMP proposed is the use of porous pavement that would promote infiltration rather than direct runoff as occurs with typical pavement. Table 2-2 of the FEIS lists the proposed BMPs.

1.7.1.4 Flowage Easement

Summary of Comments: A portion of the Development Site is located within a flowage easement, which restricts use of the land. The easement needs to be quit claimed prior to development of the Proposed Action and Alternatives. The FEIS should discuss the effects of this easement and any proposed mitigation.

Response: Flowage easement 4020-112C is shown on Figure 3-5 and is intended to provide a pathway for surface-water coming off the San Jacinto Mountains. The existing and proposed hydrologic facilities (see Section 2.1.1) will adequately capture and transfer surface-water flows to the San Jacinto River. The Tribe will pursue resolution of the easement with Riverside County Flood Control & Water Conservation District (RCFCWCD) before development of the Project either through a quit claim of the easement or meeting with RCFCWCD to discuss appropriate restrictions on the parcels given the current floodplain status based on the FIRM and the flood control benefits of the proposed hydrologic facilities.

1.7.1.5 Construction Impacts

Summary of Comments: The FEIS should describe how construction of the Proposed Action and Alternatives would comply with the statewide stormwater construction permit and the Riverside County stormwater discharge permit.

Response: The FEIS cites that the Tribe will conform to the federal National Pollution Discharge Elimination System (NPDES, Clean Water Act) which is administered by the EPA. The EPA delegates NPDES permitting authority to the RWQCB in California, but EPA alone has authority to enforce water quality standards on Indian trust lands. In compliance with NPDES, the Tribe will prepare a Storm Water Pollution and Prevention Plan (SWPPP) for the proposed construction and submit it to EPA for approval. All construction activities on the Project Site will fall under the SWPPP. The SWPPP will identify all BMPs that will be constructed and the benefits to water quality afforded by the BMPs. Construction will conform to the water quality framework described in Section 3.2.3 of the FEIS.

1.7.2 Impacts to Water Supply and Water Quality

1.7.2.1 Water Supply

Summary of Comments: The Tribe is not legally entitled to the water right to provide water service to the proposed facilities. How would the proposed water use affect the other users of the groundwater basin?

Response: The Tribe is party to the Soboba Band of Luiseno Indians Water Settlement Act (H.R. 4841) that adjudicated the water supply for the region. As part of the Settlement, the Tribe gave up a surface water right and received assurance of a specified groundwater supply. Section 3.2.2 of the FEIS describes

the Water Rights Settlement and the Hemet/San Jacinto Groundwater Management Area Water Management Plan (WMP)[3] that followed the Settlement. The Tribe has first priority right under the Settlement and the Tribe's anticipated current and future water rights are included in the Settlement and the WMP. The WMP also states that EMWD and Lake Hemet Municipal Water District will implement the WMP for the Canyon and Intake aquifers to "address the current overdraft, and recognize and take into account the Tribal Water Right" (Water Resources & Information Management Engineering, Inc., 2007).

The anticipated water demand from this project is described in Section 4.8.1 of the FEIS (Table 4-46). Table 4-46 lists the projected water demands for the first year of facilities operation. The total projected demand is 2,148 acre-feet. This is less than the 2,900 acre-feet annually allotted to the Tribe through the water rights settlement for the first year after the settlement (see Section 3.2.2). Through the Settlement, the Tribe may increase its pumping to 4,010 acre-feet after 20 years. As sated in Section 4.2.1 of the FEIS, the project "would result in less than significant effects to the San Jacinto Groundwater Basin as the WMP will account for any overdraft caused by the proposed developments." Therefore, the Tribe's allocated withdrawals to service the proposed facilities are not expected to significantly affect the region's groundwater supply. The future use of recycled wastewater will reduce some of the water demand, especially the demand for golf course irrigation water.

The Settlement is a legally binding document that the Tribe and other parties must follow. Failure to comply with the Settlement would result in further legal action by the parties to the Settlement. The Tribe is bound by the terms and conditions of the Settlement. The Proposed Action and Alternatives would be in compliance with the Water Rights Settlement and Groundwater Management Plan.

1.7.2.2 Water Quality

Summary of Comments: The Project would affect water quality. Water quality issues include the use of recycled effluent for irrigation, underground storage tanks at the proposed gas station, the wastewater treatment plant, and stormwater runoff quality. There is concern about compliance of the Project activities with the statewide general stormwater permit, the Riverside County MS4 stormwater permit, and the Santa Ana River Basin Plan. These water quality effects are a concern for local and regional areas. There is also the need for detailed engineering specifics for the BMPs proposed for the Project.

The DEIS discusses the development of a 1.2 million gallon per day wastewater treatment plant and the use of recycled water from that facility. The storage of the effluent during periods when demand for recycled water is low may negatively affect water quality, and the groundwater basin could be affected by the application of recycled water to the golf course or other uses of the water. The percolation of stored effluent to the groundwater and the proximity of the WWTP facilities to other water supply features may be problematic.

Runoff of sediment and other pollutants from the construction area during a storm may affect water quality. Furthermore, leach fields used for sewage disposal at the existing casino may affect water quality.

Response: At the time of construction, the Tribe will either enter into a contract with EMWD for wastewater service, or construct an on-Reservation wastewater treatment plant. The FEIS includes a will-serve letter from EMWD (Appendix H of the FEIS). The required EMWD infrastructure exists on the Project Site and no off-site construction improvements are anticipated. However, for purposes of this

[3] This report can be found at: http://project.wrime.com/Hemet/Documents/HSJ_WMP_final.pdf

environmental review, both wastewater service options are explored in the FEIS. Below is a discussion of the proposed on-Reservation WWTP in response to the comments registered above.

A tertiary wastewater treatment system is a service option for the proposed facilities in the Alternatives. That system would produce effluent suitable for reuse. Although the discharge of effluent is regulated by EPA through NPDES (Clean Water Act), the Tribe proposes to operation the proposed WWTP to meet California Title 22 requirements for reuse of treated effluent (see Section 2.1.1). The Tribe will conform to all discharge standards when using or disposing of all recycled water. Application of recycled water for landscaping and golf courses is appropriate because the vegetation will polish the effluent by removing any remaining nutrients beyond the level mandated for the tertiary effluent. The use of recycled water for the golf course irrigation will offset the current pumping for golf course irrigation.

The entire Reservation would be connected to the new tertiary WWTP and thereby replace existing septic tanks and leach fields on the Reservation. Overall, the switch from septic tanks to a WWTP will benefit the underlying aquifer by eliminating the poor quality of water that percolates to the aquifer from leach fields.

Treated effluent from the WWTP may have to be stored or used for other purposes during periods when the irrigation demand is low. Generally, the effluent will be used for agricultural irrigation, landscape irrigation, filling of decorative water features, surface cleaning (i.e. parking lots), toilet flushing, and fire control. During periods when effluent flows exceed the demand for recycled water, water would be discharged to percolation ponds for storage. The discharge would conform to effluent standards for discharge to percolation ponds and be consistent with the Basin Plan (see Section 2.1.1). Percolation pond discharge would follow secondary treatment standards with other constituents of concern limited to concentrations that are consistent with non-degradation of the receiving aquifer based on the beneficial uses of the receiving waters identified in the Basin Plan. Also, the storage of water in the pond will encourage settling of suspended material and subsequent percolation into the soil that will provide additional polishing of the effluent.

Section 3.2.3 describes the stormwater permit and waste discharge permits that apply to the Project. The Tribe will comply with all construction and discharge permits for the Project Site and the WWTP. Construction will occur in compliance with NPDES (Clean Water Act) as administered by EPA. The Project will include BMPs to control water pollution generated through construction activities (see Section 2.1). Section 4.1.1 describes the commitment to prepare a SWPPP and follow the plan throughout construction activities. BMPs are used to control runoff from the Project and provide a level of treatment for the runoff from the paved surfaces (see Table 2-2). The details of the BMPs (exact location, size, shape, operation) will be determined in final engineering and summarized in the SWPPP.

The underground storage tanks (UST) at the proposed gas station will conform with Federal regulations for UST installation in or adjacent to identified active fault zones (40 C.F.R. Part 280, Subpart B), as well as with State and Riverside County regulations (County of Riverside Ordinance No. 617). Section 2.1.1 and Section 5.1.3 of the FEIS identify the criteria that will be used to locate and monitor the UST's associated with the Project.

The proposed BMPs, such as the detention basins, will also serve to capture the "first flush" of runoff that is generated at the start of a runoff event. The first flush is the initial runoff from a site and is known to contain the heaviest pollutant loads. Although rainfall events larger than a 2-year event may result in some runoff to the San Jacinto River, the pollutant load associated with the first flush will be captured in the BMPs.

Detailed engineering design will occur following the FEIS and the selection of the Preferred Alternative. The design will conform to the mitigation measures and design elements described in this FEIS.

1.7.3 Impacts to Groundwater

Summary of Comments: The Proposed Action and Alternatives would affect the availability of the groundwater supply, groundwater overdraft, water conservation, and groundwater pollution. Can the local aquifer produce the necessary supply for the proposed facilities without adding to the overdraft? In addition, how would the proposed facilities affect other users of the groundwater basin? The application or storage of treated effluent could potentially pollute groundwater within the Project Area. Stormwater runoff from the Project Site could affect water quality.

Response: As mentioned above in Section 2.7.2.1, the Water Rights Settlement specifies the available water supply for the Tribe (see Section 3.2.2 of the FEIS). The Tribe's supply comes from groundwater and is first priority from the Canyon and Intake aquifers (see Figure 3-3 of the EIS). Tribal water use and use by others in the groundwater management area is considered in the Groundwater Management Plan. The plan seeks to balance supplies with demand and incorporates groundwater recharge and water banking as methods to control and reduce groundwater overdraft. On April 20, 2007, the Army Corps of Engineers issued a notice of availability for the NEPA FEIS that was performed for the Settlement's effects on the Groundwater Management Plan. EPA also reviewed this EIS and concurred with the finding of no significant impact.

The treated effluent that would be reused for landscaping and other uses would conform to all federal standards (i.e. Clean Water Act) for the discharge of treated effluent. Therefore, effects to groundwater quality from the application of the treated effluent are not significant.

Stormwater runoff will be captured in drainage facilities and stored in detention basins before any release to the San Jacinto River. The detention basins will capture much of the runoff from storm events especially the first flush from the Project Site. The first flush typically contains the lowest quality water because it picks the pollutants stored on the paved surfaces during the dry period before the rainfall. In the detention basin, suspended material will drop out along with pollutants that are adhered to the suspended material. Water will leave the basin through evaporation and percolation. Percolation of the water through the soil layer will provide additional water quality treatment and will increase the groundwater recharge.

1.8 AIR QUALITY

1.8.1 Air Quality – Construction Impacts

Summary of Comments a: Construction of the Project would create more air pollution which would negatively effect air quality, especially for seniors; and fine particulate matter in diesel exhaust is an air toxic. Mitigation measures are needed in the project plans for dust and diesel exhaust, and with respect to clean diesel rules. We disagree that air quality would not be negatively affected by the construction project.

Response a: The construction of the Proposed Action would have limited potential to incrementally contribute to existing violations of state and federal air quality standards in the project vicinity for ozone, PM_{10}, and $PM_{2.5}$. Incremental effects would be small, temporary, and would cease upon completion of the construction project.

Emissions from patron and service vehicles are presently regulated under 40 CFR 86 et seq. and state standards. Since the Proposed Action and Alternatives are not federally-sponsored transportation projects

and motor vehicle usage would be in compliance with state emissions standards under the State Implementation Plan (SIP), General Conformity Thresholds apply only to facility emissions. As presented in Section 4.3 of the FEIS, since temporary construction emissions for the Proposed Action and Alternatives are all below General Conformity significance thresholds, no long-term risk assessment of the diesel particulate matter (DPM) or CO component of construction equipment engine exhaust is warranted, because corresponding short-term DPM and CO emissions would be small and will present no significant risk to public health.

Mitigation measures listed in Section 5.3.1 of the FEIS describe the best management practices (BMPs) which would be implemented to ensure that fugitive dust emissions do not affect adjacent land users, and that VOC emissions are minimized during construction.

Summary of Comments b: Soil stabilizers were not used during other Tribal projects.

Response b: Comment noted and made part of the administrative record. As described in Section 5.3 of the FEIS, soil stabilizers would be utilized during the construction phase of the project to control fugitive dust emissions.

Summary of Comments c: Air quality effects cannot be less-than-significant because the area is in nonattainment [O_3, $PM_{2.5}$, PM_{10}]. Mitigation measures for nonattainment pollutants are needed in the project plans (and FEIS). A General Conformity determination is also needed in the FEIS.

Response c: Emissions from patron and service vehicles are presently regulated under 40 CFR 86 et seq. and state standards. Since the Proposed Action and Alternatives are not federally-sponsored transportation projects and motor vehicle usage would be in compliance with state emissions standards under the State Implementation Plan (SIP), General Conformity Thresholds apply only to facility emissions. FEIS Tables 4-6 through 4-8 show that construction and operational emissions related to the Proposed Action do not exceed the General Conformity significance thresholds for all pollutants. Section 176(c) of the Clean Air Act contains the General Conformity Rule (40 CFR 51.850-860 and 40 CFR 93.150-160). The General Conformity Rule requires that a federal agency responsible for a proposed action (i.e., project) in a National Ambient Air Quality Standards (NAAQS) nonattainment or maintenance area endeavor to ensure that the proposed action conforms to the applicable SIP. This means that federally supported or funded activities shall not 1) cause or contribute to any new air quality standard violation, 2) increase the frequency or severity of any existing standard violation, or 3) delay the timely attainment of any standard, interim emission reduction, or other milestone. Emissions of attainment pollutants are exempt from the General Conformity Rule. A federal action would comply with an applicable SIP if it does not exceed identified annual emission de minimis thresholds, the magnitudes of which are based on the severity of the nonattainment rating of the project region. Actions that exceed these thresholds are required to conduct in depth conformity determinations. Since the General Conformity significance thresholds define significance in the context of the SIP, construction and operational activities related to the Proposed Action would result in a less than significant effect since the de minimis requirement is satisfied.

Since the Project Site would be subject to Tribal sovereignty SCAQMD California Environmental Quality Act (CEQA) significance thresholds do not apply

Summary of Comments d: The CO_2 [GHG] effects cannot be less-than-significant because of the new requirements [AB 32 et seq.]. The FEIS needs to more completely assess GHG emissions (including CH_4 and N_2O, not just CO_2) that would result from the construction of the project, including cumulative effects, and with respect to AB 32. How would the project mitigate GHG emissions to a level of insignificance consistent with SCAG's responsibility under AB 32 and SB 375?

Response d: There currently are no federal regulatory standards relating to GHG emissions from construction projects. The following language has been added for clarification to Section 4.3.1 and similar language has been added to Sections 4.3.2 through 4.3.5:

Climate Change Proposed Project

USEPA has not promulgated explicit guidance or methodology to conduct project-level GHG analysis. The Council on Environmental Quality (CEQ) issued a draft guidance memorandum in February 2010 for analyzing the environmental effects of GHG emissions and climate change in National Environmental Policy Act (NEPA) documents. Specifically, the guidance states that if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons (MT) or more of CO_2 equivalent (CO_{2e}) GHG emissions on an annual basis, agencies should consider this as an indicator that a quantitative and qualitative assessment may be meaningful to decision-makers and the public. For long-term actions that have annual direct emissions of less than 25,000 MT of CO_{2e}, CEQ encourages federal agencies to consider whether the action's long-term emissions should receive similar analysis. CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs (CEQ 2010).

Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction would be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012.

The project would potentially result in a significance impact if it would result in the direct generation of more than 25,000 MT of CO_{2e}. The Tribe does not have any specific GHG reduction thresholds however, AB 32 requires that by 2020 the state's greenhouse gas emissions be reduced to 1990 levels or roughly a 28.3% reduction. Significance thresholds have not been adopted but are currently being discussed. AB 32 is specific as to when thresholds shall be defined. AB32 guidelines are not directly applicable to the proposed project but will be considered in the determination of impacts for this analysis.

Construction Related GHG Emissions

Construction-related emissions are based on the previous assumptions and include GHG sources such as construction equipment, material delivery trucks, and construction worker vehicles. Estimated GHG emissions would be 36.96 MT CO_{2e} (Appendix Y). Given the fact that the total emissions will ultimately contribute to the 2020 cumulative emission levels, it is acceptable to average the total construction emissions over a 30 year period (SCAQMD 2008).

The annual and total level of GHG emissions expected to occur from construction of the Proposed Project is well below the level recommended by CEQ for further analysis.

GHG emissions would be generated throughout the operational life of the Proposed Project via both mobile and area source emissions. Mobile emissions would be related to increased vehicle trips resulting from both employee and patron trips. Area source emissions would occur from stationary sources such as uses within the gaming facility, water conveyance, wastewater treatment plant/MVC and solid waste generation. Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. N_2O. To simplify greenhouse gas calculations, both CH_4 and N_2O are converted to equivalent amounts of CO_2 and are identified as CO_{2e}. In other words CO_{2e} is an equivalent volume or mass of CO_2 converted from global warming potentials of other gases that may cause equivalent warming.

Transportation Related GHG Emissions

Emissions from daily trips were quantified utilizing emission levels reported in grams/mile from the EMFAC2007 emission model. Vehicle emissions were then calculated using URBEMIS and converted to carbon dioxide equivalent (CO_{2e}) per year. The default setting for vehicle fleet mix was used as the Proposed Project would generate VMTs mostly from workers and patrons commuting to and from the project site. The fleet mix also incorporates buses and heavy truck trips. Emissions due to new vehicle trips are estimated to be 24,243.31 MT of CO_{2e} per year BAU (Appendix Y).

Electricity Related GHG Emissions

The generation of CO_2, CH_4, and N_2O from electricity is calculated utilizing methodologies within the California Climate Action Registry General Reporting Protocol Version 3.1-January 2009 (Registry Protocol). The Registry Protocol Electricity Emission Factors in pounds of GHG per kilowatt-hour for CO_2, CH_4, and N_2O are 0.72412, 0.0000302 and 0.0000081, respectively. The Proposed Project is expected to use up to 58,683,012.3 KWh per year of electricity for the gaming floor, restaurants, retail shops, wastewater treatment plant and the operation of the mechanical vapor compressor (MVC). This would generate approximately 19,358.49 MT of CO_{2e} per year BAU (Appendix Y).

Water Usage Related GHG Emissions

Water demand from the Proposed Project would indirectly utilize energy associated with the preparation and conveyance of clean water to the project site. It is estimated that indirect electricity for water conveyance requires 12,700 kilowatt hours (kWh) per Million Gallons (MG) (Source: http://www.greenbuildingadvisor.com/book/export/html/18037). Water

demand from the local utility is estimated at 11,730,651 gallons each year, which would require 148,979 kWh of electrical energy to supply the expected yearly. This energy consumption would generate approximately 49 MT of CO_{2e} per year (Appendix Y).

Wastewater Treatment Related GHG Emissions

An additional component of GHGs from comes from the natural biochemical breakdown of waste within the water. As water is treated initially, suspended solids are allowed to settle to the bottom while cleaner water on top is siphoned off leaving wastewater sludge. The sludge is then collected where it can be further broken down within anaerobic digesters that are sealed off from ambient air sources. The waste then is further broken down by bacteria creating methane (CH_4) and to a lesser extent Oxides of Nitrogen. The California Air Pollution Control Officers Association CAPCOA guidance for GHG mitigation strategies estimates that the CH_4 created by the proposed 200,000 gallons per day (gpd) plant.

NO_X (CO_{2e}) emissions from wastewater treatment are estimated to be roughly 22 percent of CH_4 (CO_{2e}) (Source: Draft Methane and Nitrous from Non-Agricultural Sources April 2005). Based on the Project's anticipated water usage of 114,245,000 gallons or 432,464,369.26 liters of water per year and utilizing CAPCOA's baseline CO_{2e} approximation, that for each liter of wastewater the Project would produce 873.57 MT CO_2e from CH_4. It is estimated that the project would produce 192.19 MT from CH_4. Utilizing the 22% ratio of NO_X to CH_4, NO_X generation could be as high as 21 MT. Therefore, the wastewater treatment plant is estimated to produce approximately 1,065.77 MT CO_2e per year (Appendix Y).

Solid Waste Related GHG Emissions

Solid waste generated from the Proposed Project would ultimately be discarded as trash and then deposited into a landfill. The decomposition of organic matter such as food, paper, yard trimmings and wood are anaerobicly digested by bacteria, which primarily produces GHG's as a bi-product. However, organic decomposition occurs at different rates and is a function of the material content. The Environmental Protection Agency (EPA) published various emission rates with units of Metric Tons of Carbon Dioxide Equivalent per Ton (Source: Solid Waste management and Greenhouse Gases; A Life-Cycle Assessment of Emissions and Sinks). Solid waste generated from the Proposed Project is estimated to generate 1,984 tons of trash each year. Utilizing the EPA emission factors, the CO_{2e} emissions are expected to be approximately 114.86 MT per year (Appendix Y).

Thus, total overall operational GHG emissions resulting from the Proposed Project are estimated to be approximately 47,533.23 MT CO_{2e} per year. Left unmitigated, this would be considered a significant impact. Mitigation Measures to achieve a 28.3% reduction from BAU are presented in Section 5.3.2.

In addition, in response to the Presidential Memo Regarding Fuel Efficiency Standards (May 21, 2010), EPA and the National Highway Traffic Safety Administration are working in concert to develop GHG regulations for heavy-duty engines and vehicles, as well as to improve fuel efficiency in light-duty vehicles. However, since the Proposed Action does not involve the manufacture of vehicles, those regulations would not apply.

Summary of Comments e: The FEIS needs to more rigorously assess air quality effects that would result from the construction of the project, including localized effects (CO hotspots) and sensitive receptors (seniors), and with respect to the [SCAQMD] 2007 AQMP.

Response e: In October 2008, ENTRIX performed a CO hotspots analysis for the vicinity of Ramona Expressway and Lake Park Drive assuming worst-case traffic congestion and calm wind conditions. Results of this analysis are shown in Tables 4-9 and 4-10 within the FEIS, which demonstrate that the highest predicted concentration is well below state and federal standards. The effect is less than significant.

Since the Project Site would be subject to Tribal sovereignty and immune from state and local regulation, local rules, including the SCAQMD 2007 AQMP, do not apply. Emissions standards from patron and service vehicles are presently regulated under 40 CFR 86 *et seq*.

Summary of Comments f: The air quality analysis (URBEMIS) used square footage of buildings to be constructed, not total development footprint (land area).

Response f: The URBEMIS model was re-run using current (2009-10) software and refined assumptions, including improved values for building square footage and land area, in order to bring the results up-to-date. Section 4.3 of the FEIS has been updated with the new results. Compared to the former version of URBEMIS, the most current URBEMIS model shows increased construction emissions of NO_x, PM_{10}, and $PM_{2.5}$, and decreased construction emissions of VOC and CO. As shown in Table 4-6 of the FEIS, construction emissions related to Proposed Action A do not exceed the General Conformity significance thresholds for all pollutants, which are used to ensure that the proposed developments conform to the applicable SIP. Therefore, construction activities related to Proposed Action A would still result in a less than significant effect under the most current URBEMIS model, and no new mitigation measures are required.

1.8.2 Air Quality – Operational Impacts

Summary of Comments a: Project operation would create more air pollution which would negatively affect air quality, especially for seniors; air quality on weekends is poor; and fine particulate matter in diesel exhaust is an air toxin. We disagree that air quality would not be negatively affected by operation of the project, and the pollution cannot be effectively mitigated.

Response a: Emissions from patron and service vehicles are presently regulated under 40 CFR 86 et seq. and state standards. Since the Proposed Action and Alternatives are not federally-sponsored transportation projects and motor vehicle usage would be in compliance with state emissions standards under the SIP, General Conformity Thresholds apply only to facility emissions. As described in Section 4.3 of the FEIS, incremental effect from the proposed facilities would remain below the thresholds for significance under the General Conformity Rule. Although the operation of the Proposed Action and Alternatives is not expected to result in significant effects to local air quality, the mitigation measures specified in Section 5.3.2 would be implemented to ensure that the design and operation of the proposed developments would be consistent with regional efforts to attain the NAAQS.

Summary of Comments b: The URBEMIS modeling is inadequate because a) it does not account for special events with large attendance; b) CH_4 and N_2O emissions are left out; and c) it uses square footage of buildings, not total development footprint (land area).

Response b: The URBEMIS model was re-run using current (2009-10) software and refined assumptions, including improved values for special events and building square footage and land area, in order to bring the results up-to-date. URBEMIS software only calculates emissions for criteria air pollutants (VOC, NOX, CO, SO_2, PM_{10} and $PM_{2.5}$) from land use development projects during both short-term construction and long-term operational phases. CH_4 and N_20 are not considered criteria air pollutants by the EPA, and therefore not required for analysis in the FEIS. Tables 4-6, 4-7, 4-8, 4-11 through 4-18 in Section 4.3 of the FEIS have been updated with the new results.

Summary of Comments c: Indirect GHG emissions from electric power consumption were not addressed.

Response c: Please see new language added in Response 1.8.1(d) above.

Summary of Comments d: The EPA must be notified so that proper permitting and mitigation issues will be resolved prior to the project. BIA must address air quality issues before any project is approved and get the proper permitting in place.

Response d: The EPA is a Cooperating Agency for this project (see **Section 1.1.4** above). The Proposed Action does not fall under EPA jurisdiction as a stationary source (i.e., Title V of the Clean Air Act Amendments of 1990); therefore no federal permitting requirements would apply. See also **Section 1.8.1**, ***Response d*** above.

Summary of Comments e: Has the Tribe consulted with the SCAQMD on air quality issues? Although there is a recommendation that the Tribe should meet the standards SCAQMD, the recommendation is simply an unenforceable promise.

Response e: The Tribe has not consulted with SCAQMD for the Proposed Action. Local rules, including SCAQMD stationary source permit requirements and emissions standards, do not apply to this project. A mitigation measure included in Section 5.3.2 of the FEIS states that the Tribe should solicit input from the SCAQMD on the preliminary plans of proposed facilities to reduce VOC, NOx, fine particulate matter, and other emissions. The enforceability of mitigation measures is discussed under **Section 1.18** of this public comment report.

Summary of Comments f: The baseline figures for the GHG significance discussion need to be updated along with significance criteria for consistency with current CARB guidelines. Cumulative GHG effects need to be evaluated in relation to city/county general plans and pursuant to AB 32 and SB 375.

Response f: Please see Responses 1.8.1(d).

1.9 BIOLOGICAL RESOURCES

Summary of Comments a: There is information missing from the EIS regarding the Multi Species Habitat Conservation Plan (MSHCP), species covered by the MSHCP, mitigation measures for those species, required species surveys, as well as the potential role the MSHCP may play in association with Endangered Species Act (ESA) regulatory compliance requirements associated with the proposed project alternatives.

Response a: In 2007, the Bureau of Indian Affairs (BIA), as the Lead Agency, decided to comply with the requirements of a Section 7 interagency coordination process to satisfy ESA regulatory compliance requirements independent of the MSHCP. As such the MSHCP, an ESA Section 10 regulatory compliance process, was not included in the DEIS. However, during the course of federal consultation it was determined that compliance with the MSHCP was warranted under ESA.

On September 2, 2010 the BIA consulted with Regional Conservation Authority (RCA) and FWS regarding project compliance with ESA. The BIA requested that RCA; 1) identify the areas within the Project Site that are subject to the MSHCP; and 2) that RCA develop a proposal for mitigation of project effects to the MSHCP.

RCA reviewed the boundaries of the Project Site with respect to the MSHCP Conservation Criteria. RCA determined that approximately 125 acres in the northern portion of the Project Site should be deeded to RCA for conservation to address the fee-to-trust action's effects to the MSHCP. Also, approximately 32 acres in the southern portion of the Project Site (south of Lake Park Drive) would be conserved due to the presence of Los Angeles pocket mouse (LAPM) and San Bernardino kangaroo rat (SBKR) (ENTRIX June 2010 report(s)). In addition, RCA would be deeded an additional 22 acres as mitigation to offset project effects.

A section describing the MSHCP and its regulatory function has been included in Section 3.4.3 of the FEIS under the Regulatory Framework heading. Sections 3.4.5, 3.4.7, and 4.4 address species which are covered by the MSHCP and have the potential (individuals or habitat) to occur in the Project Area. Section 4.4 contains additional language about the effects of the fee-to-trust action on the MSHCP and the WRCRCA's ability to administer the plan. Section 5.4 addresses any species (including MSHCP covered species) that might be affected by the Proposed Action and Alternatives, as well as potential mitigation measures that may reduce or remove any potential effects. Section 3.4.6 and 3.4.7 of the FEIS has been updated to include results from additional surveys that were completed for the SBKR, LAPM, and Burrowing owl (BUOW) within the Project Area.

Field surveys for SBKR were carried out according to USFWS and CDFG permit conditions. These surveys were designed to detect LAPM by trapping areas that exhibited habitat conditions typical of those occupied by the pocket mouse, which fortunately are very similar to those of SBKR in the project area. While LAPM were not the primary focus of the trapping effort, it was reasoned that the presence of LAPM in the southern and northern areas of the Project Site reflects the overall abundance of the pocket mouse in this general area of the San Jacinto River system. In addition, field surveys and site monitoring for BUOW were completed in April 2010, according to USFWS and RCA protocol.

Summary of Comments b: The potential effects of the Proposed Action and Alternatives on critical habitat for the SBKR should be further analyzed and discussed in the FEIS.

Response b: The designation of critical habitat for SBKR was removed from the proposed project area by the USFWS on October 17, 2008 (50 CFR part 17). Some areas adjacent to the proposed project area in the vicinity upstream from the E Main St Bridge remain as designated critical habitat. At present, a 20-foot high levee separates this area from the proposed project area. Potential effects that may occur as a result of the Proposed Action are discussed in Section 4.4 of the EIS. Mitigation measures have been developed to mitigate effects this project may have on SBKR critical habitat, they are discussed in Section 5.4 of the EIS.

Summary of Comments c: Table 3-11 of the DEIS contains errors and should include additional species.

Response c: In response to these concerns, Table 3-11 in Section 3.4.5 was reviewed. The results of this review lead to the table being updated for the Southwestern willow flycatcher (WIFL), the addition of the Arroyo toad and Riverside fairy shrimp, as well as the confirmation that the table is correct to not include the Palm Spring ground squirrel. Table updates and edits have been completed in the FEIS. Text describing the geographic region for the WIFL has been modified. Text has been added to the table concerning the Arroyo toad and Riverside fairy shrimp. A species description has been added for the Arroyo toad in Section 3.4.6.

Summary of Comments d: The potential effects of the Proposed Action and Alternatives on critical habitat for the Coastal California gnatcatcher (CCGN) should be further analyzed and discussed in the FEIS.

Response d: A review of the current information and the MSHCP for CCGN distribution and habitat use was completed. This review supported the information contained within the DEIS. That is, the potential for the presence of CCGN habitat within the proposed project area is low. Additionally, if a habitat patch exists, it probably is not suitable for resident or breeding populations. It should be noted that there is no formally designated CCGN critical habitat on the Project Site.

Summary of Comment e: Current disking activity on the Project Site is causing habitat destruction and soil loss.

Response e: USFWS has reviewed the additional field surveys that were completed and agree that mowing the property for weed abatement is not likely to result in impacts to federally listed species. There are no known listed or sensitive species on the properties, and the vegetation is composed of virtually all non-native invasive species. Furthermore, the Tribe will be conducting weed abatement using a new "brush hog"; therefore no disking, ripping, or other soil disturbance is anticipated (Pavelka, 2010).

Summary of Comments f: Development of commercial areas would affect biodiversity.

Response f: Potential effects to species associated with the Proposed Action and Alternatives are addressed within the FEIS in Section 4.4. Mitigation measures have been developed, with respect to the MSHCP and other guidelines associated with federally listed species, in an effort to limit adverse effects to biodiversity in the area. These measures can be found in Section 5.4 of the FEIS.

1.10 CULTURAL AND PALEONTOLOGICAL RESOURCES

1.10.1 Cultural Resources

Summary of Comments: There is concern regarding the ethnographic and historical data presented in the EIS relating to the prehistoric tribes that occupied the region centered around the Project Site near San Jacinto, California. The Project Site is outside the Soboba Band of Luiseno Indians' aboriginal territory, the Band never owned the land, no artifacts were recovered during investigations to suggest their occupation, and the Project has the potential to adversely affect cultural resources that are present within the Project Site. California laws, such as CEQA as well as statutes that protect Native American burials and remains, apply to this Project and should be considered in the FEIS. In addition, the cultural resources technical report (Appendix R) was not publicly accessible and therefore a thorough analysis of the effects to cultural resources could not be reviewed by the public. The report should be submitted to the State Historic Preservation Office (SHPO) for review and concurrence.

Response: United States courts have confirmed that the Soboba Band of the Luiseño Indians have occupied the area and subsisted on the land since at least 1815 (Byrne v. Alas et al, Supreme Court of California (74 Cal.628; 16P.523; January 31, 1888). Furthermore, the ethnographic and documentary information presented in the FEIS, collected from a variety of different sources, confirms that at the point of European contact, the Project Area was occupied by the Luiseno people, with the Luiseno-Cahuilla village of "Savado", or Soboba, located only one mile southeast of the Project Site (see Section 3.5.1 of the FEIS). As Luiseno people were known to utilize lands surrounding their villages, which represent a traditional use area, the Project Site is considered the Tribe's aboriginal territory.

Addressing CEQA's requirements for addressing Project effects to cultural resources is outside the scope of the NEPA review process and is not addressed here. See also Section 2.2.2.5 of this public comment report for a response to non-NEPA issues beyond the scope of this FEIS.

After consultation with the SHPO in the Office of Historic Preservation within the California Department of Parks and Recreation, the BIA received a letter from the SHPO on October 6, 2008 that agreed with the findings of the Section 106 technical report and the BIA conclusions, and held "no objection to your [BIA's] proposed finding of No Adverse Effect" upon historic properties. Three historic properties, RJ-1, RJ-2, and RJ-3, are located within the Project area but will not be affected by Project construction. No prehistoric resources are expected to be encountered during construction, but in the event of an unanticipated discovery of Native American burials, remains, or grave goods, these items would become subject to the Native American Graves Protection and Repatriation Act. In addition, if other unanticipated discoveries of cultural resources are found during construction, the BIA is required to comply with 36 CFR Part 800 which describes a process for protecting resources found after Section 106 review, resource evaluation, and consultation with the SHPO and other consulting parties. An Unanticipated Discoveries Plan has been developed and is included as Appendix AA to the FEIS.

The Section 106 technical report is confidential consistent with 36 CFR 800 and the National Historic Preservation Act. The FEIS summarizes the content of the report, identifies cultural resources located within the Area of Potential Effect, evaluates those resources to determine their eligibility for the National Register of Historic Places, and describes mitigation measures so that effects to historic properties are avoided.

1.10.2 Paleontological Resources

Summary of Comments: Information concerning the potential presence of paleontological resources was not adequately discussed in the DEIS. Potential effects to these resources was also not addressed in the DEIS. Planning and monitoring during construction to avoid effects to paleontological resources is required.

Response: An additional section has been added to the FEIS to describe the presence and probability of locating paleontological sites within the Project area and the potential for effects to those resources. The following text has been added to Section 3.5 of the FEIS:

3.5.2 PALEONTOLOGICAL RESOURCES

Paleontological resources are fossilized remains of prehistoric plants and animals. These remains often appear as fossilized skeletal matter, imprints, or endocasts, and reside in sedimentary rock layers. Paleontological resources are important due to their scientific and educational value in providing information about the history of the earth and its past ecological settings. They are also non-renewable resources.

Riverside County's (2009) paleontological sensitivity map indicates that the Project Site is located in a region with high paleontological sensitivity. A search of the University of California Museum of Paleontology (UCMP) database indicated that 1364 paleontological specimens have been collected in Riverside County (UCMP 2009). The majority of the specimens are plants. The vast majority of specimens have been documented within the Mt. Eden formation and date to the Late Miocene epoch (UCMP 2009). None of the fossils identified by UCMP were located within the Project Site.

Paleontological resources in Riverside County are protected by a variety of federal, state, and local regulations and guidelines, including NEPA, CEQA, the Antiquities Act of 1906, the California Public Resources Code, and the Riverside County General Plan.

The following text has been added to Section 4.5 of the FEIS:

4.5.2 PALEONTOLOGICAL RESOURCES

4.5.2.1 PROPOSED ACTION A – HOTEL/CASINO COMPLEX WITH REALIGNMENT OF LAKE PARK DRIVE

While the project area is located in a region with high paleontological sensitivity, construction associated with the project is not anticipated to result in significant adverse effects to paleontological resources. Preliminary soil borings advanced to 50 feet bgs did not encounter bedrock. Potential paleontological resources would only be expected at depths where bedrock is encountered. Soil grading and earthwork operations are not planned at depths where bedrock is present; therefore potential paleontological resources will not be disturbed. This material is sufficiently young geologically that it is very unlikely to contain fossils. In the unlikely event that paleontological resources are uncovered during ground-disturbing activities, an Unanticipated Discoveries Plan (Appendix AA) has been prepared.

The following text has been added to the cumulative effects discussion in Section 4.10.3 of the FEIS:

Paleontological Resources

The geographic boundary of the analysis of cumulative effects to paleontological resources is defined as the Project Site and surrounding area. Cumulative effects to paleontological resources could occur in the Project Site and surrounding area if urban development occurs on sites that contain fossils. When these resources are destroyed or displaced, important information is lost about the history of the earth and its past ecological settings.

Riverside County's (2009) paleontological sensitivity map indicates that the Project Site is located in a region with high paleontological sensitivity. A search of the University of California Museum of Paleontology (UCMP) database indicated that 1364 paleontological specimens have been collected in Riverside County (UCMP 2009). The majority of the specimens are plants. The vast majority of specimens have been documented within the Mt. Eden formation and date to the Late Miocene epoch (UCMP 2009). None of the fossils identified by UCMP were located within the Project Site.

While the Project area is located in a region with high paleontological sensitivity, construction associated with the project is not anticipated to result in significant adverse effects to paleontological resources. Preliminary soil borings advanced to 50 feet bgs did

not encounter bedrock. Potential paleontological resources would only be expected at depths where bedrock is encountered. Soil grading and earthwork operations are not planned at depths where bedrock is present; therefore potential paleontological resources will not be disturbed. This material is sufficiently young geologically that it is very unlikely to contain fossils. Therefore, Proposed Action A would not significantly contribute to the cumulative loss of paleontological resources. In the unlikely event that paleontological resources are uncovered during ground-disturbing activities, an Unanticipated Discoveries Plan (see Appendix AA) has been prepared.

The following text has been added to the indirect effects from off-site traffic mitigation discussion in Section 4.11.2 of the FEIS:

Paleontological Resources

The construction of the roadway improvements is unlikely to disturb or destroy paleontological resources. As discussed in Section 4.10.3, a search of the University of California Museum of Paleontology (UCMP) database indicated that 1364 paleontological specimens have been collected in Riverside County (UCMP 2009); however, none of the fossils identified by UCMP were located within the Project Site. Furthermore, as described in Section 4.10.3, construction activities are not planned at depths where bedrock is present; therefore potential paleontological resources will not be disturbed. In the unlikely event that paleontological resources are uncovered during ground-disturbing activities, an Unanticipated Discoveries Plan (see Appendix AA) has been prepared. Therefore, a less than significant indirect effect to paleontological resources would result.

The following text has been added to the indirect effects from off-site pipeline construction discussion in Section 4.11.3 of the FEIS:

Paleontological Resources

The construction of pipelines is unlikely to disturb or destroy paleontological resources. As discussed in Section 4.10.3, a search of the University of California Museum of Paleontology (UCMP) database indicated that 1364 paleontological specimens have been collected in Riverside County (UCMP 2009); however, none of the fossils identified by UCMP were located within the Project Site. Furthermore, as described in Section 4.10.3, construction activities are not planned at depths where bedrock is present; therefore potential paleontological resources will not be disturbed. In the unlikely event that paleontological resources are uncovered during ground-disturbing activities, an Unanticipated Discoveries Plan (see Appendix AA) has been prepared. Therefore, a less than significant indirect effect to paleontological resources would result.

1.11 ECONOMIC AND SOCIOECONOMIC CONDITIONS

1.11.1 Economic and Fiscal Resources

Summary of Comments a: .The proposed fee-to-trust action would take property out of the tax system decreasing local taxes. Decreased tax revenues may reduce funding for infrastructure improvements, education and other public services, particularly if the Proposed Action results in an increased demand for public services. The DEIS does not include a Memorandum of Understanding to contract for city or county services.

Response a: The Proposed Action would decrease the local property tax base. See Section 4.6 of the FEIS for a detailed discussion on the potential fiscal effects resulting from the Proposed Action. In 2008, Riverside County received $234,090 in property taxes from the Project Site – less than 0.01 percent of the $2.4 billion the County received in property tax revenue that year.[4] Thus, the effects of removing the Project Site from the County tax base will be minimal accounting for less than .01 percent in foregone County property tax revenue annually.

Of the County property tax revenue in 2008, 47.4 percent was allocated to education. The proposed fee-to-trust transfer will decrease education funding by $110,958.66 – a 0.01 percent reduction. However, as described in Section 5.8.8 of the EIS, the Tribe shall provide reasonable in-lieu development fees and property taxes to the San Jacinto Unified School District to mitigate recognized effects to the district. Please see **Section 1.13.7** of this public comment report for a more detailed discussion of mitigation measures to reduce effects to school services.

Regarding any effect of decreased property taxes on the provision of fire protection and emergency medical response, the Tribe would provide primary fire protection and medical services to the Project Site, which would relieve the local community of some financial burden. In addition, on August 8, 2011 Soboba General Council approved a Memorandum of Understanding (MOU) governing the provision of law enforcement services to the Development Site (see Appendix AC of the FEIS). The MOU provides a funding mechanism for one full-time deputy over a 24-hour time period, which equates to five sworn deputy positions, and one non-sworn Community Service Officer to meet the law enforcement needs of the proposed project. For a more detailed discussion of effects to public services, please see **Section 1.13 Public Services** of this public comment report.

Summary of Comments b: Community effects of the proposed action include a perceived negative effect of the gaming industry on property values, personal wealth of patrons (particularly lower socioeconomic residents who are believed to use casinos more frequently), gambling addicts, and additional work for local police and other services.

Response b: The Proposed Action will not increase gaming facilities in the area. The current state of the personal wealth of patrons and gambling addicts will not be affected by increased gaming facilities since no change in the number of gaming facilitates will occur under the Proposed Action.

In addition, as described in Section 2.1.1 and Section 4.6 of the FEIS, the Tribe's gaming compact with the State requires that a portion of the revenues generated by the Tribe's gaming facilities must be remitted to two state-administered funds: (1) a Revenue Sharing Trust Fund that is distributed among non-gaming California tribes; and (2) a Special Distribution Fund that is used to compensate the State for the costs incurred in the administration and oversight of compact compliance, and for grants to gambling addiction programs and to governmental agencies effected by tribal gaming. Riverside County and local governmental agencies in the County receive in excess of $10 million a year from the Special Distribution Fund for such purposes as law enforcement, fire and emergency medical services, environmental programs, water supplies and waste disposal, public health, roads, and recreation and youth programs. In 2007 alone, proceeds from the Soboba Casino accounted for nearly $1.0 million of that amount, which was supplemented by another $1.5 million that the Tribe voluntarily donated to local charities and nonprofit organizations. As noted in Section 2.1.1, for fiscal year 2008-2009, Soboba Casino accounted for $1.47 million of the Special Distribution Fund (California State Controller's Office 2010).

[4] Larry Ward with the Riverside County Assessor – County Clerk – Recorder Office, '2007 – 2008 Annual Report' accessed online at http://riverside.asrclkrec.com/acr/docs/2008-2009%20Annual%20Report%20Final.pdf

Summary of Comments c: The proposed action may increase competition for local businesses and put them at an unfair disadvantage (having to pay property taxes so may be undercut by Tribal resources). The proposed action may lead to urban decay, which is not currently addressed.

Response c: The extent to which the Proposed Action would effect specific local business establishments is unknown. The Proposed Action may increase competition for patrons at similar businesses in the local area. If the total number of patrons visiting similar businesses in the local area is fixed, than the increased competition may potentially result in a reduction in patronage at similar businesses – potentially reducing local area businesses' revenue. However, the Proposed Action is anticipated to increase visitation to the local area resulting in an increase in the total number of patrons in the local area – potentially increasing local area business' revenue. Thus, the direction and magnitude of the effects of increased competition is unknown. Urban decay is not expected to result from the Proposed Action since the Proposed Action will attract new patrons to the local area. The following subsection/text was added to Section 4.6 of the FEIS to account for potential effects from urban decay.

Urban Decay

The purpose of this section is to identify and evaluate the potential for the proposed developments to result in physical blight/urban decay in response to concerns raised during the public comment period. This analysis takes into account the market conditions in the area of analysis available through secondary sources.

Background and Terminology

In general, urban decay can be described as the physical effect, including facilities that are poorly maintained and in disrepair, deterioration of buildings and improvements, visual and aesthetic impacts, increase in property crime (e.g., graffiti) and increased demand for emergency services, which result from increases in retail closures and long-term vacancies. A 2004 study by the Bay Area Economic Forum described the urban decay process as follows:

> ***"Vacant buildings, along with their large parking lots, can attract litter, graffiti, and vandalism, as well as loiters and homeless populations. A decaying building both worsens its own prospects for refurbishment and weakens the vitality of the buildings around it. And big box stores, which are built quickly and cheaply, often have a lower quality of construction than other buildings, meaning they tend to deteriorate faster."***

The initial impetus of urban decay often originates from financial conditions faced by individual property owners; if a landlord is no longer collecting rent on a vacant property and does not believe that it can be re-leased, the incentive to maintain the property may evaporate. The effect can spread to adjacent properties and become self-fulfilling as customers start to avoid the area, and other property owners or tenants perceive an area as no longer viable. Urban decay can be reinforced by a reduction in the fiscal resources of local governing entities because of declining sales and property tax revenue.

Urban Decay in the Context of Proposed Action A

The purpose of this analysis is to assess if development of the hotel and commercial enterprise under Proposed Action A would have a negative effect on businesses in downtown San Jacinto, which can lead to urban decay. The two types businesses that could potentially be affected under Proposed Action A are hotels and retail establishments.

As discussed in more detail in Section 3.6.2, there are two hotels in San Jacinto. Both of these hotels are low-price, budget facilities. Additionally, no new hotels are currently planned in the area. In comparison, the hotels proposed under Proposed Action A and B and Alternatives 1 and 2 are more high-end, luxury facilities in terms of the services they will offer. The clientele for these would not be the same as those who might stay at the two hotels in San Jacinto. Given that the proposed developments will not result in less people staying at the hotels in San Jacinto, no effect is anticipated on the hotel businesses in downtown San Jacinto because of Proposed Actions A.

In terms of retail businesses, a Retail MarketPlace Profile from ESRI of the ten-mile trade area of Hemet, which includes San Jacinto, reveals that the retail demand in the area is over $1.2 billion dollars.5 Further, according to this profile, the leakage factor for this area is 17, meaning that a large number of the areas households are travelling long distances to shop. In most cases, they are going farther than 15 miles to shopping centers in Moreno Valley and Temecula. Given that leakage is a measure of retail sales lost by a community to a competitive market, indicating the need for more retail development in an area, there appears to be a shortage of retail businesses in the area. At the same time, the 2010 Edition of the California Retail Survey ranks Riverside County as number one in population growth.6 However, more importantly, San Jacinto is ranked number five in terms of "Relative Strength" of the retail market among all cities in California.7 The Relative Strength Ratio measures the long-term retail sales growth trend in one local market compared to growth fluctuations in statewide retail sales, and since it covers a period of the last five years, it provides a good comparison of longer-term sales growth trends relative to statewide averages. Given these facts, especially the strong growth and high retail demand in San Jacinto, the proposed commercial development is not anticipated to cause urban decay by taking business away from retail establishments in downtown San Jacinto. Based on available information, there appears to be sufficient demand in the area to accommodate new retail businesses without hurting existing ones.

Summary of Comments d: Using outdated data does not take into account the current economic downturn.

Response d: The analysis of economic resources covers effects on economic production (output), labor income, and employment as estimated by IMPLAN (IMpact Analysis for PLANning), a regional economic model that is commonly used to estimate economic effects. The DEIS included 2006 IMPLAN data, which at the time was the best available data set. The FEIS has been updated using 2008 IMPLAN data, which is the most current and best available data set. Figures were also updated to reflect the current pricing of goods and services that will be required to construct the proposed developments. For example the DEIS states that the approximate construction cost of the proposed developments was $300 million, but the price difference in materials and services raises the estimated construction cost to $335 million.

5 City of Hemet, May 2006, *Hemet Now*, "Hemet Retail Demand Tops $1 Billion."

6 The Eureka Group, 2010, "California Retail Survey – 2010 Edition."

7 "The Relative Strength Ratio measures the long-term retail sales growth trend in one local market compared to growth fluctuations in statewide retail sales. Since the Ratio covers a period of the last five years, it provides Survey users with an easily understood comparison of longer-term sales growth trends, relative to statewide averages. The ratio is derived by dividing the percentage increase in retail sales in a specific county or city over the past five years by comparable percentage increases for total statewide retail sales." The Eureka Group, 2010, "California Retail Survey – 2010 Edition."

In summary, the updated economic data and model produced varying results in regards to the total economic effect for the proposed developments under the Proposed Action. Economic effects resulting from construction decreased from $471 million to $400 million, with a decrease in construction labor income from $190 million to $130 million. However, economic effects resulting from operations increased (direct revenue figures are considered privileged information and not presented in the DEIS), with an increase in permanent labor income from $72 million to $157 million. Permanent jobs, however, decreased from 1,753 to 1,602 full-time employee positions.

Given the minor decrease in economic effects, fiscal effects also experienced a slight decrease. Sales tax revenues for the Proposed Action was adjusted from $1.15 million to $810,000 annually, where the State would realize $670,000 annually and the local municipalities would realize $140,000 annually. The total state income tax was reduced from $1.98 million to $1.71 million annually, but Federal income tax revenues increased from $7.92 million to $7.97 million annually.

Summary of Comments e: The Proposed Action is predicted to increase jobs and economic activity, which is much needed in the County. To fully understand these benefits, a breakdown of employment at the existing facility needs to be presented next to the employment resulting from the Proposed Action.

Response e: The construction, operation, and maintenance of the Proposed Action will result in significant spending, income generation, and employment in the local area. These effects are presented in Table 4-23 and 4-24 and discussed in Section 4.6 of the FEIS. The construction-related effects of the Proposed Action may result in up to 1,084 jobs, $130.4 million in labor income, and $400 million in output within Riverside County. The operation-related effects of the Proposed Action may result in up to 2,384 jobs, $189.3 in labor income, and $44.9 in output within Riverside County. The operation-related effects *include* output, income, and employment effects of the current Soboba operation.

The 'No Action' option in Table 4-23 and 4-24 in Section 4.6 represents the existing operation conditions including existing employment. The construction phase of the Proposed Action A will create up to 1,084 jobs, which is compared to the 'No Action' alternative of 0 construction-related jobs. The Proposed Action will directly employ 1,635 employees at the new casino/hotel facilities, which is compared to the 'No Action' alternative of 1,000 operation-related jobs, resulting in 653 new direct jobs related to the Proposed Action. Additionally, 731 people will be employed in Riverside County as a result of the indirect and induced effects of the Proposed Action, which is compared to the 'No Action' alternative of 285 indirect jobs and 318 induced jobs.

Summary of Comments f: Some commenters' believe the proposed action will increase property values. Others believe it will decrease home values.

Response f: The effects of the Proposed Action on local property values are complex. The value of a property is derived from its property/home attributes (e.g. lot size, number of rooms, exterior material) and neighborhood attributes (e.g. walkability, proximity to parks/golf courses, safety). Changing a property/neighborhood attribute has the potential to result in an increase or decrease in property values. For example, local area property values may increase if the facilities resulting from the Proposed Action are generally perceived as desirable. If the facilities resulting from the Proposed Action are generally perceived as undesirable, local area property values may fall.

The Proposed Action may specifically affect the neighborhood attributes of three communities: Soboba Springs Mobile Home Park, Soboba Springs, and Soboba Heights. The body of existing literature does not allow for a conclusive determination to be made regarding effects to property values in the area of the Project Site. The market values for these properties currently reflect proximity to the golf course, gaming, and other attributes of the Soboba Reservation. It is difficult to accurately forecast how property

values will react to the presence of the proposed facilities. Some home buyers may find the development of the new hotel/casino complex a desirable attribute, positively effecting property values. Some buyers may not consider the proposed facilities a desirable attribute, negatively effecting property values. See Section 4.6 of the FEIS for additional discussion of this issue.

The Proposed Action will result in the Soboba Springs Mobile Home Park being surrounded by the Soboba Reservation with the exception of a road granting entry. While this property currently internalizes proximity to the golf course, gaming, and other attributes of the Soboba Reservation in its property value, the effect of the 'island effect' on property values is not conclusive based on empirical review. As described in Section 4.6 of the FEIS, the 'Island Effect' can be expected to effect property values, but the direction and magnitude of the effect is unknown. However, the Soboba Springs Mobile Home Park is owned by a single owner, so any positive/negative property value effects will be limited. Any decrease in County property tax revenue resulting from a decrease in the Soboba Springs Mobile Home Park will be minor. The following text was added to Section 4.6 of the FEIS:

> **An 'Island Community' is formed when a small piece of fee land is privately held within a large area of trust land and occupants of the fee land must traverse trust land for ingress/egress. The effects to abutting property values and the creation of an 'Island Community' within trust land ('Island Effect') are not conclusive based on empirical review. While the creation of trust property can be expected to effect property values, the direction and magnitude of the effect is unknown.**
>
> **In cases like Strate v. A-1 Contractors (1997), Brendale v. Confederated Tribes and Bands of the Yakima Indian Nation (1989), and Montana v. United States (1981) (as discussed in Tsosie, 2001) the difficulties of governing non-Indian fee lands within reservation boundaries is highlighted. The creation of checkerboard reservations (fee land surrounded by trust land) may burden the administration of governing by state/local v. tribal governments. In cases like Solem v. Bartlett (1984) (as discussed in Sherrill v. Oneida Indian Nation of New York, 544 U.S. (2005)) the fee land islands within trust land is expected to adversely affect private landowners neighboring tribal land.**
>
> **Fee property in an area dominated by trust land may be scarce or in shortage (Rosser, 2008). The purchase of fee land over trust land may be preferable to individuals and even Indians living in the area due to their ability to own the property. This may put a premium on fee land nearby trust land (through real or perceived advantages of owning land), driving up the price of the property resulting in a higher sales price for sellers of such property. One example is where a plaintiff owned a 'very small island of fee land' surrounded by Navajo trust land (Krakoff, 2004). The owner of the land runs a hotel and was actually able to benefit financially by being within Navajo Nation boundaries through increased visitation.**
>
> **The literature suggests the need for additional research to fully understand the effects of tribal land acquisition programs on non-Indian small property owners (Rosser, 2008). Thus, the magnitude and direction of effect to property values is unknown and inconclusive. However, in this instance, Lake Park Drive and Soboba Road would remain under the jurisdiction of the City of San Jacinto and residents of local communities would not have to pass through trust land to access their homes. These right-of-ways would remain under the jurisdiction and management of the City of San Jacinto as result of the fee-to-trust action, therefore, values of abutting fee properties to trust lands may or may not experience an "island effect" given that residents can directly access their properties. Refer to Section 2.1.1 and Figure 2-6 for additional information on the right-of-ways on the Project Site.**

Summary of Comments g: A decrease in the local tax base may adversely affect the ability to repay the City's Lake Park bridge construction bond.

Response g: As concurred by General Accounting Manager Mr. Tom Prill of the City of San Jacinto (pers. comm. on December 8, 2010), the City paid off the outstanding bond debt for the Lake Park Bridge project in September 2009 and there are no outstanding bonds currently allocated to the Project Site.

1.11.2 Environmental Justice

Summary of Comments a: The DEIS does not adequately address the environmental justice issues. The DEIS ignores the disproportionate economic, environmental, and health effects of the project on the minorities and low-income senior citizens/retirees (on fixed income) in communities surrounding the Development Site, and does not provide any mitigation of these effects.

Response a: The analysis of environmental justice employed data available from the U.S. Census Bureau and other reliable sources in order to identify minority and low-income groups in the Project Site and surrounding area. The smallest geographic unit for which data on poverty rates and incomes are available is the Census Block Group. Most of the property is located in Census Tract 43510, Block Group 1, with a small portion in Census Tract 43509, Block Group 1. The Project itself will be entirely located in Census Tract 43510, Block Group 1. In response to public comment, a deeper analysis was conducted to compare the average poverty rate in the Block Groups within the 11-mile radius surrounding the Project Site with poverty rates in Census Tract 43510, Block Group 1, and Census Tract 43509, Block Group 1. This comparison is provided below:

Average Poverty Rate in Block Groups within an 11-Mile Radius of the Project Site: 16.6 Percent Poverty Rate in Census Tract 43510, Block Group 1: 15.7 Percent Poverty Rate in Census Tract 43509, Block Group 1: 7.4 Percent

This data suggest that the poverty rate in the Project Site is lower than that in the general area surrounding the Project. An analysis of the age of the population was also carried out to examine how the percentages of older population in the two Block Groups compare to that in the general area. The results are presented below:

Average Percentage of Population 65 Years and Older in Block Groups within an 11-Mile Radius of the Project Site: 24 Percent Average Percentage of Population 65 Years and Older in Census Tract 43510, Block Group 1: 25 Percent Average Percentage of Population 65 Years and Older in Census Tract 43509, Block Group 1: 6 Percent

The data on age of the population suggests that while the percentage of people over 65 years of age is slightly higher (one percentage point) than the average in the area, it is not considerably high to be an environmental justice concern. Therefore, while the analysis acknowledges that there may be groups of low-income, older people present in the vicinity of the Project, our data does not provide enough evidence at that level to support this.

Table 3-20 in the FEIS has been modified to add data at the Block Group level for the two Block Groups in which the Property is located. Also, average data for all Block Groups within the 11-mile radius of the Project Site is also presented in **Table 3-20**. The related text under the subheading "Income-Related Measures of Social Well-Being" has also been modified as follows to incorporate Block Group level discussion, and some additional discussion on the communities of Soboba Springs Mobile Home Park, Soboba Springs, and Soboba Heights:

As derivatives of total personal income, per capita and median household income and poverty rates represent widely used economic indicators of social well-being. **Table 3-20(A)** presents these socioeconomic data for the Project Site and surrounding area, Riverside County, and California. These data are also presented for the two Block Groups in which the Project Site is located (Census Tract 43510, Block Group 1 and Census Tract 43509, Block Group 1) and for the average of all Block Groups within the 11-mile radius of the Project Site. In 20058, per capita personal income in Riverside County was $28,46930,341, which is about 704 percent of the statewide level of $38,67043,687 (20071 0 dollars). Based on these figures, per capita personal income in Riverside County ranked 36th in the state. There is some disparity between local and statewide level of $38,67041,214 (20072010 dollars). Based on these figures, per capita personal income in Riverside County ranked 36th in the state. There is some disparity between local and statewide conditions in the context of per capita as well as median household incomes. Based on 2000 Census data (20072010 dollars), median household incomes in Riverside County and California were $50,20953,688 and $55,60259,454, respectively. Median household income levels were even lower in San Jacinto at $35,85638,340. As for the Reservation, the median household income was $75,47080,699 in 1999. Finally, poverty rates represent the percentage of an area's total population living at or below the poverty threshold established by the U.S. Census Bureau. Based on 2000 Census data, the poverty rate was 20.3 percent in San Jacinto, 17.7 percent on the Reservation, 14.2 percent in Riverside County, and 14.2 percent in the State of California.

The smallest geographic unit for which data on poverty rates and incomes are available is the Census Block Group. Most of the property is located in Census Tract 43510, Block Group 1, with a small portion in Census Tract 43509, Block Group 1. The Project itself will be entirely located in Census Tract 43510, Block Group 1. The communities of Soboba Springs Mobile Home Park, Soboba Springs, and Soboba Heights are also mostly located in Census Tract 43510, Block Group 1, while the Calicinto Ranch, which runs programs for children of incarcerated parents, is located in Census Tract 43509, Block Group 1. Analysis was conducted to compare the average poverty rate in the Block Groups within the 11-mile radius surrounding the Project Site with poverty rates in Census Tract 43510, Block Group 1, and Census Tract 43509, Block Group 1. This comparison is provided in Table 3.20(A). These data suggest that the poverty rate in the Project Site is lower than that in the general area surrounding the Project.

All efforts have been made to obtain, present, and analyze the most current published data from reliable sources in Sections 3.6.3 and 4.6 of the FEIS. It is important to point out, however, that some data at the lowest geographic units of analysis, such as Census Block Groups and Census Blocks, are only available for 2000. Analyses at these levels are critical for identifying low-income and minority groups directly adjacent to Project Site.

Summary of Comments b: The FEIS should consider the negative social effects of gambling on low income groups, minorities, senior citizens, and problem gamblers. Problem gamblers are more likely to commit crimes, which could pose a safety risk to the surrounding communities. The DEIS does not address the issue of effects on problem gamblers and their families, nor does it provide any mitigation measures (such as outreach programs).

Response b: Regarding concerns about the social effects of gambling on low income groups, minorities, senior citizens, and problem gamblers, the Proposed Action will not increase gaming facilities (i.e. slot machines) in the area. The existing casino is located approximately one mile from the proposed casino, which implies that the communities that will have access to gaming facilities at the proposed casino currently have access to the same number of gaming facilities in the general area. Therefore, while the

analysis acknowledges the negative effects of gambling in general, given that the Proposed Action will not add to the existing gaming facilities in the area, there is no evidence to conclude that additional effects of gambling on any groups would occur due to the Proposed Action compared to existing conditions. In addition, the Tribe's gaming compact with the State contains provisions to mitigate for the effects of gambling (see **Section 1.11.1: Response b** of this public comment report).

1.12 RESOURCE USE PATTERNS

1.12.1 Transportation Networks

1.12.1.1 Effects to Nearby Residential Communities

Summary of Comments: The DEIS did not analyze potential effects to residents of the surrounding communities, particularly Soboba Springs Mobile Home Park and the Soboba Springs and Soboba Heights communities. Residents testified during public meetings that during special events, access to their homes was blocked due to "bumper-to-bumper" traffic along Lake Park Drive and Soboba Springs Road. The only mitigation proposed for the "bumper-to-bumper" traffic expected to be generated by special events at the proposed arena, creating access issues for the Soboba Springs Mobile Estates park, potentially blocking the park's only egress point by the traffic on Lake Park Drive, and effecting the Soboba Springs community and the Soboba Heights community, is to provide off-site parking "near major thoroughfares" and shuttles from the parking center.

Residents have expressed concern that they would not be able to enter or exit their park during events, because the only park entrance is located on Lake Park Drive and there is no traffic light at that point on Lake Park Drive. The DEIS did not adequately address this issue.

Response: The updated traffic impact analysis (Appendix T of the FEIS) has analyzed the traffic effects to residential communities by analyzing the intersection of Soboba Springs Drive/Lake Park Drive (the Soboba Springs Mobile Estates access) as well as the intersection of Chabella Drive/Soboba Road.

As discussed in Section 4.7 of the FEIS, for Opening Year (2010) with project traffic conditions and without improvements, the intersection of Soboba Springs Drive/Lake Park Drive is projected to operate at unacceptable Levels of Service (LOS) under Proposed Action A, Proposed Action B, and Alternative 1. Mitigation measures have been incorporated into Section 5.7 of the FEIS in order for the intersection of Soboba Springs Drive/Lake Park Drive to operate at acceptable LOS during the peak hours for Opening Year (2010) with project traffic conditions.

For Year 2025 with project traffic conditions and without improvements, the intersection of Soboba Springs Drive/Lake Park Drive is projected to operate at unacceptable LOS under Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Section 4.10 of the FEIS). Mitigation measures have been incorporated into Section 5.7 of the FEIS in order for the intersection of Soboba Springs Drive/Lake Park Drive to operate at acceptable LOS during the peak hours for Year 2025 with project traffic conditions.

As discussed in Section 4.7 of the FEIS, for Opening Year (2010) with project traffic conditions and without improvements, the intersection of Soboba Road/Chabella Drive is projected to operate at acceptable LOS.

For Year 2025 with project traffic conditions and without improvements, the intersection of Soboba Road/Chabella Drive is projected to operate at unacceptable LOS for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Section 4.10 of the FEIS). Mitigation

measures have been incorporated into Section 5.7 of the FEIS in order for the intersection of Soboba Road/Chabella Drive to operate at acceptable LOS during the peak hours for Year 2025 with project traffic conditions.

A Transportation Management Plan (TMP) has been prepared and will be implemented as a mitigation measure to account for traffic during special events (see Section 5.7 and Appendix AB of the FEIS). Issues discussed in the TMP includes parking, site access, event notification, channelization, manual traffic control measures, valet/VIP services, designated parking areas, emergency/fire/medical services, and a monitoring measure.

As part of this analysis, consideration was given to the Soboba Springs Drive/Lake Park Drive intersection in order to provide mitigation measures to reduce traffic effects for these residents during times of special events. Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages (Appendix AB of the FEIS). In order to provide local residents with ease of access to and from their communities, the TMP recommended that traffic control personnel/police be situated at the project accesses and the intersections of Soboba Road/Chabella Drive, Soboba Road/Lake Park Drive, and Soboba Springs Drive/Lake Park Drive. Using traffic control personnel/police at the project accesses and the intersections of Soboba Road/Chabella Drive, Soboba Road/Lake Park Drive, and Soboba Springs Drive/Lake Park Drive would allow for traffic to flow to and from the Development Site as well as allow local residents access to and from their communities. Each intersection should have a minimum of one traffic control personnel/police directing traffic.

1.12.1.2 Emergency Evacuation, Emergency Response, and Access Issues

Summary of Comments: The California Gambling Control Commission has a regulation to address Emergency Evacuation and Preparedness Plans. The DEIS fails to adequately address this concern and something that is clearly required and must be included in a plan adopted under the California Gaming Control Commission regulation (CGCC-7). There is a critical need for safe emergency exits in case of an earthquake as well as the need for emergency vehicles to have access to the area. How would emergency medical services maneuver through heavily congested traffic to respond to medical emergencies? The road system here is inadequate to accommodate large amounts of traffic and in an emergency people would be trapped. Furthermore, residential communities will become islands in the event of the fee-to-trust transfer, which will result in restricted access and increased response times for emergency services.

In the interest of public safety, the project should provide an Alternate or Secondary Access(s).

Response: In response to concerns raised by the public, the TMP (see Section 5.7 and Appendix AB of the FEIS) was prepared to address traffic associated with special events and would be implemented as a mitigation measure. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured and the response protocol to be followed in the event of an emergency situation. The proposed protocol includes response times and other goals for emergency response. Also noted in the TMP is that with more than one access point, good emergency access is assured because there are two ways of reaching any point within the Project Site.

According to the TMP, in the event of an emergency, ambulances and emergency response vehicles can utilize shoulders, two way left-turn medians, and opposing traffic lanes (in this case the northbound lane(s) on Soboba Road and westbound lane(s) on Lake Park Drive) to arrive to and depart from the facility or surrounding neighborhoods in a timely manner. Concerning traffic congestion in the event of a large-scale emergency, both Soboba Road and Lake Park Drive can be utilized as thoroughfares for both patrons and employees of the Project Site and the surrounding communities as a means of evacuation. As

the roadways are currently constructed, this would allow for a total of 4 outbound lanes (2 lanes on Soboba Road and 2 lanes on Lake Park Drive) to be used for an evacuation. The shoulders can also be used as either general public outbound lanes or emergency personnel inbound/outbound lanes. The TMP concludes that it is safe to assume that the roadways have the capacity to evacuate the area within approximately one hour time.

The following language has been added to the "Parking and Access" discussion under Section 2.1.1 of the FEIS in order to clarify the accessibility of Lake Park Drive and Soboba Road upon the proposed fee-to-trust transfer:

> **During the public comment period, concerns were raised that the Proposed Action and Alternatives could restrict public access and the provision of public services to the Soboba Springs Mobile Estates and the Golf Course and hillside communities. Tribal Resolution No. CR07-HGFTT-51 (see Appendix J) acknowledges the existing easement for roadway, water lines and underground conduits and incidental purposes along the Project Site, which includes a roadway easement for Lake Park Drive and Soboba Road. Furthermore, the Resolution acknowledges, as an exception to title of the Project Site, "rights of the public in and to any portion of the subject property lying within any lawfully established streets, roads, or highways." Finally, Soboba Road beyond the existing Reservation and Lake Park Drive are public roads and would continue to be public roads in the event of the fee-to-trust transfer. Neither roadway is included in the legal descriptions for the subject fee-to-trust parcels. A plat map prepared by First American Title Company illustrates the exclusion of public roadways from the parcels proposed for the fee-to-trust transfer (see Figure 2-6). As Lake Park Drive and Soboba Road form no part of the subject parcels, the trust acquisition should have no effect on the public's right to use the roads or the ability of law enforcement personnel to access local communities. Therefore, access to the residential communities nearby the Project Site would remain unimpeded.**

Please see Section 2.12.2.2 Jurisdictional Issues above for a more detailed discussion of Land Use issues.

1.12.1.3 Mitigation Implementation

Summary of Comments a: The following comments pertain to the implementation schedule and assigning financial responsibility for proposed mitigation measures:

- The DEIS offers as mitigation measures the installation of traffic lights at various intersections, both on the Reservation and in the cities of San Jacinto and Hemet. Another proposed mitigation measure is the alteration of Lake Park Drive and Soboba Road to secondary highway width at certain points adjacent to the Project. The installation of traffic lights off the Reservation (a mitigation measure specified in the DEIS) relies upon funds being provided by the Tribe to the cities and the cooperation of the cities in the installation of signals. Furthermore, the DEIS proposes improvements that include two traffic signals on Soboba Road and two traffic signals on I-215 freeway ramps. The DEIS does not provide an implementation schedule or assign financial responsibility on any party for installing the traffic control signals.
- Relative to mitigation proposed for the intersection of Florida and San Jacinto, the DEIS does not identify how the necessary improvements will be funded. The DEIS states that signal mitigation fees would be paid, but signal mitigation fees are for installation of signals only and intersection improvements are not included in the fee. Furthermore, please clarify who would be responsible for intersection improvement implementation. The DEIS should include language calling for an agreement between the City and the Tribe clearly outlining responsibilities and appropriate payment for services and costs.

- The Tribe should be required to make any off-site improvements where the Proposed Action and Alternatives alone would have a significant traffic effect. The payment of fair share fees would not be considered sufficient mitigation. In those cases where the Proposed Action and Alternatives contribute to a cumulative effect, the payment of fair share would be acceptable, provided the fair share is computed on the basis of the percentage of the traffic contributed by the Proposed Action and Alternatives compared to traffic growth.

Response a: As discussed in Section 5.7.1 of the FEIS, the Tribe shall contribute to the funding of mitigation for traffic improvements in the Project Site and surrounding area. The contribution shall be based on the amount of traffic generated by land uses on the Project Site as a percentage of the overall traffic volume. This percentage will be derived from the results included in the traffic impact analysis (Appendix T of the FEIS). The Tribe's contribution shall be provided to the agency undertaking the improvement (e.g., Caltrans, Riverside County, City of San Jacinto). In the case of improvements that are identified as the sole responsibility of the Tribe, the Tribe must contribute 100 percent of the necessary funds. The intersections that the Tribe will pay for in full are the ones pertaining to site access and require the creation of new access points.

The Record of Decision (ROD) is the document that commits the agency to mitigation, not the FEIS. Pursuant to the NEPA process, the ROD serves as an agreement between parties to implement all prescribed mitigation measures. Please see Section 2.18 of this public comment report for a more detailed discussion on mitigation adoption.

Summary of Comments b: The traffic study identified the intersection of Florida and San Jacinto at a "D" level of service for 2010 with mitigation improvements. The improvements included adding an additional westbound through lane, an additional eastbound left turn lane and an eastbound right turn lane. Any proposed mitigation measure which itself causes effects, needs to be analyzed in the FEIS. Adding additional through lanes and turn lanes will require condemnation of land to facilitate the additional right of way. The DEIS does not address this effect and a full analysis of this necessary widening should be performed. As the Tribe does not have authority to condemn land, are they expecting the City of Hemet to assume responsibility?

Response b: Table 5-4 of the FEIS shows that Opening Year (2010) with project traffic conditions improvements include adding an additional westbound through lane. The westbound shared through-right turn lane can be accommodated by restriping the existing westbound right turn lane to a shared through-right turn lane while striping a receiving lane on the west leg of the intersection.

The same table shows that for Year 2025 with project traffic conditions, an additional eastbound left turn lane will be required. It should be noted that an eastbound right turn lane improvement is not recommended. The additional eastbound left turn lane will require restriping of the eastbound lanes and widening at the intersection on the west leg and east leg with removal of the landscaping within the right-of-way.

Summary of Comments c: The DEIS finds that six intersections and three freeway segments will operate at unacceptable LOS during peak hours without improvements. Yet, the only improvements that are proposed include two traffic signals on Soboba Road and two traffic signals on I-215 freeway ramps. The DEIS does not explain how two traffic signals will increase LOS to acceptable levels on six intersections.

Response c The traffic impact analysis proposed mitigation measures for all intersections and freeway segments which were projected to operate at unacceptable levels of service to bring those intersections and freeway segments to acceptable levels of service. It should be noted that the amount of intersection delay acceptable for an unsignalized intersection is substantially less than for a signalized intersection.

For instance, the Highway Capacity Manual describes Level of Service D for an unsignalized intersection to have 35.0 seconds of delay for any one movement, while an average of 55.0 seconds of delay is acceptable for all movements combined at a signalized intersection. Level of Service E for an unsignalized intersection may have 50.0 seconds of delay for any one movement, while an average of 80.0 seconds of delay is acceptable for all movements combined at a signalized intersection.

All relevant, reasonable traffic mitigation measures that could improve the proposed project have been identified. Good faith efforts have been made throughout the environmental review process to design the project so as to minimize traffic effects and to propose mitigation measures that are intended to further minimize effects to transportation networks.

As described in Section 5.7 of the FEIS, the Tribe shall contribute to the funding of mitigation for traffic improvements in the Project Site and surrounding area, including those identified in Section VI and Appendix G of the Traffic Impact Study (see Appendix T) and summarized in Table 5-4. The contribution shall be based on the amount of traffic generated by land uses on the Project Site as a percentage of the overall traffic volume. The Tribe's contribution shall be provided to the agency undertaking the improvement (e.g., Caltrans, Riverside County, City of San Jacinto). In the case of improvements that are identified within this document as the sole responsibility of the Tribe, the Tribe's contribution must provide 100 percent of the necessary funds. The intersections that the Tribe will pay for in full are the ones pertaining to site access and require the creation of new access points.

Summary of Comments d: The DEIS suggests potential sites for off-site parking, each of which is an educational facility, including four elementary schools. The use of elementary schools and high schools as mitigation for event parking is not fully explained and we have concerns whether this mitigation measure is adequate, particularly when those educational facilities are likely to have their own nighttime activities requiring their use of their parking structures.

Response d: A TMP has been prepared and will be implemented to account for traffic during special events. This study includes information pertaining to event parking during special events and potential mitigation measures. The TMP does not call for the use of schools to manage event traffic. Language that appeared in Section 5.7.1 of the DEIS pertaining to off-site parking at educational facilities has been removed. This language was initially added to mitigate for the increased traffic during special events by reducing the number of vehicles that would drive to the Development Site, not due to a concern regarding the sufficiency of on-site parking. As the TMP will be implemented to manage traffic from special events, the provision of off-site parking is no longer necessary. Furthermore, as described in Section 2.1 of the FEIS, the parking lot for the existing Soboba Casino would provide overflow parking for the Proposed Action and the Tribe would provide shuttle service.

It should be noted that the project utilizes shared parking procedures recommended by the Urban Land Institute (ULI). The idea of shared parking is that the various land uses have peak parking demands at different points in time, on different days of the week, and the number of parking spaces required is not the sum of the parking requirements for each land use, but rather less. The peak demands for the various land uses can be non-coincidental with an opportunity for sharing of parking. In addition, interaction between the hotel and casino will occur with the patron of the hotel visiting the casino and restaurants without the need for an additional parking space. Other interaction will occur between the hotel and convention center.

Summary of Comments e: As part of the Proposed Action and Alternatives, Soboba Road, which would serve 30 percent of the traffic to and from the proposed project, should be improved to an all-weather facility with sufficient capacity to serve the forecasted traffic of over 30,000 vehicles per day. In addition to carrying routine high traffic volumes to and from the proposed facility, the availability of Soboba Road

as an all-weather roadway with adequate capacity would be crucial in the event of evacuations and other emergencies.

Response e: Soboba Road is classified as a Secondary highway on the City of San Jacinto General Plan Circulation Element and County of Riverside General Plan Circulation Element. A Secondary highway cross-section reflects two lanes in each direction (four lanes total). The traffic impact analysis recommends that Soboba Road be constructed as a four-lane Secondary highway between Gilman Springs Road and Lake Park Drive for Opening Year (2010) and Year 2025 traffic conditions.

Mitigation measures to improve Soboba Road are described in Section 5.7.1 and shown in Table 5-4 of the FEIS, while site-specific circulation and access recommendations for the Proposed Action and Alternatives are depicted on Figures 5-1a through Figure 5-5b of the document.

Summary of Comments f: The current casino generates traffic difficulties (e.g. speeding) that have not been adequately addressed or mitigated by the City and Tribe.

Response f: The reasons for funding or denying past requests for road improvements are not part of this project and are outside the scope of this analysis.

Summary of Comments g: Proposed mitigation measures do not mention whether or not the agencies responsible for these proposed improvements have been contacted and given their approval to make these improvements.

Response g: The appropriate agencies have been contacted and have reviewed the traffic impact analysis. Based on comments from these agencies, an updated traffic impact analysis has been prepared (see Appendix T).

Summary of Comments h: Additional mitigation measures should be considered, including the following:

- Widen the road between the casino and Lake Park Drive and make the traffic split three ways between Esplanade Avenue, Main Street, and Soboba Road;
- Build another bridge at the end of San Jacinto Street to cross the river to ease traffic which would be on the west side of the Soboba Springs Country Club, or build a fjord across the river to Valle Vista as an emergency access route;

All traffic improvements should be completed before the Proposed Action and Alternatives are considered.

Response h: Section 5.7.1 of the FEIS includes a mitigation measure which would widen Lake Park Drive and Soboba Road adjacent to the Development Site. With more than one entrance, good emergency access is assured because there are two ways of reaching any point within the site. The City of San Jacinto General Plan Circulation Element does not recommend another bridge to cross the river at the end of San Jacinto Street or Valle Vista. Mitigation measures to reduce traffic effects are described in Section 5.7.1 and shown in Table 5-4 of the FEIS, while site-specific circulation and access recommendations for the Proposed Action and Alternatives are depicted on Figures 5-1a through Figure 5-5b of the document. Improvements to Lake Park Drive and Soboba Road would occur during the first phase of development.

As stated in Section 5.7.1, improvements to Lake Park Drive and Soboba Road would be performed in conjunction with the development of the proposed facilities; traffic signals shall be installed when

warranted at the Development Site entrances/Soboba Road intersections; and, on-site traffic signing/striping shall be implemented in conjunction with detailed construction plans for the Development Site.

1.12.1.4 Requests for Additional Analysis

Summary of Comments a: The DEIS analysis of effects to transportation networks is inadequate in scope and the number of intersections analyzed. At a minimum, the traffic study should analyze the following local intersections:

- Soboba Road/Gilman Springs Road
- Ramp terminals at the interchange of Gilman Springs Road and SR-79 (Sanderson Avenue)
- Ramp terminals at the interchange of SR-60/Gilman Springs Road
- SR-74/Ramona Expressway
- Ramona Expressway/Sanderson Avenue (in San Jacinto)
- Ramona Expressway/Bridge Street
- Mountain Avenue/Soboba Street
- Mountain Avenue/Ramona Expressway/Cedar Avenue
- San Jacinto Street at Devonshire Avenue
- San Jacinto Street at Menlo Avenue
- State Street at Florida Avenue
- State Street at Devonshire Avenue
- State Street at Menlo Avenue
- State Street at Esplanade Avenue
- State Street at Stetson Avenue
- State Street at Domengioni Parkway

Furthermore, the FEIS should include an analysis of the following roadway segments:

- Soboba Road between the project and Gilman Springs Road
- Gilman Springs Road between Soboba Road and SR-60 (for analysis purposes this segment may need to be subdivided)
- SR-79 between Gilman Springs Road and I-10 (for analysis purposes this segment may need to be subdivided)
- Ramona Expressway between Main Street in San Jacinto and Perris City Limits (for analysis purposes this segment may need to be subdivided)
- Mountain Avenue/Ramona Expressway between Main Street in San Jacinto and SR-74 (for analysis purposes this segment may need to be subdivided)

Response a: According to the County of Riverside Traffic Impact Analysis Preparation Guide, April 2008, "the minimum area to be studied shall include any intersection of "Collector" or higher classification street, with "Collector" or higher classification streets, at which the proposed project will

add 50 or more peak hour trips, not exceeding a 5-mile radius from the Project Site." The additional intersections and roadway segments requested for analysis which adhere to these guidelines have been added to the updated traffic impact analysis, inclusive of the following:

Intersections

- Soboba Road/Gilman Springs Road
- Ramona Expressway/Sanderson Avenue (In San Jacinto)
- San Jacinto Street at Devonshire Avenue
- San Jacinto Street at Menlo Avenue
- State Street at Florida Avenue

Mountain Avenue/Soboba Street was already assessed in the traffic impact analysis.

The following requested intersections do not meet the minimum 50 peak hour trips threshold:

- Mountain Avenue/Ramona Expressway/Cedar Avenue
- State Street at Devonshire Avenue
- State Street at Menlo Avenue
- State Street at Esplanade Avenue
- State Street at Stetson Avenue
- State Street at Domengioni Parkway

Sections 4.7 and 4.10 provide a summary of the study area intersection LOS for Opening Year (2010) and Year 2025 traffic conditions. The Opening Year (2010) study area intersections are projected to operate at acceptable LOS during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 traffic conditions (see Tables 4-27, 4-31, 4-35, 4-39, and 4-43 in the FEIS). The Year 2025 study area intersections are projected to operate at acceptable LOS during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 traffic conditions (see Table 100(a) in the FEIS).

Roadway Segments

- Soboba Road between the project and Gilman Springs Road
- Gilman Springs Road north of Soboba Road (added to the updated traffic impact analysis until it exceeds the 5 mile radius threshold)
- Ramona Expressway from Main Street to west of Sanderson Street (added to the updated traffic impact analysis until it exceeds the 5 mile radius threshold)
- Mountain Avenue/Ramona Expressway from Main Street to east of Soboba Street (added to the updated traffic impact analysis until the proposed project does not meet the 50 peak hour trip threshold)

The following requested intersections and roadway segment are located beyond a 5-mile radius of the Project Site:

- Ramp terminals at the interchange of Gilman Springs Road and SR-79 (Sanderson Avenue)

- Ramp terminals at the interchange of SR-60/Gilman Springs Road
- Ramona Expressway/Bridge Street
- SR-79 between Gilman Springs Road and I-10

Sections 4.7 and 4.10 provide a summary of the study area roadway segments LOS for Opening Year (2010) and Year 2025 traffic conditions. The Opening Year (2010) study area roadway segments are projected to operate at acceptable LOS during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 traffic conditions (see Table 4-27b in the FEIS). The Year 2025 study area roadway segments are projected to operate at acceptable LOS during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 traffic conditions (see Table 4-100(b) in the FEIS).

As described in Section 5.7 of the FEIS, the Tribe shall contribute to the funding of mitigation for traffic improvements in the Project Site and surrounding area, including those identified in Section VI and Appendix G of the Traffic Impact Study (see Appendix T) and summarized in Table 5-4. The contribution shall be based on the amount of traffic generated by land uses on the Project Site as a percentage of the overall traffic volume. The Tribe's contribution shall be provided to the agency undertaking the improvement (e.g., Caltrans, Riverside County, City of San Jacinto). In the case of improvements that are identified within this document as the sole responsibility of the Tribe, the Tribe's contribution must provide 100 percent of the necessary funds. The intersections that the Tribe will pay for in full are the ones pertaining to site access and require the creation of new access points.

Summary of Comments b: According to the traffic study, the proposed effects on the I-10 and I-215 freeways were analyzed. However, the study did not address effects to Highway 79 expansion and re-alignment which is slated for construction in year 2011 and represents the primary north-south corridor in the San Jacinto Valley. At a minimum, the FEIS should analyze effects to the intersection of:

- Highway 79 and Florida Avenue
- Highway 79 and Esplanade Avenue

Response b: According to the County of Riverside Traffic Impact Analysis Preparation Guide, April 2008, "the minimum area to be studied shall include any intersection of "Collector" or higher classification street, with "Collector" or higher classification streets, at which the proposed project will add 50 or more peak hour trips, not exceeding a 5-mile radius from the Project Site." The additional intersections requested for analysis are located beyond the 5-mile radius from the Project Site.

Summary of Comments c: The DEIS fails to address the effects that the Proposed Action and Alternatives will have on Gilman Springs Road.

Response c: The updated traffic impact analysis (Appendix T of the FEIS) has analyzed the intersection of State Street/Gilman Springs Road at Soboba Road as well as the roadway segment north and east of the intersection. As stated in Section 3.7 of the FEIS, the intersection of State Street/Gilman Springs Road at Soboba Road operates at unacceptable LOS during the peak hours and appears to currently warrant a traffic signal for existing traffic conditions. As discussed in Section 4.7 of the FEIS, the Opening Year (2010) traffic conditions show that the intersection of State Street/Gilman Springs Road at Soboba Road is projected to operate at acceptable LOS during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Tables 4-27(a), 4-31, 4-35, 4-39, and 4-43 in the FEIS).

As discussed in Section 4.10 of the FEIS, the Year 2025 traffic conditions show that the intersection of State Street/Gilman Springs Road at Soboba Road is projected to operate at acceptable Levels of Service during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Table 4-100(b) of the FEIS).

The roadway segment of Gilman Springs Road, north of Soboba Road currently operates at an unacceptable LOS for existing traffic conditions. The Opening Year (2010) traffic conditions show that the roadway segment of Gilman Springs Road, north of Soboba Road is projected to operate at an acceptable LOS, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Table 4-27(b) in the FEIS). The Year 2025 traffic conditions show that the roadway segment of Gilman Springs Road, north of Soboba Road is projected to operate at an acceptable LOS, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Table 5-4 in the FEIS).

Summary of Comments d: A TMP should be prepared to handle major special events like concert and other intense short-term peaks using the proposed convention center. The TMP should be submitted to the review and approval of all affected jurisdictions (including but not limited to, County Transportation Sheriff, CHP, CAL Fire, and the City of San Jacinto). The TMP should address such matters as:

- Special traffic controls, including Traffic Officers
- Need for off-site parking, if necessary,
- Bus or shuttle services,
- Pedestrian circulation,
- Avoidance of vehicular/pedestrian conflicts
- Other measures as may be appropriate

Response d: The Proposed Action and Alternatives are not subject to review and approval of state, county, or local officials. However, a TMP has been prepared for the project which addresses these points (see Appendix AB) as follows:

Special traffic controls, including Traffic Officers: Manual traffic control points should be manned with traffic control personnel/police in order to route traffic flow at intersections and at parking areas. At a minimum, traffic control personnel/police should be situated at each project access to be utilized for "special event" operations and at the intersection of Soboba Road/Lake Park Drive to account for site access (see Figures 1 to 5). In order to provide local residents with ease of access to and from their communities, it is recommended that traffic control personnel/police also be situated at the intersections of Soboba Springs Drive/Lake Park Drive and Soboba Road/Chabella Drive during events. Using traffic control personnel/police at the project accesses and the intersections of Soboba Road/Chabella Drive, Soboba Road/Lake Park Drive, and Soboba Springs Drive/Lake Park Drive will allow for traffic to flow to and from the project site as well as allow local residents access to and from their communities during special events. Each intersection should have a minimum of one traffic control personnel/police directing traffic.

Traffic control personnel/police can also be utilized within the project site to direct vehicles to the appropriate parking areas prior to an event and assist in the release of traffic when the event has ended.

On-site and off-site traffic control personnel/police should communicate to each other via "walkie-talkies" in order to be in constant contact. All on-site and off-site traffic control personnel/police should

be trained prior to starting work in the field and should be equipped with appropriate safety equipment (i.e. orange vest, etc.).

Need for off-site parking, if necessary, and bus or shuttle services: See **Section 1.12.1.3 Mitigation Measures: *Response d*** of this public comment report.

Pedestrian circulation and avoidance of vehicular/pedestrian conflicts: Pedestrian conflicts should be minimized as much as possible by directing pedestrians to designated pedestrian crossings. Pedestrian crossings should be clearly marked and signed for both pedestrians and vehicular traffic. Clearly identified pedestrian walkways should be situated as to minimize any potential conflict with vehicular traffic.

Other measures as may be appropriate: The TMP addresses parking, site access, event notification, channelization, manual traffic control, valet/VIP area, designated parking areas, emergency/fire/medical services, and a monitoring program.

Summary of Comments e: The DEIS states that traffic control will be provided on-site for special events. However, the DEIS fails to analyze off-site effects and the need for off-site traffic control and associated effects on police services and public works. A full analysis of off-site effects should be provided along with appropriate mitigation measures.

Response e: See ***Response d*** above.

Summary of Comments f: The Traffic Impact Analysis Preparation Guide developed by the Riverside County Transportation Department requires that the traffic and circulation effects of a proposed development project, General Plan Amendments, and Specific Plans be analyzed. A thorough analysis of traffic patterns must be completed by the Tribe prior to approval of the Proposed Action and Alternatives. A project scoping form must be submitted for approval prior to the preparation of the traffic study. A Traffic Impact Analysis must be developed which takes into consideration all of the traffic concerns the citizens of the three communities have already communicated such as zoning, city sphere of influence, intersections, traffic volumes, special events traffic and traffic speed.

Response f: The County is not the lead agency or a cooperating agency for this project. A traffic impact analysis and a TMP have been prepared for the project consistent with the requirements of NEPA. In response to the issues raised on traffic and transportation in the vicinity of the three neighborhoods, additional data was collected and analyzed at the intersections of these three neighborhoods. These findings were considered in the revised TIA and during the development of the TMP (see **Section 1.12.1.1** of this public comment report for a response to comments concerned about traffic effects to nearby residential communities).

1.12.1.5 Traffic Study Analysis

Summary of Comments a: The methodology employed by the traffic study is suspect. The DEIS incorporates a ten percent reduction in trips generated based on double counting but does not identify the assumption used in generating the figure. The DEIS also fails to provide sufficient detail to support the basis for the trip generation methodology used. Moreover, instead of using traffic data from neighboring casinos such as Pechanga, Morongo, and Fantasy Springs, which are Indian gaming casinos and would be more likely to result in realistic trip generation data for the Project, the DEIS appears to rely on a 2002 report and background documents used in a study in northern California casinos. Thus, the DEIS provides misleading and inaccurate information about trips generated by the Project

Response a: The ten percent reduction in vehicle trips was used as a conservative estimate to account for the internal capture present within the project. This percentage was derived from other similar projects in California. This internal capture was applied to the casino, events center, convention center, and hotel. It was not applied to the service station with convenience market or the fire station. It is reasonable to assume that this project will have interaction between the casino, events arena, convention center, and hotel without additional vehicle trips occurring between each land use. The "Horseshoe Grande Development Market Analysis – Draft Report" confirmed that nearly all of the hotel guests are expected to also visit the casino; hence they are accounted for within the trip generation characteristics of the casino itself.[8]

Located in Appendix T of the traffic effect analysis is the Shingle Springs Rancheria Interchange Transportation Circulation Report dated April 2002. This report was used to derive the traffic generation rates. This comprehensive analysis has also been used as a basis for trip generation in the County of San Bernardino as well as in Northern California for Indian gaming style casinos. As part of formulating trip generation rates, this study used multiple approaches. One approach reviewed a marketing study performed for an earlier, and larger, version of the project. Another approach investigated trip generation characteristics at other casinos, including both information within traffic studies for other casinos, and the results of surveys conducted at two Northern California Indian gaming casinos for the project. The March 1999 Institute of Transportation Engineers Journal article titled "Gaming Casino Traffic" summarized the results of year long traffic counts at St. Louis, Missouri area casinos. This article provided for the factoring of traffic counts or trip generation rates collected during an off-peak month to a peak month condition. By using this information, the traffic counts were able to be adjusted to establish trip generation rates for peak month conditions.

This report also included a comparison to the "Report on the Potential Impacts of Tribal Gaming on Northern and Eastern San Diego County" prepared by the San Diego County Department of Public Works and the "Trip Generation Rates for Las Vegas Area Hotel-Casinos" prepared by the Institute of Transportation Engineers Journal to validate the trip generation rates.[9][10]

This report is the best known source for trip generation rates for an Indian gaming casino. Trip generation information is not available for the Pechanga, Morongo, and Fantasy Springs casinos.. Difficulty would arise in discerning which vehicle trips to the casino were used for which land use and of these vehicle trips, which vehicle trips utilized multiple land uses thus accounting for interaction. This difficulty would also prove problematic in generating accurate trip generation rates since land uses and quantities differ between the casinos. Using traffic counts to generate the total number of daily, morning peak hour, and evening peak hour trip generation rates also poses the problem of relating this data to the project. For example, trips generated at a casino half the size of the project cannot be multiplied by two to estimate Project trips because trip generation rates for a casino are not linear, but are u-shaped. This has been shown in the Shingle Springs Rancheria Interchange Transportation Circulation Report dated April 2002 that was used as the methodology for computing the project's trip generation.

Summary of Comments b: The DEIS did not consider the possibility of creating an alternative access point to the reservation from Esplanade Avenue. Doing so could alleviate some traffic effects at the Lake

[8] Based on the confidentiality of certain data and values, the "Horseshoe Grande Development Market Analysis – Draft Report" is bound under separate cover for confidentiality and cannot be obtained under the Freedom of Information Act. Accordingly, some of these data are omitted from the presentation of results in the FEIS.

[9] County of San Diego, November 1, 2000, *Report on the Potential Impacts of Tribal Gaming on Northern and Eastern San Diego County*, prepared for the County of San Diego Board of Supervisors.

[10] Ackeret, K. and R. C. Hosea, III, 1992, "Trip Generation Rates for Las. Vegas Area Hotel-Casinos," *ITE Journal*, Vol. 62: 5, pp. 33-37, Institute of Transportation Engineers, Washington, D.C.

Park Drive and Ramona Expressway intersection, as well as effects on local residents that have expressed concerns regarding access to their properties during special events. Doing so would create an alternative route that could assist in rapid evacuation in case of an emergency. Given the above, BIA should strongly consider a mitigation measure requiring the extension of Esplanade Avenue in order to more efficiently serve the Project area and protect area residents as well as visitors to the Project.

Response b: While this alternative access would help alleviate traffic from Lake Park Drive, the access route would run parallel to Lake Park Drive and traffic would continue to utilize Ramona Expressway/Mountain Avenue which would not create a significant reduction of traffic except for Lake Park Drive between Ramona Expressway and Soboba Road and Ramona Expressway/Mountain Avenue between Lake Park Drive/Main Street and Esplanade Avenue. It would also create additional traffic effects along Soboba Road from Lake Park Drive to Esplanade Avenue where the alternative access would then be created to cross the San Jacinto River and intersect with Ramona Expressway/Mountain Avenue at Esplanade Avenue.

As a means to address the concerns of residents, the intersections of Soboba Springs Drive/Lake Park Drive and Chabella Drive/Soboba Road were added to the analysis. Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP (see **Section 1.12.1.1** of this public comment report).

Summary of Comments c: Traffic during special events is a major concern. While the DEIS acknowledges that the proposed Events Arena could create 6,848 daily trips, and while the Scoping Report stated that the BIA would do so, no analysis of that many cars on the roadways at one time was included in the DEIS. Instead, the DEIS simply finds that "the on-site and off-site roadway improvements prescribed in Section 5.7.2 and the intersection improvements shown in Table 5-4 would improve traffic conditions during normal operations as well as during special events". Notably, the DEIS does not assert that traffic effects would be less than significant during events, only that conditions would be "improved".

Response c: For the Proposed Action A, the traffic generation for the events arena is approximately 6,848 daily vehicle trips. These 6,848 vehicle trips are the daily total and do not represent the peak hour total or a total to be expected to occur at one specific period during the day. To account for traffic conditions during special events, a TMP has been prepared (see Appendix AB). The TMP provides mitigation measures for on-site and off-site traffic conditions during special events. The on-site and off-site roadway improvements prescribed in Section 5.7.1 and the intersection improvements shown in Table 5-4 are projected to mitigate the study area intersections and roadway segments to operate at acceptable LOS during the peak hours. Furthermore, traffic conditions will be alleviated by the two access points built into the Proposed Action and Alternatives.

An updated traffic impact analysis (Appendix T of the FEIS) was prepared in accordance with Riverside County and City of San Jacinto traffic impact analysis preparation guidelines. Typically, traffic mitigation is based upon the weekday peak hours when ambient traffic volumes are the highest. The manual "A Policy on Geometric Design of Highways and Streets" prepared by the American Association of State Highway and Transportation Officials, 2001, states that it is recommended that the hourly traffic volume that should generally be used in roadway design is the 30th highest hourly volume of the year. For example, roadway design is not typically based upon the holiday volumes around a shopping mall or for a special event. For those hours where traffic is above the 30th highest hourly volume, a TMP (see Appendix AB) has been prepared. The TMP implements traffic solutions for special events at the casino and outlines steps to minimize traffic impacts and delays associated with this project. The TMP summarizes the procedures that may be used to minimize traffic impacts and the process for distribution of accurate and timely information to the public. The TMP will be implemented as a mitigation measure

to account for traffic during special events (see Section 5.7 and Appendix AB of the FEIS). Issues discussed in the TMP includes parking, site access, event notification, channelization, manual traffic control measures, valet/VIP services, designated parking areas, emergency/fire/medical services, and monitoring measure.

Summary of Comments d: The Proposed Action would increase traffic by 100 times the number of existing daily trips.

Response d: The Proposed Action is not expected to increase the number of daily traffic trips by a factor of 100. As stated in Section 3.7 of the FEIS, the existing casino at 23333 Soboba Road generates approximately 2,957 daily vehicle trips. Proposed Action A is projected to generate a total of approximately 22,525 daily vehicle trips (see Section 4.7 of the FEIS). Approximately 19,568 more daily vehicle trips would occur under Proposed Action A than are currently generated by the existing casino, which is a magnitude of approximately 6.6 times greater than the number of existing daily trips.

Summary of Comments e: Existing vehicle counts show a staggering amount of traffic for local roads in the Project Area. This 24 hour traffic is definitely detrimental to the surrounding communities. The Proposed Action and Alternatives would exacerbate existing conditions.

Response e: Traffic counts have been included in Section 3.7 of the FEIS and mitigation measures have been recommended in Section 5.7 of the FEIS in order to achieve acceptable Level of Service for study area intersections and roadway segments for Year 2025 traffic conditions.

Summary of Comments f: Pedestrian safety has not been addressed in the DEIS.

Response f: An updated traffic impact analysis has been prepared in accordance with Riverside County and City of San Jacinto traffic impact analysis preparation guidelines (Appendix T of the FEIS) and would be implemented as a mitigation measure (see Section 5.7 of the FEIS). See ***Response d*** in **Section 1.12.1.4** of this public comment report for a discussion of how the TMP addresses pedestrian circulation and avoidance of vehicular/pedestrian conflicts.

Summary of Comments g: The Oaks Retreat facilities will bring more traffic to the area and the mitigation measures (i.e. traffic lights) for that project are still being negotiated after two years.

Response g: The Tribe has entered into an agreement with the City of San Jacinto to provide funding for the traffic/transportation mitigation measures developed during the NEPA process for that project. This agreement was adopted on January 28, 2010 and resulted in the City of San Jacinto's withdraw of an administrative protest to the action.

Summary of Comments h: The DEIS's traffic analysis relies on methodologies and assumptions that are wholly inappropriate for the project, resulting in serious underestimates of traffic. Since special events would occur on the weekend, the analysis should have been based on weekend traffic counts. In order to provide a conservative analysis, the traffic analysis should have assumed 100 percent use of the convention center and events arena during peak hour to account for special events.

Response h: An updated traffic impact analysis was prepared in accordance with Riverside County and City of San Jacinto traffic impact analysis preparation guidelines. Typically, traffic mitigation is based upon the weekday peak hours when ambient traffic volumes are the highest. The manual "A Policy on Geometric Design of Highways and Streets" prepared by the American Association of State Highway and Transportation Officials, 2001, states that it is recommended that the hourly traffic volume that should generally be used in roadway design is the 30th highest hourly volume of the year. For example, roadway

design is not typically based upon the holiday volumes around a shopping mall or for a special event. For those hours where traffic is above the 30th highest hourly volume, a TMP (see Appendix AB) has been prepared. The TMP implements traffic solutions for special events at the casino and outlines steps to minimize traffic impacts and delays associated with this project. The TMP summarizes the procedures that may be used to minimize traffic impacts and the process for distribution of accurate and timely information to the public. The TMP will be implemented as a mitigation measure to account for traffic during special events (see Section 5.7 and Appendix AB of the FEIS). Issues discussed in the TMP includes parking, site access, event notification, channelization, manual traffic control measures, valet/VIP services, designated parking areas, emergency/fire/medical services, and monitoring measure.

Summary of Comments i: No worksheets are provided in the report or appendix to verify any of the calculations or methodology used to forecast Opening Year (2010) peak hour turning movement volumes. Also, using a traffic forecast model to estimate near-term traffic volumes is less accurate than using existing peak hour traffic count data along with cumulative data to estimate near-term traffic volumes.

Response i: The traffic impact analysis (Appendix T of the FEIS) was prepared in accordance with Riverside County and City of San Jacinto traffic impact analysis preparation guidelines. The peak hour traffic turning movement volumes were derived in accordance with City of San Jacinto guidelines. Existing delay is based upon manual morning and evening peak hour intersection turning movement counts obtained by Kunzman Associates, Inc. in April/October/November 2007 and January 2010. Traffic count worksheets are provided in Appendix B of the revised traffic impact analysis (Appendix T of the FEIS).

Summary of Comments j: HCM delay calculations for Intersection #2 San Jacinto Street (NS) at Ramona Boulevard/Main Street (EW) were performed using Traffix version 7.8. Traffix is limited in its ability to analyze 5-legged intersections. The analysis performed in this study assumes a 4-legged intersection with the northwest leg (Ramona Boulevard) and west leg (Main Street) combined. In order to properly analyze this intersection per HCM methodology, the lane group and demand flow rate, the saturation flow rate, the capacity and volume/capacity ratio, and delays must be calculated for all 5 approached individually. This can be done manually or by using software capable of this analysis such as Synchro 7.

Response j: The updated traffic impact analysis has analyzed intersections (HCM delay methodology) using Traffix version 7.9. The commenter is correct that Traffix is limited in its ability to analyze 5-legged intersections. However, this intersection has been analyzed in accordance with commonly accepted practice in the County of Riverside.

Summary of Comments k: The community can't wait until 2025 for improvements as the safety concerns and effects will be immediate.

Response k: Several improvements will occur prior to 2025. Section 5.7.1 of the FEIS discusses mitigation measures to reduce project effects on transportation networks. Figures 5-1 through 5-5 show prescribed mitigation measures for the Proposed Action and Alternatives for both opening year and 2025. Table 5-4 shows the intersection improvements prescribed for the Proposed Action and Alternatives for opening year and 2025.

Summary of Comments l: Has the City of San Jacinto permitted realignment of Lake Park and Soboba Road? This would be a major disruption of access to communities, utility interruption, increased pollution, and it is not a mitigated issue.

Response l: Realignment of Lake Park Drive hinges on which project alternative is chosen. This process is ongoing. The City of San Jacinto has not yet permitted the realignment.

Summary of Comments m: The new casino and hotel will be closer to the main roads and it won't take as long to get to the new casino as it does now. It will all be on the city streets.

Response m: Comment is noted and made part of the administrative record.

1.12.2 Land Use

1.12.2.1 Consistency with the City of San Jacinto General Plan

Summary of Comments: If the Project Site is taken into trust, local jurisdictions will no longer have input into use of the Project Site. The Proposed Action and Alternatives are incompatible with the City of San Jacinto's land use and zoning designations for the Project Site, and the Proposed Action would not be allowable according to the City's existing land use regulations. The project would be inconsistent with numerous goals and policies specified in the San Jacinto General Plan. The FEIS should model its analysis of land use compatibility after the 2006 EIS for the Oneida Nation of New York Conveyance of Lands into Trust.

The DEIS did not adequately address the project's immediate and long-term compatibility effects with surrounding land uses. It is not ethical to alter zoning after residents purchased their homes in the area based on the understanding that nearby uses would remain light residential in character, and the Project Site would be developed as per the Soboba Springs Redevelopment Project.

Response: Implementation of the Proposed Action would result in the federal government taking the Project Site into trust for the benefit of the Tribe. As described in Section 4.7 of the FEIS, Tribal lands are not subject to County or City rules and regulations once the land is in trust. Application and enforcement of local land use and zoning enactments on trust lands is beyond the jurisdiction of local governments. Tribes retain jurisdiction over land use and zoning matters on lands they control.

A detailed evaluation of potential conflicts between the Proposed Project alternatives and adopted City land use regulations and policies was included within Section 4.7 of the DEIS. The significance of potential conflicts with local land use plans resulting from the proposed project will be considered by the BIA during the decision-making process.

Another issue raised in comments is the Proposed Project's immediate and long-term incompatibility effects with surrounding land uses. A project's "incompatibility" would manifest itself in specific environmental effects (e.g., noise, air quality, traffic, etc.). Section 4.0 of the FEIS details the various environmental effects that may result from the construction and operation of the Proposed Action and Alternatives. The level of the project's "incompatibilities" is measurable by the resulting effects before and after stated mitigation in Chapter 5.0 of the FEIS.

While the BIA was the lead agency for the 2006 EIS for the Oneida project, that project is fundamentally different in scope and magnitude than the Proposed Action. The Oneida project proposed a 17,370-acre conveyance to federal trust status, a magnitude of 32 times larger than the 534.91± acre conveyance under the Proposed Action. The Oneida project included state, county, and local land use elements, whereas the entirety of the Project Site is located within the City of San Jacinto boundaries and sphere of influence. The nature of the Proposed Action is singular (i.e. commercial development), whereas the Oneida project proposed multiple uses, including commercial, residential, governmental services, fishing, hunting, agricultural use, and co-generation energy production. While the Oneida EIS was used as a guidance

document, the differences between the Oneida project and the Proposed Action were considered too great to precisely model the land use analysis for the Proposed Action after the analysis within the Oneida EIS.

1.12.2.2 Jurisdictional Issues

Summary of Comments: The proposed fee-to-trust action would cause the three residential communities nearby the Project Site to become "islands" of U.S. territory within the borders of a sovereign nation, resulting in:

- Different laws between adjacent trust and non-trust parcels;
- Effects to utilities, law enforcement, fire protection, and emergency response;
- The reduction of property values;
- The Tribe controlling ingress and egress;
- The hindrance of emergency evacuation; and
- The transformation of portions of Lake Park Drive and Soboba Road into Indian Reservation Roads (IRRs).

The DEIS failed to adequately address these issues, and the creation of "islands" would be unprecedented in U.S. law. Please explain how, if at all, the Riverside Local Area Formation Commission (LAFCO) regulations would affect the proposed fee-to-trust transfer. The number of homes that may become part of jurisdictional "islands" totals 385 and includes the Soboba Springs Mobile Estates, the Soboba Heights community, the community adjacent tot the Soboba Springs Country Club, and nearby ranches.

Response: Concerns over differing sets of laws between adjacent trust and non-trust parcels are noted and made part of the administrative record. The existing environment already includes adjacent trust and non-trust parcels with differing sets of laws. Similarly, statements made that the creation of "islands" would be unprecedented are noted and made part of the administrative record. Whether the creation of "islands" is unprecedented in the greater body of U.S. law is outside of the scope of this NEPA analysis.

Numerous comments expressed concern that the Tribe would have the ability to legally restrict movement along Soboba Road and Lake Park Drive and to otherwise interfere with the rights-of-way established adjacent to the Project Site. Commenters cited the Tribe's authority to control access on Soboba Road within the existing Reservation as evidence that the Tribe might attempt to similarly restrict access elsewhere. However, Soboba Road within the Reservation is not a public roadway and is maintained by the Tribe. Soboba Road beyond the existing Reservation and Lake Park Drive are public roads and would continue to be public roads in the event of the fee-to-trust transfer. In fact, neither roadway is included in the legal descriptions for the subject fee-to-trust parcels. A plat map prepared by First American Title Company illustrates the exclusion of public roadways from the parcels proposed for the fee-to-trust transfer, and is included in the FEIS as Figure 2-6. As Lake Park Drive and Soboba Road form no part of the subject parcels, the trust acquisition should have no effect on utility infrastructure or the public's right to use the roads.

The CEQ Regulations for implementing NEPA, 40 C.F.R. §1502.16(c), require analysis of the "[p]ossible conflicts between the proposed action and the objectives of Federal, regional, State, and local land use plans, policies, and controls for the area concerned." The Riverside County LAFCO regulates boundary changes proposed by public agencies within the County. LAFCO is not involved with determining land use planning or policies, but instead governs jurisdictional boundaries at the city and county levels. The Tribe is not a signatory to LAFCO; therefore, if the lands are transferred into trust status LAFCO policies will no longer apply to the Project Site.

See Section 2.10.1 Economic and Fiscal Resources of this public comment report for a discussion of potential effects to property values for the three nearby residential communities, including the potential for an 'island effect' on the Soboba Springs Mobile Estates.

1.12.2.3 Community Character and Quality of Life

Summary of Comments: The project would affect the quality of life in the surrounding communities by permanently changing the rural residential community character. It is not appropriate to site a high-rise resort in the middle of a predominately senior citizen residential area. The Tribe pledged in its 1999 Compact to "…prevent the deterioration of the standard of living, quality of life and well-being of all persons;" however, this pledge is not being fulfilled due to negative effects from the existing casino and Soboba Springs Country Club. The proposed developments would forever change the existing community character through increased traffic, noise, crime, reduced property values, effects to wildlife, and the degradation of scenic views. The DEIS did not provide an adequate analysis of those potential effects to community character and quality of life. Finally, the potential changes to community character cannot be sufficiently mitigated.

Response: The environmental review conducted for the project addresses issues associated with the physical environmental effects of the construction and operation of the proposed development. Comments referred to issues such as "quality of life" and "community character" when discussing the perceived inadequacies of the DEIS.

While not a specific NEPA category, "quality of life" and "community character" are described by several commenters as categories that encompass specific environmental topics that are combined to define the experience of living in the Project area. For example, Comment Letter #A02 includes effects to traffic, noise, water supply, crime, and public services in the commenter's definition of "quality of life" within comment #A02-141. Comment Letter #A30 includes crime, air quality effects, and noise in its definition of how the Tribe has allegedly not honored its commitment in the 1999 Compact to "…prevent the deterioration of the standard of live, quality of life and well-being of all persons…" (comments #A30-309 through #A30-311).

Quality of life and community character are subjective categories that are defined by each person based on his or her own interpretations. Looking deeper into what each element of commenters' statements means, one recognizes that they can be broken down into various environmental categories. Therefore, these subjective categories actually consist of individual environmental topics chosen based on the individual commenter's particular interpretation.

For purposes of NEPA review, the categories included in community character are broken down into discrete physical environmental categories such as lighting, noise, air quality, traffic, crime, and so on. The existing setting is described in the affected environment section within Chapter 3.0 of the FEIS. The environmental effects are analyzed and described within Chapter 4.0 of the FEIS. Please see Table 4 below for those environmental issues that are addressed within the FEIS.

Table 4 Environmental Issues Addressed within the FEIS

Environmental Issue	Affected Environment Section	Environmental Consequences Section
Land Resources[1]	3.1	4.1
Water Resources[2]	3.2	4.2
Air Quality	3.3	4.3
Biological Resources	3.4	4.4

Cultural Resources	3.5	4.5
Economic and Socioeconomic Conditions	3.6	4.6
Resource Use Patterns[3]	3.7	4.7
Public Services[4]	3.8	4.8
Other Resources[5]	3.9	4.9
Topography, Geology, Soils, Seismic Hazards, Mineral Resources1 Surface Water, Drainage, Flooding, Groundwater, Water Quality[2] Transportation Networks, Land Use, Agriculture[3] Water Supply, Wastewater Service, Solid Waste, Electricity and Natural Gas, School Services[4] Hazardous Materials, Noise, Visual Resources, Recreational Resources[5]		

Section 4.0 Environmental Consequences of the DEIS concluded that, without mitigation, significant environmental effects would occur in several areas. The environmental issue, coupled with the phase of project development/operation, will dictate whether an effect would be site specific or if it could occur within the project vicinity or region. The DEIS found that the Proposed Action would result in following significant effects without the application of mitigation:

- Land Resources (Seismic Hazards);
- Water Resources;
- Air Quality;
- Biological Resources;
- Transportation Networks;
- Public Utilities and Services (Wastewater Service);
- Hazardous Materials;
- Noise; and
- Visual Resources.

Where possible or available, the DEIS disclosed those environmental effects that may occur outside of the Project Site on the surrounding residential communities or within the region. An example would be noise, which was cited several times as an element that factored into commenters' definitions of "community character" and "quality of life". The noise assessment provided in Section 4.9 of the DEIS discloses noise generated from the proposed developments during construction and operation. Some of this noise could potentially affect the Project Site and surrounding residential communities. In analyzing noise effects, the nearest sensitive receptors were identified. These are the Soboba Springs Mobile Estates, located approximately 170 feet to the south of the Development Site and approximately 50 feet from Soboba Road and Lake Park Drive (see Figure 4-6 of the FEIS); and the golf course community, located approximately 300 feet to the north of the Development Site. The section assesses the level of noise that may reach these sensitive noise receptors based on the attenuation of sound over distance.

Other examples exist where the DEIS analysis considers the effects of the project on the nearby residential communities, including under Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7). The FEIS does not attempt, nor does NEPA require, a synthesizing of all recognized environmental effects into new categories termed "quality of life" or "community character."

1.12.2.4 Lighting and Glare

Summary of Comments a: The project could cause light pollution and reduce the Project Area's dark sky.

Response a: The FEIS describes the potential for the Proposed Action to increase ambient lighting and adversely affect night time activities. As such, there is a potential for light pollution.[11] The proposed mitigation measure for lighting fixtures (see Section 5.7.2) incorporates many of the recommendations from the International Dark-Sky Society's *Guidelines for Good Lighting Plans* (see www.darkskysociety.org). In addition, the measures require a qualified lighting professional review the light and glare reduction plan. This professional would evaluate the proposed lighting fixture locations by type and wattage for appropriateness to the site and use, and to minimize off-site and night sky spillover. The professional would also review or create a photometric study to identify any "hot spots" where the light is too bright or where it would create unnecessary spillover onto adjacent properties.

As described within Section 4.7 of the FEIS, the application of the prescribed mitigation measures (Section 5.7.2 of the FEIS) would reduce potential effects to less than significant levels. However, minimizing light pollution is essential to maintaining the area's night sky and night time activities. Therefore, the following clarification was made to the following mitigation measure (Section 5.7.2 of the FEIS):

> Lighting Fixtures: ~~**To the extent feasible, a**~~**All** permanent ~~**exterior**~~ lighting that **could increase exterior lighting levels will have the International Dark-Sky Society's Fixture Seal of Approval for dark sky friendly fixtures.** ~~**will incorporate cutoff shields and non-glare fixture design.**~~ All permanent exterior lighting **will incorporate cutoff shields and non-glare fixture design and** will be directed onsite and downward. New lighting will be oriented to ensure that no light source is directly visible from neighboring residential areas and will be installed with motion-sensor activation **where feasible.** Decorative lighting will be directed away from sensitive receptors and will not generate light beyond the Development Site's boundaries.

Summary of Comments b: Would security lighting for the facilities would be on 24 hours a day, 7 days a week?

Response b: Although there are some areas of the Development Site where security lighting would not be necessary all the time (for instance the arena buildings when not in use), other areas would require lighting 24 hours a day, 7 days a week. For structures requiring lighting at all times, such as the parking garage, the lighting would conform to the mitigation measure as listed above. In addition, mitigation for Alternative 3 requires that all lighting not required for security, including business signage, be turned off after regular business hours and that campers are prohibited from using exterior area lighting between the hours of 10 PM and 7 AM (see Section 5.7.2 of the FEIS).

1.12.2.5 Other Land Use Comments

Summary of Comments: Easement agreements allowing for secondary ingress and egress, land for recreational vehicle storage, and a 10' perimeter strip on the former Daon Property need to be addressed prior to the proposed fee-to-trust transfer. This property is currently owned by the Tribe and comprises the portion of the Project Site directly adjacent to the Soboba Springs Mobile Estates.

[11] The International Dark-Sky Society defines light pollution as glare, light trespass, and light which is reflected into the night sky, contributing to sky glow, through the use of unshielded, misplaced, excessive, or unnecessary outdoor night lighting.

Bonds issued for the Soboba Springs Redevelopment Project under Special Assessment District 94-1 were not addressed in the DEIS.

Response: Code of Federal Regulations Title 25, Part 151 sets forth the authorities, policy, and procedures governing the acquisition of land by the United States in trust status for individual Indians and tribes. These regulations require that in the event the Secretary of the Interior approves a request for the acquisition of land from unrestricted fee status to trust status, the Secretary shall acquire, or require the applicant to furnish, title evidence meeting the standards established by the U.S. Department of Justice (25 C.F.R. sec. 151.13). After examining the title evidence, the Secretary shall notify the applicant of any liens, encumbrances, or infirmities which may exist. If the liens, encumbrances, or infirmities make title to the land unmarketable, the Secretary shall require their elimination prior to taking final approval action on the acquisition. The easements in question do not appear to render title to the relevant parcels unmarketable.

Bonds for Special Assessment District 94-1 were discussed in Section 3.7.2 of the DEIS. As discussed therein, the Tribe owns APN 433-100-015, 39.18+ acres of the Golf Course and Country Club, which is subject to Special Assessment District 94-1. The 2005/06 San Jacinto Annual Report on Assessment Districts indicated that the balance of debt to be collected was $382,994. The 2006/07 version of the annual report was not available. According to the City of San Jacinto, as of June 11, 2008 the outstanding principal was $275,000. However, in September 2008 this balance was paid in full and the Tribe cleared of payment liability to the City.[12]

1.13 PUBLIC SERVICES

Summary of Comments a: The fee-to-trust action and the proposed realignment of Lake Park Drive and Soboba Road would disrupt utility services to nearby residents.

Response a: As discussed in Section 4.8 of the FEIS, prior to excavation for the proposed developments, Underground Service Alert (USA) of Southern California would be contacted, which would then automatically notify all USA members (utility services providers) that might have underground facilities at the excavator's work site. In response, the USA member(s) will mark or stake the horizontal path of underground facilities, provide information about the facilities, and/or give clearance to dig. This simple safety service not only protects the excavator from personal injury, but also prevents underground facilities from being damaged, and would thereby avoid interruption of service to the surrounding communities due to project construction. Utilities that could require relocation due to the Lake Park realignment would be scheduled to minimize disruptions (if they occur) to homes and businesses

Summary of Comments b: The Tribe should give the utility companies a detailed plan of the project prior to any fee-to-trust acquisition approval so that the terms and conditions can be discussed and mitigated. The Proposed Action and Alternatives would lead to progressively more expensive costs to the nearby communities for utilities and public services.

Response b: Draft and Final Will Serve letters (see Appendix Z of the Final FEIS) were obtained for solid waste, electricity, and natural gas services after discussion with the service providers, in which ENTRIX provided maps showing the location of the proposed developments under the Proposed Action and Alternatives, the applicable Assessor Parcel Numbers (APNs), and estimates of the amount of service that would be demanded by the proposed developments. If and when the BIA approves the proposed fee-to-trust action, the Tribe's existing contracts with these providers would be re-negotiated to include the provision of services to the proposed developments. As with all other commercial costumers, the

[12] Personal communication with Tom Prill, General Accounting Manager, City of San Jacinto, June 11, 2008.

contracts would specify the price to be paid by the Tribe for these services and, in the case of electricity and natural gas, for connection of the proposed developments to the infrastructure adjacent to the Project Site. Therefore, no costs would be borne by taxpayers as a result of the Tribe expanding its existing contracts with solid waste, natural gas, and electricity service providers.

See the subheading "Water Supply" below for a discussion of how water demand by the proposed developments has the potential to affect available water supply. As described therein, the total projected demand for the Proposed Action is 2,148 acre-feet. This is less than the 2,900 acre-feet annually allotted to the Tribe through the Water Rights Settlement for the first year after the settlement (see Section 3.2.2 of the FEIS).

Potential effects to the provision of public services (Law Enforcement, Fire Protection and Emergency Medical Services, and School Services) are discussed in Section 4.8 of the FEIS and under the appropriate subheadings below. The agreements and measures described therein would ensure that the proposed developments do not generate an additional tax burden on the local communities.

Summary c: Removal of the Project Site from taxation would reduce funding for local government services.

Response c: As discussed in Section 4.6 of the FEIS, the reduction in property taxes associated with the removal of the subject property from the tax rolls ($0.24 million) would be partially offset by the generation of local sales tax receipts of approximately $0.22 million annually. The remaining shortfall would be more than compensated for by revenue contributed by the Special Distribution Fund. Soboba Casino accounted for $1.47 million of the Special Distribution Fund for fiscal year 2008-2009. Therefore, the proposed fee-to-trust action is not expected to result in the reduction of funding for public services.

1.13.1 Water Supply

Summary of Comments: The Proposed Action and Alternatives would affect the availability of the groundwater supply, groundwater overdraft, water conservation, and groundwater pollution. Can the local aquifer produce the necessary supply for the proposed facilities without adding to the overdraft? In addition, how would the proposed facilities affect other users of the groundwater basin? The application or storage of treated effluent could potentially pollute groundwater within the Project Area. Stormwater runoff from the Project Site could affect water quality.

Response: The Tribe is party to the Water Rights Settlement that adjudicated the water supply for the area. As part of the settlement the Tribe gave up a surface water right and received assurance of a specified groundwater supply. Section 3.2.2 of the FEIS describes the Water Rights Settlement and the Water Management Plan that followed the settlement. The Tribe has first right under the settlement and the Tribe's anticipated current and future water rights are included in the settlement and the Water Management Plan. The WMP also states that EMWD and Lake Hemet Municipal Water District will implement the WMP for the Canyon and Intake aquifers to "address the current overdraft, and recognize and take into account the Tribal Water Right" (Water Resources & Information Management Engineering, Inc., 2007).

The anticipated water demand from this project is described in Section 4.8.1 of FEIS (Table 4-46). Table 4-46 lists the projected water demands for the first year of Project operation. The total projected demand is 2,148 acre-feet. This is less than the 2,900 acre-feet annually allotted to the Tribe through the water rights settlement for the first year after the settlement (see Section 3.2.2). Through the settlement, the tribe

may increase its pumping to 4,010 acre-feet after 20 years. The future use of recycled wastewater will reduce some of the water demand, especially the demand for golf course irrigation water.

The water rights settlement is a legally binding document that the Tribe and other parties must follow. Failure to comply with the settlement would result in further legal action by the parties to the settlement. The Tribe is bound by the terms and conditions of the settlement.

1.13.2 Wastewater Service

Summary of Comments: There is concern regarding the storage of the effluent during periods when demand for recycled water is low. Percolation of stored effluent to the groundwater and the proximity of the WWTP facilities to other water supply features could affect water quality. The application of recycled water to the golf course could result in effects to the groundwater basin. The FEIS should clarify which government entity would be responsible for monitoring and enforcement over the WWTP. The DEIS did not propose mitigations for noise, smell, lighting, aesthetics, or any other nuisances from the WWTP.

Response: At the time of construction, the Tribe will either enter into a contract with EMWD for wastewater service, or construct an on-Reservation wastewater treatment plant. The EIS includes a will-serve letter from EMWD (Appendix H of the EIS). The required EMWD infrastructure exist on the Project Site and no off-site construction is anticipated. However, for purposes of this environmental review, both wastewater service options are explored in the EIS. Below is a discussion of the proposed on-Reservation WWTP in response to the comments registered above.

An on-Reservation tertiary wastewater treatment system is a proposed wastewater service option for the Project. That system will produce effluent suitable for reuse and will conform to all federal discharge standards when using or disposing of all recycled water. Application of recycled water for landscaping and golf courses is appropriate because the vegetation will polish the effluent by removing any remaining nutrients beyond the level mandated for the tertiary effluent. The use of recycled water for the golf course irrigation will offset the current pumping for golf course irrigation.

The entire reservation will be connected to the new tertiary WWTP and thereby replace existing septic tanks and leach fields on the reservation. Overall, the switch from septic tanks to a WWTP will benefit the underlying aquifer by eliminating the poor quality of water that percolates to the aquifer from leach fields.

Treated effluent from the WWTP may have to be stored or used for other purposes during periods when the irrigation demand is low. Generally, the effluent will be used for agricultural irrigation, landscape irrigation, filling of decorative water features, surface cleaning (i.e. parking lots), toilet flushing, and fire control. During periods when effluent flows exceed the demand for recycled water, water would be discharged to percolation ponds for storage. The discharge would conform to effluent standards for discharge to percolation ponds and be consistent with the Basin Plan (see Section 2.1.1). Percolation pond discharge would follow secondary treatment standards with other constituents of concern limited to concentrations that are consistent with non-degradation of the receiving aquifer based on the beneficial uses of the receiving waters identified in the Basin Plan. Also, the storage of water in the pond will encourage settling of suspended material and subsequent percolation into the soil that will provide additional polishing of the effluent.

Section 3.2.3 describes the stormwater permit and waste discharge permits that apply to the Project. The Tribe will comply with all construction and discharge permits for the Project Site and the WWTP.

Regarding concerns over noise, smell, lighting, and aesthetics effects from the WWTP, the best management practices (BMPs) which would be used for the Proposed Action and Alternatives are specified in Section 2.1.1 of the EIS under the heading "Wastewater Treatment and Disposal." The BMPs include the following:

- Treatment structures that provide complete containment during wastewater treatment and storage;
- Alarm and automatic flow diversion systems to prevent system bypass or overflow;
- Odor abatement systems;
- Tertiary treatment;
- Denitrification;
- Disinfection of treated effluent;
- Recycling of wastewater using agronomic application rates;
- Appropriate biosolids storage and disposal practices; and
- Certified operators to assure proper operation and maintenance.

1.13.3 Solid Waste Service

Summary of Comments: Solid waste would be generated by the Proposed Action and Alternatives. The DEIS failed to disclose the ultimate disposal location for the solid waste generated. Would the solid waste generated by the Proposed Action and Alternatives have a negative effect on ground or surface water? Based on the number of tons projected to be generated by the Proposed Action, frequent refuse collection would be necessary.

Response: Section 4.8 of the EIS discloses the disposal location for solid waste generated by the Proposed Action and Alternatives. As described therein, waste would either be hauled to the Lambs Canyon Landfill for disposal, approximately 10 miles northwest of the Project Site or, if the waste is recyclable, transported by CR&R to its material recovery facility (MRF) in Perris. CR&R employees would perform the sorting of recyclable materials at the MRF; these materials include paper, wood, glass, plastic, lumber, concrete, and metals. The portion of the commercial solid waste stream that is typically recycled is around 50 percent. The remaining waste would be hauled to the Lambs Canyon Landfill after being compressed at the MRF. A Final Will Serve letter was obtained from CR&R on December 29, 2009 (see Appendix Z of the FEIS), stating that CR&R has the capacity to absorb the solid waste generated by the Proposed Action and Alternatives.

As the solid waste will be processed by CR&R and either recycled or disposed of in a suitable location (Lambs Canyon Landfill), a less than significant effect to ground or surface water is anticipated. Regarding the comment expressing concern that frequent refuse collection would be necessary, potential effects to traffic, air quality, and noise are already incorporated in those respective analyses in Section 4.0 of the FEIS.

1.13.4 Electricity and Natural Gas

Summary of Comments: The three residential communities near the Project Site have the potential to be affected by increased demand on power lines in the area and to experience loss of service during construction and upgrading of the Proposed Action and Alternatives. Have Southern California Edison (SCE) and the Southern California Gas Company (SCGC) been consulted about the Proposed Action and

Alternatives? The project would require the construction of extra power lines and grids; what would be the cost to tax payers would be for this new infrastructure?

Response: Draft Will Serve letters were obtained from SCE and SCGC in 2006 and 2008, respectively (see Appendix Z of the FEIS). A Final Will Serve letter was obtained from SCE on January 25, 2010. SCGC's Final Will Serve letter was received on December 22, 2009 (see Appendix Z of the FEIS for copies of the Final Will Serve letters for this project), which states that "gas service to the project could be provided from the nearest existing, 2" M in Chabela Dr. (Cross of Soboba Rd.)." Appendix Z includes a map recently provided by SCGC showing the location of this infrastructure. Both letters were obtained after discussion with the service providers, in which maps were provided showing the location of the proposed developments under the Proposed Action and Alternatives, the applicable Assessor Parcel Numbers (APNs), and estimates of the amount of energy that would be demanded by the proposed developments. If and when the BIA approves the proposed fee-to-trust action, the Tribe's existing contracts with these providers would be re-negotiated to include the provision of services to the proposed developments. As with all other commercial accounts, the contracts would specify the price to be paid by the Tribe for energy usage and connection of the proposed developments to the infrastructure adjacent to the Project Site. Therefore, no costs would be borne by taxpayers as a result of the Tribe expanding its existing contracts with SCE and SCGC.

No new off-site infrastructure improvements are anticipated to be necessary as a result of the proposed developments. As indicated in the Final Will Serve letter obtained from SCGC, infrastructure to the Project Site already exists that could provide natural gas service. Electricity to the Project Site could be provided by the 12,000-volt pole line paralleling Lake Park Drive (see Section 4.8 of the FEIS). As indicated in the Final Will Serve letter obtained from SCE, the electrical loads of the proposed developments are "within parameters of projected load growth which SCE is planning to meet in this area."

Utility easements would not be affected by the proposed fee-to-trust action. As discussed in Section 4.7 of the FEIS, Tribal Resolution No. CR07-HGFTT-51 (see Appendix J) acknowledges the existing easement for roadway, water lines and underground conduits and incidental purposes along the Project Site, which includes a roadway easement for Lake Park Drive and Soboba Road. Furthermore, the Resolution acknowledges, as an exception to title of the Project Site, "rights of the public in and to any portion of the subject property lying within any lawfully established streets, roads, or highways." Therefore, the easements would remain protected under the proposed fee-to-trust action, and service to surrounding communities would not be affected. In addition, as discussed in Section 4.8 of the FEIS, prior to excavation for the proposed developments, Underground Service Alert (USA) of Southern California would be contacted, which would then automatically notify all USA members (utility services providers) that might have underground facilities at the excavator's work site. In response, the USA member(s) will mark or stake the horizontal path of underground facilities, provide information about the facilities, and/or give clearance to dig. This simple safety service not only protects the excavator from personal injury, but also prevents underground facilities from being damaged, and would thereby prevent interruption of service to the surrounding communities due to project construction.

1.13.5 Law Enforcement

Summary of Comments a: Law enforcement services would be delayed due to the increased traffic from the proposed project. In addition, ingress and egress of law enforcement personnel could be restricted if the fee-to-trust action creates jurisdictional "islands."

Response a: In response to concerns raised by the public, a TMP (see Section 5.7 and Appendix AB of the FEIS) was prepared to address traffic associated with special events and would be implemented as a

mitigation measure. See **Section 1.12.1.2** of this public comment report for a discussion of how adequate emergency access to local communities would be assured.

Soboba Road beyond the existing Reservation and Lake Park Drive are public roads and would continue to be public roads in the event of the fee-to-trust transfer. In fact, neither roadway is included in the legal descriptions for the subject fee-to-trust parcels. A plat map prepared by First American Title Company illustrates the exclusion of public roadways from the parcels proposed for the fee-to-trust transfer, and is included in the FEIS as Figure 2-6. As Lake Park Drive and Soboba Road form no part of the subject parcels, the trust acquisition should have no effect on the public's right to use the roads or the ability of law enforcement personnel to access local communities. Please see **Section 1.12.2.2 Jurisdictional Issues** above for a more detailed discussion of Land Use issues.

Summary of Comments b: Criminal incidents in the Project Area have increased in part due to the Tribe's existing casino clientele or to residents of the Reservation. Studies show that crime increases after a casino opens. Therefore, the number of criminal incidents would increase should the Proposed Action and Alternatives be developed. The DEIS fails to adequately address the increase in criminal activity that would result from development of the Proposed Action and Alternatives.

Response b: As described in Section 4.8 of the FEIS: "A potential effect related to casino development is the increase in the incidence of crime in the area due to the casino. However, since the casino is only being relocated under Proposed Action A, changes in the crime rate should not differ from the present situation. Based on this and discussions presented in Section 3.~~7~~**.4**8, no crime-related effects associated with casinos are anticipated as a result of Proposed Action A. Thus, the crime rate in the area will not be affected by the proposed casino development."

Summary of Comments c: Calls for law enforcement services would increase under the Proposed Action and Alternatives. The DEIS fails to adequately address the increased demands on local law enforcement due to the Proposed Action and Alternatives.

Response c: In its August 27, 2009 public comment letter, the RCSD projected the law enforcement impact from the proposed project. According to the RCSD, the scope of the project, increased traffic volume, and the temporary population increase associated with events at the events arena would result in increased calls for service to local law enforcement. The letter concluded that the anticipated law enforcement needs for the Proposed Action would be met by staffing a full-time, sworn deputy over a 24-hour time period, which equates to staffing five sworn deputy positions, and one non-sworn Community Service Officer. The MOA approved by the Tribe on August 13, 2011 (see Appendix AC) provides a funding mechanism for these staffing needs; therefore, the Proposed Action would have a less than significant effect on local law enforcement.

Summary of Comments d: PL 280 has negative fiscal effects on local governments and fails to provide sufficient protection for all residents near and within reservations. Has the Tribe agreed to PL 280 law in writing? The Tribe is trying to dismantle PL 280.

Response d: PL 280 does not require Tribal consent. An assessment of the general effectiveness of PL 280 or the effects of that law on local governments is outside the scope of this analysis under NEPA. Speculation regarding repeal of PL 280 is likewise outside the scope of this analysis under NEPA. However, the effect of PL 280 as it relates to the Proposed Action is discussed under Section 2.1.1 of the FEIS:

> Prior to the enactment of Public Law 83–280 (PL 280) in 1953, jurisdiction over crimes involving Indians in Indian country was generally shared by Tribal and Federal law enforcement. PL 280

shifted this jurisdiction to the State level for certain States, and gave other States an option to assume such jurisdiction in the future. PL 280 does not require Tribal consent and effectively applies the same laws to Indians living both on and off reservations. Under PL 280, the State of California is one of six states required to accept jurisdiction over crimes committed by or against Indians in Indian country. The law provides no new funding to assist the State in meeting its obligations under PL 280.

Under PL 280, the Riverside County Sheriff's Department (RCSD) and California Highway Patrol (CHP) are responsible for responding to emergencies on the Reservation, and would be responsible for calls to the Project Site upon conveyance of the property to trust status.

Summary of Comments e: The FEIS should note that the Tribe had a contract with RCSD, which it later canceled.

Response e: The following language has been added to Section 3.8 of the FEIS:

> **In 2005 RCSD signed a five-year contract with the Tribe for a deputy to be dedicated to patrolling the Reservation; however, the following year the Tribe canceled the agreement, citing dissatisfaction with the level of service provided.**

It should be noted that the MOU approved by the Tribe (see Appendix AC of the FEIS) would provide a funding mechanism for the provision of law enforcement services to the Development Site.

Summary of Comments f: A Tribal escort could be required for law enforcement, fire protection, and emergency response personnel to access the Project Site and surrounding communities, which would increase response times.

Response f: The tribally approved MOU would (see Appendix AC of the FEIS) ensure that RCSD officers are allowed to access to the Development Site without interference and unnecessary delay, and without Tribal escort. In addition, the MOU would provide a framework for the Tribe and RCSD to cooperate in good faith to develop protocols for coordination of RCSD officers entering the Development Site with Tribal casino security and Tribal Law Enforcement. This MOU will serve as a legally binding contract between the Tribe and RCSD once executed by the Riverside County Board of Supervisors.

Summary of Comments g: Criminals have been able to take refuge on the Reservation from law enforcement authorities.

Response g: Under PL 280, the RCSD and CHP are responsible for responding to emergencies on the Reservation.

Summary of Comments h: What enhanced access features would increase safety?

Response h: As discussed in Section 4.8 under Law Enforcement, safety features built into the Proposed Action include:

- In comparison to the current location of the Tribe's casino, the location of the Development Site near the intersection of Soboba Road and Lake Park Drive would enhance access to and from the proposed facilities and would increase customer safety in case of an emergency.

- Safety within the proposed facilities would be insured through strict adherence to a set of development standards, as discussed in Section 2.1.1.2 of the FEIS.

- Finally, the traffic mitigation measures discussed in Section 5.7.1 of the FEIS would increase traffic safety, thereby reducing the amount of calls for law enforcement to mediate traffic accidents.

In addition, in response to concerns raised by the public, a TMP (see Section 5.7 and Appendix AB of the FEIS) was prepared to address traffic associated with special events and would be implemented as a mitigation measure. See **Section 1.12.1.2** of this public comment report for a discussion of how adequate emergency access to local communities would be assured.

Summary of Comments i: There must be a judicially enforceable public safety agreement between the Tribe and RCSD.

Response i: On August 13 2011, the Tribe approved an MOU governing the provision of law enforcement services to the Development Site (Appendix AC). This MOU will serve as a legally binding contract between the Tribe and RCSD once executed by the Riverside County Board of Supervisors.

Summary of Comments j: The methodology used in the DEIS to present the existing level of crime in the Project Area is questionable.

Response j: Section 3.8 of the FEIS has been updated to incorporate the most recent data available for calls for law enforcement service to the Reservation and existing casino, as provided by RCSD. According to these data, the rate of calls for law enforcement service to both the Reservation and existing casino during this period was highest in 2005 (154 and 541 calls, respectively). The number of calls fell each year between 2005 and 2008, with 29 calls for service to the Reservation and 293 calls for service to the existing casino in 2008. The number of calls rose slightly between 2008 and 2009. Compared to the data previously provided by RCSD for the years 2006, 2007, and the first five months of 2008, the new data show fewer calls for service to the existing Reservation. For example, data previously provided by RCSD showed 224 calls for service to the Reservation in 2006, whereas the most recent data provided by RCSD show 67 calls for service in that year. Conversely, the new data show a slight increase in calls for service to the existing casino for the years 2006 and 2007, compared to data previously provided by RCSD.

Summary of Comments k: The DEIS fails to assess the ability of local law enforcement to maintain the existing level of service to surrounding communities in light of increased demands from the project.

Response k: As described within this section of the public comment report and within Sections 4.8 and 4.10 of the FEIS, the Proposed Action and Alternatives would have a less than significant effect on local law enforcement. Therefore, the project would not affect the ability of local law enforcement to maintain the existing level of service for surrounding communities.

Summary of Comments l: The DEIS fails to propose appropriate mitigation measures to reduce effects to law enforcement.

Response l: As described within this section of the public comment report and within Sections 4.8 and 4.10 of the FEIS, the Proposed Action and Alternatives would have a less than significant effect on local law enforcement. Therefore, no mitigation measures are required.

1.13.6 Fire Protection and Emergency Medical Services

Summary of Comments a: The FEIS should include an emergency evacuation plan, particularly in light of the expected increase in traffic. The California Gambling Control Commission requires an Emergency Evacuation and Preparedness Plan for this type of project. Emergency response would be delayed due to the increased traffic from the Proposed Action and Alternatives, and ingress and egress of emergency response personnel could be restricted if the fee-to-trust action creates jurisdictional "islands." There is a need for alternate or secondary road access to provide adequate circulation and emergency ingress and egress.

Response a: In response to concerns raised by the public, a TMP (see Section 5.7 and Appendix AB of the FEIS) was prepared to address traffic associated with special events and would be implemented as a mitigation measure. See **Section 1.12.1.2** of this public comment report for a discussion of how adequate emergency access to local communities would be assured.

Soboba Road beyond the existing Reservation and Lake Park Drive are public roads and would continue to be public roads in the event of the fee-to-trust transfer. In fact, neither roadway is included in the legal descriptions for the subject fee-to-trust parcels. A plat map prepared by First American Title Company illustrates the exclusion of public roadways from the parcels proposed for the fee-to-trust transfer, and is included in the FEIS as Figure 2-6. As Lake Park Drive and Soboba Road form no part of the subject parcels, the trust acquisition should have no effect on the public's right to use the roads or the ability of law enforcement personnel to access local communities. Please see **Section 1.12.2.2 Jurisdictional Issues** above for a more detailed discussion of Land Use issues.

Summary of Comments b: A Tribal escort could be required for fire protection and emergency response personnel to access the Project Site, which would increase response times.

Response b: As described in Section 3.8 of the FEIS, in response to a series of violent incidents in December 2007, California Department of Forestry and Fire Protection (CDF) required its rescue crews to wait for an escort from RCSD before responding to emergency calls on the Reservation. The policy was lifted within a few weeks. Two isolated incidents on the Reservation in May 2008 caused CDF to temporarily reinstate the policy; however, the policy was reversed on June 13, 2008. Currently, CDF rescue crews do not require an escort to respond to emergency calls to the Reservation.

RCFD currently has unimpeded access to all facilities on the Project Site. Upon development of the proposed Tribal fire stations, the Tribe will pursue an MAA with RCFD.

Summary of Comments c: The DEIS failed to analyze the direct and cumulative effects to the Riverside County Fire Department's (RCFD) ability to provide an acceptable level of service to local communities. Effects to public safety (including fire) should be analyzed based on calls for service per 1000 population, and the FEIS should assess secondary effects on the provision of fire protection and emergency medical service to surrounding communities. A mitigation plan should be developed to address effects.

Response c: The methodology employed for this effects analysis was derived in consultation with CDF/RCFD Chief Tracy Hobday where the frequency of fire department calls is roughly proportional to the number of employees and patrons visiting a casino; therefore, the DEIS estimated the projected increase in fire protection service calls by comparing the Proposed Action and Alternatives to the demand on similar existing facilities (see Section 4.8 of the FEIS). Section 4.8 determined that the proposed fire stations, project safety features, and mitigation measures prescribed in Section 5.8.7 would ensure that effects to Riverside County Fire Department and CDF are not significant; therefore, no secondary effects would be anticipated, nor would additional mitigation measures beyond those prescribed in Section 5.8.7

be warranted. Cumulative effects to Fire Protection and Emergency Medical Services are discussed in Section 4.10.

Summary of Comments d: Fire and medical service would be influenced by PL 280.

Response d: As described in Section 2.1.1 of the FEIS, Public Law 83–280 (PL 280) affects jurisdiction over crimes involving Indians in Indian country in six states, including California. PL 280 does not affect the level of fire and medical service provided to reservations and surrounding communities.

Summary of Comments e: There must be a judicially enforceable agreement between the Tribe and RCFD, and that details of this agreement would be necessary in order to fully assess the effects of the proposed project.

Response e: As described in Section 4.8 of the FEIS, Tribal consultants met with Chief John Hawkins on April 23, 2008 to present the Proposed Action and Alternatives and discuss the implications of the Tribal fire stations. Upon development of the subject fire stations under the Proposed Action and Alternatives, the Tribe would negotiate with RCFD to establish a Mutual Aid Agreement, under which the Tribe and the RCFD would share fire service resources. This would also include the City of San Jacinto due to its contractual relationship with RCFD to provide fire protection services. An additional Mutual Aid Agreement would be pursued with the City of Hemet. Mutual Aid Agreements are typically not pursued until a fire station has been constructed.

Section 4.8 of the DEIS projected the increase in fire protection service calls by comparing the Proposed Action and Alternatives to the demand on similar existing facilities. As described therein, James Barron, Interim Fire Chief of the Tribal fire department, has confirmed that the staffing levels called for under the Draft Operations Plan (see Appendix G) for the proposed Tribal fire stations would be sufficient to respond to service calls to the Project Site and the Reservation. Therefore, while Mutual Aid Agreements would be pursued by the Tribe with the Cities of San Jacinto and Hemet, the proposed Tribal fire stations would be sufficient to service the projected level of demand from the Proposed Action and Alternatives.

Summary of Comments f: Would one or two fire stations be developed under the Proposed Action and Alternatives?

Response f: As described in Section 2.1.1 of the FEIS,

> Two Tribal fire stations will be developed under Proposed Action A and in accordance with the Draft Tribal Fire Operations Plan (attached as Appendix G of the EIS). The Tribal fire department headquarters would be developed on Soboba Road, towards the southeastern corner of the Project Site, during construction of the hotel/casino complex. The other Tribal fire station would be located near the intersection of Soboba Road and Castile Canyon Road on the existing Reservation. The two stations would total approximately 13,500 square-feet and will serve the Project Site along with the entire Reservation. The two-story buildings would have a maximum height of 40 feet above grade, with sufficient pavement and parking made available to maneuver and house the necessary fire equipment and fire trucks, and to provide for employee parking. The headquarters and satellite fire station would include apparatus storage bays, equipment storage rooms, restrooms, and office space. These facilities would use the Tribe's existing water supply network and proposed on-Reservation wastewater facilities.

The two Tribal fire stations described for Proposed Action A are also included under the other action alternatives (Proposed Action B, Alternative 1, Alternative 2, and Alternative 3).

Summary of Comments g: The EIS should be restructured to provide for a separate public safety section.

Response g: Comment noted and made part of the administrative record. The structure of the EIS is based off guidelines set forth in the BIA NEPA Handbook (59 IAM 3).

Summary of Comments h: Effects from the Proposed Action and Alternatives on the level of service provided by the Department would need to be mitigated by the Development Impact Fee Program, which would fund capital improvements such as land, equipment purchases, and fire station construction. The Proposed Action and Alternatives must comply with local regulations which affect the provision of fire protection and emergency medical services. The Tribe should prepare a Fire Protection/Vegetation Management Plan, to be submitted to the review and approval of affected jurisdictions.

Response h: Upon transfer of the Project Site from fee-title to trust status, the Developer Impact Fee Program would no longer apply. Furthermore, as described in Section 4.8 of the FEIS, under Proposed Action and Alternatives, two fire stations would be developed to serve the Reservation and Project Site (see Section 2.1.1 Proposed Developments for a description of the proposed facilities): one on the Project Site and the other located near the center of the Reservation. James Barron, Interim Fire Chief of the Tribal fire department, has confirmed that the staffing levels called for under the Draft Operations Plan (see Appendix G) will be sufficient to respond to service calls to the Project Site and the Reservation.[13]

In addition, other local regulations would no longer apply upon transference of the subject property to trust status. However, the Tribe will adopt and comply with the development standards specified in Section 2.0 of the FEIS, including:

- The Tribe will adopt Uniform Building Code standards when constructing the proposed facilities (see Appendix I of the EIS). These standards include all fire, plumbing, electrical, mechanical, and other related building codes. The Tribe will also adhere to the standards set forth in the Federal Americans with Disabilities Act [42 U.S.C. §12101, et seq.].

- The Tribe will adopt and comply with standards no less stringent than the fire protection features identified in the California Fire Code and Riverside County Fire District Fire Prevention Bureau Requirements, including but not limited to the following:

    - The proposed facilities will be of Type I non-combustible, fire-resistive construction materials as defined by the California Building Code;

    - The proposed facilities will be equipped with hydraulically calculated automatic sprinkler systems. This system will be designed to comply with the California Building Code;

    - The proposed facilities will be equipped with automatic fire detection and alarm system.

[13] Personal communication with James Barron, Fire Chief, Soboba Fire Department, June 26, 2008.

In addition, as specified under Section 3.8 of the FEIS, the Tribal fire department would adopt the land use/fire suppression goals of California Department of Forestry and Fire Protection (CDF)/Riverside County Fire Department for heavy urban areas.

Summary of Comments i: The FEIS should address the financial feasibility of the Tribe's proposed fire stations.

Response i: The financial feasibility of the Tribe's proposed developments is outside the scope of this analysis under NEPA.

1.13.7 School Services

Summary of Comments: New jobs added by the Proposed Action and Alternatives would exacerbate the current overcrowding of local schools by causing an influx of new families into the area. The DEIS should have included projections on the number of new children entering the school system due to the Proposed Action and Alternatives, and should have specified judicially enforceable mitigation measures.

Response: Section 4.10 of the FEIS acknowledges that development of the Proposed Action and Alternatives would result in additional demands on the local education system. This section also acknowledges that the fee-to-trust action would result in "lost revenues" from developer school effect fees and property taxes, which would constitute a negative financial effect to San Jacinto Unified School District (SJUSD).

Section 5.8.8 of the FEIS prescribes mitigation measures to reduce potential effects to the SJUSD:

> The Tribe shall provide reasonable in-lieu development fees and property taxes to the San Jacinto Unified School District to mitigate recognized effects to the district. The Tribe shall consult with the district to determine the amount and schedule of payments to reasonably mitigate fee and tax loss to the district and increased student enrollment in the district's schools.

Currently, SJUSD's developer fee for development of land within the district is $0.47 per square-foot of total building area. This is an increase of $0.05 from the developer fee being charged at the time the EIS was written. Payment of these in-lieu school impact fees to the district would provide San Jacinto Unified School District with the resources to mitigate effects that may occur as a result of the Proposed Action A. Accordingly, the discussion of cumulative effects to school services in Section 4.10 of the EIS is revised as follows:

> Pursuant to Government Code Section 65995 et seq. and Education Code Section 17620 et seq., school districts are authorized to levy fees on new commercial-industrial development to fund the "construction or reconstruction of school facilities" necessary to accommodate the students from new development. Currently, the district's developer fee for development of land within the district is ~~$0.42~~ **$0.47** per square-foot of total building area.
>
> **Based on the development of a 729,500 square-foot facility under the Proposed Action A, the calculated school impact fees from development would be approximately $343,000. Calculated school impact fees from development of Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 would be $336,000, $270,000, $129,000, and $67,000, respectively.**

Impacts to school enrollment are usually tied more directly to new housing than to employment. As discussed in Section 4.10 of the FEIS, given Riverside County's substantial supply of vacant housing, the Proposed Action and Alternatives would not result in the development of additional housing in the region. Therefore, only a nominal effect to school enrollment is expected. As the SJUSD developer fees are intended to compensate for effects of new development on schools, including increased student enrollment, the in-lieu payments prescribed above would reduce potential effects to school services to less than significant.

The enforceability of mitigation measures is discussed in **Section 1.17 Mitigation Measures** of this public comment report.

1.14 OTHER VALUES

1.14.1 Hazardous Materials

Summary of Comments a: The proposed underground storage tanks (USTs) pose a risk to groundwater in the Project Area. These USTs should be constructed and operated in accordance with applicable Federal regulations.

Response a: As described in Section 5.1.3 of the FEIS, all USTs associated with the gas station would be installed consistent with Federal regulations (40 C.F.R. Part 280, Subpart B). As specified in Section 5.9.1, all USTs would have double walls with integrated leak detection systems and associated alarms. If a leak were to occur within the inner tank, the outer tank would contain the leak, while a pressure sensor sends a signal to the indicator panel and alarm unit. Leak detection will be regularly monitored by personnel trained in emergency response procedures.

Summary of Comments b: Who would monitor hazardous materials and what emergency service provider would respond to hazardous waste spills that may affect workers and/or neighboring communities?

Response b: As stated in Section 2.1.1 of the EIS, the Tribe would conform to all regulations set forth in the Occupation Safety and Health Act (OSHA) [29 USC 651-678]. OSHA establishes monitoring, protection, and record keeping policies for businesses that use hazardous materials. In accordance with OSHA, a hazardous materials safe handling and response plan will be developed and maintained. These plans contain guidance for employees in the event of a spill or exposure of a hazardous material. In the unlikely event of a hazardous waste spill that threatens neighboring communities, the appropriate authorities (i.e. police, fire department) would be notified immediately.

Summary of Comments c: The project must incorporate spill prevention of hazardous materials.

Response c: Detailed spill prevention procedures are outlined in the FEIS and will be included in written standard operation procedures (SOPs). These procedures include:

- Fuel, oil, and hydraulic fluids will be transferred directly from a service truck to construction equipment tanks and will not be stored on-Site. Other potentially hazardous materials to be used during construction (paint, cleaners, sealants, etc.) will be stored in a locked utility building and handled as per specifications;

- Refueling will be conducted with approved pumps, hoses, and nozzles and will be performed away from bodies of water to prevent potential contamination;

- Catch-pans will be placed under equipment to catch potential spills during servicing;
- All disconnected hoses will be placed in containers to collect residual fuel from the hose;
- Service trucks will be provided with spill containment equipment, such as absorbents;
- All containers used to store hazardous materials will be inspected at least once per week for signs of leaking or failure;
- The amount of hazardous materials use in project construction and operation will be consistently kept at the lowest volumes needed;
- During construction, the contractor will be requested to avoid and minimize the use of hazardous materials to the fullest extent practicable.

Summary of Comments d: Current practices have resulted in the improper use and storage of chemicals associated with the Soboba Springs golf course. Without enforceable mitigation measures, there is no guarantee that the Proposed Action and Alternatives would not result in similar unsafe practices.

Response d: The mitigation measures specified in Section 5.9.1 of the FEIS would reduce potentially significant hazardous materials effects to less than significant. See **Section 1.18 Mitigation Measures** of this public comment report for a discussion of mitigation measure enforceability.

Summary of Comments e: The proposed USTs would be located in close proximity to groundwater. This groundwater supplies many of the City's residents and businesses as a drinking water source.

Response e: According to a summary of Site conditions prepared by LandMark GeoEngineers and Geologists, historical records were reviewed regarding ground water levels in the vicinity of the Site. Over 14 years (1993-2007), groundwater levels ranged from 128 – 193 ft below ground surface. Data were obtained from the Western Municipal Water District and the San Bernardino Valley Municipal Water District cooperative well measuring program records.

As described above, all USTs will have double walls with integrated leak detection systems and associated alarms. If a leak were to occur within the inner tank, the outer tank would contain the leak, while a pressure sensor sends a signal to the indicator panel and alarm unit. Leak detection will be regularly monitored by personnel trained in emergency response procedures.

Based on the depth of ground water resources (>100 ft bgs) and the UST leak detection construction, potential effect to ground water resources are less than significant.

1.14.2 Noise

1.14.2.1 Noise – Construction Impacts

Summary of Comments a: Noise mitigation measures were not applied during construction of the Soboba Springs Country Club clubhouse; therefore, there is no guarantee that the construction noise mitigation measures proposed in the FEIS would be implemented.

Response a: For the Proposed Action and Alternatives, construction noise mitigation measures listed in Section 5.9.2 of the FEIS are recommended. These mitigation measures would serve to minimize the

effects of construction noise in the vicinity of the Development Site. For a discussion of the enforceability of mitigation measures, please see **Section 1.18** of this public comment report.

Summary of Comments b: Excessive noise from construction would have negative effects on the local communities.

Response b: The noise analysis contained in Section 4.9 of the FEIS demonstrates that construction effects could be perceived as slightly to moderately loud with a significant effect, about 10 dBA, over existing levels. However, any peak noise levels would be temporary and intermittent, during daylight hours only, and will attenuate with distance. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, as well as one between the Golf Course Community and Soboba Road, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS to lower received noise levels by about an additional 3 dBA overall. Mitigated construction noise levels are shown in Table 4-69 of the FEIS.

Summary of Comments c: Noise from construction equipment would be created 7 am to 7 pm Monday through Saturday.

Response c: Comment acknowledged. These construction hours would be consistent with the City of San Jacinto noise ordinances found in Section 8.40.040.

1.14.2.2 Noise – Operational Impacts

1.14.2.2.1 Residential Communities

Summary of Comments a: Excessive noise from operation of the Proposed Action and Alternatives would negatively effects seniors' lifestyle. Noise levels would increase especially for the Mobile Home Park residents and excessive noise exacerbates health issues. However, the EIS states that noise levels are not significant to nearest residents.

Response b: As described within Section 4.9 of the FEIS, unmitigated operational noise levels would be significant under the Proposed Action and Alternatives. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS to lower received noise levels by about an additional 3 dBA overall. Implementation of this and other mitigation measures specified within Section 5.9.2 of the FEIS would result in less than significant effects for the Proposed Action and Alternatives, with the exception of Alternative 3, which would remain significant even after mitigation implementation.

Summary of Comments c: The EIS does not provide adequate data regarding the noise effect on the surrounding communities (e.g., Soboba Springs Mobile Estates), nor does it provide sufficient mitigation measures for the noise effect of the Proposed Action and Alternatives on those communities.

Response c: The effect of noise generated by the Proposed Action and Alternatives is discussed for the Soboba Springs Mobile Estates, the Golf Course community, and the hillside residential community in Section 4.9 of the FEIS. Implementation of the mitigation measures specified within Section 5.9.2 of the FEIS would result in less than significant effects to the local residential communities, with the exception of Alternative 3, which would generate a significant noise effect even after mitigation implementation.

1.14.2.2.2 Events Center / Arena

Summary of Comments: The noise that would be generated from the proposed open air event arena adjacent to a senior community is unacceptable. Loud music from concerts at night would be especially problematic. Special events associated with the Project could lead to increased noise in the vicinity. Despite the Scoping Report's indication that it would do so, the EIS did not address this concern at all.

Response: The events center (indoor arena/theater) is designed as a fully enclosed structure with sound isolation and absorbing features incorporated which will prevent the propagation of significant noise beyond the property line. There will be no outdoor concert events at the facility, only indoor events. The noise analysis contained in Section 4.9 of the FEIS demonstrates that mitigated operational effects would be less than significant.

Potential noise effects from the events center are discussed under Section 4.9 of the FEIS. For clarification, text within that section was revised as follows:

> **Events Center: The events center (indoor arena/theater) is designed as a fully enclosed structure with sound isolation and absorbing features incorporated which will prevent the propagation of significant noise beyond the property line. There will be no outdoor concert events at the facility, only indoor events.** Noise from a rock concert may reach 120 dBA at a close distance **indoors (Medlin and Associates 2004)**. This is considered the worst-case scenario for inside the events center. The closest noise-sensitive receptor (the Soboba Springs Mobile Estates) would be located approximately 300 feet from the events arena (see Figure 4-6). **Due to engineered soundproof construction techniques, a 50 dBA attenuation would be achieved, from about 120 dBA on the interior to about 70 dBA on the exterior of the building. It follows that residual** noise from the events center would greatly decrease over this distance **to about 51 dBA, which is less than the 60 to 65 dBA background and would thus not be an impact. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which would result in an approximately 5 dBA decrease of noise levels from the event center.** In addition, noise from the events center would only be expected to occur during special events and would not form a permanent part of the background noise level. **Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 to lower received noise levels by about an additional 3 dBA overall. Mitigated construction noise levels are shown in Table 4-69 above. T**he level of noise reaching the Soboba Springs Mobile Estates from the events center is **therefore not** expected to surpass the significance threshold of an increase of 5 dBA from ambient noise levels.

1.14.2.2.3 Parking and Traffic

Summary of Comments a: We would be subjected to the noise of vehicles (e.g., cars, SUVs, motorcycles, and motorbikes) going to and from the facilities. The EIS claim that parking garage noise events would be infrequent is unsupported.

Response a: The noise analysis contained in Section 4.9 of the FEIS demonstrates that mitigated noise levels from the parking garages would be less than significant, taking into account that noise levels associated with parking structure activities are caused by purely random human behavioral events which may or may not occur during any given period of time. The parking structures will incorporate acoustic materials to reduce the effect of intermittent vehicle noises on the Soboba Springs Mobile Estates mobile home park as described in FEIS Section 5.9.2. This mitigation is designed precisely to deal with the unpredictable nature of noise events typical of parking structures.

Unmitigated noise levels experienced by the Soboba Springs Mobile Estates from traffic would be significant under the Proposed Action and Alternatives (70 dBA L_{eq}). There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS to lower received noise levels by about an additional 3 dBA overall. Implementation of this mitigation measure would result in an overall increase in the level of noise to approximately 3 dBA, which is below the significance threshold of an increase of 5 dBA.

Summary of Comments b: Alternative 3 proposes an RV park only a few feet from the Soboba Springs Mobile Estates. Noise from the RV Park would disturb the nearby residents.

Response b: Measures that would mitigate the effects of noise from the RV-park under Alternative 3 on are described in Section 5.9.2 of the EIS. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS to lower received noise levels by about an additional 3 dBA overall. However, as described in Section 4.9 of the FEIS, even with implementation the prescribed mitigation measures, the operational noise effects would remain significant under Alternative 3.

1.14.2.2.4 Facilities & Grounds

Summary of Comments a: Noise would be created 7 am to 7 pm Monday through Saturday by the casino, including delivery at loading docks, maintenance, and lawn care. Noise from maintenance does not appear to have been addressed in the EIS.

Response a: Noise effects from loading docks, maintenance, and lawn care are discussed in Section 4.9 of the DEIS and mitigation measures were prescribed under Section 5.9.2. Unmitigated and mitigated operational noise effects under the Proposed Action A are shown in Tables 4-72 and 4-73 of the FEIS, respectively. As shown in these tables, unmitigated noise effects from loading docks are less than significant. Noise from landscape maintenance equipment (lawnmowers, edgers, trimmers, etc.) would be no different than presently generated at the Soboba Springs Country Club golf course or private residences.

Summary of Comments d: Noise levels will at least double if two casinos are open with supporting buildings.

Response d: Only one casino would operate. Per the FEIS Executive Summary, Purpose and Need (Section 1.3), and Proposed Action (Section 2.1), the Tribe would relocate its existing casino, which presently resides on trust lands, to the Project Site. The structure of the existing Soboba Casino, located less than a half mile from the Project Site, would then be used for Tribal functions and programs, such as Tribal general membership meetings and gatherings. Conversion of the existing casino to meeting hall would coincide with the opening of the new casino with no overlapping functions.

Summary of Comments e: Noise does not stop at the borders of the Reservation. Noise generated within the existing boundaries of the Reservation disturbs the nearby residential communities.

Response e: Noise currently generated from the Reservation and existing casino is outside the scope of this analysis under NEPA as it is not part of the proposed project. The noise effects of the Proposed Action and Alternatives on nearby residential communities are discussed within Section 4.9 of the FEIS.

Summary of Comments f: The EIS noise discussion is inadequate because it analyzed Alternative 3, a proposed retail and office complex, neither of the proposed projects, nor one of the other alternatives.

Response f: Noise effects from each of the alternatives are discussed within Section 4.9 of the FEIS. The supporting technical tables are shown within Appendix X of the FEIS.

Summary of Comments g: Because there are currently no facilities on the Development Site, any new sources of noise would be significant, not less-than-significant as the EIS states. The EIS did not disclose the existing baseline noise levels in the area.

Response g: The effects analysis conducted for noise employed federal and local standards and significance thresholds. See Section 3.9.2 and 4.9.1 for additional discussion of the regulatory framework employed for this analysis. As described therein, the mitigated noise expected to be produced by the Proposed Action or Alternatives does not break the threshold criteria for noise, with the exception of Alternative 3.

As described in Section 3.9 of the FEIS, baseline ambient noise measurements conducted in 2004 by Medlin and Associates for the Development Site and surrounding area yielded average levels of 64.3 dBA and 65 dBA at distances of approximately 75 and 150 feet from the roads, respectively, corresponding with the 60 to 65 dBA noise level reported in the San Jacinto General Plan. Since no major development (i.e., no significant changes in traffic volumes) has taken place in the vicinity of the Development Site since 2004, the noise study cited above is still considered valid and is referenced for this analysis in the following sections as appropriate.

Summary of Comments h: The EIS provided no analysis of the combined noise effects from project build-out; only for each use individually.

Response h: The following text has been modified within Section 4.9.1 of the FEIS to clarify the combined noise effects from the proposed developments:

> **Conclusion: The simultaneous "worst case" combined unmitigated effects of** road traffic, parking structures, **the events arena,** and ancillary equipment associated with the Proposed Action A **could possibly increase average ambient noise levels for the Soboba Springs Mobile Estates by approximately 6 dBA over existing ambient levels, which would be a significant effect. However, the mitigation measures specified in Section 5.9.2 would reduce noise effects to the Soboba Springs Mobile Estates to less than significant, at an increase of 4 dBA overall. Specifically, construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 to lower received noise levels by about an additional 3 dBA overall.**
>
> **The mitigated change would not** exceed the threshold of significance of an increase in 5 dBA from ambient noise levels. **D**uring special events at the **indoor** events center, **outside** noise levels **would not** exceed this threshold and would therefore be **less than** significant.
>
> **The simultaneous "worst case" combined unmitigated effects of the proposed developments on the Golf Course and hillside communities (69 dBA Leq and 62 dBA Leq, respectively) would not exceed an increase in 5 dBA from ambient noise levels, and would thus be less than significant.** Mitigation measures to reduce noise effects are described in Section 5.9.2 **would result in an overall noise environment of 68 and 62 dBA Leq for the Golf Course and**

Hillside communities, respectively. Noise calculation spreadsheets are contained in Appendix X.

Section 4.10 of the EIS was revised to clarify the cumulative noise effects for the Proposed Action A:

As shown in Table 100(a), the LOS for the intersection of Soboba Springs Drive and Lake Park Drive would be Level F, without improvements, for Year 2025 with Proposed Action A traffic conditions. Similarly, the intersection of Soboba Road at Chabella Drive would operate at LOS F, without improvements, for Year 2025 with Proposed Action A traffic conditions. The noise associated with increased traffic volumes, combined with the unmitigated noise generated by the proposed facilities, would result in a significant effect of an increase over 5 dBA from ambient noise levels (65 dBA). The unmitigated cumulative noise level would be 71 dBA Leq at the Soboba Springs Mobile Estates and 70 dBA Leq at the Golf Course residential community. Noise effects at the Hillside residential community would be less than significant, at 62 dBA Leq.

To ensure that noise effects from operation of Proposed Action A do not contribute to cumulative noise effects, noise control measures would be implemented. With the implementation of the mitigation measures described in Section**s 5.7** and 5.9.2, the noise effects from operation of the proposed developments may be reduced to less than significant **(68 dBA Leq and 69 dBA Leq at the Soboba Springs Mobile Estates and the Golf Course residential community, respectively) .**

1.14.2.2.5 Mitigation

Summary of Comments a: The proposed noise barriers and buffers would not mitigate noise for neighborhoods that are not next to the Development Site. Noise travels up and over sound barriers, which would do nothing to help mitigate effects on the Hill community.

Response a: The Hill community is approximately 2,000 feet (610 meters) from the northeast corner of the facility, and over 3,000 feet (915 meters) from the main building. This distance affords considerable noise attenuation, including terrain effects (absorption). For example, 75 to 80 dBA traffic noise would be attenuated down to about 40 or 45 dBA, which would be less than significant since the low-density residential (LDR) noise threshold is 65 dBA under the Land Use Element (see EIS Section 3.7.2). In addition, there will be no outdoor concert events at the facility, only indoor events, which would not affect the Hill community. As discussed in Section 4.9 of the FEIS, noise effects to the hillside community would be less than significant under the Proposed Action and Alternatives. The primary source of noise which could affect the Hillside community during both the construction and operational phases is traffic, which would be attenuated by distance to 62 dBA L_{eq}. This is below the LDR noise threshold of 65 dBA under the Land Use Element and is therefore not a significant effect.

Summary of Comments b: The EIS does not provide adequate noise mitigation measures for the operational phases of the project alternatives.

Response b: As described in Sections 4.9 and 4.10 of the FEIS, with the exception of Alternative 3 the mitigation measures prescribed for the operational phase of the proposed developments (see Section 5.9.2 of the FEIS) would reduce direct and cumulative noise effects to less than significant. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, as well as one between the Golf Course Community and Soboba Road, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the

Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS to lower received noise levels by about an additional 3 dBA overall.

Summary of Comments c: The mitigation measures identified for operational noise do not appear to include identifiable performance standards (e.g., that construction of a sound wall would be an "optional" mitigation measure).

Response c: Per EIS Section 5.9.2, the sound wall is not optional, but rather an additional noise control measure which would be implemented to further reduce noise effects on the Soboba Springs Mobile Estates. Please see Section 1.18of this report for information on the enforceability of the prescribed mitigation measures. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS. The sound wall would be approximately 6 feet high and would lower received noise levels by about an additional 3 dBA overall, which is the performance standard. The barrier material would have to be solid and massive (i.e., mortared architectural concrete blocks), with no significant gaps in construction. Parking structure noises could result in an increase of 1 to 3 dBA over the existing ambient noise level of 60 to 65 dBA depending on the frequency and distance. This noise level would not be expected to be noticeable nor significant at the nearest residences (Soboba Springs Mobile Estates). For the Soboba Springs community, due to its close proximity (170 feet) to the proposed south parking structure under the Proposed Action A, construction of a mitigating sound wall between re-routed Lakeside Drive and the community would lower received noise levels to existing (pre-project) LDR background levels, i.e., 60 to 65 dBA.

The enclosed Central Plant (HVAC ancillary equipment) would be located furthest away from any residences, adjacent to the golf course on the north end of the facility. Per FEIS Section 4.9.1, HVAC equipment placed inside enclosures which create natural noise barriers or dissipation, would have noise levels reduced by 8 dBA or more compared to unenclosed equipment.

1.14.2.2.6 Plans, Ordinances, Codes

Summary of Comments a: There is an issue of compatibility with Riverside County's General Plan's noise requirements. Noise from the proposed project would cross property lines into the City of San Jacinto residences which have a Noise ordinance with fine-punishable offenses. Several municipal noise codes would be violated by the proposed project.

Response a: The noise analysis within Section 4.9 of the FEIS demonstrates that mitigated operational effects of the Proposed Action and Alternatives would be less than significant which is *de facto* compliance with applicable plans, ordinances, and codes. However, mitigated effects of Alternative 3 would remain significant and would therefore be inconsistent with local noise ordinances.

Summary of Comments b: Would the Proposed Action comply with city noise ordinances or would the Tribe be able to bypass the ordinances?

Response b: The proposed noise mitigations (FEIS Section 5.9.2) would otherwise enable compliance with Chapter 8.40 of the City of San Jacinto Municipal Code, with the exception of Alternative 3, which would remain significant even with mitigation. However, since the Proposed Action "is subject to Tribal sovereignty" and "is restricted against future alienation and immune from state and local taxation and regulation" by state and local agencies, the City of San Jacinto Municipal Code noise requirements are

not enforceable against the Tribe. For a discussion of the enforceability of the mitigation measures prescribed in the FEIS, please see **Section 1.18** of this public comment report.

1.14.3 Visual Resources

Summary of Comments: Mountain views from residential homes and nearby communities would be irreparably damaged or eliminated by the Proposed Action and Alternatives. These views are an important scenic resource for the City of San Jacinto.

***Response*:** Specific text describing effects to views of the San Jacinto Mountains was not included within each section. Therefore, the following sentence will be added to the Section 4.9.1 of the FEIS:

Proposed Action A Effect Determination (Section 4.9.1)
As discussed under Main Street, Verona Avenue, Menlo Avenue, and Soboba Springs Drive below, Proposed Action A would not dominate the view from locations over 0.5 miles away. Because the terrain is consistently level from most viewpoints, this distance would be greatly reduced if there are visual obstructions exist between the viewpoint and the Development Site. Although Proposed Action A would attract attention, the moderate contrast with the existing setting from these viewpoints would be acceptable under the Class III VRM classification. However, Proposed Action A would be proximate to several residential communities and public roads where, as shown by Soboba Road, the changes would create a strong contrast to the existing setting. Due to their size, any viewers within 0.5 miles of the structures who have an unobstructed line-of-sight could not overlook them. In addition, residences and trails at the same elevation or higher than the proposed structures' roofs, as shown by Granite View Drive, would have a clear view of parked vehicles and mechanical equipment. At these locations, viewers could not ignore the strong color and texture contrast with the existing setting. **Views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured.** Therefore, visual standards would not be met and mitigation measures would be warranted.

Proposed Action B Effect Determination (Section 4.9.2)
As discussed under Main Street, Verona Avenue, Menlo Avenue, and Soboba Springs Drive below, Proposed Action B would not dominate the view from locations over 0.5 miles away. Because the terrain is **consistently** level from most viewpoints, this distance would be greatly reduced if there are visual obstructions exist between the viewpoint and the Development Site. Although Proposed Action B would attract attention, the moderate contrast with the existing setting from these viewpoints would be acceptable under the Class III VRM classification. However, Proposed Action B would be proximate to several residential communities and public roads where, as shown by Soboba Road, the changes would create a strong contrast to the existing setting. Due to their size, any viewers within 0.5 miles of the structures who have an unobstructed line-of-sight could not overlook them. In addition, residences and trails at the same elevation or higher than the proposed structures' roofs, as shown by Granite View Drive, would have a clear view of parked vehicles and mechanical equipment. At these locations, viewers could not ignore the strong color and texture contrast with the existing setting. **Views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured.** Therefore, visual standards would not be met and mitigation measures would be warranted.

Alternative 1 Effect Determination (Section 4.9.13)
As discussed under Main Street, Verona Avenue, Menlo Avenue, and Soboba Springs Drive below, Alternative 1 would not dominate the view from locations over 0.5 miles away. Because

the terrain is consistently level from most viewpoints, this distance would be greatly reduced if there are visual obstructions exist between the viewpoint and the Development Site. Although Alternative 1 would attract attention, the moderate contrast with the existing setting from these viewpoints would be acceptable under the Class III VRM classification. However, Alternative 1 would be proximate to several residential communities and public roads where, as shown by Soboba Road, the changes would create a strong contrast to the existing setting. Due to their size, any viewers within 0.5 miles of the structures who have an unobstructed line-of-sight could not overlook them. In addition, residences and trails at the same elevation or higher than the proposed structures' roofs, as shown by Granite View Drive, would have a clear view of parked vehicles and mechanical equipment. At these locations, viewers could not ignore the strong color and texture contrast with the existing setting. **Views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured.** Therefore, visual standards would not be met and mitigation measures would be warranted.

Alternative 2 Effect Determination (Section 4.9.4)
As discussed under Main Street, Verona Avenue, Menlo Avenue , and Soboba Springs Drive below, Alternative 2 would not dominate the view from locations over 0.5 miles away. Because the terrain is consistently level from most viewpoints, this distance would be greatly reduced if there are visual obstructions exist between the viewpoint and the Development Site. Although Alternative 2 would attract attention, the moderate contrast with the existing setting from these viewpoints would be acceptable under the Class III VRM classification. However, Alternative 2 would be proximate to several residential communities and public roads where, as shown by Soboba Road, the changes would create a strong contrast to the existing setting. Due to their size, any viewers within 0.5 miles of the structures who have an unobstructed line-of-sight could not overlook them. In addition, residences and trails at a higher elevation than the proposed structures' parking lot, as shown by Granite View Drive, would have a clear view of parked vehicles. At these locations, viewers could not ignore the strong color and texture contrast with the existing setting. **Views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured.** Therefore, visual standards would not be met and mitigation measures would be warranted.

Alternative 3 Effect Determination (Section 4.9.5)
As discussed under Main Street, Granite View Drive, Verona Avenue, Menlo Avenue, and Soboba Springs Drive below, views to Alternative 3's single story structures would be largely obscured or eliminated by existing landforms, vegetation and structures, except in the immediate vicinity. Although the Alternative 3 would be seen at Main Street, Granite View Drive, and Menlo Avenue, the weak contrast to the existing setting would be acceptable under the Class III VRM classification. However, the Alternative 3 would be highly visible to travelers using Lake Park Drive and Soboba Avenue, as well as to residents bordering the Development Site. At these locations, viewers could not ignore the strong form, color and texture contrast with the existing setting. **Views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured.** Therefore, visual standards would not be met and mitigation measures would be warranted.

1.14.4 Recreational Resources

Summary of Comments: The City of San Jacinto is not meeting its goal of 5 acres of parkland for every 1,000 residents; in addition, the original master plan for the Soboba Springs Community included parkland. On this basis, designs for the Proposed Action should have included useable parkland.

Response: As stated within Section 3.9.4 of the FEIS, the City falls short on its standard of providing five acres of parkland for every 1,000 residents, as there are currently only 2.99 acres for every 1,000 residents. Pursuant to the California State Quimby Act (California Government Code §66477), the City of San Jacinto requires new residential developments to dedicate 5 acres of parkland per 1,000 residents or an in-lieu fee payment as a condition for approval of a residential subdivision. Section 9(d) of the Quimby Act states that this requirement does not apply to commercial or industrial subdivisions. The Proposed Action and Alternatives are commercial in nature and do not include residential development; therefore, the Quimby Act does not apply to the type of development proposed under the project.

1.15 CUMULATIVE EFFECTS

Summary of Comments: Cumulative effects of the project have not been thoroughly analyzed. The cumulative effects section did not clearly specify which past, present, and reasonable foreseeable projects were included in the analysis. The cumulative effects analysis should include the proposed Tenaya and Festival projects.

Response: According to the City's planning technician, the Tenaya project (now known as "The Villages of San Jacinto") has been approved pending final corrections to the Specific Plan. This project would be located south of Ramona Boulevard and west of Sanderson Avenue, which is approximately six miles from the Project Site. Environmental effects of the Tenaya project were considered in the Final Environmental Impact Report for the Villages of San Jacinto (State Clearinghouse No. 2004122132), released in November 2009. The Festival project, a proposed 756,200 square foot community shopping center development at the intersection of Highway 79 and Ramona Expressway, is on hold. There is no projected date for approval or construction. The Tenaya project is therefore a reasonably foreseeable action, while the Festival project is not.

Cumulative effects are described within Section 4.10 of the FEIS. The cumulative effects analysis for each environmental topic begins with defining the geographic boundary and time frame for the analysis. For many environmental topics, the geographic boundary of the cumulative effects analysis is generally defined as Riverside County. In some cases, a larger or smaller geographic boundary is addressed. For instance, air quality effects are analyzed within the context of the South Coast Air Basin (SCAB), which spans the western portion of Riverside County as well as Los Angeles and Orange counties. In other cases, effects would only be noticeable on a local level. For this reason, effects to some resources, such as socioeconomic and public services, are analyzed within the context of the City of San Jacinto as well as Riverside County.

Environmental topics for which a larger area of analysis was required (e.g. the San Jacinto River Basin for water resources or within Riverside County for solid waste service) consider the overall effects of planned development, including the Tenaya project, within those geographic boundaries. Environmental topics for which a more localized area of analysis was required detail the anticipated effects on a project by project basis. For example, the geographic scope for the lighting and glare cumulative effect analysis includes all areas within a one-mile radius of the Development Site. Similarly, the visual resources cumulative effect analysis includes all areas within viewing distance of the Key Observation Points (KOPs). The development tracts considered in the lighting and glare and visual resources analyses are shown in Figures 4-14 and 4-15, respectively. These projects were derived from the City of San Jacinto's Tentative Tracts map, found on the Zoning page of the City's website (http://san-jacinto.ca.us/city-govt/zoning.html). The City's planning technician provided the following description of the subject tracts:

- TR 30577: A permit for 73 residential lots expired on January 29, 2006.

- SP 1-05: The Park Hill residential development, planned for 766 lots, was abandoned.

- TR 33509: The permit for development of 37 residential lots was extended a second time to May 26, 2012.

- TR 28224: The Maravella Estates senior housing development was permitted for 223 lots. Forty of these lots have been completed, with Phase 1 recorded; however, the permit for Phase 2 development has expired.

- CUP 10-04: The Maravella 21,240 square foot multi-tenant retail shopping center has received some grading and improvements; however, there is no anticipated construction date.

- TR 32053: Development of 24 out of 178 residential lots has been completed. There is no projected date for completion of the remaining lots.

- TR 30484: A 117-lot residential development was permitted. This permit has been extended three times to January 15, 2012. There is no anticipated construction date.

- TR 31566: This 61-lot residential development tract was not approved.

- TR 34271: This 147 residential lot development is in process. There is no projected construction or completion date.

- TR 33862: The permit for this 98 residential lot development has been extended to April 27, 2012.

- TR 30923: An application to develop 84 residential lots was withdrawn.

- TR 32582: A permit for 192 residential lots has possibly expired. The City is in the process of confirming the status of this permit.

- TR 30379: A permit for 126 residential lots expired on December 12, 2007 and was subsequently extended to August 12, 2015.

- TR 30588: A permit for 85 residential lots expired on May 22, 2006.

- TR 32518: Development of 9 out of 35 residential lots has been completed. There is no projected date for completion of the remaining lots.

The Tenaya project is not included within the above list of tracts because it is located outside of the areas of analysis for lighting and glare and visual resources.

1.16 INDIRECT EFFECTS

Summary of Comments: The DEIS failed to account for the indirect effects of the Proposed Action and Alternatives.

Response: Section 4.11.1 of the FEIS provides discussion on the indirect effects of project implementation for the Proposed Action, the Alternatives, and No Action. Section 4.11.2 assesses indirect effects caused by the recommended traffic mitigation, while Section 4.11.3 examines indirect effects due to the off-site construction of pipelines. Potential effects caused by the treatment and disposal of wastewater at the proposed Tribal WWTP (see Section 2.1.1) are addressed in Section 4.8. The

indirect effects of off-site traffic mitigation and pipeline construction are discussed separately in the FEIS because they are separate projects (indirectly resulting at least in part from the Proposed Action or an Alternative) that affect most issue areas.

1.17 GROWTH-INDUCING EFFECTS

Summary of Comments: Growth-inducing effects have not been thoroughly analyzed.

Response: The growth-inducing effects of the Proposed Action and Alternatives are presented in Section 4.12 of the FEIS. The analysis is based on the proposed developments' potential influence on and relationship between regional employment, housing, and commercial and industrial development.

1.18 MITIGATION MEASURES

Summary of Comments: There is no guarantee that the Tribe would comply with its stated mitigation measures or any agreements developed between the Tribe and local authorities. Mitigation measures proposed in the DEIS are inadequate.

Response: It should be noted that the EIS is not the document that commits the agency to mitigation; it is the Record of Decision (ROD) that does so. The EIS may set forth potential measures for consideration. It does not adopt them. This background information should be kept in mind in evaluating the reach of proposed mitigation measures suggested in the EIS for the BIA to adopt in its ROD. The commenters' suggestions become appropriate measures for the BIA to consider in their Record of Decision. As required by 40 CFR 1505, the BIA or other appropriate consenting agency shall be responsible for ensuring that mitigation adopted within the ROD is implemented. A monitoring and enforcement program for mitigation measures shall be adopted and summarized within the ROD (40 CFR 1505.2 [c]). However, many of the mitigation measures recommended in the EIS are self-enforcing and implementation will be ensured through permit conditions or other binding agreements. See the expanded discussion of NEPA procedural requirements for adopting the ROD in Section 1.5.6 the FEIS.

With respect to those commenters who concluded that the DEIS does not conclusively demonstrate that enforceable mitigation measures will actually mitigate the identified effects, that comment is noted. All relevant, reasonable mitigation measures that could improve the proposed project have been identified. Good faith efforts have been made throughout the environmental review process to design the project so as to minimize environmental effects and to propose mitigation measures that are intended to further minimize potential effects.

SECTION 2

Comment Log, Written Comments, and Public Hearing Transcript

S E C T I O N 2

Comment Log, Written Comments, and Public Hearing Transcript

Table 1 below contains the Comment Log, which lists the names of individuals, agencies, and organizations that submitted written and verbal comments. Copies of all public comment letters received during the public comment period follow **Table 1**, as well as the transcript of the public hearing held on August 5, 2009.

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #A01			City of San Jacinto	
Letter #A01.A	Tim Hults	595 S. San Jacinto, Avenue San Jacinto, CA 92583	City of San Jacinto	1/13/12
Letter #A02		PO Box 682, San Jacinto, CA 92581	Save Our Communities	8/1/09
Letter #A03	David H. K. Huff	3535 10th Street, Suite 300 Riverside, CA 92501	Riverside County Counsel	8/18/09
Letter #A04	Scott Morgan	1400 10th Street, PO Box 3044,Sacramento, CA 95812-3044	State of California, Governor's Office of Planning and Research	8/18/09
Letter #A05	Cheryl Schmit	PO Box 355, Penryn, CA 95663	Stand Up for California	8/24/09
Letter #A06	Patty Brandt	1300 I Street, Suite 125, Sacramento, CA 94244-2550	State of California, Dept. of Justice, Office of Attorney General	9/3/09
Letter #A07	Charles V. Landry	3403 10th Street, Suite 320, Riverside, CA 92501	Regional Conservation Authority	9/14/09
Letter #A08	Michael D. Fitts		Endangered Habitats League	9/15/09
Letter #A09	Jim A. Bartel	6010 Hidden Valley road, suite 101, Carlsbad, CA 92011	US FWS/Carlsbad Office	9/15/09
Letter #A10	Edwin J. Evans	2230 Lake Park Drive, San Jacinto, CA 92583	Lake Park Soboba Springs Mobile Estates	9/15/09
Letter #A11	Charles V. Landry	3403 10th Street, Suite 320, Riverside, CA 92501	Regional Conservation Authority	9/14/09
Letter #A12	Pamela J. Walls	3535 10th Street, Suite 300 Riverside, CA 92501	Riverside County Counsel	9/14/09
Letter #A13	Pamela J. Walls	3535 10th Street, Suite 300 Riverside, CA 92501	Riverside County Counsel	9/15/09
Letter #A14	George Hague	26711 Ironwood Avenue, Moreno Valley, CA 92555-1906	Sierra Club/San Gorgonio Chapter	9/14/09
Letter #A15	Kathleen Browne	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	9/15/09
Letter #A16	Jason Neuman	2300 Market Street, 1st Floor, Suite 150, Riverside, CA 92501	Riverside County Fire Department	9/9/09
Letter #A17	Lee A. Wagner	PO Box 512, Riverside, CA 92502	Riverside County Sheriff	8/27/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #A18	David L. Jones	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	8/24/09
Letter #A19		PO Box 1280, Riverside, CA 92502-1280	County of Riverside, Department of Environmental Health	9/9/09
Letter #A20	Ken Baez	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	9/8/09
Letter #A21	Autumn DeWoody	3741 Merced Drive, Unit F2, Riverside, CA 92503	Inland Empire Waterkeeper	9/15/09
Letter #A22	Andrea Lynn Hoch	Governor Arnold Schwarzenegger, Sacramento, CA 95814	California Office of the Governor	9/15/09
Letter #A23	Brian Nakamura	445 East Florida Avenue, Hemet, CA 92543	City of Hemet	9/10/09
Letter #A24	Joseph B. Lewis	PO Box 8300, Perris, CA 92572	Eastern Municipal Water District	9/11/09
Letter #A25	Robert K. Edmunds	One America Plaza, 600 West Broadway, Suite 1100, San Diego, CA 92101	Buchanan Ingersoll Rooney LLP	9/14/09
Letter #A26	Ken Baez	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	9/8/09
Letter #A27		PO Box 1280, Riverside, CA 92502-1280	County of Riverside, Department of Environmental Health	9/9/09
Letter #A28	Ron Goldman	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	9/8/09
Letter #A29	David E. Jones	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	8/24/09
Letter #A30	Patricia Mayne	PO Box 682, San Jacinto, CA 92581	Save Our Communities	9/9/09
Letter #A31	Barry McClellan	595 S. San Jacinto Avenue, San Jacinto, CA 92583	City of San Jacinto	9/15/09
Letter #A32	Danial Kopulsky	464 West 4th Street, 6th Floor MS 725, San Bernadino, CA 92401	State of California, Department of Transportation - District 8	9/15/09
Letter #A33	Scott Morgan	1400 10th Street, PO Box 3044,Sacramento, CA 95812-3044	State of California, Governor's Office of Planning and Research	9/15/09
Letter #A34	Mekbib DeGaga	1995 Market Street, Riverside, CA 92501	Riverside County Flood Control and Water Conservation District	9/28/09
Letter #A35	Scott Morgan	1400 10th Street, PO Box 3044,Sacramento, CA 95812-3044	State of California, Governor's Office of Planning and Research	9/16/09
Letter #A36	Scott Morgan	1400 10th Street, PO Box 3044,Sacramento, CA 95812-3044	State of California, Governor's Office of Planning and Research	9/22/09
Letter #A37	Kathleen M. Goforth	75 Hawtorne Street San Francisco, CA 94105-3901	United States Environmental Protection Agency	9/15/09
Letter #A38	Joseph E. Mudd	1888 Century Park East, Ste.1900 Los Angeles, CA 90067	Freeman, Freeman, Smiley	2/23/12
Letter #1	Shirley J. Ross	862 Bergmano Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #2	Don A. Nelson	1718 Carrera Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #3	Floyd R. Ross	862 Bergmano Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #4	Jacqueline M. Nielsen	1718 Carrera Drive, San Jacinto, CA 92583	Local Resident	7/13/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #5	Peggy L. Washburn	2230-216 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #6	Jack R. Washburn	2230-216 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #7	Leonard G. Burns and Barbara R. Burns	2230 Lake Park Drive, #172, San Jacinto, CA 92583	Local Resident	7/20/09
Letter #8	Michelle Seman	26256 Wisdome Drive, Hemet, CA 92544	Local Resident	7/13/09
Letter #9	Jerry Decker	2230 Lake Park Drive, #107, San Jacinto, CA 92583	Local Resident	
Letter #10	Beverly Williams	2230 Lake Park Drive, #107, San Jacinto, CA 92583	Local Resident	
Letter #11	Janice R. Emmerich	2230 Lake Park Drive, #79, San Jacinto, CA 92583	Local Resident	
Letter #12	Berton J. McComb	22190 Las Palmas Court, San Jacinto, CA 92583-2981	Local Resident	7/14/09
Letter #13	John G. McGibb	2230-247 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #14	Patricia Finn	2230-194 Lake Park Drive, San Jacinto, CA 92583	Local Resident	8/7/09
Letter #15	Bob and Cecelia Morris	2307 Patirot Way, Corona, CA 92882	Local Resident	
Letter #16	Candace Lange	773 Bergano Avenue, San Jacinto, CA 92583	Local Resident	
Letter #17	Charlotte R. Albert	2230 Lake Park Drive #36, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #18	Harold and Francis Retzlaff	2230-68 Lake Park Drive, San Jacinto, CA 92583	Local Resident	8/8/09
Letter #19	Joanne Pirelli	22770 Soboba Road, San Jacinto, CA 92583	Local Resident	
Letter #20	Margaret Rodenbusch	2230-50 Lake Park Drive, San Jacinto, CA 92583	Local Resident	
Letter #21	Doris Mathers	2230-95 Lake Park Drive, San Jacinto, CA 92583	Local Resident	
Letter #22	Beverly Castleton	985 Verona Avenue, San Jacinto, CA 92583	Local Resident	
Letter #23	Marie Lemons	43761 Pioneer Avenue, Hemet, CA 92544	Local Resident	
Letter #24	Thomas & Dee Wickham	953 Verona Avenue, San Jacinto, CA 92583	Local Resident	8/17/09
Letter #25	Sandra Jensen	2230 Lake Park Drive #101, San Jacinto, CA 92583	Local Resident	
Letter #26	Audrey Garnella	44625 Adobe Drive, Hemet, CA 92544	Local Resident	8/27/09
Letter #27	Linda Warwick	42106 San Jose Drive, San Jacinto, CA 92583	Local Resident	8/27/09
Letter #28	Norm Pabst	42121 San Jose Drive, San Jacinto, CA 92583	Local Resident	8/15/09
Letter #29	Ruth Pabst	42121 San Jose Drive, San Jacinto, CA 92583	Local Resident	8/15/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #30	Sarah Torres	42051 San Jose Drive, San Jacinto, CA 92583	Local Resident	8/15/09
Letter #31	Barbara Andersen	Spc. 61, 2230 Lake Park Drive, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #32	Berton J. McComb	22190 Las Palmas Court, San Jacinto, CA 92583-2981	Local Resident	7/14/09
Letter #33	Beverly Williams	2230 Lake Park Drive. 107, San Jacinto, CA 92583	Local Resident	8/15/09
Letter #34	Elizabeth A. Dalton	21100 State Street, Spc 219, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #35	Francis O. McClelland	2230 Lake Park Dr. Sp #225, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #36	Harold and Francis Retzlaff	2230-68 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/11/09
Letter #37	Kaylene Gutierrez	2230 Lake Park Dr., #19, San Jacinto, CA 92583	Local Resident	7/11/09
Letter #38	Kenneth J. Miller	PO Box 282, San Jacinto, CA 92581	Local Resident	
Letter #39	LeDora Gold	2230 Lake Park Dr., #250, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #40	Linda McKee	21928 Springcrest Road, Moreno Valley, CA 92557	Local Resident	9/15/09
Letter #41	Linda L. Warwick	42106 San Jose Drive, San Jacinto, CA 92583	Local Resident	8/27/09
Letter #42	Patricia Finn	2230-194 Lake Park Drive, San Jacinto, CA 92583	Local Resident	8/7/09
Letter #43	Ted and Margaret Bryant	2230-184 Lake Park Drive, San Jacinto, CA 92583	Local Resident	9/14/09
Letter #44	Beth Gristead	PO Box 1516, San Jacinto, CA 92581	Local Resident	9/14/09
Letter #45	R. Dudley Hoover	166 E. Main Street, Suite 1, San Jacinto, CA 92583	Local Resident	9/14/09
Letter #46	John & Elaine Phillips	2365 S. San Jacinto, San Jacinto, CA 92581	Local Resident	9/4/09
Letter #47	Lois Duran	2230 Lake Park Drive, Spc. 119, San Jacinto, CA 92583	Local Resident	9/9/09
Letter #48	Michael Adams & Florence Adams	42131 Granite View Drive, San Jacinto, CA 92583	Local Resident	9/14/09
Letter #49	Armando Pirelli	22770 Soboba Road, San Jacinto, CA 92583	Local Resident	9/12/09
Letter #50	Denise Pirelli	22770 Soboba Road, San Jacinto, CA 92583	Local Resident	9/12/09
Letter #51	Endre Nika and Pirosha Papp	620 S. Camino Los Banos, San Jacinto, CA 92583	Local Resident	9/15/09
Letter #52	Maureen Castello	1912 Medoc Circle., San Jacinto, CA 92583	Local Resident	
Letter #53	Mike Mayne	1766 Carrera Drive, San Jacinto, CA 92583	Local Resident	9/3/09
Letter #54	Robert C. Snyder and Geraldine M. Snyder		Local Resident	9/1/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #55	LaDora Gold	2230 Lake Park Dr., #250, San Jacinto, CA 92583	Local Resident	7/17/09
Letter #56	Joan C. Sayler	21160 State Street, #162, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #57	Herbert M. Henry	21100 State Street, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #58	Don & Jenice Leslie	1793 Messina Drive, San Jacinto, CA 92583	Local Resident	9/8/09
Letter #59	Jimmy V. Malorni		Local Resident	
Letter #60	Jim Turiace	2230 Lake Park Drive, Space 31, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #61	George W. & Dora C. Rainey	2230-121 Lake Park Drive, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #62	Rodney McClelland	2230 Lake Park Drive, Spc 225, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #63	Virginia Shaw-Metivier	2230 Lake Park Drive, Spc 110, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #64	Jose Martinez		Local Resident	9/1/09
Letter #65	William B. Richmond	2230 Lake Park Drive, Spc 54, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #66	Carol M. Leeds		Local Resident	9/1/09
Letter #67	Christine G. Ellison		Local Resident	9/1/09
Letter #68	Clara L. Roesner		Local Resident	9/1/09
Letter #69	Nona L. Casson	754 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #70	Marlene S. Manion	905 Verona Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #71	Jeneane Prince	7171 Calico Circle, Corona, CA 92881	Local Resident	7/13/09
Letter #72	Richard Lee Prince	7171 Calico Circle, Corona, CA 92881	Local Resident	7/13/09
Letter #73	*Name Unreadable*	2230 Lake Park Drive, Spc 215, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #74	Calvin G. Montney	2230 Lake Park Drive, #11, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #75	Mr. and Mrs. Darrell Jacobson	2230 Lake Park Drive, #239, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #76	Vicki L. Rupert	2230 Lake Park Drive, #196, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #77	Dorothy Klingert	2230 Lake Park Drive, #129, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #78	Charmaine Jones	2230 Lake Park Drive, #33, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #79	John Odgen	2230 Lake Park Drive, #33, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #80	Mr. and Mrs. Frank Minjares	2230 Lake Park Drive, #14, San Jacinto, CA 92583	Local Resident	9/1/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #81	Charles and Judy Helberg	2230 Lake Park Drive, #6, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #82	Ronald and Bonnie Evans	2230 Lake Park Drive, #149, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #83	Donald Atwell	2230 Lake Park Drive, #188, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #84	Mr. and Mrs. Steve Klern	2230 Lake Park Drive #90, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #85	Bradley Haas		Local Resident	9/1/09
Letter #86	Jillian T. Schlentz	2230 Lake Park Drive, #67, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #87	Kenneth B. Howe		Local Resident	9/1/09
Letter #88	Samuel Gold	2230 Lake Park Drive, Spc 240, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #89	Milton S. and Joan D. Maxwell		Local Resident	9/1/09
Letter #90	Margaret P. and William L. Wise	2230 Lake Park Drive, #80, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #91	V. A. Thompson	2230 Lake Park Drive, #233, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #92	Nathalie J. Derry	2230-178 Lake Park Drive, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #93	Daniel J. Derry	2230-178 Lake Park Drive, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #94	Patricia Finn	Soboba Springs Mobile Home Park	Local Resident	9/1/09
Letter #95	David A. Ellison		Local Resident	9/1/09
Letter #96	Frances C. Sherwood		Local Resident	9/1/09
Letter #97	Helen McGrew		Local Resident	9/1/09
Letter #98	E. Stephens Difani		Local Resident	9/1/09
Letter #99	Gayle and Clyde Rocco		Local Resident	9/1/09
Letter #100	Michael D. Tracy		Local Resident	9/1/09
Letter #101	Shirley R. Burke		Local Resident	9/1/09
Letter #102	Rose DeWees		Local Resident	9/1/09
Letter #103	Sandra Jensen		Local Resident	9/1/09
Letter #104	Jesse and Olea Hinojos	2230 Lake Park Drive, Spc 21, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #105	Madge Davis	2230 Lake Park Drive, #46, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #106	Margaret Perez	2230 Lake Park Drive, #49, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #107	Margaret Ann Rodenbusch	2230-50 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #108	Cynthia Johnson	2230 Lake Park Drive, #52, San Jacinto, CA 92583	Local Resident	7/13/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #109	Gayleen C. Johnson	2230 Lake Park Drive, #52, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #110	Viola Keffer	2230 Lake Park Drive, Spc 53, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #111	J. Berg	2230 Lake Park Drive, #54, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #112	Robert Johnson	2230 Lake Park Drive, #66, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #113	Mary Cowan	2230-106 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #114	John R. Wilkins	2230-113 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #115	Judith D. Wilkins	2230-113 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #116	Thelma Ames	2230 Lake Park Drive, Spc 140, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #117	Billie E. Jacobson	2231 Lake Park #141, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #118	Barbara Chavez	2230-143 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #119	Luella M. Roquemore	2230-145 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #120	Sylvia Guenther	2230 Lake Park Drive, #174, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #121	Carol Shephard	2230 Lake Park Drive, #187, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #122	Gary Shephard	2230 Lake Park Drive, #187, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #123	Ted W. Bryant	2230 Lake Park Drive, Spc 184, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #124	Margaret Bryant	2230 Lake Park Drive, Spc 184, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #125	Lois Lorentzen	2230 Lake Park Drive, #183, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #126	Leon Thormahlen	2230 Lake Park Drive, #186, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #127	Maureen Shine	2230 Lake Park Drive, #195, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #128	Gerda M. Mann	2230 Lake Park Drive, #211, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #129	Philip R. Mann	2230 Lake Park Drive, #211, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #130	Sasha M. Moore	2230-227 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #131	Thomas G. Wagorn	2230 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #132	Helen Duke	San Jacinto, CA 92583	Local Resident	7/13/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #133	Cathy Johnson	395 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #134	Robert E. and Bebe M. Phillips	1856 Carrera Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #135	Vernon Reed Johnson	395 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #136	Helen C. Pelletier	368 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #137	Shirley A. Payne	365 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #138	Karen Peters	358 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #139	Ben Rodriguez	348 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #140	Patrick Hardiman	487 Buckingham, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #141	Albert Esqueda	486 Buckingham, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #142	Teresa Saldana	416 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #143	Thomas Stancyk Jr.	1074 Liverpool Lane, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #144	Jamie Stancyk	1074 Liverpool Lane, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #145	Susan Pratt	881 Sussex Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #146	Don Leslie	1793 Messina Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #147	Loren Pratt	881 Sussex Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #148	*Name Unreadable*	991 Sussex Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #149	John Morris	977 Sussex Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #150	Thomas Pippenger Jr.	3681 Anchorage Street, Hemet, CA 92545	Local Resident	7/13/09
Letter #151	Andrea Pippenger	3681 Anchorage Street, Hemet, CA 92545	Local Resident	7/13/09
Letter #152	James Culbreth	1028 Oxford Lane, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #153	Lavonne Culbreath	1028 Oxford Lane, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #154	Clifford L. Bronson	341 Wales Ct. San Jacinto, CA 92583	Local Resident	7/13/09
Letter #155	Gene and Adrianne Canfield	1251 Osprey Street, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #156	James A. Peterson	43715 Orinoco Lane, Hemet, CA 92544	Local Resident	7/13/09
Letter #157	Corina Peterson	43715 Orinoco Lane, Hemet, CA 92544	Local Resident	7/13/09
Letter #158	Richard Lemier	11861 Pasco Bonita, Los Alamitos, CA 90720	Local Resident	7/13/09
Letter #159	Julia Lemier	11861 Pasco Bonita, Los Alamitos, CA 90720	Local Resident	7/13/09
Letter #160	George Sagen	11911 Paseo Bonita, Los Alamitos, CA 90720	Local Resident	7/13/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #161	Linda Sagen	11911 Paseo Bonita, Los Alamitos, CA 90720	Local Resident	7/13/09
Letter #162	Bruce Prince	11432 Kearny Way, Garden Grove, CA 92840	Local Resident	7/13/09
Letter #163	Lee Prince	2 McCormick, Irvine, CA 92680	Local Resident	7/13/09
Letter #164	Nanette Prince Egetter	6544 Westview Drive, Riverside, CA 92506	Local Resident	7/13/09
Letter #165	Sharon Applebury	9701 Turtle Dove, Fountain Valley, CA 92708	Local Resident	7/13/09
Letter #166	Karen S. Underhill	2520 W. Ball Road, #7, Anaheim, CA 92804	Local Resident	7/13/09
Letter #167	Robert Prince	777 W. 12th Street, Claremont, CA 91711	Local Resident	7/13/09
Letter #168	Collen Carpenter & Gary S. Carpenter		Local Resident	7/13/09
Letter #169	Lee A. Hasz	1773 Messina Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #170	Brian Yoke	41633 Lori Lane, Hemet, CA 92544	Local Resident	7/13/09
Letter #171	Joseph W. Herbster	878 Torino Avenue, San Jacinto, CA	Local Resident	7/13/09
Letter #172	Linda M. Hasz	1773 Messina Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #173	Geoffry L. Bentley	1713 Messina Drive,	Local Resident	7/13/09
Letter #174	Sue Hartman	927 Torino Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #175	Dolores R. Arciniega	870 Verona, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #176	Myrna Gifford	913 Verona Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #177	Leticia J. Arciniega	890 Verona, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #178	Edwin Leroy Hinman	774 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #179	Martha Jane Hinman	774 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #180	Patricia J. Mayne	1766 Carrera Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #181	Emmett M. Mayne	1766 Carrera Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #182	Geena Copeland		Local Resident	9/1/09
Letter #183	Shirley Mazzei	714 Verona Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #184	John A. Massei	714 Verona Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #185	Patricia G. Prince	847 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #186	Richard C. Prince	847 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #187	Shirley A. Blair	857 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #188	David D. Christian	890 Verona, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #189	Carol Hawkins	42150 Granite View Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #190	Linda Bassett	42161 Granite View Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #191	Mark Bassett	42161 Granite View Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #192	Eliana Arciniega Ecker	42070 Granite View Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #193	Bruce Ecker	42070 Granite View Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #194	Kenneth Miller	42106 San Jose Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #195	Dean King	42171 Granite View Place, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #196	Carmela Heikkila	21932 Soboba Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #197	Joanne and Henry Pirelli	22770 Soboba Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #198	Angela Mendez	21930 Soboba Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #199	Mike Olin	21100 State Street, Spc 149, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #200	Amy J. Steinert	21100 State Street, Spc 60, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #201	Leon A. Steinert	21100 State Street, Spc 60, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #202	Richard L. Glover	21100 State Street, #94, San Jacinto, CA 92583	Local Resident	7/14/09
Letter #203	John Bakey	917 Bettina Way, San Jacinto, CA 92583	Local Resident	7/15/09
Letter #204	Roberta A. Cook and Darrel Wood	21100 State Street, #40, San Jacinto, CA 92583	Local Resident	7/16/09
Letter #205	Ron Ernst	21100 State Street, Spc 80, San Jacinto, CA 92583	Local Resident	7/17/09
Letter #206	Mary Jane Dahlstrom	21100 State Street, #119, San Jacinto, CA 92583	Local Resident	7/18/09
Letter #207	Shan Lane	2110 State Street, Spc 2, San Jacinto, CA 92583	Local Resident	7/19/09
Letter #208	Many Brittain	21100 State Street, #272, San Jacinto, CA 92583	Local Resident	7/20/09
Letter #209	Michael G. Lowe		Local Resident	7/21/09
Letter #210	Joyce Boulanger		Local Resident	7/22/09
Letter #211	Susan Lynn	21100 State Street, #8, San Jacinto, CA 92583	Local Resident	7/23/09
Letter #212	(Petition signatures)		Residents of San Jacinto Valley	
Letter #213	Ethel Van Deusen	639 Attenborough Way, San Jacinto, CA 92583	Local Resident	9/17/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #214	Charles Sepulveda	466 Meadow View Drive, San Jacinto, CA 92582	Local Resident	9/13/09
Letter #215	(Petition signatures)		Residents of San Jacinto Valley	
Letter #216	James B. Gibford	2230 Lake Park Drive, Spc 162, San Jacinto, CA 92583	Local Resident	
Letter #217	John Londolfi	2047 Saint Emilion Lane, San Jacinto, CA 92583	Local Resident	
Letter #218	Leonard L. Souza	24600 Mountain Avenue, #21, San Jacinto, CA 92544	Local Resident	9/14/09
Letter #219	Paige Duckworth		Local Resident	9/17/09
Letter #220	Mary and Vic Schutt	1240 Lodgepole Drive, Hemet, CA 92545-7872	Local Resident	9/14/09
Letter #221	Ethel Van Deusen	639 Attenborough Way, San Jacinto, CA 92583	Local Resident	9/17/09

SECTION 3

Detailed Responses to Public Comments

S E C T I O N 3

Detailed Responses to Public Comments

Each of the bracketed comments within the comment letters and public hearing transcript contained in Section 2 of this appendix are responded to within this section. Once an issue has been addressed in a response to a comment, subsequent responses to similar comments reference the initial response. If necessary, the chapters in the FEIS have been modified in response to comments, and the nature and the location of the modification is identified in the response. In many instances, the reader is directed to Section 1 of this appendix when a general response has been developed for the specific comment. This format eliminates redundancy where multiple comments have been submitted on the same issue. Responses to bracketed comments within the comment letters are listed below, followed by responses to bracketed comments within the public hearing transcript.

3.1 DETAILED RESPONSES TO COMMENT LETTERS SUBMITTED BY AGENCIES AND ORGANIZATIONS

3.1.1 Agency/Organization Comment Letter #A01

Response #A01-1

Refer to **Section 1.1.4** for a discussion of Cooperating Agency issues and relationships. **Section 1.13.5** includes a discussion specific to criminal incidents and law enforcement in the Project Area. The City of San Jacinto, as a Cooperating Agency, was issued a copy of the Administrative EIS, and the City and subsequently submitted comments to the BIA. These comments were reviewed and taken into consideration in the EIS. In addition, throughout the 75-day public comment period, occurring July 2, 2009 through September 15, 2009, the City was afforded another opportunity to comment on the EIS.

In its verbal comments submitted at the August 5, 2009 public hearing, the City requested a meeting with the BIA. In response, the BIA, its consultants, and the Tribe met with the City on December 2, 2009, to afford the City the opportunity to clarify its previously submitted comments. In addition, the meeting set a framework for future technical meetings. Technical meetings to discuss socioeconomic and fiscal effects, public safety, and traffic issues were held on the following dates:

- Socioeconomic and Fiscal Effects: January 21, 2010
- Public Safety Effects: January 28, 2010
- Traffic Effects: March 3, 2010

The EIS considers the input provided by the City during these meetings.

Response #A01-2

See ***Response #A01-1*** above, and refer to **Section 1.1.4** for a discussion of Cooperating Agency issues. See also **Section 1.12.2** for a discussion of land use issues. Law enforcement and fire protection/emergency medical services are discussed in **Sections 1.13.5** and **1.13.6**, respectively.

Response #A01-3

The EIS describes the Purpose and Need for the Proposed Action in Section 1.3. Refer to **Section 1.3** of this public comment report for a response to comments related to the Proposed Action's Purpose and Need, and to **Section 1.4** for a discussion of Alternatives.

Response #A01-4

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A01-5

Refer to **Section 1.13.5** for a discussion of Law Enforcement issues.

Response #A01-6

Refer to **Section 1.14.2** for a discussion of noise issues.

Response #A01-7

Refer to **Section 1.12.1** for a discussion of Transportation Networks.

Response #A01-8

Refer to **Section 1.11.1 Economic and Fiscal Resources** for a detailed discussion on the potential fiscal effects resulting from the Proposed Action, including tax effects. The effects of removing the Project Site from the County tax base would account for less than .01 percent in foregone County property tax revenue annually. The Tribe shall provide in-lieu development fees and property taxes to the San Jacinto Unified School District to mitigate recognized effects to the district. Also, the Tribe would provide primary fire protection and medical services to the Project Site, which would relieve the local community of some financial burden.

Response #A01-9

See **Sections 1.8.1** and **1.8.2** for discussions of air quality effects due to construction and operation, respectively.

Response #A01-10

See **Section 1.7.2 Impacts to Water Supply and Water Quality** for a discussion of water quality issues, specifically, the wastewater treatment plant and underground storage tanks at the gas station.

Response #A01-11

See **Section 1.18 Mitigation Measures** for a discussion of mitigation measures and related NEPA requirements.

Response #A01-12

Refer to **Section 1.13.5** for a discussion of Law Enforcement and **Section 1.13.6** for a discussion of Fire Protection/Emergency Medical Services.

Response #A01-13

See **Section 1.18** for a discussion of mitigation measures and **Section 1.1.4** for a discussion of cooperating agencies.

Response #A01-14

See **Section 1.1.4** for a discussion of cooperating agencies. See also **Sections 1.3** and **1.4** for discussions of the purpose of and need for the project, and the project alternatives, respectively. See **Section 1.18** for a discussion of mitigation measures.

The BIA, its consultants, and the Tribe met with the City on December 2, 2009, to afford the City the opportunity to clarify its previously submitted comments. In addition, the meeting set a framework for future technical meetings. Technical meetings to discuss socioeconomic and fiscal effects, public safety, and traffic issues were held on the following dates:

- Socioeconomic and Fiscal Effects: January 21, 2010
- Public Safety Effects: January 28, 2010
- Traffic Effects: March 3, 2010

The EIS considers the input provided by the City during these meetings.

3.1.1.A Agency/Organization Comment Letter #A01.A

Response #A01.A-1

The City states that the EIS identifies less than significant impacts for issues that are significant. The examples used by the City include aesthetics, greenhouse gases, and traffic. Please see Aesthetics and Visual Resources below for a response to aesthetics, Air Quality/Greenhouse Gas below for a response to greenhouse gases, and Traffic below for a response to traffic.

The City also claims that the FEIS ensures that impacts to the County are mitigated, while leaving impacts to the City unmitigated. The issues of particular concern to the City are law enforcement, fire protection services, schools, land use, noise and socioeconomic impacts. Please see the responses provided below for Law Enforcement and Fire Protection, Schools, Land Use, and Noise.

The City states that there are a "number of other remaining problematic areas including agriculture, water, the Project's purpose and need, alternatives, and cumulative impacts…" Please see responses below to Agriculture, Water, Alternatives and Purpose and Need, and Cumulative Impacts.

The City states that portions of the document refer to past dates in the future tense. The examples the City uses are on page 1-12, 3-136, 4-578 to 581, and 4-401/402. Changes have been made to the text to correct the errors.

Response #A01.A-2

Aesthetics and Visual Resources
The City claims that we "seriously underestimate" the number of locations that will be impacted by the visual change. The FEIS included 6 Key Observation Points (KOPs):

KOP 1: Residents from the communities along Main Street and Mountain Drive,

KOP 2: Residents from hillside private residents,

KOP 3: Residents on Lake Park Drive, residents from the community off Lake Park Drive,

KOP 4: Residents from Menlo Avenue,

KOP 5: Residents of the retirement community south of Lake Park Drive, and

KOP 6: Residents near Soboba Road.

The FEIS states on page 184 that the intent in KOP selection is to identify locations in proximity to the Development Site, which best represent overall views of the proposed project as seen from public places such as roads, recreation areas and trails as well as adjacent residential communities. The KOPs are generally selected for one or two reasons: (1) the location provides representative views of the landscape along a specific route segment or in a general region of interest; and/or (2) the viewpoint effectively captures the presence or absence of a potentially significant project effect in that location. The KOPs are typically established in locations that provide high visibility to relatively large numbers of viewers and/or sensitive viewing locations such as residential areas, recreation areas, and vista points. Section 4.9 of the FEIS discusses additional KOP selection criteria and results.

While it is not possible to represent every view toward the project, the KOPs identified are representative of typical views with potential for visual effects generated by the proposed project and they facilitate review and discussion. As the following section will show, KOPs chosen are representative of key sensitive viewer types, key sensitive viewer locations and/or key visual simulation locations.

The City states that it is unclear if the FEIS comes to any conclusion of significance as to the visual impacts of the project. Page 4-289 of the FEIS states that the "views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured. Therefore, visual standards would not be met and mitigation measures would be warranted."

i. Views from Main Street would be significant (FEIS page 4-290)

ii. Views from Granite View Drive would be significant (FEIS page 4-290 through 291)

iii. Views from Verona Avenue would be significant (FEIS page 4-291through 292)

iv. Views from Menlo Avenue would be less than significant (FEIS 4-292)

v. Views from Soboba Springs Drive would be significant (FEIS page 4-292 through 293)

vi. Views from Soboba Road would be significant (FEIS page 4-293 through 294)

Page 4-447 of the FEIS states that the project would "contribute to a cumulatively considerable effect on visual resources from six KOPs, because the proposed permanent structures would strongly contrast with the existing setting."

Our introduction to the visual mitigation reads:

> "The following mitigations measures are recommended to reduce the amount of contrast that the proposed developments would have with the existing setting. These mitigations measures should be used in conjunction with each other and where appropriate in order to reduce the amount of contrast from strong to moderate or less. By reducing the contrast rating to moderate or less, the Proposed Action and Alternatives would have a less than significant visual effect on the existing setting." (FEIS page 5-37)

Therefore, we are stating that the project would have significant existing plus project and cumulative impacts prior to mitigation, but that these impacts would be reduced to LTS with these mitigation measures. In addition, our summary pages make it clear that the impact goes from Significant to Less than Significant with mitigation (page ES-26).

Lastly, City claims that "it is imperative that this significant negative environmental impact be recognized and that substantial additional mitigation measures be added in order to ameliorate this impact as much as possible, and not merely leave the people of San Jacinto to suffer." FEIS Pages 5-37 to 5-39 include visual resource measures that address vegetative screening, earth tone color choices, and parking and roof materials. The City does not specify what other measures are needed or why the existing measures are deficient.

Response #A01.A-3/4

Air Quality/Greenhouse Gases:
The City states that the FEIS analysis regarding greenhouse gas (GHG) emissions is legally insufficient because it "merely calculates the percentage that the Project's GHGs are of the State of California's entire GHG emissions.

Section 4.3.1 and 4.10.3 of the FEIS provides information concerning project related and cumulative GHG emissions. Section 4.3.1 of the FEIS has been modified to show a detailed breakdown of the GHG emissions estimated for both construction and operation. The analysis concludes that the project would generate greater than 25,000 MT of CO_2e emissions, which if left unmitigated would be considered a significant impact. Section 5.3.2 of the FEIS presents mitigation measures designed to reduce the emissions by at least 28.3% from business as usual levels. The revised FEIS does not calculate the percentage of the project's GHG emissions against the State of California.

The City states that the GHG cumulative analysis within the FEIS is inadequate because it fails to come to a conclusion regarding significance. The City goes on to state that there are a number of agencies that have established thresholds including the SCAQMD, BAAQMD, and CARB. The FEIS (Section 4.3.1) uses the CEQ identified annual generation rate of 25,000 MT of CO2e as an

indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. Given that the project would generate GHG emissions above the 25,000 MT level, the FEIS then applied a 28.3% reduction requirement from BAU levels to ensure a less than significant impact would result.

The City claims that the FEIS discussion of mitigation for GHG emissions is also insufficient. Section 5.0 provides mitigation measures that, combined with California Regulatory measures, would reduce GHGs by 34.5%. This is sufficient and exceeds the 28.3% goals of AB 32.

The City states that the Appendix shows that CO_2 will barely be affected by the energy efficiency measures. Please refer to the Global Climate Change assessment provided in Appendix Y.

The City also claims that the mitigation measures are "illusory" since the discussion states that they "should be incorporated" and are not required to be incorporated. The City expands the "illusory" claim to other measures such as the facilitation of public transit use and specifically the application of the solar panel mitigation. The mitigation measures presented in the FEIS are designed to a level of detail that is appropriate given the current planning level of project design. Therefore, it is impossible to state and show exactly where the solar panels will be location on the facility. The Record of Decision identifies those mitigation measures the BIA is adopting and committing to implement, including any monitoring and enforcement program applicable to mitigation. The Tribal Council has also adopted a Tribal resolution that commits the Tribe to implement all mitigation measures carried forward in the BIAs Record of Decision.

Lastly, the City claims that the GHGs emitted by this project are cumulatively significant and that additional mitigation measures are needed. The analysis provided in the revised FEIS provides for mitigation that would reduce the GHG emissions by 34.5%, which exceeds the 28.3% BAU reduction sought by the State of California. The reduction provided for with the implementation of the stated mitigation measures would reduce the project's contribution to a less than significant level.

Response #A01.A-5/7

Traffic

The City was pleased to learn that the Project expressly does not include Lake Park Dr. in the fee—to trust transfer; however, they were concerned that the Soboba Springs Mobile Home Estates residents would still have to share their single access road with a large number of additional cars due to the Project, especially during arena events. They go on to state that the FEIS's "…bald conclusion that there will be no traffic impacts appears to be mere wishful thinking." In addition, the City doesn't believe that the transportation management plan contains sufficient mitigation.

The updated traffic impact analysis (Appendix T of the FEIS) has analyzed the traffic effects to the adjacent residential community by analyzing the intersection of Soboba Springs Drive/Lake Park Drive (the Soboba Springs Mobile Estates access). For Opening Year (2010) with project traffic conditions and without improvements, the intersection of Soboba Springs Drive/Lake Park Drive is projected to operate at unacceptable Levels of Service for Proposed Action "A", Proposed Action "B", and Alternative 1 traffic conditions. Improvements have been recommended for the intersection of Soboba Springs Drive/Lake Park Drive to operate at acceptable Levels of Service during the peak hours for Opening Year (2010) with project traffic conditions during the peak hours.

For Year 2025 With Project traffic conditions and without improvements, the intersection of Soboba Springs Drive/Lake Park Drive is projected to operate at unacceptable Levels of Service for Proposed Action "A", Proposed Action "B", Alternative 1, Alternative2, and Alternative 3 traffic conditions. Improvements have been recommended for the intersection of Soboba Springs Drive/Lake Park Drive to operate at acceptable Levels of Service during the peak hours for Year 2025 with project traffic conditions during the peak hours.

A Transportation Management Plan (TMP) has been prepared and will be implemented as a mitigation measure to account for traffic during special events (see Section 5.7 and Appendix AB of the FEIS). Issues discussed in the TMP includes parking, site access, event notification, channelization, manual traffic control measures, valet/VIP services, designated parking areas, emergency/fire/medical services, and monitoring measures.

As part of this analysis, consideration was given to the Soboba Springs Drive/Lake Park Drive intersection in order to provide mitigation measures to reduce traffic effects for these residents during times of special events. Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages (Appendix AB of the FEIS). In order to provide local residents with ease of access to and from their communities, the TMP recommended that traffic control personnel/police be situated at the project accesses and the intersections of Soboba Road/Chabella Drive, Soboba Road/Lake Park Drive, and Soboba Springs Drive/Lake Park Drive. Using traffic control personnel/police at the project accesses and the intersections of Soboba Road/Chabella Drive, Soboba Road/Lake Park Drive, and Soboba Springs Drive/Lake Park Drive would allow for traffic to flow to and from the Development Site as well as allow local residents access to and from their communities. Each intersection should have a minimum of one traffic control personnel/police directing traffic.

The City goes on to states that the general traffic impacts are also substantial and that the project would increase the number of cars on City roads, and that no mitigation was provided for wear and tear of City streets. They go on to claim that the traffic baseline is out of date with no discussion of whether it reflects current conditions. The proposed development will participate in the adopted TUMF (Transportation Uniform Mitigation Fee) program and pay required development impact fees (FEIS page 5-12). The Board of Supervisors of the County of Riverside and the Councils on the Cities of Western Riverside County enacted the TUMF to fund the mitigation of cumulative regional transportation impacts resulting from future development. The mitigation fees collected through the TUMF program will be utilized to complete transportation system capital improvements necessary to meet the increased travel demand and to sustain current traffic Levels of Service. As noted in Section III.C.5 of the traffic study, the peak hour intersection turning movement counts were obtained in April/October/November 2007 and January 2010.

Lastly, the City requests that the identified mitigation measures for transportation impacts be clarified, preferably with diagrams because it is difficult or impossible to understand exactly how far certain proposed improvements would extend, or exactly where they would be located. As noted in Section VI.C of the traffic study (FEIS Appendix T), the improvements off-site to achieve the required LOS at the study intersections are depicted.

Response #A01.A-8/10

Law Enforcement and Fire Protection

The City claims that the Tribe's signing of the MOU with RCSD has predetermined the outcome as to what would be approved, which they say is forbidden under NEPA. The MOU signed between the City and RCSD would only go into effect should the BIA approve the fee-to-trust request. This MOU is a commitment by the Tribe to the BIA to show that the mitigation identified in the FEIS would/could be implemented. The decision to approve/ disapprove the fee-to-trust request lies solely with the BIA, who is not a party to the MOU. As such, the commitment to implement mitigation, which the MOU provides, does not predetermine the outcome as to what would be approved.

The City states that it is not clear how the agreement with the RCSD would reduce the impact since the Tribe could unilaterally cancel the agreement. All mitigation measures, including law enforcement mitigation, would be carried forward by the BIA to the Record of Decision (ROD) for the EIS. For measures carried forward to the ROD, the BIA would have enforcement capability to ensure implementation.

The City claims that City law enforcement would be impacted by the Project and the additional service calls and traffic problems it created. The City goes on to state that there are "simple calculations" that allow for evaluation of how much City law enforcement would be compensated. The EIS consultants met with the City of San Jacinto (Cooperating Agency) on several occasions to discuss potential impacts caused by the Proposed Action including law enforcement. The topic of law enforcement impact was discussed and the City was requested to provide their calculations. After repeated requests by the EIS authors, the City failed to provide the information. The City did send an overall compensation request to the Tribe identifying a number of items that the City would like to receive compensation for including law enforcement compensations. On that list were provisions for police personnel, police car and a new police station. Minus the simple calculations from the City to help determine the nexus between the Proposed Action and the compensation measures identified by the City, the EIS authors turned to RCSD who are under contract to the City to provide law enforcement services. The signed MOU entered into between the Tribe and RCSD covers law enforcement needs as defined by the service provider - Riverside County. The agreement is worded to be inclusive of needs for all law enforcement services, including those that may be needed by the City. The MOU is a commitment by the Tribe to fully implement law enforcement measures identified in the FEIS. No additional changes to the FEIS mitigation are needed.

The City states that they would be impacted due to increased fire calls because they have an existing mutual aid agreement with the CDF and Riverside County Fire Department. The project description includes the inclusion of a new, fully functioning fire department equipped and run by the Tribe upon project operation. This self sufficient facility would operate independent of CDF, Riverside County and the City of San Jacinto. If the Tribe enters into Mutual Aid Agreements after the facility opens, it would be to the benefit of CDF, Riverside County and the City of San Jacinto because the Tribal Fire Department would agree to participate in off reservation calls. No additional mitigation is needed in the FEIS to address Fire Service impacts.

Response #A01.A-11

Schools
The City claims that it is impossible to know if the school mitigation is adequate because a dollar amount has not been identified. The existing school mitigation presented in the FEIS is as follows:

> The Tribe shall provide reasonable in-lieu development fees and property taxes to the San Jacinto Unified School District to mitigate recognized effects to the district. The Tribe shall consult with the district to determine the amount and schedule of payments to reasonably mitigate fee and tax loss to the district and increased student enrollment in the district's schools.

The Tribe is committed through the BIAs Record of Decision and Mitigation Monitoring Plan to follow through with all mitigation measures listed in the FEIS. In addition, the Tribal Council has adopted a Resolution committing the Tribe to implement all mitigation measures. If the fee-to-trust is approved, the Tribe would then be ready to implement these mitigation measures, which includes meeting with the District to determine the amount needed.

The City states that, while they are not opposed to the Tribe benefiting through the creation of new business opportunities in a destination resort-type project, the City does object to "being left to suffer the drawbacks and many of the costs of the new development, while receiving little if any benefits." FEIS Appendix E, Section 1.13 Public Services, Response C states the following:

> As discussed in Section 4.6 of the FEIS, the reduction in property taxes associated with the removal of the subject property from the tax rolls ($0.24 million) would be partially offset by the generation of local sales tax receipts of approximately $0.22 million annually. The remaining shortfall would be more than compensated for by revenue contributed by the Special Distribution Fund. Soboba Casino accounted for $1.47 million of the Special Distribution Fund for fiscal year 2008-2009. Therefore, the proposed fee-to-trust action is not expected to result in the reduction of funding for public services.

Response #A01.A-12

Land Use
The City claims that the FEIS does very little analysis and discounts the overall impacts by relegating the discussion to separate sections, thereby significantly discounting the impacts that would be felt. The Land Use Compatibility discussion begins on page 4-109 of the FEIS and continues to page 4-111. The FEIS analysis concludes that the project would "result in the transformation of the Development Site from its current vacant rural state into a retail and service development characteristic of urban environments." The analysis also states that "(t)he increased traffic, noise, air emissions, and artificial lighting and glare generated by the proposed commercial developments would be inconsistent with the nearby open space and residential communities." While the conclusions of these physical environmental effects are summarized in this section of the FEIS, the reader is directed to the detailed analysis in other sections of the FEIS where the data/analysis is provided (with the exception of artificial lighting and glare). It would be redundant to reproduce the discussions for traffic, noise, and air emissions in the Land Use Compatibility discussions. The existing discussion is proper and no changes are needed.

The City claims that a separate section that "honestly and completely" discloses and analyzes the land use impacts is necessary for a full and legally adequate EIS. The City does not provide details

as to how the existing analysis fails to comply with NEPA other than the point that the reader is directed to other sections for details related to traffic, noise, and air emission impacts. Please see the response above regarding traffic, noise and air emission impacts.

The City states that mitigation measures pertain only to lighting and that substantial additional mitigation measures must be added to reduce other land use impacts. Mitigation measures associated with traffic, noise, air emissions, and artificial lighting and glare are presented in their respective sections of Section 5.0. The introduction to Section 5.7.2 Land Use has been modified as follows to direct the reader to those sections for applicable mitigation.

> "Land Use impacts necessitate mitigation for traffic, noise, air emissions and artificial lighting and glare. Please refer to Section 5.7.1 *Transportation Networks*, 5.9.2 *Noise*, 5.3 *Air Quality* for mitigation to those impacts. The mitigation provided below is for lighting and glare effects."

Response #A01.A-13

Noise

The City states that the section utilizes an eight-year old baseline, without addressing whether existing noise levels have increased in the interim. Since no major development (i.e., no significant changes in traffic volumes) has taken place in the vicinity of the Development Site since 2004, the noise study cited above is still considered valid. If updated measurements were taken and found that traffic has increased. Subsequently the ambient noise levels would have increased and the project's contribution would be less than what is stated in the report. If the travel speeds, vehicle mix and roadway conditions remain the same it takes a doubling of the traffic volume to increase the noise 3 decibels. So, as the ambient traffic increases the Project's percentage reduces. The report would be considered conservative.

The City claims that the FEIS indicates that construction noise would be significant, but concludes a less than significant impact (FEIS 4-264). This is an improper conclusion. See section changes, they applied the Lmax not the Leq. The Leq is below the 75 threshold – no impacts.

The City claims that the FEIS statements (pages 4-300, 327 and 351) that the addition of lower levels of noise would be less than significant due to the masking effects of higher levels of noise is untrue. They claim that noise is additive and that an adequate analysis is needed. Please see section changes.

Response #A01.A-14

Agriculture

The City states that they have identified two parcels on the project site as being "Farmland of Local Importance." This property is located on the vacant property surrounding the mobile home park southeast of Lake Park Drive. The San Jacinto General Plan states that these lands were identified by the Department of Conservation, and that any plans to convert these lands are subject to review under CEQA (San Jacinto General Plan, May 2006).

The City's General Plan EIR failed to identify a significant impact for the conversion of "Farmland of Local Importance" even though the General Plan maps identified this category. The Thresholds used in the City EIR included the conversion of "Prime Farmland, Unique Farmland, or Farmland of Statewide Importance…to non-agricultural use." Farmland of local importance was not included in the agricultural thresholds. The significant impacts resulting from the conversion of these

agricultural lands to non-agricultural uses was considered a significant and unavoidable impact back in 2006 when the City General Plan was adopted.

More recent research conducted for the EIS through the U.S. Department of Agriculture in 2010 concluded that the project site did not contain any prime and unique farmland, or any statewide and locally important farmlands (Robert S. Hewitt, June 18, 2010). These lands are not currently being used for farmland purposes. The majority of these lands would be left undeveloped except for the convenience mart and fire station.

No additional research/information beyond that which exists in the FEIS is needed based on the fact that the more recent research conducted through the U.S. Department of Agriculture in 2010 for the FEIS revealed that no Farmlands of Local Importance existed on the project site, coupled with the fact that the City's own General Plan EIR for General Plan buildout did not identify the conversion of Locally Important Farmland a significant impact.

Response #A01.A-15

Water

The City states that it is not enough for the FEIS to base a less than significant finding on the fact that it has adequate water rights to the groundwater. The City points out that other parties are currently using the groundwater water that the Tribe has rights to, so in the end an overdraft situation may result, which may be a significant impact. The City concludes by stating that the elimination of current users of groundwater may result in a significant impact, depending on what those uses are.

Section 4.8 of the FEIS (Water Supply and Public Services) shows that the Tribe currently has adequate capacity to serve the domestic needs of the existing Reservation plus Proposed Action A. As shown in the Water Supply discussion (FEIS Section 4.8.1), Existing Plus Project demand would total 1.46 million gallons per day (MGD) from the domestic wells and 0.45 MGD from the irrigation wells. The existing capacity for the Soboba wells is 3.75 MGD. The total Existing Plus Project demand is approximately 2.24 MGD below the existing capacity of the Tribe's domestic wells, and 1.71 MGD below the capacity of the irrigation wells. The existing wells were assumed to maintain their current capacities; therefore, a less than significant impact would result given that projected Existing Plus Project demand would be below existing Tribal water capacity. Additionally, the analysis presented in the cumulative 2030 discussion in Section 4.10, Public Services, Water Supply (page 4-433) concludes that existing water supply is sufficient to accommodate the cumulative demands of the Cumulative Plus Project scenario. Therefore, the existing Tribal wells currently produce adequate quantities of water to serve both the existing and cumulative plus project scenarios.

As presented in Section 4.10.3 of the FEIS (Water Resources), the Tribe's Water Rights Settlement, signed by President Obama on July 31, 2008, guarantees the Tribe paramount right to pump approximately 4,010 acre-feet in 2030, increasing to 9,000 acre-feet in 2058. The Hemet/San Jacinto Groundwater Management Area Water Management Plan accounts for future demands on the Hemet/San Jacinto Groundwater Basin and institutes artificial recharge measures to assure an adequate water supply. The WMP also states that EMWD and Lake Hemet Municipal Water District will implement the WMP for the Canyon and Intake aquifers to "address the current overdraft, and recognize and take into account the Tribal Water Right" (Water Resources & Information Management Engineering, Inc., 2007).

Response #A01.A-16

Drainage
The City wants assurance that the on-site development would not result in significant off-site drainage impacts. Page 4-14 of the FEIS concludes that the "incorporation of the proposed developments would reduce the potential effects to less than significant for structures proposed as part of Proposed Action A, along with downstream *and off-site drainage systems*." (emphasis added)

Response #A01.A-17

Cumulative Impacts

The City claims that it is difficult to know by reading the FEIS exactly what other projects are being considered for the cumulative analysis. Beginning on Page 4-396 and continuing to 4-398, the FEIS presents all of the cumulative projects used as a basis for the baseline cumulative conditions. In addition, Figure 4-12 of the FEIS presents "other developments in the project site and surrounding area" (FEIS, page 4-399). The list presents 16 projects that could have cumulative effects when combined with the Proposed Action and Alternatives. Mike Hasapas, Planning Technician for the City of San Jacinto was contacted for additional information on the City's Tentative New Development/Tracts Map.

The City claims that there is little or no disclosure of the cumulative baseline projects' impacts, and no disclosure of those impacts plus project impacts. The cumulative discussion presents approximately 145 pages of cumulative impact discussion beginning on page 4-400 and continuing through Page 4-545. Baseline and project plus baseline conditions are presented in various tables including, but not limited to:

a. Table 4-95: Estimated Regional Population Growth (2000 to 2010)

b. Table 4-96: 2000-2025 Projected Regional Population Growth

c. Table 4-97: Projected Average Annual Day Emissions (Tons/Day) for the South Coast Air Basin

d. Table 4-98: Expected Year of Compliance with Federal and State Standards for South Coast Air Basin

e. Table 4-99: Project Operational Emissions (Facility and Mobile Source) 2023 South Coast Air Basin (Tons Per Year)

f. Tabl4 4-100: Estimated 2025 Intersection Delay and Level of Service

g. Table 4-101: Estimated 2025 Freeway Interchange Delay and Level of Service

h. Table 4-102: Projected (2030) Water Demand Reservation Plus Proposed Action A

i. Table 4-103: Projected (2030) Wastewater Generation for Reservation Plus Proposed Action A (Gallons/Day)

The cumulative impact discussion covering approximately 145 pages within the FEIS presents a comprehensive analysis of the baseline conditions, as well as the baseline plus project conditions. No additional analysis is required.

Response #A01.A-18

Mitigation Measures

The City claims that the mitigation measures are legally deficient, illusory and meaningless because they do not mandate that the measures be implemented. The FEIS identifies mitigation measures to lessen the recognized environmental impacts resulting from proposed projects. As mentioned previously, the BIA will prepare a ROD that will carry forward and mandate implementation of various mitigation measures to be performed by the Tribe over the course of construction and operation of the project. The step of preparing the ROD has yet to be completed; however, when completed the Tribe will be required, with oversight provided by the BIA, to implement all mitigation measures brought forward in the ROD. In addition, the Tribe has agreed, by way of an adopted Tribal Resolution, to implement all mitigation measures identified in the EIS.

The City claims that they have previously been told that the "TASIN" grant process would adequately mitigate any impacts to the City. The authors of this FEIS are not aware of any such claim regarding TASIN. The comment is noted and forwarded to the BIA for consideration.

The development and approval of a ROD by the BIA, as well as the adoption of the Tribal Resolution ensures that all mitigation measures would be carried forward and implemented by the Tribe. Therefore, no change to the mitigation language in the FEIS is required.

Response #A01.A-19

Alternatives and Purpose and Need

City claims that almost any relocation of the casino would lessen or eliminate the majority of the impacts to the City and its citizens. The relocation of the proposed facility to the Reservation would not allow the Tribe to attain a destination resort, which is a key provision within the Purpose and Need. As stated within Section 2.3.2 of the FEIS, the purpose of the casino relocation is to facilitate the Tribe's need for economic growth by providing an adequate gaming parcel as part of a destination resort. Section 1.3.2 *Economic Necessity*, which is part of Section 1.3 *Purpose and Need for the Proposed Action*, states that the location of the gaming facility would allow the Tribe to fully capitalize on the proposed hotel/casino complex's proximity to the golf course and County Club in order to offer a destination resort. The section goes on to state that an integrated complex offers customers many possible activities in one location. The intent of the Tribe is to differentiate its hotel, casino, golf course, and related facilities from those of nearby competing tribes.

The FEIS (Table ES-1 *Summary of Potential Environmental Effects, Mitigation Measures, and Significance*) found that significant impacts to seismic hazards, Western Riverside County MSHCP, federally listed species, migratory birds, transportation networks, special event traffic, land use inconsistency, wastewater service, hazardous materials, noise, and visual resources would be brought to a level of insignificance with implementation of listed mitigation measures in Section 5.0 *Mitigation Measures*. As stated previously, the Tribe would be required to implement all mitigation measures identified in the FEIS. Therefore, impacts after mitigation are expected to be less than significant at the project site.

City claims that the reason for rejecting an off-site alternative is improper since "having the casino located next to the golf course is not identified as a purpose or need of the Project in the EIS." As stated above, Section 1.3.2 *Economic Necessity* is part of Section 1.3 *Purpose and Need for the Proposed Action*. Within Section 1.3.2 is a sub-category *Suitability of the Project Site for Economic*

Development, which addresses the locational issues associated with the casino project and identifies the need to create a destination resort on the project site combining the existing golf course with the gaming project.

The City claims that the Purpose and Need would be met by keeping the land in fee title rather than bringing it into trust. They go on to state that there are no cultural resources or natural resources on the site, so taking the property into trust does not meet the goal of providing a homeland that protects and conserves cultural and natural resources. Please see Section 1-3.1 (Page 1-10) of the FEIS for revised language.

As stated in Section 1.3.2 (page 1-10) of the FEIS "Tribal self-determination and sovereignty provides the essential nature of the need to transfer the Project site from fee-title to federal trust status. The future welfare of the Tribe's members, and the Tribe's continued existence as a sovereign people, depends upon its ability to sustain economic independence. Placing the land into trust would allow the Tribe to exercise its powers of self determination over the Project Site as an integral part of an enhanced tribal land base, and will provide the Tribe with additional opportunities for economic development that rely upon the Project Site's acquisition in trust."

City claims that freeing the land from state environmental laws and removing it from the City tax base results in environmental and economic impacts that are not worthy or permissible goals. Federal laws apply to fee-to-trust requests. In addition to NEPA compliance, prior to constructing the new gaming facility the Tribe will comply with the Tribal-State Compact, which requires that the Tribe prepare and circulate an environmental document pursuant to its own Environmental Protection Ordinance, which incorporates the policies and purposes of the National Environmental Policy Act and California Environmental Quality Act consistent with the Tribe's governmental interests. Lastly, the FEIS found that the fiscal impacts of taking the property into trust are less than significant.

Response #A01.A-20

<u>Conclusion</u>
The City states that they believe the FEIS to be legally inadequate and they urge the BIA and the Tribe to address these inadequacies fully before taking any action. The responses to comments provided above address the issues raised by the City. The BIA believes the FEIS to be legally adequate.

The City cites the City's residents and a letter from "Save our Communities." The attached letter states concerns regarding the following issues:

1. Restricted input of what happens on sovereign Tribal land: The NEPA process is a means to provide input to the federal government prior to the property being taken into trust and the casino facility constructed. The BIA will fully consider all public input prior to decision making. Following fee-to-trust action, federal laws are fully enforceable on Tribal property.

2. Aquifer: SOC states that the overuse of the aquifer could result in serious consequences. Please see Response to Comment 1.7.2.1 Water Supply in FEIS Appendix E, which states that the Tribe's anticipated current and future water rights are included in the Settlement

and the Water Management Plan. The Water Management Plan also states that EMWD and Lake Hemet Municipal Water District will implement the WMP for the Canyon and Intake aquifers to "address the current overdraft, and recognize and take into account the Tribal Water Right" (Water Resources & Information Management Engineering, Inc., 2007).

3. Elimination of all tax revenues: Please see Response to Comment 1.11.1 Economic and Fiscal Resources in FEIS Appendix E, which states that Riverside County received $234,090 in property taxes from the Project Site – less than 0.01 percent of the $2.4 billion the County received in property tax revenue that year. Thus, the effects of removing the Project Site from the County tax base will be minimal accounting for less than .01 percent in foregone County property tax revenue annually. Of the County property tax revenue, 47.4 percent was allocated to education. The proposed fee-to-trust transfer will decrease education funding by $110,958.66 – a 0.01 percent reduction. However, as described in Section 5.8.8 of the EIS, the Tribe shall provide reasonable in-lieu development fees and property taxes to the San Jacinto Unified School District to mitigate recognized effects to the district. Please see **Section 1.13.8** of this public comment report for a more detailed discussion of mitigation measures to reduce effects to school services.

4. Casino is not the answer to need for tribal self-sufficiency: Comment is noted and forwarded to decision makers for their consideration.

5. U.S. citizens should not be harmed by the pursuit of self-sufficiency: The NEPA process is intended to fully disclose the environmental effects of the Proposed Action. The BIA will fully consider all of the information, including comments received, prior to taking a final action with regards to the project.

3.1.2 Agency/Organization Comment Letter #A02

Response #A02-15

Comment noted.

Response #A02-16

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A02-17

For concerns regarding seismic hazards, see **Section 1.6 Land Resources**. See also **Section 1.7.1** for a discussion of flooding and **Section 1.13.6** for a discussion of fire protection. In response to concerns raised by the public, a TMP (see Appendix AB) was prepared. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured.

Response #A02-18

Refer to **Section 1.2.1 Expressions of Opinion** and **Section 1.12.2 Land Use**.

Response #A02-19

Refer to **Section 1.12.2 Land Use**, **1.12.2.1 Consistency with the City of San Jacinto General Plan**.

Response #A02-20

Refer to **Section 1.18 Mitigation Measures**.

Response #A02-21

Refer to **Section 1.18 Mitigation Measures**.

Response #A02-22

Refer to **Section 1.11.1 Economic and Fiscal Resources** for a detailed discussion on the potential fiscal effects resulting from the Proposed Action.

Response #A02-23

Refer to **Section 1.11.1 Economic and Fiscal Resources** for a detailed discussion on the potential fiscal effects resulting from the Proposed Action, including tax effects.

Response #A02-24

The most current published data sources are presented for analysis in Section 4.6 of the EIS.

Response #A02-25

Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities, as described under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

Response #A02-26

Refer to **Section 1.3 Purpose and Need**.

Response #A02-27

Refer to **Section 1.11.2 Environmental Justice**.

Response #A02-28

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A02-29

Refer to **Section 1.14.3 Visual Resources** and **Section 1.15 Cumulative Effects**.

Response #A02-30

Comment noted and made part of the administrative record.

Response #A02-31

Refer to **Section 1.3 Purpose and Need** and to **Section 1.4 Alternatives**. Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities, as described under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

Response #A02-32

Comment noted and made part of the administrative record.

Response #A02-33

Comment noted and made part of the administrative record.

Response #A02-34

Comment noted and made part of the administrative record.

Response #A02-35

Comment noted and made part of the administrative record.

Response #A02-36

Comment noted and made part of the administrative record.

Response #A02-37

Refer to **Section 1.10.1 Cultural Resources** and **Section 1.3 Purpose and Need**.

Response #A02-38

See ***Response #A02-37***.

Response #A02-39

See ***Response #A02-37***.

Response #A02-40

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site.

Response #A02-41

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site, as well as for a discussion regarding the location of the Project Site relative to Flood Zone X.

Response #A02-42

Speculation about alternative developments falls outside the scope of the NEPA process. See **Section 1.2** of this public comment report for additional information on non-NEPA topics.

Response #A02-43

Refer to **Section 1.8** for a discussion of air quality effects during construction and operation.

Response #A02-44 Refer to **Section 1.12.1 Transportation Networks**. The location of the proposed hotel/casino complex near the intersection of Soboba Road and Lake Park Drive would allow easier access to and from the facilities relative to the location of the existing casino, which is accessible only via Soboba Road. A TMP (Appendix AB of the FEIS) has been conducted to account for traffic during special events. This study includes information pertaining to event parking during special events and potential mitigation measures.

Response #A02-45

Refer to **Section 1.12.1 Transportation Networks**.

Response #A02-46

Speculation regarding repeal of PL 280 is outside the scope of this analysis under NEPA (see **Section 1.13.5 Law Enforcement**). See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A02-47

Speculation regarding the failed passage of SB 331 is outside the scope of this analysis under NEPA. See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A02-48

Refer to **Section 1.12.1 Transportation Networks, 1.12.1.2 Emergency Evacuation, Response and Access**. The TMP (Appendix AB of the EIS) includes an emergency evacuation plan. The emergency evacuation plan presents a strategy for residents in nearby communities and patrons of the proposed developments to retreat from the area in the event of an emergency situation.

Response #A02-49

PL 280 does not require Tribal consent. Speculation regarding repeal of PL 280 is outside the scope of this analysis under NEPA (see **Section 1.13.5 Law Enforcement**).

Refer to **Section 1.12.1 Transportation Networks, 1.12.1.2 Emergency Evacuation, Response and Access**. The TMP (Appendix AB of the EIS) includes an emergency evacuation plan. The emergency evacuation plan presents a strategy for residents in nearby communities and patrons of the proposed developments to retreat from the area in the event of an emergency situation.

Appendix G contains the Fire Department Development Plan that was developed for the proposed casino facility. As description of the fire apparatus and equipment to be used in the new fire station is located

Appendix G. Three apparatus have been identified to meet the projected needs: (1) one Type-1 structural fire engine, (2) one Type-3 brush engine and (3) one aerial truck company . A Smeal 105-foot "quint" ladder truck is earmarked for future purchase for the proposed casino facility. The analysis states that "The importance of building accessibility for firefighting equipment will be emphasized during the project's design review stage to assure public safety." At this time, a helicopter and land pad is not deemed necessary to provide adequate emergency service to the propose gaming facility. All costs associated with equipment and training will be financed by the Tribe.

See also **Section 1.6 Land Resources**.

Response #A02-50

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." See also **Section 1.13.5 Law Enforcement** and **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A02-51

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

Response #A02-52

Refer to **Section 1.5 General Environmental Concerns**. Noise concerns are addressed in **Section 1.14.2**.

Response #A02-53

Refer to **Section 1.13.5 Law Enforcement**.

Response #A02-54

Refer to **Section 1.13.5 Law Enforcement** for a discussion of the agreement between RCSD and the Tribe. See **Section 1.2.1 Expressions of Opinion**.

Response #A02-55

See ***Response #A02-54***.

Response #A02-56

See ***Response #A02-54***.

Response #A02-57

See **Section 1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497)** and **Section 1.10.1 Cultural Resources**.

Response #A02-58

See ***Response #A02-57***.

Response #A02-59

See ***Response #A02-57***.

Response #A02-60

See ***Response #A02-57***.

Response #A02-61

See ***Response #A02-57***.

Response #A02-62

Section 1.3 of the EIS presents overview information on the Tribe. This section conveys that tribal membership was approximately 900 people, with 625 living on the existing Reservation. This information was the best available at the time of the publication of the EIS. At the end of 2011, the Tribe had over 1,100 members, with 482 people living on the Reservation. Of the total Reservation population, approximately 84 percent or 405 people identify themselves as Native American. The Tribe contends that additional lands are needed to support its growing membership, which is a core element of the Purpose and Need of the EIS. See **Section 1.3** for comments related to the Purpose and Need statement.

Response #A02-63

See ***Response #A02-62***.

Response #A02-64

See **Section 1.3** for discussion of the Purpose and Need for the Proposed Action. See also **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan** of this public comment report for a response to comments regarding project consistency with the City of San Jacinto General Plan.

Response #A02-65

See **Section 1.2.1 Expressions of Opinion** and **Section 1.3 Purpose and Need**.

Response #A02-66

See ***Response #A02-65*** reference.

Response #A02-67

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site.

Response #A02-68

See ***Response #A02-67***.

Response #A02-69

See **Section 1.2.1 Expressions of Opinion**.

Response #A02-70

See **Section 1.2.1 Expressions of Opinion**. The economic ~~necessity~~ need for the Proposed Action is described under Section 1.3.2 of the EIS.

Response #A02-71

See **Section 1.5 General Environmental Concerns**.

Response #A02-72

Refer to **Section 1.8 Air Quality**.

Response #A02-73

Refer to **Section 1.8 Air Quality**.

Response #A02-74

Refer to **Section 1.8 Air Quality**.

Response #A02-75

Refer to **Section 1.8 Air Quality**.

Response #A02-76

Refer to **Section 1.8 Air Quality**.

Response #A02-77

Refer to **Section 1.8 Air Quality**.

Response #A02-78

Refer to **Section 1.8 Air Quality**.

Response #A02-79

Please Refer to **Response 1.12.1.5(d).**

Response #A02-80

Refer to **Section 1.8 Air Quality**.

Response #A02-81

See **Section 1.7 Water Resources**.

Response #A02-82

See **Section 1.7 Water Resources**.

Response #A02-83

See **Section 1.7 Water Resources**.

Response #A02-84

See **Section 1.7 Water Resources**.

Response #A02-85

See **Section 1.7 Water Resources**.

Response #A02-86

See **Section 1.14.3 Visual Resources**

Response #A02-87

See **Section 1.14.3 Visual Resources**.

Response #A02-88

See **Section 1.14.3 Visual Resources**. See also **Section 1.18 Mitigation Measures**.

Response #A02-89

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area.

Response #A02-90

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area.

Response #A02-91

The casino was built in 1995 and noise likely increased with casino development and related activity. NEPA requires that the EIS analyze environmental effects compared to the existing condition, which includes the existing casino. Therefore, noise effects described in the EIS reflect the change between the existing conditions (including the existing casino) and the Proposed Action and Alternatives. Refer to **Section 1.14.2** for a discussion of noise effects.

Response #A02-92

Section 1.14.2 addresses noise effects. Only one casino would operate. Per the EIS Executive Summary, Purpose and Need (Section 1.3), and Proposed Action (Section 2.1), the Tribe would relocate its existing casino, which presently resides on trust lands, to the Project Site. The structure of the existing Soboba Casino, located less than a half mile from the Project Site, would [then] be used for Tribal functions and programs, such as Tribal general membership meetings and gatherings. Conversion of the existing casino to meeting hall would coincide with the opening of the new casino with no overlapping functions.

Response #A02-93

An increase of 5-10 miles per hour in the speed limit along Soboba Road and Lake Park would result in a negligible increase (i.e. less than 1 dBA) to ambient noise levels. As discussed in Section 3.9.2 of the FEIS, a change of 1 dBA cannot be perceived by humans, expect in carefully controlled laboratory environments. Therefore, the ambient noise baseline data used in the noise model is reasonably accurate.

Response #A02-94

Section 1.14.2 addresses noise effects. Refer to **Section 1.12.1** for a discussion of the Transportation Networks, which includes a discussion of traffic during special events.

Response #A02-95

The following text has been added to Section 3.9.2 of the EIS, which describes the ambient environment of the Project Site:

> **Residents located in the Golf Course Community have raised concerns to the management of the Golf Course and Clubhouse and the Tribal Chairman regarding noise late at night and early in the morning. Their concerns include car alarms, car stereos, events, vehicle noise, and blowers.**

Response #A02-96

See **Section 1.14.2 Noise**. If the fee-to-trust transfer is approved, the area where the new casino is proposed would become part of the Soboba Reservation and would therefore not be subject to noise ordinances of the City of San Jacinto. Mitigation measures to reduce noise effects are described in Section 5.9 of the EIS.

Response #A02-97

See ***Response #A02-96***.

See also **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan** of this public comment report for a response to comments regarding project consistency with the City of San Jacinto General Plan. Mitigation measures to reduce noise effects are described in Section 5.9 of the EIS. See also **Section 1.14.2 Noise**.

Response #A02-98

Refer to **Section 1.12.1** for a discussion of the transportation networks, including a discussion of the traffic analysis. NEPA requires that the analysis in the EIS evaluate the effects of the project compared to the existing condition (including the existing casino); therefore, the traffic effects assessed in Section 4.7 of the EIS and discussed in **Section 1.12.1** do not reflect the change from before the existing casino was built. Traffic mitigation is described in Section 5.7 of the EIS.

Response #A02-99

Comment noted and made part of the administrative record. Refer to **Section 1.12.1** for a discussion of the transportation networks and traffic in the Project Area.

Response #A02-100

The approval or denial of requests made to the Tribe by the City of San Jacinto for traffic control equipment is outside the scope of this EIS. Refer to **Section 1.12.1 Transportation Networks**. Traffic mitigation for the proposed project is described in Section 5.7 of the EIS.

Response #A02-101

Traffic mitigation (Section 5.7 of the EIS) for the project in would help mitigate traffic safety problems. The mitigation is proposed in order to lessen the traffic effects of the project compared to existing conditions. Refer to **Section 1.12.1** for a discussion of the transportation networks and traffic in the project area.

Response #A02-102

In order to obtain an accurate understanding of how project traffic could affect nearby communities, data on roadway segments was collected in October 2010. Traffic counters were placed at the intersection of these communities and the adjacent roads (i.e. Lake Park Drive, Soboba Drive). This data provided a baseline of existing traffic activity at these communities and allowed for a specific analysis of traffic effects resulting from the project. As presented in Section 4.7.1 of the EIS, the traffic analysis found that the intersection of Soboba Springs Drive (NS) at Lake Park Drive (EW) would not operate at an acceptable level of service and a two-way left turn median on Lake Park Drive would serve as mitigation. This would allow this intersection to operate at an acceptable level of service.

Response #A02-103

The baseline trip data collected for the traffic analysis was collected in 2007 and 2010. The Golf Course and Country Club was opened in April 2008. Therefore, the baseline data collected in 2010 accounts for traffic generated from the Golf Course and Country Club.

Response #A02-104

Numerous comments expressed concern that the Tribe would have the ability to legally restrict movement along Soboba Road and Lake Park Drive and to otherwise interfere with the rights-of-way established adjacent to the Project Site. Commenters cited the Tribe's authority to control access on Soboba Road within the existing Reservation as evidence that the Tribe might attempt to similarly restrict access elsewhere. However, Soboba Road within the Reservation is not a public roadway and is maintained by the Tribe. Soboba Road beyond the existing Reservation and Lake Park Drive are public roads and would continue to be public roads in the event of the fee-to-trust transfer. In fact, neither roadway is included in the legal descriptions for the subject fee-to-trust parcels. A plat map prepared by First American Title Company illustrates the exclusion of public roadways from the parcels proposed for the fee-to-trust transfer, and is included in the EIS as Figure 2-6. As Lake Park Drive and Soboba Road form no part of the subject parcels, the trust acquisition should have no effect on utility infrastructure or the public's right to use the roads.

Response #A02-105 See **Section 1.12.1 Transportation Networks**.

Response #A02-106

Refer to **Section 1.9 Biological Resources**.

Response #A02-107

Refer to **Section 1.9 Biological Resources**.

Response #A02-108

Refer to **Section 1.9 Biological Resources**.

Response #A02-109

See **Section 1.8 Air Quality** for a discussion of project-related greenhouse gas emissions.

Response #A02-110

See **Section 1.7.1** for a discussion of water resources with regard to effects to flooding and runoff.

Response #A02-111

Comment noted and made part of the administrative record. Stormwater runoff is addressed in Section **1.7.1**. Water quality is addressed in **Section 1.7.2**.

Response #A02-112

Refer to **Section 1.13.6** for a discussion of fire protection.

Response #A02-113

Refer to **Section 1.8 Air Quality**. Mitigation measures to reduce emissions are identified in Section 5.3 of the EIS.

Response #A02-114

Refer to **Section 1.9 Biological Resources**.

Response #A02-115

Refer to **Sections 1.7**, **1.9** and **1.12** for a discussion of water resources (including stormwater runoff), biological resources, and transportation networks, respectively. Fire protection is described under **Section 1.13.6**. Evacuation in the event of a large scale emergency is discussed within the TMP (Appendix AB of the EIS) and in **Section 1.12.1.2** of this public comment report.

Response #A02-116

See **Section 1.12.2 Land Use**.

Response #A02-117

Comment acknowledged. Refer to **Section 1.12.2** for a discussion of land use and **Section 1.11.1** for a discussion of economic and fiscal conditions, including property values. Community character and quality of life issues are discussed in **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**.

Response #A02-118

Refer to **Section 1.14.1** for discussion of hazardous materials. **Section 1.7.1** (flooding) and **1.13.6** (fire protection) also respond to this comment. All underground storage tanks would be constructed and operated in accordance with applicable Federal regulations. Whether the Tribe has complied with Federal regulations on their existing Reservation land is outside of the scope of this EIS.

Response #A02-119

Refer to **Section 1.6 Land Resources** and **1.7.1 Impacts to Flooding and Runoff**. The Tribe will adopt Uniform Building Code standards when constructing the proposed facilities (see Appendix I of the EIS).

The TMP (Appendix AB of the EIS) contains a section entitled "Emergency/Fire/Medical Services," which describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header.

Response #A02-120

Refer to **Section 1.13.7** for a discussion of emergency response services and **Section 1.11.1** for a discussion of tax effects. **Section 1.13.5 Law Enforcement** describes the agreement between the Tribe and RCSD. As described in Section 2.1.1 of the EIS, Public Law 83–280 (PL 280) affects jurisdiction over crimes involving Indians in Indian country in six states, including California. PL 280 does not affect the level of fire and medical service provided to reservations and surrounding communities. PL 280 does not require Tribal consent. Speculation regarding repeal of PL 280 is outside the scope of this analysis under NEPA.

Response #A02-121

See ***Response #A02-120***.

Response #A02-122

See **Sections 1.13 Public Services, 1.13.1 Water Supply**, **1.13.2 Wastewater Service**, and **1.13.4 Electricity and Natural Gas**.

Response #A02-123

See **Section 1.13.5 Law Enforcement**.

In response to concerns that the project would increase emergency services costs, see the discussion within **Section 1.13.5 Law Enforcement** regarding the agreement between the Tribe and RCSD. See also **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A02-124

See ***Response #A02-123***.

Response #A02-125

See ***Response #A02-123***.

Response #A02-126

See ***Response #A02-123***.

Response #A02-127

See **Section 1.11.2 Environmental Justice**.

Response #A02-128

See **Section 1.10 Cultural and Paleontological Resources** and **Section 1.3 Purpose and Need**: Response c.

Response #A02-129

The Notice of Intent incorrectly stated that 289.88 ± acres were proposed for fee-to-trust approval. The correct figure, 534.91± acres, has been incorporated into all following project documentation. Section 1.5.1 of the FEIS corrects the error.

Response #A02-130

See ***Response #A02-*129**. The scoping process is initiated very early in the NEPA process, when the proposed project is often not entirely formed. It is common to have incomplete or conflicting information during the initial stages in the NEPA process. BIA considered the scope of the project sufficient to gather substantive public input and published the Notice of Intent, which initiated the public involvement process, on December 14, 2007. This provided the public with notice 43 days prior to the close of the scoping period on January 25, 2008. This length of time exceeds the 30-day minimum scoping period, required under NEPA. As detailed below, multiple opportunities were provided for public and agency involvement during the scoping phase. These efforts include:

- The public comment period, totaling 43 days.
- Invitations to six cooperating agencies to participate in the preparation of the EIS.
- A press release to The Press-Enterprise on December 22 and 23, 2007.
- Notices posted in surrounding libraries. Notice was posted in the Hemet Public Library, Valle Vista Library, and Riverside County Library – San Jacinto branch, as of December 27, 2007.
- Notices were also distributed to the local communities of Hill Community, Lake Park Mobile Home, Soboba Springs Homes on January 4, 2008.
- A public notice was posted on the City of San Jacinto's web site on January 3, 2008. The posting was available for viewing at: http://www.ci.san-jacinto.ca.us/public_notices.html
- A large notice sign was posted on January 4, 2007 at the corner of Soboba Road and Lake Park Drive, the proposed project site, alerting local residents.
- During the public comment period, a public scoping meeting was held at Hemet Public Library in the City of Hemet (January 8, 2008), California, attended by approximately 225 persons.
- Sixty-one comment letters were received by the BIA from individuals.
- Two comment letters were received by the BIA from cooperating agencies.

Response #A02-131

See ***Response #A02-130***.

Response #A02-132

See ***Response #A02-130***.

Response #A02-133

See **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Ordinance**.

Response #A02-134

Refer to **Section 1.13.5 Law Enforcement**. See also **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A02-135

The comment cards distributed at the scoping meeting were on blue paper. When the original comment cards were photocopied, some comments appeared tinted in the scoping report. All original copies of comments were reviewed by BIA as they were received during the public scoping period. The environmental issues described in each comment letter were summarized in Table 3-1 of the Scoping Report, and were also discussed under Section 3.2 Scoping Issues. The nature of each comment letter received was therefore represented in the Scoping Report within the discussion of environmental issues raised by the public.

Response #A02-136

See **Section 1.11 Economic and Socioeconomic Conditions**.

Response #A02-137

See **Section 1.11 Economic and Socioeconomic Conditions** and **Section 1.13.7 School Services**.

Response #A02-138

See **Section 1.11 Economic and Socioeconomic Conditions** and **Section 1.13.7 School Services**.

Response #A02-139

See **Section 1.11.1 Economic and Fiscal Resources**.

Response #A02-140

See **Section 1.11.1 Economic and Fiscal Resources** and **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A02-141

Refer to **Section 1.15** for a discussion on cumulative effects. **Section 1.13** discusses the effect of the project on public services.

Response #A02-142

See **Section 1.13.5 Law Enforcement**. An MOU is not proposed for this project. Agreements between the Tribe and the County regarding the provision of law enforcement and fire protection services are described under **Section 1.13.5** and **1.13.6**, respectively. See also **Section 1.6 Land Resources**. The Tribe will adopt Uniform Building Code standards when constructing the proposed facilities (see Appendix I of the EIS). See also **Section 1.2.1** Expressions of Opinion.

Response #A02-143

Comments noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. See also **Section 1.10.1 Cultural Resources**, **Section 1.12.2 Land Use**, and **Section 1.13.5 Law Enforcement**. Refer to **Section 1.1.4 Cooperating Agency**.

Response #A02-144

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**.

3.1.3 Agency/Organization Comment Letter #A03

Response #A03-145

See **Section 1.1.2 Extension of the Comment Period**.

3.1.4 Agency/Organization Comment Letter #A04

Response #A04-146

Comment noted and made part of the administrative record.

3.1.5 Agency/Organization Comment Letter #A05

Response #A05-147

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. See also **Section 1.2.2 Matter beyond the Scope of the EIS**.

Response #A05-148

See also **Section 1.2.2 Matter beyond the Scope of the EIS**, **1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Compliance**.

Response #A05-149

See also **Section 1.2.2 Matter beyond the Scope of the EIS**, **1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Compliance**.

Response #A05-150

See also **Section 1.2.2 Matter beyond the Scope of the EIS**, **1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Compliance**.

Response #A05-151 Refer to **Section 1.3** regarding Purpose and Need.

Response #A05-152 Refer to **Section 1.11.1** for a discussion of Economic and Fiscal Resources.

Response #A05-153

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." For land use concerns, refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan.**

A TMP has been prepared (Appendix AB of the EIS). The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

As described within Section 2.1.1 of the EIS, the Tribe will adopt a "Responsible Alcoholic Beverage Policy" which would include but not be limited to carding patrons and refusing service to those who have had enough to drink. This policy would be discussed with RCSD.

Air quality is discussed within **Section 1.8**. For the necessary equipment or costs for public safety response, see **Section 1.13 Public Services**.

Response #A05-154

See **Section 1.18 Mitigation Measures**. A TMP has been prepared (Appendix AB of the EIS). The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

Response #A05-155

See **Section 1.11.2 Environmental Justice**.

Response #A05-156

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." For concerns related to crime, and for details regarding the agreement between the Tribe and RCSD, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report.

Response #A05-157

Evacuation plans will be developed following final design and construction of all structures including the parking garage. In addition, a TMP has been prepared (Appendix AB of the EIS). The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header.

Section 2.1.1 of the EIS presents the Development Standards the Tribe would adopt when developing the facilities. After collecting additional site specific data on the seismicity of the Development Site and performing additional geotechnical analysis, the following mitigation measures (Section 5.1.2 and Section 5.1.4 of the EIS) were developed for the Proposed Action and Alternatives:

Implement measures presented in Appendix L: Preliminary Fault Hazard Evaluation Report and Preliminary Geotechnical Investigation, which present recommendations related to the following:

1. **Site Preparation,**
2. **Foundations and Settlements,**
3. **Deep Foundations,**
4. **Slabs-On-Grade,**
5. **Concrete Mixes and Corrosivity,**
6. **Excavations,**
7. **Lateral Earth Pressures, and**
8. **Pavements**

For all other proposed structures, engineering designs should comply with the latest edition of the California Building Code (CBC) for Site Class D using the seismic coefficients provided in the geotechnical report (see Appendix L). A qualified geologist should inspect any excavations (foundation, utility, etc.) on the Development Site during construction for possible indications of faulting. If unanticipated faulting were encountered in these excavations, further relocation of the structures may be necessary to maintain a 50-foot setback of human occupancy structures from active faults, consistent with the Alquist-Priolo Earthquake Fault Zoning Act.

Response #A05-158

See **Section 1.13.3 Solid Waste Service**. Water quality issues are discussed under **Section 1.7.2 Impacts to Water Supply and Water Quality**.

Response #A05-159

Refer to **Section 1.8** for a discussion of air quality. In addition, see **Section 1.18 Mitigation Measures** and **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-160

The Tribal water rights are set in the Water Rights Settlement. The settlement is independent of the Proposed Action and Alternatives and the location of the Project Site. The Tribe will rely on existing groundwater wells for the Reservation supply and therefore, this Project does not grant the Tribe control of the regional water supply. Regarding other issues raised in this comment, refer to **Section 1.7** for a discussion of water resources.

Response #A05-161

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS** for discussion of the Governor's Proclamation on Tribal Gaming and the Indian Gaming Regulatory Act.

Response #A05-162

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-163

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-164

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-165

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-166

See **Section 1.2.1 Expressions of Opinion**.

Response #A05-167

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-168

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. See also **Section 1.13.5 Law Enforcement** for a discussion of the agreement between RCSD and the Tribe.

3.1.6 Agency/Organization Comment Letter #A06

Response #A06-169

See **Section 1.1.2 Extension of the Comment Period**.

Response #A06-170

See **Section 1.1.2 Extension of the Comment Period**.

3.1.7 Agency/Organization Comment Letter #A07

Response #A07-171

Comment noted and made part of the administrative record. See **Section 1.9 Biological Resources**.

Response #A07-172

See **Section 1.9 Biological Resources**.

Response #A07-173

See **Section 1.9 Biological Resources**.

Response #A07-174

See **Section 1.9 Biological Resources**.

Response #A07-175

See **Section 1.9 Biological Resources**.

3.1.8 Agency/Organization Comment Letter #A08

Response #A08-176

Comment noted and made part of the administrative record.

Response #A08-177

Refer to the following sections:

- **Section 1.1.1 General EIS Issues**
- **Section 1.9 Biological Issues**
- **Section 1.7 Water Resources**
- **Section 1.12.1 Transportation Networks**
- **Section 1.8 Air Quality**
- **Section 1.4 Alternatives**

Response #A08-178

See **Section 1.9 Biological Resources**.

Response #A08-179

See **Section 1.9 Biological Resources**.

Response #A08-180

See **Section 1.9 Biological Resources**.

Response #A08-181

See **Section 1.9 Biological Resources**.

Response #A08-182

See **Section 1.9 Biological Resources**.

Response #A08-183

See **Section 1.9 Biological Resources**.

Response #A08-184

See **Section 1.9 Biological Resources**.

Response #A08-185

See **Section 1.9 Biological Resources**.

Response #A08-186

See **Section 1.9 Biological Resources**.

Response #A08-187

See **Section 1.9 Biological Resources**.

Response #A08-188

See **Section 1.9 Biological Resources**.

Response #A08-189

See **Section 1.7 Water Resources**.

Response #A08-190

See **Section 1.7 Water Resources**.

Response #A08-191

See **Section 1.7 Water Resources**.

Response #A08-192

See **Section 1.7 Water Resources**.

Response #A08-193

See **Section 1.7 Water Resources** and **Section 1.16 Indirect Effects**.

Response #A08-194

See **Section 1.7 Water Resources**.

Response #A08-195

See **Section 1.7 Water Resources**.

Response #A08-196

See **Section 1.12.1 Transportation Networks**.

Response #A08-197

See **Section 1.12.1 Transportation Networks**.

Response #A08-198

See **Section 1.8 Air Quality** and **Section 1.15 Cumulative Effects**.

Response #A08-199

See **Section 1.8 Air Quality** and **Section 1.15 Cumulative Effects**.

Response #A08-200

See **Section 1.8 Air Quality** and **Section 1.15 Cumulative Effects**.

Response #A08-201

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A08-202

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A08-203

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A08-204

Comment noted and made part of the administrative record.

3.1.9 Agency/Organization Comment Letter #A09

Response #A09-205

Comment noted and made part of the administrative record.

Response #A09-206

See **Section 1.9 Biological Resources**.

Response #A09-207

See **Section 1.9 Biological Resources**.

Response #A09-208

See **Section 1.9 Biological Resources**.

Response #A09-209

See **Section 1.9 Biological Resources**.

Response #A09-210

See **Section 1.9 Biological Resources**.

Response #A09-211

See **Section 1.9 Biological Resources**.

Response #A09-212

See **Section 1.9 Biological Resources** and **Section 1.4 Alternatives**.

Response #A09-213

See **Section 1.9 Biological Resources**.

Response #A09-214

See **Section 1.9 Biological Resources** and **Section 1.4 Alternatives**.

Response #A09-215

Focused field and trapping surveys were performed for SBKR in August and October 2010. This information is presented in Section 3.4.5 of the EIS and discussed above in **Section 1.9 Biological Resources**. The BIA and USFWS are currently undergoing formal consultation for potential effects to endangered species, including SBKR. Based on preliminary discussions with the USFWS, the biological mitigation measures identified within this FEIS are expected to be carried forward to the Biological Opinion. Additional measures, should they be necessary as determined by the USFWS, will also be incorporated into Record of Decision and applied to the project.

Response #A09-216

The levee that protects the Project Site was engineered and developed to ACOE standards and ACOE has "provisionally accepted" the levee, but has not formally approved it. The floodplain map (Figure 3-4 of the EIS) was developed as if the levee did not exist. If ACOE formally approves the levee, the majority of the 100-year floodplain (Zone X) would be removed from the Project Site. As stated in Section 4.2.1 of the EIS: "In the event that the FEMA determines the levee to be inadequate, a floodplain study would be required for the Project Site to determine the base flood elevation and a grading plan would be prepared to ensure structures are elevated one-foot above the base flood elevation. These actions are identified as mitigation in Section 5.2 (of the EIS)." Considering there were no SBKR found to be present on the Development Site, raising the Development Site to allow for the proposed facilities to be one-foot above the base flood elevation would likely result in the same effects to SBKR on the Development Site as if the levee is formally approved by ACOE.

See **Section 1.7 Water Resources** and **Section 1.9 Biological Resources**.

3.1.10 Agency/Organization Comment Letter #A10

Response #A10-217

See the following sections:

- **Section 1.1.2 Extension of the Comment Period**
- **Section 1.12.1 Land Use**
- **Section 1.2.2 Matters beyond the Scope of the EIS**
- **Section 1.13.2 Wastewater Service** and **Section 1.4 Alternatives**: Response f**.**

- **Section 1.13 Public Services**
- **Section 1.12.1 Transportation Networks**
- **Section 1.5 General Environmental Concerns**
- **Section 1.14.2 Noise**
- **Section 1.4 Alternatives**

Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities ~~include~~ under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

Regarding buffers, project effects that depend upon distance from the Development Site are described under EIS Sections 4.7 (see Land Use, subsection Lighting and Glare) and 4.9 (see subsections Visual Resources and Noise). The sound wall is included as a mitigation measure (see Section 5.9.2 Noise).

Response #A10-218

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." Refer also to **Section 1.1.1 General EIS Issues** and **Section 1.4 Alternatives**.

Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities include under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

3.1.11 Agency/Organization Comment Letter #A11

Response #A11-219

Agency/Organization Comment Letter #A11 is a copy of Agency/Organization Comment Letter #A07. See ***Response #A07-171*** through ***Response #A07-175***.

Response #A11-220

See ***Response #A11-219***.

Response #A11-221

See ***Response #A11-219***.

Response #A11-222

See ***Response #A11-219***.

Response #A11-223

See ***Response #A11-219***.

Response #A11-224

See ***Response #A11-219***.

Response #A11-225

See ***Response #A11-219***.

Response #A11-226

See ***Response #A11-219***.

3.1.12 Agency/Organization Comment Letter #A12

Response #A12-227

RCSD submitted a numbered list of comments. The responses are therefore correspondingly numbered below. See the following sections per resource issue raised in comment letter:

1. NEPA Process

- **Section 1.1.2 Extension of the Comment Period**
- **Section 1.1.1 General EIS Issues**
- **Section 1.2.1 Expressions of Opinion**

2. Traffic and Transportation Effects

- **Section 1.12.1 Transportation Networks**
- **Section 1.12.1 Land Use**

The Tribe would not have authority over Lake Park Drive or Soboba Road when the Project Site is taken into trust by DOI. Therefore, the Tribe cannot control or restrict access to the nearby residential communities.

3. Biological Resources and MSHCP Compliance

- **Section 1.9 Biological Resources**

The proposed on-Reservation WWTP and percolation ponds would be regulated by Federal rules, laws, and regulations. These facilities would adhere to EPA guidelines for controlling vector breeding.

4. Fire Protection and Emergency Services

- **Section 1.13.6 Fire Protection and Emergency Medical Services**

5. Water Resources and Groundwater Contamination

- **Section 1.7 Water Resources**
- **Section 1.18 Mitigation Measures**

6. Cumulative Effects on RCSD

- **Section 1.13.5 Law Enforcement**

7. Public Services

- **Section 1.13.2 Wastewater Service**
- **Section 1.13.3 Solid Waste**

8. Geology and Site Suitability

- **Section 1.6 Land Resources**

9. Paleontological Resources

- **Section 1.10.2 Paleontological Resources**

3.1.13 Agency/Organization Comment Letter #A13

Response #A13-228 Agency/Organization Comment Letter #A13 is a copy of Agency/Organization Comment Letter #A12.

See ***Response #A12-227***.

3.1.14 Agency/Organization Comment Letter #A14

Response #A14-229

See the following sections:

- **Section 1.6 Land Resources**

A licensed California engineer performed the geotechnical investigation of the Development Site. Information from USGS was utilized in the seismic and geotechnical analyses, however USGS is not typically consulted on the issue of site suitability. Furthermore, as stated in Section 5.2 of the EIS, all proposed structures will comply with the latest edition of the CBC for Site Class D using the seismic coefficients provided in the geotechnical report (see Appendix L of the EIS). A qualified geologist will also inspect any excavations (foundation, utility, etc.) on the Development Site during construction for possible indications of faulting.

- **Section 1.12.1 Transportation Networks**
- **Section 1.13.6 Fire Protection and Emergency Medical Services**
- **Section 1.9 Biological Resources**
- **Section 1.8 Air Quality**
- **Section 1.7 Water Resources**
- **Section 1.17 Growth-Inducing Effects**
- **Section 1.15 Cumulative Effects**
- **Section 1.16 Indirect Effects**
- **Section 1.1.1 General EIS Issues**

3.1.15 Agency/Organization Comment Letter #A15

Response #A15-230

Comment noted and made part of the administrative record.

Response #A15-231

Comment noted and made part of the administrative record.

Response #A15-232

Comment noted and made part of the administrative record.

Response #A15-233

See **Section 1.13.6 Fire Protection and Emergency Medical Services** and **Section 1.18 Mitigation Measures.**

Response #A15-234

See **Section 1.8 Air Quality**.

Response #A15-235

See **Section 1.8 Air Quality**.

Response #A15-236

See **Section 1.8 Air Quality**.

Response #A15-237

See **Section 1.14.2 Noise**.

Response #A15-238

See **Section 1.12.1 Transportation Networks**.

Response #A15-239

See **Section 1.12.1 Transportation Networks**.

Response #A15-240

See **Section 1.12.1 Transportation Networks**.

Response #A15-241

See **Section 1.12.1 Transportation Networks**.

Response #A15-242

See **Section 1.12.1 Transportation Networks**.

Response #A15-243

See **Section 1.12.1 Transportation Networks**.

Response #A15-244

See **Section 1.12.1 Transportation Networks**.

Response #A15-245

Comment noted and made part of the administrative record.

3.1.16 Agency/Organization Comment Letter #A16

Response #A16-246

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-247

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-248

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-249

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-250

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-251

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-252

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-253

See **Section 1.13.6 Fire Protection and Emergency Medical Services**. Also see Development Standards in Section 2.1.1 of the EIS where the Tribe will "adopt and comply with Type I non-combustible, fire-resistive construction materials as defined by the CBC."

Response #A16-254

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-255

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-256

Flag lots do not occur on the Project Site.

Response #A16-257

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-258

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-259

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-260

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-261

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-262

Year 1 of the Operational Implementation phase of the proposed fire stations (Phase III of the Fire Department Development Plan; see Appendix G of the EIS) includes the opening of the satellite fire station with a staffed fire engine. This would occur prior to operation of the other proposed facilities under the Proposed Action and Alternatives. Positions would be filled with permanent staff.

Response #A16-263

A comment letter submitted by Robert Betancourt, Jr. during the scoping period suggested the Tribe develop a sailing program.

Response #A16-264

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-265

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-266

Under the subheading "Public Safety" in Section 2.1.1, the following text was modified to clarify the land use/fire suppression goals of California Department of Forestry and Fire Protection (CDF)/Riverside County Fire Department for heavy urban areas, which the Tribal fire department would adopt:

> The Tribal fire department would adopt the land use/fire suppression goals of California Department of Forestry and Fire Protection (CDF)/Riverside County Fire Department for ~~**heavy**~~ urban areas. The goal calls for **a response time of seven minutes and for** ~~**the first arriving unit to be on scene within five minutes from time of dispatch and**~~ setup to be complete within an additional three minutes.[2] This would allow for extinguishing agents to be applied within a goal of ~~**eight**~~ **ten** minutes from the time of dispatch. The goal for the full assignment is to arrive at the scene and be setup for operation within ~~**ten**~~ **15** minutes of dispatch on 90 percent of all fire incidents.

The corresponding footnote states the following:

> **Response time is the time that begins when units are en route to the emergency incident and ends when units arrive at the scene. In addition to response time, dispatch time and turnout time add to the amount of time required before units arrive at the scene. Dispatch time is from the point of receipt of the emergency alarm at the public safety answering point to the point where sufficient information is known to the dispatcher and applicable units are notified of the emergency. Dispatch time is between 90 and 120 seconds. Turnout time is the time beginning when units acknowledge notification of the emergency to the beginning point of response time.**

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-267

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

3.1.17 Agency/Organization Comment Letter #A17

Response #A17-268

See **Section 1.13.5 Law Enforcement**.

3.1.18 Agency/Organization Comment Letter #A18

Response #A18-269

No response required.

Response #A18-270

See **Section 1.6 Land Resources**.

Response #A18-271

See **Section 1.6 Land Resources**.

Response #A18-272

See **Section 1.6 Land Resources**.

Response #A18-273

See **Section 1.6 Land Resources**.

Response #A18-274

See **Section 1.6 Land Resources**.

Response #A18-275

See **Section 1.6 Land Resources**. The following mitigation measure has also been added to Section 5.1.4 of the EIS:

> **For all other proposed structures, engineering designs should comply with the latest edition of the California Building Code (CBC) for Site Class D using the seismic coefficients provided in the geotechnical report (see Appendix L). A qualified geologist should inspect any excavations (foundation, utility, etc.) on the Development Site during construction for possible indications of faulting. If unanticipated faulting were encountered in these excavations, further relocation of the structures may be necessary to maintain a 50-foot setback of human occupancy structures from active faults, consistent with the Alquist-Priolo Earthquake Fault Zoning Act.**

Response #A18-276

See **Section 1.6 Land Resources**.

Response #A18-277

See **Section 1.6 Land Resources** and **Section 1.10.2 Paleontological Resources**.

3.1.19 Agency/Organization Comment Letter #A19

Response #A19-278

Refer to the following sections:

- **Section 1.13.2 Wastewater Service**
- **Section 1.13.3 Solid Waste Service**
- **Section 1.7 Water Resources**

3.1.20 Agency/Organization Comment Letter #A20

Response #A20-279

See **Section 1.9 Biological Resources**.

Response #A20-280

See **Section 1.9 Biological Resources**.

Response #A20-281

See **Section 1.9 Biological Resources**.

Response #A20-282

See **Section 1.9 Biological Resources**.

Response #A20-283

See **Section 1.9 Biological Resources**.

3.1.21 Agency/Organization Comment Letter #A21

Response #A21-284

See **Section 1.7 Water Resources**.

3.1.22 Agency/Organization Comment Letter #A22

Response #A22-285

See **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.2 Governor Schwarzenegger's Proclamation on Tribal Gaming**.

Response #A22-286

Comment noted and made part of the administrative record.

Response #A22-287

Comment noted and made part of the administrative record.

Response #A22-288

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**. The EIS describes the purpose and need for the project under Section 1.3.

Response #A22-289

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

The existing Soboba casino is not considered a permanent structure because it is a soft-shell sprung-structure. These types of structures do not withstand the elements like hard-shell structures and do not possess the life-span of a hard-shell, or permanent, structure.

The proposed developments are anticipated to attract a wider array of patrons that will visit for reasons other than gaming (i.e. concert, dining). In addition to gaming patrons, these non-gaming visitors would add to the overall visitation of the facility.

Response #A22-290

The comment cites only part of the footnote in Section 4.2 of the EIS. The complete footnote is: "The Tribe's first priority water right increases to 9000 AFY over a 50-year period (see Section 3.2.2.1). As the Tribe increases its water use for the proposed developments, or for other uses unrelated to the Proposed Action and Alternatives, groundwater pumping by others must decrease, unless balanced by increased artificial recharge. Through the WMP, total groundwater withdrawals from the basin should remain the same or decrease." See **Section 1.7** of this public comment report for additional information regarding the Tribal water supply under the Water Rights Settlement.

Response #A22-291

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A22-292

See **Section 1.13.5 Law Enforcement**.

Response #A22-293

See **Section 1.13.5 Law Enforcement**.

Response #A22-294

See **Section 1.13.6 Fire Protection and Emergency Medical Services**. As described in Section 4.8 of the FEIS, Tribal consultants met with Chief John Hawkins on April 23, 2008 to present the Proposed Action and Alternatives and discuss the implications of the Tribal fire stations. Upon development of the subject fire stations under the Proposed Action and Alternatives, the Tribe would negotiate with RCFD to establish a Mutual Aid Agreement, under which the Tribe and the RCFD would share fire service resources. This would also include the City of San Jacinto due to its contractual relationship with RCFD to provide fire protection services. An additional Mutual Aid Agreement would be pursued with the City of Hemet. Mutual Aid Agreements are typically not pursued until a fire station has been constructed.

Response #A22-295

See **Section 1.12.1 Transportation Networks**.

Response #A22-296

See **Section 1.12.1 Transportation Networks**.

Response #A22-297

See **Section 1.12.1 Transportation Networks**.

Response #A22-298

See **Section 1.12.1 Transportation Networks**.

Response #A22-299

See **Section 1.12.1 Transportation Networks**.

Response #A22-300

See **Section 1.14.2 Noise**.

Response #A22-301 Comment noted and made part of the administrative record. See **Section 1.2.2 Matters beyond the Scope of the EIS**, **1.2.2.2 Governor Schwarzenegger's Proclamation on Tribal Gaming**. See also **Sections 1.1.1 General EIS Issues** and **Section 1.18 Mitigation Measures**.

3.1.23 Agency/Organization Comment Letter #A23

Response #A23-302

See **Section 1.12.1 Transportation Networks**.

Response #A23-303

See **Section 1.12.1 Transportation Networks**.

Response #A23-304

See **Section 1.12.1 Transportation Networks**.

Response #A23-305

See **Section 1.12.1 Transportation Networks**.

Response #A23-306

See **Sections 1.13.5 Law Enforcement** and **1.13.6 Fire Protection and Emergency Medical Services**.

Response #A23-307

Regarding concerns about the social effects of gambling, the Proposed Action will not increase gaming facilities (i.e. slot machines) in the area (see the discussion within **Section 1.11.2 Environmental Justice**). The existing casino is located approximately one mile from the proposed casino, which implies that the communities that will have access to gaming facilities at the proposed casino currently have access to the same number of gaming facilities in the general area. Therefore, while the analysis acknowledges the negative effects of gambling in general, given that the Proposed Action will not add to the existing gaming facilities in the area, there is no evidence to conclude that additional effects of gambling on any groups would occur due to the Proposed Action compared to existing conditions.

Response #A23-308

See **Section 1.1.1 General EIS Issues**.

3.1.24 Agency/Organization Comment Letter #A24

Response #A24-309

Comment noted and made part of the administrative record.

Response #A24-310

See **Section 1.7 Water Resources**.

Response #A24-311

See **Section 1.7 Water Resources**.

Response #A24-312

See **Section 1.7 Water Resources**.

3.1.25 Agency/Organization Comment Letter #A25

Response #A25-313

See **Section 1.2.2 Matters beyond the Scope of the EIS**, **1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497**).

Response #A25-314

See **Section 1.2.2 Matters beyond the Scope of the EIS**, **1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497**). As stated within Section 1.2 of the EIS, "The 34 parcels considered in this FEIS are contiguous with the northwestern portion of the Reservation."

Response #A25-315

See ***Response #A25-314***.

Response #A25-316

See ***Response #A25-314***.

Response #A25-317

See **Section 1.12.1 Transportation Networks**.

Response #A25-318

See **Section 1.12.1 Transportation Networks**.

Response #A25-319

See **Section 1.12.1 Transportation Networks**.

Response #A25-320

See **Section 1.12.1 Transportation Networks**.

Response #A25-321

See **Section 1.12.1 Transportation Networks**.

Response #A25-322

See **Section 1.12.1 Transportation Networks**.

Response #A25-323

See **Section 1.12.1 Transportation Networks**.

Response #A25-324

See **Section 1.12.1 Transportation Networks**.

Response #A25-325

See **Section 1.12.1 Transportation Networks**.

Response #A25-326

See **Section 1.12.1 Transportation Networks**.

Response #A25-327

See **Section 1.9 Biological Resources**.

Response #A25-328

See **Section 1.9 Biological Resources**.

Response #A25-329

See **Section 1.9 Biological Resources**.

Response #A25-330

See **Section 1.9 Biological Resources**.

Response #A25-331

See **Section 1.9 Biological Resources**.

Response #A25-332

See **Section 1.9 Biological Resources**.

Response #A25-333

See **Section 1.9 Biological Resources**.

Response #A25-334

See **Section 1.10 Cultural and Paleontological Resources** and **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.5 CEQA Compliance**.

3.1.26 Agency/Organization Comment Letter #A26

Response #A26-335

Agency/Organization Comment Letter #A26 is a copy of Agency/Organization Comment Letter #A20. See ***Response #A20-279*** through ***#A20-283***.

Response #A26-336

See ***Response #A26-335***.

Response #A26-337

See ***Response #A26-335***.

Response #A26-338

See ***Response #A26-335***.

Response #A26-339

See ***Response #A26-335***.

3.1.27 Agency/Organization Comment Letter #A27

Response #A27-340

Agency/Organization Comment Letter #A27 is a copy of Agency/Organization Comment Letter #A19. See ***Response #A19-278***.

3.1.28 Agency/Organization Comment Letter #A28

Response #A28-341

Agency/Organization Comment Letter #A28 is a copy of Agency/Organization Comment Letter #A15. See ***Responses #A15-230*** through ***#A15-245***.

Response #A28-342

See ***Response #A28-341***.

Response #A28-343

See ***Response #A28-341***.

Response #A28-344

See ***Response #A28-341***.

Response #A28-345

See ***Response #A28-341***.

Response #A28-346

See ***Response #A28-341***.

Response #A28-347

See ***Response #A28-341***.

Response #A28-348

See ***Response #A28-341***.

Response #A28-349

See ***Response #A28-341***.

Response #A28-350

See ***Response #A28-341***.

Response #A28-351

See ***Response #A28-341***.

Response #A28-352

See ***Response #A28-341***.

Response #A28-353

See ***Response #A28-341***.

Response #A28-354

See ***Response #A28-341***.

Response #A28-355

See ***Response #A28-341***.

Response #A28-356

See ***Response #A28-341***.

Response #A28-357

See ***Response #A28-341***.

3.1.29 Agency/Organization Comment Letter #A29

Response #A29-358

Agency/Organization Comment Letter #A29 is a copy of Agency/Organization Comment Letter #A18. See ***Responses #A18-269*** through ***#A18-277***.

Response #A29-359

See ***Response #A29-358***.

Response #A29-360

See ***Response #A29-358***.

Response #A29-361

See ***Response #A29-358***.

Response #A29-362

See ***Response #A29-358***.

Response #A29-363

See ***Response #A29-358***.

Response #A29-364

See ***Response #A29-358***.

Response #A29-365

See ***Response #A29-358***.

Response #A29-366

See ***Response #A29-358***.

3.1.30 Agency/Organization Comment Letter #A30

Response #A30-367

See **Section 1.1.1 General EIS Issues**.

Response #A30-368

See **Section 1.1.1 General EIS Issues**.

Response #A30-369

The letter claims that the "Procedural and Other Legal Issues" described in Section 3.2.2 of the Scoping Report were not covered in the EIS, which included the following:

- The Notice of Intent published in the Federal Register on December 14, 2007 incorrectly stated the number of acres the Tribe is requesting to place into trust. What measures have been taken to correct this statement?

The Notice of Intent incorrectly stated that 289.88 ± acres were proposed for fee-to-trust approval. The correct figure, 534.91± acres, has been incorporated into all following project documentation. Section 1.5.1 of the EIS corrects the error.

- According to 25 U.S.C. Section 2719 of the Indian Gaming Regulatory Act (IGRA), gaming regulated by the Act shall not be conducted on lands placed into trust after October 17, 1988, with some exceptions. Would this affect the Proposed Action?

See **Section 1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497)**.

- Did the scoping process provide adequate advance notice to the community?

The scoping process provided advance notice to the community with the Notice of Intent. The Notice of Intent, which initiated the public involvement process, was published on December 14, 2007. This provided the public with notice 43 days prior to the close of the scoping period on January 25, 2008. This length of time exceeds the 30-day minimum scoping period, required under NEPA. As detailed below, multiple opportunities were provided for public and agency involvement during the scoping phase. These efforts include:

  - The public comment period, totaling 43 days.
  - Invitations to six cooperating agencies to participate in the preparation of the EIS.
  - A press release to The Press-Enterprise on December 22 and 23, 2007.
  - Notices posted in surrounding libraries. Notice was posted in the Hemet Public Library, Valle Vista Library, and Riverside County Library – San Jacinto branch, as of December 27, 2007.
  - Notices were also distributed to the local communities of Hill Community, Lake Park Mobile Home, Soboba Springs Homes on January 4, 2008.
  - A public notice was posted on the City of San Jacinto's web site on January 3, 2008. The posting was available for viewing at: http://www.ci.san-jacinto.ca.us/public_notices.html
  - A large notice sign was posted on January 4, 2007 at the corner of Soboba Road and Lake Park Drive, the proposed project site, alerting local residents.
  - During the public comment period, a public scoping meeting was held at Hemet Public Library in the City of Hemet (January 8, 2008), California, attended by approximately 225 persons.
  - Sixty-one comment letters were received by the BIA from individuals.
  - Two comment letters were received by the BIA from cooperating agencies.

- When will detailed conceptual site plans be available for the community to view?

Conceptual site plans for each Alternative are provided in Section 2.0 of the EIS as Figure 2-1(a), Figure 2-7, Figure 2-9, Figure 2-11(a), and Figure 2-13(a).

- As recorded on December 31, 1981 and February 5, 1982 in Riverside County, the owners of the Soboba Springs Mobile Estates and the Daon Corporation entered into easement agreements. The agreements allowed for a secondary ingress and egress, land for RV storage, and a 10' perimeter strip on what was then the Daon Property adjacent to the Soboba Springs Mobile Estates. The Tribe now holds the land title to the former Daon Property, and thus is bound by the easement agreements.

These title restrictions must be addressed through negotiations by the Tribe and BIA with the owners of the Soboba Springs Mobile Estates before the land is placed into trust.

Refer to **Section 1.12.2** for a discussion of land use issues.

- The Soboba Springs Mobile Home Estates community will be an "island" in the middle of the reservation once the land is placed into trust. Does this affect Local Agency Formation Commissions?

Refer to **Section 1.12.2** for a discussion of land use issues.

Response #A30-370

Sovereign power and tribal programs are discussed both in the Scoping Report and in the EIS. Page 1 of the Scoping Report describes that the purpose of the Proposed Action is to "improve the tribal economy in order to better enable the Tribe to provide governmental services, perform governmental functions, create jobs and career opportunities for tribal members and develop programs that would assist tribal members to attain economic self-sufficiency" (emphasis added). This line of thought is continued in Section 1.3.2 of the EIS where the links between economic development and reinvestment in the Tribal community are discussed. The rights afforded to the Tribe by being a federally recognized Indian Tribe and the sovereign powers a Tribal Nation may exercise over reservation lands is further discussed in Section 1.3.1 of the EIS. This section also presents information on Tribal self-determination and government operations.

Response #A30-371

The Tribe gradually purchased the title to properties that constitute the Project Site from June of 2001 to January of 2007. The Tribe considers the Project Site aboriginal territory and it is a tribal policy to reacquire all aboriginal territory and transfer it to trust status. The historical review performed for the EIS substantiates the presence of the Tribe in the area of the Project Site since 1815 (see Section 1.3 of the EIS). Refer to **Section 1.10** for further discussion this issue.

Response #A30-372

Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities include under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

Response #A30-373

Section 2.3.2 of the EIS discussed the insufficiency of the present gaming parcel. The Tribe is seeking to create a destination resort by locating their gaming operation next to the Soboba Springs Golf Course and Country Club and compliment these businesses with additional amenities, such as the proposed hotel, conference center, and events arena. Refer to **Section 1.3** for comments related to the purpose and need statement.

Response #A30-374

The TMP (Appendix AB of the EIS) includes an emergency evacuation plan. The emergency evacuation plan presents a strategy for residents in nearby communities and patrons of the proposed developments to retreat from the area in the event of an emergency situation. See Appendix AB of the EIS and **Section 1.12.1 Transportation Networks** for additional discussion on the TMP.

Response #A30-375

Section 1.3 of the EIS presents overview information on the Tribe. This section conveys that tribal membership was approximately 900 people, with 625 living on the existing Reservation. This information was considered best available at the time of the publication of the EIS. The Tribe contends that additional lands are needed to support its growing membership, which is a core element of the purpose and need of the EIS. See **Section 1.3** for comments related to the purpose and need statement.

Response #A30-376

See **Section 1.4 Alternatives**.

Response #A30-377

See **Section 1.18 Mitigation Measures**.

Response #A30-378

See **Section 1.3 Purpose and Need**.

Response #A30-379

Refer to **Section 1.12.1 Transportation Networks**.

Response #A30-380

Refer to **Section 1.12.1 Transportation Networks**.

Response #A30-381

See **Section 1.12.2 Land Use**.

Response #A30-382

Refer to **Section 1.12.1 Transportation Networks, 1.12.1.2 Emergency Evacuation, Response and Access**.

Response #A30-383

See **Section 1.13.5 Law Enforcement**.

Response #A30-384

See **Section 1.11.1 Economic and Fiscal Resources**.

Response #A30-385

See **Section 1.11.1 Economic and Fiscal Resources**.

Response #A30-386

See **Section 1.11.1 Economic and Fiscal Resources**.

Response #A30-387

See **Section 1.11.2 Environmental Justice**.

Response #A30-388

See **Section 1.13.5 Law Enforcement**.

Response #A30-389

See **Section 1.11.2 Environmental Justice**.

Response #A30-390

See **Section 1.4 Alternatives** and **Section 1.12.2 Land Use, 1.12.2.5 Other Land Use Comments**.

Response #A30-391

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

Response #A30-392

See **Section 1.6 Land Resources**.

Response #A30-393

See **Section 1.7 Water Resources**.

Response #A30-394

See **Section 1.8 Air Quality**.

Response #A30-395

See **Section 1.11.2 Environmental Justice**.

Response #A30-396

See **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan**.

Response #A30-397

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A30-398

See **Section 1.13.7 School Services**.

Response #A30-399

See **Section 1.14.2 Noise** and **Section 1.18 Mitigation Measures**.

Response #A30-400

See **Section 1.14.3 Visual Resources**. The scenic quality rating of grade C is based upon BLM's methodology outlined earlier in the chapter. As stated in Section 3.9.3, the scenic quality rating unit (SQRU) is defined by similar topography. The San Jacinto basin has distinct topographical features that differentiate it from the San Jacinto Mountains. While the San Jacinto Mountains are considered in the scenic quality rating under surrounding topography, they are not considered under other visual factors in this SQRU. The three communities surrounding the Project Site are considered under the cultural modification section.

Due to the sloping topography and vegetation, the only public viewpoint that includes an open and clear view of the Soboba Golf Course lakes is the top of the Lake Park Drive bridge over the San Jacinto River. Drivers can currently see these lakes for at most 30 seconds before moving out of visual range. Public views partially obscured by vegetation and topography also occur along Soboba Road and several residential streets in the San Jacinto foothills. All other views of these lakes are from private residences or the golf course itself. Therefore, these lakes do not contribute to the visual landscape on a large scale within the SRQU.

The Visual Resources Management (VRM) analysis (Sections 3.9.3 and 4.9 of the EIS) considered the immediate views from public roads and private residences close to the Development Site. The six Key Observation Points (KOPs) were chosen because they represented views with the greatest visual effect of the proposed developments to the surrounding community. The KOPs included views from the hillside community, the communities along Main Street and Mountain Drive, and Soboba Springs Mobile Estates, among other views.

Contrast ratings are dependent on the perspective of each viewpoint. Some of these viewpoints show a reduced Project effect due to terrain, vegetation, and development. However, five of the six viewpoints include at least one "Strong" rating under the Proposed Project analysis. Therefore, the analysis agrees with the statement that many visual Project features from many different perspectives mandate a "Strong" contrast rating.

Response #A30-401

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area.

Response #A30-402

See **Section 1.14.2 Noise**.

Response #A30-403

See **Section 1.14.3 Visual Resources**.

Response #A30-404

See **Section 1.14.1 Hazardous Materials**.

Response #A30-405

See **Section 1.8 Air Quality**.

Response #A30-406

See **Section 1.9 Biological Resources**.

Response #A30-407

See **Section 1.9 Biological Resources**.

Response #A30-408

See **Section 1.14.1 Hazardous Materials**.

Response #A30-409

See **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Ordinance**. Refer also to **Section 1.1.4 Cooperating Agency**. Comments noted and made part of the administrative record. These comments are directed towards separate projects from the Proposed Action and Alternatives, and are therefore outside the scope of this NEPA analysis.

Response #A30-410

See **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Ordinance**. Refer also to **Section 1.1.4 Cooperating Agency**. Comments noted and made part of the administrative record. These comments are directed towards separate projects from the Proposed Action and Alternatives, and are therefore outside the scope of this NEPA analysis.

Response #A30-411

See **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Ordinance**. Refer also to **Section 1.1.4 Cooperating Agency**. Comments noted and made part of the administrative record. These comments are directed towards separate projects from the Proposed Action and Alternatives, and are therefore outside the scope of this NEPA analysis.

Response #A30-412

See **Section 1.1.4 Cooperating Agency** and **Section 1.1.2 Extension of the Comment Period**.

Response #A30-413

See the following sections:

- **Section 1.6 Land Resources**
- **Section 1.18 Mitigation Measures**
- **Section 1.7 Water Resources**
- **Section 1.14.2 Noise**
- **Section 1.14.3 Visual Resources**
- **Section 1.8 Air Quality**
- **Section 1.4 Alternatives**

Response #A30-414

See **Section 1.7 Water Resources**.

Response #A30-415

See **Section 1.8 Air Quality** and **Section 1.1.4 Cooperating Agency**.

Response #A30-416

See **Section 1.9 Biological Resources**.

Response #A30-417

See **Section 1.11.1 Economic and Fiscal Resources** and **Section 1.11.2 Environmental Justice**. Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities include under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

The Tribe is a Federally-recognized Indian tribe, possessing sovereign status and powers by virtue of such recognition (Federal Register, Vol. 70, No. 226, p. 71194, November 25, 2005).

Response #A30-418

See the following:

- **Section 1.12.2 Land Use**
- **Section 1.14.4 Recreational Resources**
- **Section 1.13.6 Fire Protection and Emergency Medical Services**
- **Section 1.12.1 Transportation Networks**
- **Section 1.14.3 Visual Resources**
- **Section 1.4 Alternatives**

Response #A30-419

See **Section 1.13.5 Law Enforcement** and **Section 1.1.1 General EIS Issues**.

Response #A30-420

See **Section 1.13.5 Law Enforcement** and **Section 1.1.1 General EIS Issues**.

Response #A30-421

See **Section 1.13.5 Law Enforcement** and **Section 1.1.1 General EIS Issues**.

Response #A30-422

See **Section 1.13.5 Law Enforcement** and **Section 1.1.1 General EIS Issues**.

Response #A30-423

See **Section 1.14.2 Noise** and **1.13.5 Law Enforcement**. Refer also to **Section 1.14.3 Visual Resources**.

Response #A30-424

As stated under Section 3.9.3 of the EIS (Visual Resources) under Key Observation Points: Selection Methods, the intent of viewpoint selection is to identify those locations which best represent overall views of the proposed project as seen from public places. Each key observation point represents several viewing locations. While not every view can be shown in this analysis, viewpoints were selected based on the greatest effect to public viewing.

Response #A30-425

See ***Response #A30-424*** above.

Response #A30-426

Comment noted and made part of the administrative record. This comment is directed towards a separate project from the Proposed Action and Alternatives, and is therefore outside the scope of this NEPA analysis.

Response #A30-427

See **Section 1.11.1 Economic and Fiscal Resources**.

Response #A30-428

See **Section 1.12.1 Transportation Networks**.

Response #A30-429

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare**.

Response #A30-430

See **Section 1.11.2 Environmental Justice**.

Response #A30-431

This issue is outside the scope of this NEPA analysis.

Response #A30-432

See **Section 1.13.5 Law Enforcement**.

Response #A30-433

See **Section 1.13.5 Law Enforcement**.

Response #A30-434

The reference to Soboba Road as a lightly traveled road has been removed in the EIS. As stated in Section 4.7, Soboba Road currently carries approximately 6,400 to 9,100 vehicles per day in the study area, while Lake Park Drive currently carries approximately 11,700 vehicles per day in the study area.

Traffic counts have been included in Section 2 of the updated traffic impact analysis (Appendix T of the FEIS) and mitigation measures have been recommended in order to achieve acceptable Level of Service for study area intersections and roadway segments for Year 2025 traffic conditions. Noise and air quality concerns related to traffic are addressed in Sections 4.9 and 4.3 of the FEIS, respectively. Safety concerns are addressed by the TMP (see **Sections 1.12.1 Transportation Networks**).

Response #A30-435

See **Section 1.12.2 Land Use**.

Response #A30-436

See **Section 1.14.4 Recreational Resources**.

Response #A30-437

See **Section 1.18 Mitigation Measures**.

Response #A30-438

See **Section 1.2.1 Expressions of Opinion**.

Response #A30-439

See **Section 1.2.1 Expressions of Opinion**.

3.1.31 Agency/Organization Comment Letter #A31

Response #A31-440

Comment noted and made part of the administrative record.

Response #A31-441

See **Section 1.1.4 Cooperating Agency**.

Response #A31-442

See **Section 1.1.4 Cooperating Agency**.

Response #A31-443

See **Section 1.1.4 Cooperating Agency** and **Section 1.12.2 Land Use**.

Response #A31-444

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A31-445

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A31-446

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A31-447

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** and **Section 1.11 Economic and Socioeconomic Conditions**.

Response #A31-448

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A31-449

See the following sections:

- **Section 1.11 Economic and Socioeconomic Conditions**
- **Section 1.13 Public Services**
- **Section 1.12.1 Transportation Networks**
- **Section 1.1.1 General EIS Issues**

Response #A31-450

Land use issues are described under Section 4.7 of the EIS.

Response #A31-451

See **Section 1.12.2 Land Use**.

Response #A31-452

See **Section 1.12.2 Land Use**.

Response #A31-453

See **Section 1.4 Alternatives** and **Section 1.14.2 Noise**.

Response #A31-454

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A31-455

See **Section 1.12.2 Land Use**.

Response #A31-456

See **Section 1.12.2 Land Use**, **Section 1.4 Alternatives**: Response d, and **Section 1.1.4 Cooperating Agency**, and **Section 1.3 Purpose and Need**.

Response #A31-457

See **Section 1.2.2 Matters beyond the Scope of the EIS**, **1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497)**. As stated within Section 1.2 of the EIS, "The 34 parcels considered in this FEIS are contiguous with the northwestern portion of the Reservation."

Response #A31-458

References to "Section 3.7.4" in the EIS were changed to "Section 3.8". This is the section that immediately follows Section 3.7.3 and discusses effects to public services, including law enforcement. Refer to **Section 1.13.5** for a discussion of law enforcement issues.

Response #A31-459

See **Section 1.13.5 Law Enforcement**.

Response #A31-460

See **Section 1.13.5 Law Enforcement**.

Response #A31-461

See **Section 1.13.5 Law Enforcement**.

Response #A31-462

See **Section 1.13.5 Law Enforcement**.

Response #A31-463

See **Section 1.13.5 Law Enforcement**.

Response #A31-464

See **Section 1.13.5 Law Enforcement** and **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

Response #A31-465

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A31-466

See **Section 1.12.1 Transportation Networks**.

Response #A31-467

See **Section 1.12.1 Transportation Networks**.

Response #A31-468

See **Section 1.12.1 Transportation Networks**.

Response #A31-469

See **Section 1.12.1 Transportation Networks**.

Response #A31-470

See **Section 1.12.1 Transportation Networks** and **Section 1.18 Mitigation Measures**.

Response #A31-471

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area. See also **Section 1.18 Mitigation Measures**.

Response #A31-472

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area. See also **Section 1.18 Mitigation Measures** and **Section 1.4 Alternatives**.

Response #A31-473

Refer to **Section 1.12.2 Land Use**, **1.12.2.1 Consistency with the City of San Jacinto General Plan**. See also **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area.

Response #A31-474

See **Section 1.8 Air Quality** and **Section 1.12.1 Transportation Networks**.

Response #A31-475

See **Section 1.8 Air Quality** and **Section 1.18 Mitigation Measures**.

Response #A31-476

See **Section 1.8 Air Quality** and **Section 1.13.2 Wastewater Service**.

Response #A31-477

See **Section 1.8 Air Quality**.

Response #A31-478

See **Section 1.14.2 Noise**.

Response #A31-479

See **Section 1.14.2 Noise**.

Response #A31-480

See **Section 1.14.2 Noise**.

Response #A31-481

See **Section 1.14.2 Noise**.

Response #A31-482

See **Sections 1.14.1 Hazardous Materials**, **1.7 Water Resources**, and **1.13.2 Wastewater Service**.

Response #A31-483

See **Section 1.9 Biological Resources**.

Response #A31-484

See **Sections 1.7 Water Resources** and **1.13.2 Wastewater Service**.

Response #A31-485

See **Section 1.11.1 Economic and Fiscal Resources** and **Section 1.13.7 School Services**.

Response #A31-486

See **Section 1.4 Alternatives** and **Section 1.12.2 Land Use**.

Response #A31-487

See **Section 1.15 Cumulative Effects**.

Response #A31-488

See **Section 1.11.2 Environmental Justice** and **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

Response #A31-489

See **Section 1.1.1 General EIS Issues** and **Section 1.1.4 Cooperating Agency**.

3.1.32 Agency/Organization Comment Letter #A32

Response #A32-490

Comment noted and made part of the administrative record. Section 4.7 of the EIS assesses the effects of the project on transportation networks. Cumulative effects are described within Section 4.10 of the EIS.

3.1.33 Agency/Organization Comment Letter #A33

Response #A33-491

Comment noted and made part of the administrative record. The letter attached to the State Clearinghouse comment letter is from the California Regional Water Quality Control Board. Comments

raised within this letter are responded to in **Section 1.7 Water Resources** and **Section 1.13.2 Wastewater Service**.

3.1.34 Agency/Organization Comment Letter #A34

Response #A34-492

See **Section 1.7 Water Resources**.

Response #A34-493

See **Section 1.7 Water Resources**.

Response #A34-494

See **Section 1.7 Water Resources**.

Response #A34-495

See **Section 1.7 Water Resources**.

Response #A34-496

See **Section 1.7 Water Resources**.

Response #A34-497

See **Section 1.7 Water Resources**.

Response #A34-498

See **Section 1.7 Water Resources**.

Response #A34-499

See **Section 1.7 Water Resources**.

Response #A34-500

See **Section 1.7 Water Resources**.

Response #A34-501

See **Section 1.7 Water Resources**.

Response #A34-502

See **Section 1.7 Water Resources**.

Response #A34-503

See **Section 1.7 Water Resources**.

Response #A34-504

See **Section 1.7 Water Resources**.

3.1.35 Agency/Organization Comment Letter #A35

Response #A35-505

Agency/Organization Comment Letter #A35 is a copy of Agency/Organization Comment Letter #A04. See ***Response #A04-146***.

3.1.36 Agency/Organization Comment Letter #A36

Response #A36-506

Comment noted and made part of the administrative record. The letter attached to the State Clearinghouse comment letter is a copy of Agency/Organization Comment Letter #A32. See ***Response #A32-490***.

3.1.37 Agency/Organization Comment Letter #A37

Response #A37-507

BIA appreciates EPA's comments on the DEIS as a cooperating agency under the sited regulations and statutes. BIA acknowledges EPA's determination of "Environmental Concerns" under the provided EPA rating guidance for select resource analyses included in the DEIS.

Response #A37-508

In the comments below, BIA intends to clarify EPA's request for a jurisdictional delineation for the on-Reservation wastewater treatment plant's (WWTP) percolation ponds (see Comments A37-510 and A37-511 below); the representation of EPA's role in regulating wastewater treatment and reuse (see Comments A37-512 and A37-513 below); additional mitigation measures pertaining to construction emissions (see Comment A37-515 through A37-519 below); and, the incorporation of sustainable and energy efficient technologies into the project description (see Comments A37-521 through A37-523 below).

Response #A37-509

BIA will issue a copy of the Final EIS to EPA at the information provided in the agency's DEIS comment letter.

Response #A37-510

A wetlands/WOUS delineation was performed for the percolation pond site in 2008. It was determined that these three ephemeral washes were not likely jurisdictional. However, these results were not submitted to the Army Corp of Engineers (ACOE) for concurrence or the issuance of a National Pollutant Discharge Elimination System (NPDES) permit due to the possibility that this facility may or may not be constructed. Section 2.1 of the EIS has been revised to include an additional wastewater service option where the Tribe would contract with Eastern Metropolitan Water District (EMWD). These revisions to the project description are provided below. Furthermore,

as stated in the wastewater mitigation Section 5.8.2 of the EIS, "The potential Tribal wastewater facilities and system would likely be permitted and operational before the proposed developments are operational. This project is considered a separate, but related Tribal initiative that will obtain the necessary federal permits and abide by the established federal operating guidelines."

Wastewater Treatment and Disposal

The facilities proposed in Proposed Action A, would generate an average daily flow of 313,000 gallons per day (GPD). The Tribe has two options for wastewater service: (1) enter into a contract with EMWD for wastewater service or, (2) utilize an on-Reservation wastewater treatment plant, which would be constructed to serve the existing Reservation and casino project site. The existing Golf Course and Country Club would continue to utilize EMWD services regardless of which wastewater option is pursued for the other project features. Option #2, the on-Reservation WWTP, is considered a separate but related project to the Proposed Action and Alternatives as it is undergoing a separate process for approval. However, for purposes of this environmental review, both options are examined for potential environmental effects. The following describes the components of each option.

Option #1: EMWD Service Option

Under Option #1, the Tribe would utilize a will-serve letter with EMWD, which confirms that the existing EMWD facilities have capacity and capability to service the proposed developments (Appendix E). Wastewater generated by the proposed developments would be processed by EMWD's Hemet/San Jacinto Regional Water Reclamation Facility (RWRF). The Hemet/San Jacinto RWRF currently has a capacity of 11 million GPD, but has expansion plans/approvals to 14 million GPD by 2014 (Wesson 2010). Wastewater will undergo secondary and tertiary treatment and meet the Title 22 standards.

The necessary infrastructure is in place on/near the Project Site to service the proposed developments. **Figure 2-3** provides the location of EMWD pipes in the area of Project Site. As observed, existing EMWD infrastructure traverses the Development Site. The necessary facilities, piping, and connections would be installed during construction, when the Development Site is highly disturbed.

Option #2: On-Reservation WWTP

Under Option #2, the Tribe would construct an on-Reservation tertiary sequencing batch reactor (SBR) WWTP capable of handling 1.2 million gallons per day (GPD). This facility would service **existing and planned future uses on the** Reservation, as well as the facilities under the Proposed Action and Alternatives. Total projected wastewater generation for the year 2030 for Proposed Action A **and the Reservation** was calculated to be 545,323 GPD. The proposed WWTP would meet California Title 22 requirements for reuse of treated effluent. System reuse of the effluent could include agricultural irrigation, landscape irrigation, filling of decorative water features, surface cleaning (i.e. parking lots), toilet flushing, and fire control. Wastewater would be delivered to the WWTP by a force main from a central plant located on the Project Site and on-Reservation (see **Figure 2-4**).

Response #A37-511

While five tributary washes were found to be present on the northern portion of the project site, no WOUS were found to be present on or near the development site. Therefore, no jurisdictional waters will be affected by the proposed developments.

As stated in comment A37-510 above, in the event that the Tribe elects to develop the on-Reservation WWTP option, a jurisdictional report will be prepared and submitted to ACOE for jurisdictional determination. If impacts to waterways cannot be avoided or minimized, mitigation for this project will be developed in coordination with ACOE and EPA using the most recent mitigation requirements.

Response #A37-512

The following text has been included in Section 4.11.1 to clarify EPA's role in permitting the on-Reservation WWTP percolation ponds.

> The EPA is the permitting authority for discharge projects occurring on tribal trust lands. **Based on a preliminary assessment of the percolation pond site, it was found that the waters present on the site are likely non-jurisdictional. Therefore, it is assumed at this time that the construction and operations of the percolation ponds will result in a less than significant effect to jurisdictional waters protected under the Clean Water Act, and EPA will not be required to issue a NPDES permit since EPA does not regulate wastewater discharge when it occurs via land disposal. However, if the Tribe elects to construct the on-Reservation wastewater treatment system, ACOE and EPA will be consulted for a final jurisdictional determination on the percolation pond site. If waters present on the site are determined to be jurisdictional, ACOE and EPA would be required to issue a NPDES permit prior to the construction of these facilities.**

Response #A37-513

All references to EPA standards for treated effluent have been removed from the EIS.

Response #A37-514

As stated in EPA Comment A37-513, there are no federal guidelines for the use of recycled water. Therefore, the reference that commits the Tribe to "monitor the treatment and disposal in accordance with EPA guidelines" has been removed from the EIS.

Response #A37-515

The Final EIS includes a revised air quality analysis that utilizes the most recent emissions modeling and regulatory frameworks. The emissions related to construction activities are not forecasted to exceed any general conformity thresholds, therefore not warranting mitigation measures. However, the EIS does include the recommendation of implementing fugitive dust mitigation measures that intend to minimize construction effects to nearby residents (see Sections 4.3.1 and 5.3 of the EIS). In order to further minimize potential effects to nearby receptors (i.e. residents), the mitigation measures provided by EPA, including the preparation of a Construction Emissions Mitigation Plan (CEMP), will be added to the existing recommendations in Section 5.3 of the EIS.

Response #A37-516

As stated in Response A of Section 1.8.1 of the public comment report,

> The construction of the Proposed Action would have limited potential to incrementally affect the attainment status of the SCAB for ozone, PM_{10}, and $PM_{2.5}$. Incremental effects would be small, temporary, and would cease upon completion of the construction project.
>
> As presented in Section 4.3 of the FEIS, since temporary construction emissions for the Proposed Action and Alternatives are all below General Conformity significance thresholds, no long-term risk assessment of the diesel particulate matter (DPM) or CO component of construction equipment engine exhaust is warranted, because corresponding short-term DPM and CO emissions would be small and will present no significant risk to public health. Mitigation measures listed in Section 5.3.1 of the FEIS describe the best management practices (BMPs) which would be implemented to ensure that fugitive dust emissions do not affect adjacent land users, and that VOC emissions are minimized during construction.

Response #A37-517

See responses to Comments A37-515 and A37-516 above. The recommended Fugitive Dust Source Controls will be added to Section 5.3 of the EIS.

Response #A37-518

See responses to Comments A37-515 and A37-516 above. The recommended Mobile and Stationary Source Controls will be added to Section 5.3 of the EIS.

Response #A37-519

See responses to Comments A37-515 and A37-516 above. The recommended Administrative Controls will be added to Section 5.3 of the EIS.

Response #A37-520

Since the publication of the DEIS, the Tribe has installed facilities to address potential contamination activities at the Golf Course maintenance area. These measures include the installation of a wash pad that drains to an on-site waste water treatments system.

However, the following mitigation measures will remain as recommendations in Section 5.9.1 of the EIS:

- Pollution control and prevention equipment, such as an oil-water separator and washrack, is needed for the golf course maintenance wash area.

- To reduce the potential for accidental releases, fuel, oil, and hydraulic fluids shall be transferred directly from a service truck to construction equipment tanks and shall not otherwise be stored on-site. Paint, thinner, solvents, cleaners, sealants, and lubricants used during construction shall be stored in a locked utility building, handled per the manufacturers' directions, and replenished as needed.

Response #A37-521

BIA appreciates EPA's comment regarding the use of *green* technology to develop an energy efficient facility. However, considering the less than significant results determination regarding energy supply/use, the inclusion of these technologies is at the discretion of the Tribe and would require a revision to the project description and subsequent residual effects analyses.

Response #A37-522

See response to Comment A37-521 above.

Response #A37-523

The Final EIS includes finalized Will-Serve Letters from Southern California Edison and Southern California Gas Company that state these utility providers have the capacity and capability to service the proposed developments. BIA appreciates EPA's comment regarding the minimization of energy use and LEED certification. However, considering the less than significant results determination regarding energy supply/use, the inclusion of these technologies is at the discretion of the Tribe and would require a revision to the project description and subsequent residual effects analyses.

Response #A37-524

The proposed Tribal Fire Station that is located on the Horseshoe Grande property is considered part of the "Development Site" and is fully evaluated throughout the EIS. Please see Figures 1-1 and 2-1A for clarification. The approximate location of the second proposed Tribal Fire Station that would be located near the intersection of Soboba Road and Castille Canyon Road on the existing Reservation, however, the precise location has not yet been decided by the Tribe. Section 5.8.7 has been revised to clarify that "**in the event that the second on-Reservation fire station is constructed, all required permitting will be obtained prior to construction.**"

Response #A37-525

BIA has taken the position that the possible on-Reservation WWTP is a separate project and that its construction is uncertain at this time. The on-Reservation wastewater treatment plant was identified in the DEIS as a separate but related project. As such, the future facility was evaluated in Section 4.11 Indirect Effects section of the DEIS. Additionally, Section 5.0 *Mitigation Measures* of the EIS identified the wastewater treatment facility as a separate but related facility that would need to be fully functioning prior to the facility's doors opening for business. The location and operation of the wastewater treatment plant was provided for full disclosure purposes at the time the DEIS was drafted. The ultimate location and construction/operation of the facility still needs to be fully planned and vetted by/through the Tribe and other outside agencies. As noted above, it may be that the on-Reservation construction of a wastewater plant for the casino project is not necessary.

Separate from the fee-to-trust NEPA process, the Tribe has been working with ACOE to determine if there is a federal interest in conducting a cost-sharing feasibility study to address economic and water related development needs of the Tribe. To date, the Tribe has approved undertaking the feasibility study, which is expected to span a 40-month period. This work will include many tasks including the sitting/sizing of the wastewater treatment facility on the Reservation to serve the current and projected wastewater needs of the Tribe. Therefore, while information concerning the on-Reservation wastewater facility was presented in the DEIS for full disclosure purposes, BIA believe it to be

premature to move forward with permitting the wastewater treatment plant at this time. It may be that the casino project does not use this on-Reservation wastewater plant even if one is constructed. Should a wastewater treatment facility be constructed on-Reservation in the future, the Tribe and BIA will ensure that all applicable federal regulations are complied with when that time comes.

Response #A37-526

The paragraph that discusses the State Phase II General Stormwater Construction Permit has been removed in response to EPA's comment. The following revisions have been made to Section 4.2.1:

Construction Effects
EPA alone has the authority to enforce water quality standards on Indian trust status lands, including the responsibility to enforce waste discharges under the National Pollutant Discharge Elimination System (NPDES).
Construction activities on the Development Site would be regulated under NPDES Construction General Permit (CGP) program. The CGP requires the developer/owner prepare a SWPPP for projects. The SWPPP is a document that addresses water quality controls during construction activities. To address this requirement, a SWPPP would be prepared for Proposed Action A to reduce the off-site discharge of pollutants.

3.1.38 Agency/Organization Comment Letter #A38

Response #A38-527

The commenter claims that the adjacent land owner was not notified of the proposed project and had to seek out information from others. The BIA issued a Notice of Intent for the preparation of the Draft EIS together with a notice for a public scoping meeting at the Hemet Public Library in 2008. A total of approximately 225 people attended the public scoping meeting in 2008. The BIA distributed a Notice of Availability together with the Draft EIS in June 2009 to Federal, State, and local agencies and other interested persons, which began a 75-day public review period. The Notice of Availability for the Draft EIS was filed by the BIA with the U.S. EPA in the Federal register, which also provided the time and location of the public hearing on the Draft EIS. During the Draft EIS public comment period, approximately 250 comment letters were received by the BIA. In addition, a number of public comments were recorded for the record at the August, 2009 public hearing on the Draft EIS. Following completion of the Final EIS, the BIA will file the document with the EPA and have it published in the Federal Register.

The commenter states that the FEIS suggests that there are two road closings and that re-routing would significantly affect "Calicinto Ranch," which is located to the east of the project site. Proposed Action A and Alternative 1 include the realignment of Lake Park Drive to a more southeasterly connection with Soboba Road. None of the existing roads would be closed. The commenter may be responding to the roadside landscaping depicted on the conceptual plan, which gives the impression that continued access to E. Main Street from Soboba Road would be closed. This is not the case. Other than the realigned Lake Park Drive, no road closings are proposed.

Response #A38-528

The commenter states that the property rights of Mr. Pierelli have been ignored and that a fence has been placed over his easement. As stated above, no road closing are proposed under the Proposed Action. The authors of the EIS are not aware of a fence that has been placed on the easement of Mr.

Pierelli. A re-routing of Lake Park Drive is proposed in Proposed Action A and Alternative 1; however, other than the re-routing of traffic to the southeast, no road closings are proposed. In order for this re-routing to occur, the City of San Jacinto would need to process the re-alignment request from the Tribe through the City's discretionary process. All easements and rights-of-ways on record would be fully considered prior to the approval/denial of any re-routing requests.

Response #A38-529

The commenter states that the Proposed Action would destroy the Calicinto Ranch and provides several points below, which are responded to herein:

The commenter states that the intersection of Lake Park Drive and Soboba Road would be eliminated and re-routed. The roadway plan for Proposed Action A and Alternative 1 would re-route Lake Park Drive to the southeast. No roads would be closed. Travelers from the Calicinto Ranch would still have access to Soboba Road if either Proposed Action A or Alternative 1 were selected and implemented. Please note, that any realignment would be required to be processed through the City of San Jacinto for consideration and decision making.

The commenter states that the plans do not account for the existing and future drainage coming off of the San Jacinto Mountains. Figures 2-5, 2-8, 2-10, 2-12, and 2-14 all show proposed drainage facility improvements for the various alternatives, which would accommodate pre- and post-development flows coming into the site and generated by the increased impervious surfaces. Each development alternative provides for specific drainage infrastructure improvements in the area of Soboba Road and Lake Park Drive. Each development alternative discussion within the FEIS contains a discussion of the drainage improvements that would be included in the site design. Lastly, Appendix K includes a preliminary drainage study for the proposed project. The impact to site drainage was found to be less than significant with the implementation of the drainage improvement measures provided for in each development plan.

The commenter states that the events arena would generate noise that would "…travel uphill and impact everything that is done at Calicinto Ranch…" The fully enclosed, multiuse arena would be constructed with sound isolation and absorbing features incorporated within the facility, which will prevent the propagation of significant noise beyond the property line. There will be no outdoor concert events at the facility, only indoor events. A less than significant noise impact on the Calicinto Ranch would result from operation of the events center.

The commenter states that the FEIS does not address the parking lot, hotel, accumulation of people, noise and traffic on Calicinto Ranch. The environmental analysis is not required to undertake an environmental review for each and every property surrounding the project site. The analysis identified the sensitive areas, corridors, and receptors nearest the project site and conducted an environmental impact assessment on those resources (specifically the Soboba Springs Mobile Home Estates), which is closer to the proposed gaming facility than Calicinto Ranch. The level of impact on identified sensitive resources within the FEIS was found to be less than significant with the design features and mitigation measures. Calicinto Ranch would not be expected to experience significant impacts once all design and mitigation features are implemented.

The commenter states that the noise, crowds, and "gathering" of the proposed facilities would have a significant impact on Calicinto Ranch. The commenter also states that it is "…sad that this was simply ignored, with no attempt to give notice to Calicinto Ranch and the Pirellis, or to receive their

input." Please see Response FFS-1 for background on the BIA's public noticing efforts throughout this process. With regards to the "Pirellis," our records indicate that they were present at the scoping meeting and Draft EIS public meeting and provided individual comments during that time (Please see Appendix B, page 9, F-7, G-2,3; Appendix E, Section 2 page 3, and 10).

The traffic and noise effects have been fully considered within the FEIS. The traffic study did include the operational effects along Soboba Road and specifically addressed traffic along Soboba Road, Lake Park drive, as well as the Soboba Road and Lake Park Drive intersection. Additionally, the noise analysis addressed various noise impacts on the closest sensitive receptors including Soboba Springs Mobile Home Estates, which is approximately 50 feet from the noise sources. Although the analysis did not specifically address Calicinto Ranch, the less than significant impact on a sensitive receptor that is closer to the site than Calicinto Ranch, coupled with the less than significant conclusion, allows for the conclusion of less than significant on Calicinto Ranch.

The commenter states that the traffic would have a devastating effect on Calicinto Ranch. The FEIS fully analyzes and discloses the traffic impacts that would occur along Soboba Road and Lake Park Drive.

The commenter states that the EIS does not address the effects on agricultural lands to the east. Neither the Proposed Action nor the development alternatives would result in development on agricultural lands east of the project site. For those lands within the project boundaries, the FEIS fully addressed the impacts to prime/local farmland. Therefore, a less than significant impact on agricultural lands east of the project site would occur.

The commenter states that the Tribe has a significant amount of land on the existing reservation that can be used for the project. The location of the Project Site would allow the Tribe to fully capitalize on the proposed hotel/casino complex's proximity to the Golf Course and Country Club in order to offer a destination resort, which is a primary reason for proposing the project at this location. In real terms, it is not feasible to relocate the Golf Course and Country Club to the existing gaming parcel. There is not enough developable land to create an 18-hole golf course near the existing casino, nor is it economically feasible to construct an additional golf course near the existing casino with the existing golf course remaining in operation. The purpose of the proposed hotel/casino complex is to diversify the economic enterprises of the Tribe and to allow for these enterprises to compliment by creating a business cluster, or economic synergy. An integrated complex offers customers many possible activities in one location. Thus, the proposed development would act as a destination center for tourists and businesses, while also catering to local interests. The intent of the Tribe is to differentiate its hotel, casino, golf course, and related facilities from those of nearby competing tribes.

The commenter states that drainage needs to be considered. Please see Response FFS-3(2) above.

The commenter states that the taking of easements needs to be considered, as well as noise and traffic effects. Please see Response FFS-1, FFS-2, and FFS-3(1) for a response related to the easement issue. Please see Response FFS-3(3)(4)(5) and (6) for a response related to noise and traffic.

3.2 DETAILED RESPONSES TO LETTERS SUBMITTED BY INDIVIDUALS

3.2.1 Individual Letter 1

Response 1-507

Letter #1 is one of many copies of a form letter received by the BIA during the public comment period. The form letter contains expressions of opinion, as well as concerns regarding land use, tax revenues, general environmental issues, the project's purpose and need, and project alternatives. Accordingly, please refer to the following discussions in **Section 1** of this public comment report:

- **Section 1.2.1 Expressions of Opinion**
- **Section 1.12.2 Land Use**
- **Section 1.11.1 Economic and Fiscal Resources**
- **Section 1.5 General Environmental Concerns**
- **Section 1.3 Purpose and Need**
- **Section 1.4 Alternatives**

3.2.2 Individual Letter 2

Response #2-508

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.3 Individual Letter 3

Response #3-509

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.4 Individual Letter 4

Response #4-510

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.5 Individual Letter 5

Response #5-511

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.6 Individual Letter 6

Response #6-512

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.7 Individual Letter 7

Response #7-513

Prior to development of the Proposed Action, the Project Site would be placed into trust, and would therefore lie within the Tribe's Reservation boundaries.

Refer to **Section 1.2.1 Expressions of Opinion**. Consultation with the City is described under **Section 1.1.4 Cooperating Agency**. Refer to **Section 1.13.5 Law Enforcement** for a discussion of the project's anticipated effect on crime. See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." Refer to **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities** for traffic concerns. Project effect on property values are discussed in **Section 1.11 Economic and Socioeconomic Conditions.** See **Section 1.5 General Environmental Concerns**.

3.2.8 Individual Letter 8

Response #8-514

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.9 Individual Letter 9

Response #9-515

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

In response to concerns raised by the public, a TMP (see Appendix AB of the EIS) was prepared. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured.

3.2.10 Individual Letter 10

Response #10-516

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.2.11 Individual Letter 11

Response #11-517

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use** for a discussion of jurisdiction issues and quality of life. Project effects to air quality and visual resources are discussed under **Section 1.8 Air Quality** and **1.14.3 Visual Resources**, respectively. In addition, see **Section 1.11 Economic and Socioeconomic Conditions** for a discussion of

effects to local tax revenue. Refer to **Section 1.13.5 Law Enforcement** for a discussion of the project's anticipated effect on crime.

3.2.12 Individual Letter 12

Response #12-518

See **Section 1.2.1 Expressions of Opinion**. Many of the points raised in this letter refer to the purpose and need for the project; accordingly, refer to **Section 1.3 Purpose and Need**.

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS).

3.2.13 Individual Letter 13

Response #13-519

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.14 Individual Letter 14

Response #14-520

See **Section 1.2.1 Expressions of Opinion**. Refer to **Section 1.3 Purpose and Need** for a discussion of the Tribe's stated need to require aboriginal territory. See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." **Section 1.11.1 Economic and Fiscal Resources** describes potential project effects on local tax revenue and property values Refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan** and **Section 1.12.2.3 Community Character and Quality of Life** for land use and quality of life concerns.

3.2.15 Individual Letter 15

Response #15-521

See **Section 1.2.1 Expressions of Opinion**. Refer to Section 3.8 of the EIS for a discussion of the existing level of crime on the Reservation. In addition, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report for a discussion of the project's anticipated effect on crime.

3.2.16 Individual Letter 16

Response #16-522

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2.3 Community Character and Quality of Life** for quality of life concerns. ." **Section 1.11.1 Economic and Fiscal Resources** describes potential project effects on local tax revenue.

3.2.17 Individual Letter 17

Response #17-523

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.18 Individual Letter 18

Response #18-524

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." In addition, refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan** and **Section 1.12.2.3 Community Character and Quality of Life** for land use and quality of life concerns. **Section 1.11.1 Economic and Fiscal Resources** describes potential project effects on local property values. See also **Section 1.3 Purpose and Need** and **Section 1.4 Alternative** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site.

3.2.19 Individual Letter 19

Response #19-525

See **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life** for quality of life concerns. See also **Section 1.3 Purpose and Need**: Response a, and **Section 1.4 Alternatives**: Responses a, c, and d for a discussion of project siting.

In response to concerns raised by the public, a TMP (see Appendix AB of the EIS) was prepared. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured.

3.2.20 Individual Letter 20

Response #20-526

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." See also **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

3.2.21 Individual Letter 21

Response #21-527

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.22 Individual Letter 22

Response #22-528

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages.

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area. Concerns regarding noise and project effects to property values are discussed in **Sections 1.14.2 Noise** and **1.11.1 Economic and Fiscal Resources**. Refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan** for land use concerns. See also **Section 1.3 Purpose and Need**: Response a, and **Section 1.4 Alternatives** for a discussion of project siting.

3.2.23 Individual Letter 23

Response #23-529

See **Section 1.2.1 Expressions of Opinion**. Refer to Section 3.8 of the EIS for a discussion of the existing level of crime on the Reservation. In addition, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report for a discussion of the project's anticipated effect on crime.

3.2.24 Individual Letter 24

Response #24-530

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." **Section 1.11.1 Economic and Fiscal Resources** describes project effects on local property values. See also **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the Tribe's stated need for economic development.

See also **Section 1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497)**.

3.2.25 Individual Letter 25

Response #25-531

See **Section 1.2.1 Expressions of Opinion**. For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report. Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

For land use concerns, refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan.** See also **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

3.2.26 Individual Letter 26

Response #26-532

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Many of the points within this letter address the purpose and need for the project, as well as the selection of the proposed Development Site. Accordingly, see **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

3.2.27 Individual Letter 27

Response #27-533

Letter #27 is one of several copies of a form letter developed by Save Our Communities and received by the BIA during the public comment period. The form letter contains expressions of opinion, as well as concerns regarding land use, natural hazards, the enforceability of mitigation measures listed in the EIS, the effect of the project on local revenues and expenditures, the economic data used in the EIS, the purpose and need for the project, and environmental justice. Accordingly, please refer to the following discussions in **Section 1** of this public comment report:

- **Section 1.2.1 Expressions of Opinion**
- **Section 1.12.2 Land Use**
- **Section 1.6 Land Resources**
- **Section 1.18 Mitigation Measures**
- **Section 1.11.1 Economic and Fiscal Resources**
- **Section 1.3 Purpose and Need**: Response d.
- **Section 1.11.2 Environmental Justice**

Emergency response access to the Project Area and emergency evacuation are discussed within the TMP (Appendix AB of the EIS).

3.2.28 Individual Letter 28

Response #28-534

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.29 Individual Letter 29

Response #29-535

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.30 Individual Letter 30

Response #30-536

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.31 Individual Letter 31

Response #31-537

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.32 Individual Letter 32

Response #32-538

Individual Letter 32 is a copy of Individual Letter 12. Please see **Response #12-518**.

3.2.33 Individual Letter 33

Response #33-539

This letter is one of several copies of a form letter developed by Save Our Communities and received by the BIA during the public comment period. See the response provided to Individual Letter 27, **Response #27-533**.

3.2.34 Individual Letter 34

Response #34-540

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.35 Individual Letter 35

Response #35-541

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.36 Individual Letter 36

Response #36-542

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." **Section 1.12.2 Land Use** also discusses other land use concerns, such as quality of life (**1.12.2.3**) and consistency with the San Jacinto General Plan (**1.12.2.1**). For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report.

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages.

Section 1.11.1 Economic and Fiscal Resources describes project effects on local property values.

3.2.37 Individual Letter 37

Response #37-543

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**. The effects of the project on employment and local tax revenue are described in **Section 1.11.1 Economic and Fiscal Resources.**

3.2.38 Individual Letter 38

Response #38-544

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." **Section 1.12.2 Land Use** also discusses other land use concerns, such as quality of life (**1.12.2.3**) and consistency with the San Jacinto General Plan (**1.12.2.1**).

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages.

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting. **Section 1.4 Alternatives** responds to the request for an alternative access point to the Reservation from Esplanade Avenue.

Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities include under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

3.2.39 Individual Letter 39

Response #39-545

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.40 Individual Letter 40

Response #40-546

See **Section 1.2.1 Expressions of Opinion**. Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

3.2.41 Individual Letter 41

Response #41-547

This letter is one of several copies of a form letter developed by Save Our Communities and received by the BIA during the public comment period. See the response provided to Individual Letter 27, **Response #27-533**.

3.2.42 Individual Letter 42

Response #42-548

Individual Letter 42 is a copy of Individual Letter 14. Please see **Response #14-520**.

3.2.43 Individual Letter 43

Response #43-549

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area. For general traffic concerns, refer to **Section 1.12.1 Transportation Networks.** For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report. Refer also to **Section 1.8 Air Quality**.

3.2.44 Individual Letter 44

Response #44-550

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**.

3.2.45 Individual Letter 45

Response #45-551

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

3.2.46 Individual Letter 46

Response #46-552

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**. **Section 1.11.1 Economic and Fiscal Resources** describes project effects on employment and local property values.

3.2.47 Individual Letter 47

Response #47-553

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns. **Section 1.11.1 Economic and Fiscal Resources** describes project effects on employment.

3.2.48 Individual Letter 48

Response #48-554

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting. Refer to **Section 1.3 Purpose and Need** for a response to concerns that the project would develop Tribal ancestral lands.

Section 1.1.1 General EIS Issues responds to comments regarding the overall quality of the EIS. As described in **Section 1.18 Mitigation Measures**, all relevant, reasonable mitigation measures that could improve the proposed project have been identified. Good faith efforts have been made throughout the environmental review process to design the project so as to minimize environmental effects and to propose mitigation measures that are intended to further minimize potential effects. **Section 1.11.2 Environmental Justice** responds to concerns that environmental justice effects to local communities were not accounted for in Section 3.6.3 of the EIS.

The effects of the project on land use and jurisdictional issues are described in **Section 1.12.2 Land Use**. **Section 1.11.1 Economic and Fiscal Resources** describes project effects on local tax revenue. The economic necessity for the project is described in Section 1.3.2 of the EIS. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.2.49 Individual Letter 49

Response #49-555

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Concerns that the local communities would become jurisdictional "islands" or that Tribe would have any influence over ingress and egress or public services are addressed within **Section 1.12.2 Land Use,**

1.12.2.2 Jurisdictional Issues. **Section 1.12.2 Land Use** also addresses project consistency with the San Jacinto General Plan (**1.12.2.1**) and quality of life issues (**1.12.2.3**).

Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting. General concerns regarding the effects of the project on traffic, local tax revenues, and crime addressed within **Section 1.12.1 Transportation Networks**, **Section 1.11.1 Economic and Fiscal Resources**, and **Section 1.13.5 Law Enforcement**.

3.2.50 Individual Letter 50

Response #50-556

See **Section 1.2.1 Expressions of Opinion**. Concerns that the local communities would become jurisdictional "islands" or that Tribe would have any influence over ingress and egress or public services are addressed within **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

3.2.51 Individual Letter 51

Response #51-557

See **Section 1.2.1 Expressions of Opinion**. Concerns that the local communities would become jurisdictional "islands" or that Tribe would have any influence over ingress and egress or public safety services are addressed within **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**. **Section 1.11.1 Economic and Fiscal Resources** describes project effects on local tax revenue and property values. For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report.

See also **Section 1.14.1 Hazardous Materials**.

Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting. **Section 1.4 Alternatives** responds to the request for an alternative access point to the Reservation from Esplanade Avenue. See also **Section 1.12.1 Transportation Networks**. All relevant, reasonable traffic mitigation measures that could improve the proposed project have been identified. Good faith efforts have been made throughout the environmental review process to design the project so as to minimize traffic effects and to propose mitigation measures that are intended to further minimize effects to transportation networks. Mitigation measures to reduce traffic effects are described in Section 5.7.1 and shown in Table 5-4 of the FEIS, while site-specific circulation and access recommendations for the Proposed Action and Alternatives are depicted on Figures 5-1a through Figure 5-5b of the document.

3.2.52 Individual Letter 52

Response #52-558

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**.

3.2.53 Individual Letter 53

Response #53-559

The commenter submitted a numbered list of comments. The responses are therefore correspondingly numbered below.

1. As described within the Executive Summary of the EIS: "Additionally, the Tribe proposes to develop approximately 55 acres of the Project Site (ten percent of total conveyance) into a destination hotel/casino complex." As discussed within Section 1.2 of the EIS, the existing golf course is 159 acres.

2. See **Section 1.3 Purpose and Need** for a discussion of the need to place the Project Site into trust under Alternatives 2 and 3.

3. The effects of the Alternative 3 on noise, lighting and glare, traffic, and solid waste are described within Sections 4.9.5, 4.7.5, and 4.85 of the EIS.

4. See **Section 1.6 Land Resources** of this public comment report.

5. See **Section 1.7 Water Resources**. Site grading will direct runoff to the proposed Best Management Practices (BMP) for collection and treatment.

Response #53-560

6. See **Section 1.7 Water Resources**. The underground storage tanks (UST) at the proposed gas station will conform with Federal regulations for UST installation in or adjacent to identified active fault zones (40 C.F.R. Part 280, Subpart B), as well as with State and Riverside County regulations (County of Riverside Ordinance No. 617). Section 2.1.1 and Section 5.1.3 of the EIS identify the criteria that will be used to locate and monitor the UST's associated with the project.

7. Comment regarding existing flood control is noted and made part of the administrative record.

Comment regarding soil stabilizers noted and made part of the administrative record. As described in Section 5.3 of the EIS, soil stabilizers would be utilized during the construction phase of the Project to control fugitive dust emissions.

8. See **Section 1.8 Air Quality** and **Section 1.12.1 Transportation Networks**.

9. See **Section 1.8.1 Air Quality – Construction Impacts, 1.8.1.2 Emissions Modeling and Regulatory Authority**: Response b.

As described in Section 4.4 of the EIS, while five jurisdictional waterways exist on portions of the Project Site, there are no waters of the United States present at the Development Site; therefore, no effects to waters of the United States would occur as a result of the Proposed Action and Alternatives. Water supply for the project is described within Sections 3.8 and 4.8 of the EIS.

10. See **Section 1.9 Biological Resources**.

Response #53-561

11. See **Section 1.9 Biological Resources**.

12. See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site.

13. As it relates to the 34 properties subject to transfer as part of the Proposed Action and Alternatives, at present, Riverside County receives $286,804 per year in property taxes on these parcels (see Section 3.6.1 of the EIS). This figure is not related to the existing casino. For fiscal year 2008-2009, Soboba Casino accounted for $1.47 million of the Special Distribution Fund (see **Section 1.11.1 Economic and Fiscal**

Resources). **Section 1.11.1 Economic and Fiscal Resources** and Section 3.6.1 of the EIS describe the methodology used to compute projected changes in tax revenues.

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site.

14. The traffic effect analysis proposed mitigation measures for all intersections and freeway segments which were projected to operate at unacceptable levels of service to bring those intersections and freeway segments to acceptable levels of service. All relevant, reasonable traffic mitigation measures that could improve the proposed project have been identified. Good faith efforts have been made throughout the environmental review process to design the project so as to minimize traffic effects and to propose mitigation measures that are intended to further minimize effects to transportation networks.

A TMP (see Appendix AB of the EIS) has been prepared and will be implemented to account for traffic during special events. This study includes information pertaining to event parking during special events and potential mitigation measures. The TMP does not call for the use of schools to manage event traffic. Language in Section 5.7.1 of the EIS pertaining to off-site parking at educational facilities has been removed.

For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report.

Response #53-562

15. See ***Response #53-561***, point 14 above. Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

Response #53-563

16. See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare**.

Response #53-564

17. See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare**. See also **Section 1.7.2 Impacts to Water Supply and Water Quality, 1.7.2.1 Water Supply**.

Response #53-565

18. See **Section 1.13.2 Wastewater Service**. Regarding concerns over noise, smell, lighting, and aesthetics effects from the WWTP, the best management practices (BMPs) which would be used for the Proposed Action and Alternatives are specified in Section 2.1.1 of the EIS under the heading "Wastewater Treatment and Disposal."

The amount of solid waste generated by each Action Alternative was determined using solid waste generation rates from the California Integrated Waste Management Board (CIWMB). Waste generation

rates are dependent upon the type of facility. Under Alternative 3, in place operating a hotel and the relocated casino, the Tribe would operate a retail shopping center and an RV-park. Therefore, while the solid waste that would have been produced from operation of the hotel and relocated casino under the Proposed Action is eliminated under this Alternative, solid waste would instead be generated by the operation of the shopping center and RV-park. It is expected that this Alternative would generate 1,836 more pounds per day of solid waste during the operational phase of the facilities than under the Proposed Action.

Response #53-566

19. See **Section 1.13.4 Electricity and Natural Gas**.

Response #53-567

20. See Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report.

In addition, in response to concerns raised by the public, a TMP (see Appendix AB) was prepared. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. The TMP includes an emergency evacuation plan. The emergency evacuation plan presents a strategy for residents in nearby communities and patrons of the proposed developments to retreat from the area in the event of an emergency situation. See Appendix AB of the EIS and **Section 1.12.1 Transportation Networks** for additional discussion on the TMP.

21. See **Section 1.13.6 Fire Protection and Emergency Medical Services**

Response #53-568

22. See **Section 1.14.1 Hazardous Materials**

Response #53-569

23. See **Section 1.14.2 Noise.**

Regarding the comment expressing concern that frequent refuse collection would be necessary, potential effects to traffic, air quality, and noise are already incorporated in those respective analyses in Section 4.0 of the EIS.

Response #53-570

24. See **Section 1.14.3 Visual Resources**. The fire stations, WWTP, gas station, commercial enterprises, and RV park building will not exceed two stories.

Response #53-571

25. Comments regarding cumulative effects to specific resources are addressed under the relevant headers within this public comment report (e.g. comments alleging that cumulative effects to air quality are not fully considered are addressed under Section 1.8 Air Quality). For concerns regarding soils and seismic hazards, see **Section 1.6 Land Resources**. See also the cumulative effects to land resources discussion in Section 4.10.3 of the EIS, which explains why it is not anticipated that the completion of Proposed Action and Alternatives would create any significant cumulative effects regarding land resources.

Response #53-572

26. See **Section 1.7 Water Resources**. See also **Section 1.8 Air Quality** and **Section 1.9 Biological Resources**. Refer also to Section 4.4 of the FEIS, which describes the effects of the Proposed Action, and Alternatives on biological resources by specifically presenting these effects on waters of the United States, Federally-listed plant and animal species, some additional species, and migratory birds.

Response #53-573

27. See **Section 1.9 Biological Resources** and Section 4.4 of the EIS.

Response #53-574

28. See **Section 1.10.1 Cultural Resources**. Land use and environmental justice concerns are addressed in Sections 4.6 and 4.7 of the EIS, respectively.

See **Section 1.12.1 Transportation Networks, 1.12.1.3 Mitigation Implementation**

For concerns regarding Indian Reservation Roads, see **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

The appropriate agencies have been contacted and have reviewed the traffic effect analysis, which contains a list of proposed improvements. Based on comments from these agencies, an updated traffic effect analysis has been prepared (see Appendix T of the EIS).

See also **Section 1.12.1 Transportation Networks, 1.12.1.3 Mitigation Implementation**

The size of the parking lots under the Proposed Action and Alternatives are disclosed in Section 2.1 of the EIS. Under Proposed Action A, a total of approximately 5,080 parking spaces would be provided. Two three-story parking garages would provide a total of approximately 4,300. These structures would be approximately 40-45 feet in elevation from existing grade and built upon pile driven foundations.

Response #53-575

29. See **Section 1.13.7 School Services**.

Response #53-576

30. Comment noted and made part of the administrative record. See **Section 1.14.1 Hazardous Materials**.

Response #53-577

31. See **Section 1.14.4 Recreational Resources** and **Section 2.12.2 Land Use** of this public comment report for a more detailed discussion on this topic.

Response #53-578

32. The effect of exhaust from vehicle traffic on air quality is accounted for in Section 4.3 of the EIS. Comment noted and made part of the administrative record. As described in Section 5.3 of the EIS, soil stabilizers would be utilized during the construction phase of the Project to control fugitive dust emissions.

Response #53-579

33. Realignment of Lake Park Drive hinges on which project alternative is chosen. This process is ongoing.

Response #53-580

See ***Responses #A30-369*** through ***#A30-373*** under Agency/Organization Comment Letter #A30. In addition, see **Section 1.18 Mitigation Measures** of this public comment report.

3.2.54 Individual Letter 54

Response #54-581

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.55 Individual Letter 55

Response #55-582

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. General concerns regarding noise, air quality, visual resources, quality of life, traffic, and crime are addressed in the following sections: **1.14.2 Noise**, **1.8 Air Quality**, **1.14.3 Visual Resources**, **1.12.2 Land Use (**see **1.12.2.3 Community Character and Quality of Life**)**, 1.12.1 Transportation Networks**, and **1.13.5 Law Enforcement**.

3.2.56 Individual Letter 56

Response #56-583

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.57 Individual Letter 57

Response #57-584

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.58 Individual Letter 58

Response #58-585

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, Section 1.12.2.3 Community Character and Quality of Life** for quality of life concerns.

Response #58-586

Refer to **Section 1.1.3 Scoping**

Response #58-587

For concerns regarding crime, refer to **Section 1.13.5 Law Enforcement** of this public comment report, as well as to Sections 3.8 and 4.8 of the EIS.

Response #58-588

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #58-589

Regarding concerns about the social effects of gambling on low income groups, minorities, senior citizens, and problem gamblers, the Proposed Action will not increase gaming facilities (i.e. slot machines) in the area (see the discussion within **Section 1.11.2 Environmental Justice**). The existing casino is located approximately one mile from the proposed casino, which implies that the communities that will have access to gaming facilities at the proposed casino currently have access to the same number of gaming facilities in the general area. Therefore, while the analysis acknowledges the negative effects of gambling in general, given that the Proposed Action will not add to the existing gaming facilities in the area, there is no evidence to conclude that additional effects of gambling on any groups would occur due to the Proposed Action compared to existing conditions.

Response #58-590

Refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan**.

Response #58-591

See **Section 1.14.2 Noise**.

Response #58-592

Refer to **Section 1.4 Alternatives**

Response #58-593

Refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan**.

Response #58-594

See **Section 1.14.1 Hazardous Materials**.

Response #58-595

The CEQ Regulations for implementing NEPA, 40 C.F.R. §1502.16(c), require analysis of the "[p]ossible conflicts between the proposed action and the objectives of Federal, regional, State, and local land use

plans, policies, and controls for the area concerned." The Riverside County LAFCO regulates boundary changes proposed by public agencies within the County. LAFCO is not involved with determining land use planning or policies, but instead governs jurisdictional boundaries at the city and county levels. The Tribe is not a signatory to LAFCO; therefore, if the lands are transferred into trust status LAFCO policies will no longer apply to the Project Site.

Section 3.6.1 of the EIS assesses the effect of the project on tax revenue in the context of the San Jacinto Redevelopment Zone.

Response #58-596

Section 1.11.1 Economic and Fiscal Resources and Section 3.6.1 of the EIS describe project effects on local tax revenue.

Response #58-597

Section 1.11.1 Economic and Fiscal Resources and Section 3.6.1 of the EIS describe project effects on local property values.

Response #58-598

Presently, there are no mature trees on the Development Site. Therefore, substantial tree removal is not envisioned as part of the Proposed Action or Alternatives. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in **Section 5.9.2** to lower received noise levels by about an additional 3 dBA overall.

Response #58-599

Speculation about alternative developments falls outside the scope of the NEPA process. See **Section 1.2** of this public comment report for additional information on non-NEPA topics.

Section 1.11.2 Environmental Justice responds to concerns that environmental justice effects to local communities were not accounted for in Section 3.6.3 of the EIS.

Response #58-600

Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

Response #58-601

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

Section 1.11.2 Environmental Justice addresses concerns regarding the social effects of gambling. See also **Section 1.13.5 Law Enforcement.**

Response #58-602

For concerns regarding crime, refer to **Section 1.13.5 Law Enforcement** of this public comment report, as well as to Sections 3.8 and 4.8 of the EIS.

Response #58-603

Refer to **Section 1.14.2 Noise** and to **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**.

Response #58-604

See **Section 1.2.1 Expressions of Opinion**.

Response #58-605

Comment noted and made part of the administrative record.

Response #58-606

This comment generally summarizes the content of the letter.

Responses to additional concerns raised are as follows:

Under the TMP (Appendix AB of the EIS), pedestrian crossings would be clearly marked and signed for both pedestrians and vehicular traffic. Clearly identified pedestrian walkways would be situated as to minimize any potential conflict with vehicular traffic. Traffic cones would be used to channelize traffic and guide drivers to the available parking areas. Proper signs would be utilized during peak periods. These include permanent and temporary signs. Each approach would have proper signs with directions marked clearly. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header.

The boundaries of the existing Reservation and the Project Site are shown in Figure 1-3 of the EIS.

3.2.59 Individual Letter 59

Response #59-607

The existing air quality in the Project Area and potential effects of the project on air quality are discussed in Sections 3.3 and 4.3 of the EIS. Refer to **Section 1.8 Air Quality** of this public comment report for air quality concerns.

3.2.60 Individual Letter 60

Response #60-608

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP

and will lessen the frequency of access blockages. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

Concerns that the local communities would become jurisdictional "islands" or that Tribe would have any influence over ingress and egress or public safety services are addressed within **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

The WWTP and associated percolation ponds would be located on the existing Reservation, with the WWTP site situated near the eastern terminus of Soboba Road, north of the road and the San Jacinto River. Figure 2-4 in the EIS depicts the location of the proposed wastewater facility, infrastructure, pump stations, and disposal fields. The site was selected partially due to its remote location from development and the potential effects on residents from its operation. The percolation ponds would be situated north of Soboba Road and west of Castille Canyon Road.

General concerns regarding crime are addressed within **Section 1.13.5 Law Enforcement**.

3.2.61 Individual Letter 61

Response #61-609

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.62 Individual Letter 62

Response #62-610

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.63 Individual Letter 63

Response #63-611

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.64 Individual Letter 64

Response #64-612

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.65 Individual Letter 65

Response #65-613

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.66 Individual Letter 66

Response #66-614

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.67 Individual Letter 67

Response #67-615

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.68 Individual Letter 68

Response #68-616

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.69 Individual Letter 69

Response #69-617

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.70 Individual Letter 70

Response #70-618

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.71 Individual Letter 71

Response #71-619

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.72 Individual Letter 72

Response #72-620

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.73 Individual Letter 73

Response #73-621

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.74 Individual Letter 74

Response #74-622

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.75 Individual Letter 75

Response #75-623

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.76 Individual Letter 76

Response #76-624

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.77 Individual Letter 77

Response #77-625

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.78 Individual Letter 78

Response #78-626

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.79 Individual Letter 79

Response #79-627

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.80 Individual Letter 80

Response #80-628

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.81 Individual Letter 81

Response #81-629

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.82 Individual Letter 82

Response #82-630

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.83 Individual Letter 83

Response #83-631

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.84 Individual Letter 84

Response #84-632

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.85 Individual Letter 85

Response #85-633

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.86 Individual Letter 86

Response #86-634

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.87 Individual Letter 87

Response #87-635

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.88 Individual Letter 88

Response #88-636

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.89 Individual Letter 89

Response #89-637

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.90 Individual Letter 90

Response #90-638

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.91 Individual Letter 91

Response #91-639

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.92 Individual Letter 92

Response #92-640

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.93 Individual Letter 93

Response #93-641

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.94 Individual Letter 94

Response #94-642

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.95 Individual Letter 95

Response #95-643

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.96 Individual Letter 96

Response #96-644

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.97 Individual Letter 97

Response #97-645

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.98 Individual Letter 98

Response #98-646

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.99 Individual Letter 99

Response #99-647

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.100 Individual Letter 100

Response #100-648

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.101 Individual Letter 101

Response #101-649

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.102 Individual Letter 102

Response #102-650

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.103 Individual Letter 103

Response #103-651

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.104 Individual Letter 104

Response #104-652

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.105 Individual Letter 105

Response #105-653

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.106 Individual Letter 106

Response #106-654

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.107 Individual Letter 107

Response #107-655

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.108 Individual Letter 108

Response #108-656

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.109 Individual Letter 109

Response #109-657

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.110 Individual Letter 110

Response #110-658

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.111 Individual Letter 111

Response #111-659

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.112 Individual Letter 112

Response #112-660

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.113 Individual Letter 113

Response #113-661

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.114 Individual Letter 114

Response #114-662

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.115 Individual Letter 115

Response #115-663

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.116 Individual Letter 116

Response #116-664

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.117 Individual Letter 117

Response #117-665

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.118 Individual Letter 118

Response #118-666

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.119 Individual Letter 119

Response #119-667

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.120 Individual Letter 120

Response #120-668

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.121 Individual Letter 121

Response #121-669

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.122 Individual Letter 122

Response #122-670

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.123 Individual Letter 123

Response #123-671

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.124 Individual Letter 124

Response #124-672

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.125 Individual Letter 125

Response #125-673

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.126 Individual Letter 126

Response #126-674

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.127 Individual Letter 127

Response #127-675 \

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.128 Individual Letter 128

Response #128-676

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.129 Individual Letter 129

Response #129-677

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.130 Individual Letter 130

Response #130-678

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.131 Individual Letter 131

Response #131-679

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.132 Individual Letter 132

Response #132-680

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.133 Individual Letter 133

Response #133-681

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.134 Individual Letter 134

Response #134-682

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.135 Individual Letter 135

Response #135-683

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.136 Individual Letter 136

Response #136-684

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.137 Individual Letter 137

Response #137-685

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.138 Individual Letter 138

Response #138-686

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.139 Individual Letter 139

Response #139-687

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.140 Individual Letter 140

Response #140-688

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.141 Individual Letter 141

Response #141-689

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.142 Individual Letter 142

Response #142-690

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.143 Individual Letter 143

Response #143-691

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.144 Individual Letter 144

Response #144-692

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.145 Individual Letter 145

Response #145-693

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.146 Individual Letter 146

Response #146-694

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.147 Individual Letter 147

Response #147-695

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.148 Individual Letter 148

Response #148-696

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.149 Individual Letter 149

Response #149-697

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.150 Individual Letter 150

Response #150-698

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.151 Individual Letter 151

Response #151-699

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.152 Individual Letter 152

Response #152-700

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.153 Individual Letter 153

Response #153-701

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.154 Individual Letter 154

Response #154-702

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.155 Individual Letter 155

Response #155-703

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.156 Individual Letter 156

Response #156-704

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.157 Individual Letter 157

Response #157-705

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.158 Individual Letter 158

Response #158-706

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.159 Individual Letter 159

Response #159-707

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.160 Individual Letter 160

Response #160-708

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.161 Individual Letter 161

Response #161-709

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.162 Individual Letter 162

Response #162-710

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.163 Individual Letter 163

Response #163-711

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.164 Individual Letter 164

Response #164-712

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.165 Individual Letter 165

Response #165-713

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.166 Individual Letter 166

Response #166-714

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.167 Individual Letter 167

Response #167-715

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.168 Individual Letter 168

Response #168-716

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.169 Individual Letter 169

Response #169-717

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.170 Individual Letter 170

Response #170-718

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.171 Individual Letter 171

Response #171-719

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.172 Individual Letter 172

Response #172-720

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.173 Individual Letter 173

Response #173-721

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.174 Individual Letter 174

Response #174-722

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.175 Individual Letter 175

Response #175-723

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.176 Individual Letter 176

Response #176-724

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.177 Individual Letter 177

Response #177-725

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.178 Individual Letter 178

Response #178-726

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.179 Individual Letter 179

Response #179-727

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.180 Individual Letter 180

Response #180-728

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.181 Individual Letter 181

Response #181-729

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.182 Individual Letter 182

Response #182-730

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.183 Individual Letter 183

Response #183-731

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.184 Individual Letter 184

Response #183-732

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.185 Individual Letter 185

Response #185-733

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.186 Individual Letter 186

Response #186-734

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.187 Individual Letter 187

Response #187-735

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.188 Individual Letter 188

Response #188-736

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.189 Individual Letter 189

Response #189-737

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.190 Individual Letter 190

Response #190-738

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.191 Individual Letter 191

Response #191-739

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.192 Individual Letter 192

Response #192-740

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.193 Individual Letter 193

Response #193-741

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.194 Individual Letter 194

Response #194-742

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.195 Individual Letter 195

Response #195-743

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.196 Individual Letter 196

Response #196-744

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.197 Individual Letter 197

Response #197-745

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.198 Individual Letter 198

Response #198-746

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.199 Individual Letter 199

Response #199-747

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.200 Individual Letter 200

Response #200-748

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.201 Individual Letter 201

Response #201-749

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.202 Individual Letter 202

Response #202-750

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.203 Individual Letter 203

Response #203-751

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.204 Individual Letter 204

Response #204-752

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.205 Individual Letter 205

Response #205-753

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.206 Individual Letter 206

Response #206-754

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.207 Individual Letter 207

Response #207-755

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.208 Individual Letter 208

Response #208-756

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.209 Individual Letter 209

Response #209-757

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.210 Individual Letter 210

Response #210-758

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.211 Individual Letter 211

Response #211-759

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.212 Individual Letter 212

Response 212-760

See **Section 1.2 Non-NEPA Issues, 1.2.1 Expressions of Opinion**.

The comment also lists several types of environmental effects attributable to the project. Commenters listing various categories of environmental effects can refer to the specific resource categories in **Section 1** for a summary of more specific comments and responses concerning each environmental resource. In particular, refer to the following:

- **Section 1.13.5 Law Enforcement**
- **Section 1.12.1 Transportation Networks**
- **Section 1.5 General Environmental Concerns**
- **Section 1.12.2 Land Use**

3.2.213 Individual Letter 213

Response 213-761

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**. In addition, see **Section 1.11 Economic and Socioeconomic Conditions** for a discussion of the tax revenue and employment implications of the project.

3.2.214 Individual Letter 214

Response 214-762

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**. In addition, see **Section 1.12.1 Transportation Networks; Section 1.11 Economic and Socioeconomic Conditions;** and **Section 1.8 Air Quality** for a discussion of the effects of the project on traffic, air quality, and the local economy.

3.2.215 Individual Letter 215

Response 215-763

See **Section 1.2.1 Expressions of Opinion**.

3.2.216 Individual Letter 216

Response 216-764

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**.

3.2.217 Individual Letter 217

Response 217-765

See **Section 1.4 Alternatives**: Response c. Regarding traffic concerns, refer to **Section 1.12.1 Transportation Networks, 1.12.1.5 Traffic Study Analysis**. For a response to safety concerns, see **Section 1.13.5 Law Enforcement**.

3.2.218 Individual Letter 218

Response 218-766

Refer to **Section 1.12.2 Land Use** for a discussion of zoning and quality of life issues. In addition, refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

Response 218-767

Refer to **Section 1.3 Purpose and Need**: response e for a discussion of the Tribe's stated need to require aboriginal territory.

Response 218-768

Comment noted and made part of the administrative record. The proposed casino would operate 2,000 slot machines. The Tribe's gaming compact with the State does not permit operation of more than 2,000 slot machines.

Response 218-769

Comment noted and made part of the administrative record.

Response 218-770

Comment noted and made part of the administrative record.

3.2.219 Individual Letter 219

Response 219-771

Refer to **Section 1.2.1 Expressions of Opinion**. See also **Section 1.11 Economic and Socioeconomic Conditions** for a discussion of project effects on the local economy.

3.2.220 Individual Letter 220

Response 220-772

Letter 220 is a copy of Letter 213. Refer to **Response 213-761**.

3.2.221 Individual Letter 221

Refer to **Section 1.2.1 Expressions of Opinion**.

3.3 DETAILED RESPONSES TO COMMENTS SUBMITTED AT THE AUGUST 5, 2009 PUBLIC HEARING

3.3.1 TC-001

No response required.

3.3.2 TC-002

See **Section 1.1.4 Cooperating Agency**.

3.3.3 TC-003

See **Section 1.1.4 Cooperating Agency** and **Section 1.13.5 Law Enforcement**.

3.3.4 TC-004

See **Section 1.1.4 Cooperating Agency**.

3.3.5 TC-005

See **Section 1.12.2 Land Use**, **Section 1.13.5 Law Enforcement**, and **Section 1.13.6 Fire Protection and Emergency Medical Services**.

3.3.6 TC-006

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.3.7 TC-007

See **Section 1.3 Purpose and Need**, **Section 1.4 Alternatives**, and **Section 1.12.2 Land Use**.

3.3.8 TC-008

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.3.9 TC-009

See **Section 1.13.5 Law Enforcement**.

3.3.10 TC-010

See **Section 1.13.5 Law Enforcement**.

3.3.11 TC-011

See **Sections 1.14.2 Noise**, **1.14.3 Visual Resources**, and **1.12.1 Transportation Networks**.

3.3.12 TC-012

See **Sections 1.8 Air Quality**, **1.11.1 Economic and Fiscal Resources**, **1.7 Water Resources**, **1.13.2 Wastewater Service**.

3.3.13 TC-013

See **Section 1.18 Mitigation Measures** and **Section 1.1.4 Cooperating Agency**.

3.3.14 TC-014

See **Section 1.1.4 Cooperating Agency** and **Section 1.2.1 Expressions of Opinion**.

3.3.15 TC-015

See **Section 1.1.2 Expressions of Opinion**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.3.16 TC-016

See **Section 1.12.2 Land Use**.

3.3.17 TC-017

See **Section 1.12.2 Land Use**.

3.3.18 TC-018

Comment noted and made part of the administrative record. The Soboba Tribe has been a Federally-recognized Indian tribe since 1883, possessing sovereign status and powers by virtue of such recognition (Federal Register, Vol. 70, No. 226, p. 71194, November 25, 2005). See also **Section 1.12.2 Land Use**.

3.3.19 TC-019

See **Section 1.2.1 Expression of Opinion**.

3.3.20 TC-020

Comment noted and made part of the administrative record.

3.3.21 TC-021

See **Section 1.2.1 Expression of Opinion** and **Section 1.10.1 Cultural Resources**.

3.3.22 TC-022

Speculation about alternative developments falls outside the scope of the NEPA process. See **Section 1.2.1 Expression of Opinion** and **Section 1.13.5 Law Enforcement**.

3.3.23 TC-023

Comment noted and made part of the administrative record.

3.3.24 TC-024

See **Section 1.2.1 Expression of Opinion** and **Section 1.4 Alternatives**. Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities, as

described under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

3.3.25 TC-025

See **Section 1.2.1 Expression of Opinion**, **Section 1.13.5 Law Enforcement**, and **Section 1.3 Purpose and Need**.

3.3.26 TC-026

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** and **Section 1.13.5 Law Enforcement**.

3.3.27 TC-027

See **Section 1.1.2 Expressions of Opinion**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.3.28 TC-028

See **Section 1.1.3 Scoping**.

3.3.29 TC-029

See the response to **TC-029** above.

3.3.30 TC-030

See **Section 1.13.5 Law Enforcement**.

3.3.31 TC-031

See **Section 1.2.1 Expression of Opinion**, **Section 1.13.5 Law Enforcement**, **Section 1.3 Purpose and Need**, and **Section 1.4 Alternatives**.

3.3.32 TC-032

Comment noted and made part of the administrative record.

3.3.33 TC-033

Comment noted and made part of the administrative record. These comments are directed towards a separate project from the Proposed Action and Alternatives, and are therefore outside the scope of this NEPA analysis.

3.3.34 TC-034

See the response to **TC-033** above.

3.3.35 TC-035

See the response to **TC-033** above. Refer also to **Section 1.12.2 Land Use**.

3.3.36 TC-036

See **Section 1.14.2 Noise**.

3.3.37 TC-037

Comment noted and made part of the administrative record.

3.3.38 TC-038

See **Section 1.2.1 Expression of Opinion**.

3.3.39 TC-039

Comment noted and made part of the administrative record.

3.3.40 TC-040

Comment noted and made part of the administrative record. See **Section 1.13.5 Law Enforcement**.

3.3.41 TC-050

See **Section 1.12.1 Transportation Networks**, **Section 1.14.2 Noise**, and **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**.

3.3.42 TC-051

See **Section 1.12.1 Transportation Networks**.

3.3.43 TC-052

See **Section 1.2.1 Expression of Opinion**.

3.3.44 TC-053

Comment noted and made part of the administrative record. See **Section 1.2.1 Expression of Opinion**.

3.3.45 TC-054

See **Section 1.2.1 Expression of Opinion**, **Section 1.13.5 Law Enforcement**, and **Section 1.13.6 Fire Protection and Emergency Medical Services**.

3.3.46 TC-055

See **Section 1.4 Alternatives**. Refer also to **Section 1.13.5 Law Enforcement** and **Section 1.2.1 Expression of Opinion**.

3.3.47 TC-056

See **Section 1.13.5 Law Enforcement** and **Section 1.2.1 Expression of Opinion**.

3.3.48 TC-057

See **Section 1.13.5 Law Enforcement** and **Section 1.2.1 Expression of Opinion**.

3.3.49 TC-058

See **Section 1.12.1 Transportation Networks**.

3.3.50 TC-059

Comment noted and made part of the administrative record.

3.3.51 TC-060

See **Section 1.9 Biological Resources**.

3.3.52 TC-061

See **Section 1.6 Land Resources**, **Section 1.7 Water Resources**, **Section 1.1.1 General EIS Issues**, and **Section 1.3 Purpose and Need.**

3.3.53 TC-062

Comment noted and made part of the administrative record. See **Section 1.2.1 Expression of Opinion**.

3.3.54 TC-063

Comment noted and made part of the administrative record. See also **Section 1.1.4 Cooperating Agency**.

3.3.55 TC-064

Comment noted and made part of the administrative record. See **Section 1.2.1 Expression of Opinion** and **Section 1.5 General Environmental Concerns**.

3.3.56 TC-065

See **Section 1.18 Mitigation Measures**, **Section 1.12.1 Transportation Networks**, **Section 1.12.2 Land Use**, and **Section 1.13.5 Law Enforcement**.

3.3.57 TC-066

See **Section 1.1.4 Cooperating Agency** and **Section 1.18 Mitigation Measures**.

3.3.58 TC-067

See **Section 1.2.1 Expressions of Opinion**, **Section 1.12.2 Land Use**, **Section 1.3 Purpose and Need**.

3.3.59 TC-068

See **Section 1.12.1 Transportation Networks**.

3.3.60 TC-069

See **Section 1.12.1 Transportation Networks**.

3.3.61 TC-070

See **Section 1.12.1 Transportation Networks**.

3.3.62 TC-071

See **Section 1.1.2 Extension of the Comment Period**, **Section 1.1.1 General EIS Issues**, and **Section 1.5 General Environmental Concerns**.

3.3.63 TC-072

See **Section 1.14.2 Noise** and **Section 1.4 Alternatives**.

3.3.64 TC-073

See **Section 1.13.5 Law Enforcement** and **Section 1.12.1 Transportation Networks**.

3.3.65 TC-074

See **Section 1.2.1 Expressions of Opinion**. Refer also to **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life** and **11.12.2.2 Jurisdictional Issues.**

3.3.66 TC-075

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**.

3.3.67 TC-076

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**.

3.3.68 TC-077

Comment noted and made part of the administrative record. See **Section 1.12.2 Land Use**.

3.3.69 TC-078

See **Section 1.14.2 Noise, 1.14.2.2 Noise –Operational Impacts, 1.14.2.2.3 Parking and Traffic**.

3.3.70 TC-079

See **Section 1.12.2 Land Use** and **Section 1.11.2 Environmental Justice**.

3.3.71 TC-080

Comment noted and made part of the administrative record. See **Section 1.12.2 Land Use** and **Section 1.11.2 Environmental Justice**.

3.3.72 TC-081

See **Sections 1.2.1 Expressions of Opinion**, **1.5 General Environmental Concerns**, **1.12.2 Land Use**, and **1.3 Purpose and Need**.

3.3.73 TC-082

See **Sections 1.2.1 Expressions of Opinion** and **1.3 Purpose and Need**.

3.3.74 TC-083

See **Section 1.12.2.3 Community Character and Quality of Life** and **Section 1.5 General Environmental Concerns**. See also **Section 1.11.2 Environmental Justice**, **Section 1.12.1 Transportation Networks**, **Section 1.13.6 Fire Protection and Emergency Medical Services**, and **Section1.3 Purpose and Need**.

3.3.75 TC-084

Refer to **Section 1.10.1 Cultural Resources** and **Section 1.3 Purpose and Need**. See also **Section 1.1.1 General EIS Issues**.

3.3.76 TC-085

Refer to **Section 1.10.1 Cultural Resources**, **Section 1.3 Purpose and Need,** and **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

3.3.77 TC-086

See **Section 1.3 Purpose and Need**, **Section 1.4 Alternatives**, and **Section 1.11 Economic and Socioeconomic Conditions**.

3.3.78 TC-087

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

3.3.79 TC-088

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**. Refer also to **Section 1.12.1 Transportation Networks**.

3.3.80 TC-089

Refer to **Section 1.12.1 Transportation Networks**.

3.3.81 TC-090

See **Section 1.12.2 Land Use**.

3.3.82 TC-091

See **Section 1.12.2 Land Use**, **Section 1.14.3 Visual Resources**, and **Section 1.9 Biological Resources**.

3.3.83 TC-092

See **Section 1.7 Water Resources**.

3.3.84 TC-093

See **Section 1.7 Water Resources**.

3.3.85 TC-094

See **Section 1.13 Public Services** and **Section 1.2.1 Expressions of Opinion**. Refer also to Section 2.1.1 where the following text has been included:

> **Tribal Resolution No. CR07-HGFTT-51 (Appendix J of the EIS) acknowledges the existing easements for roadway, water lines and underground conduits and incidental purposes along the Project Site, which includes a roadway easement for Lake park Drive and Soboba Road.**

Therefore, all existing right-of-ways, including for utilities, would be preserved by the Tribe as a condition of DOI/BIA approving the trust action.

3.3.86 TC-095

See **Section 1.14.2 Noise**.

3.3.87 TC-096

See **Section 1.12.2 Land Use**, **Section 1.6 Land Resources**, and **Section 1.7.1 Impacts to Flooding and Runoff**.

3.3.88 TC-097

See **Section 1.12.2 Land Use**, **Section 1.6 Land Resources**, and **Section 1.7.1 Impacts to Flooding and Runoff**. Refer also to **Section 1.18 Mitigation Measures**.

3.3.89 TC-098

See **Section 1.5 General Environmental Concerns** and **Section 1.18 Mitigation Measures**.

3.3.90 TC-099

See **Section 1.18 Mitigation Measures** and **Section 1.11.1 Economic and Socioeconomic Conditions**.

3.3.91 TC-100

See **Section 1.3 Purpose and Need** and **Section 1.1.1 General EIS Issues**.

3.3.92 TC-101

See **Section 1.11.2 Environmental Justice** and **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**. Refer also to **Section 1.18 Mitigation Measures** and **Section 1.4 Alternatives**.

3.3.93 TC-102

See **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**. Refer also to **Section 1.14.2 Noise** and **Section 1.4 Alternatives**.

3.3.94 TC-103

See **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**.

3.3.95 TC-104

See **Section 1.11.1 Economic and Socioeconomic Conditions**, **Section 1.2.1 Expressions of Opinion**, and **Section 1.12.2 Land Use**.

3.3.96 TC-105

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**. Refer also to **Section 1.12.1 Transportation Networks**.

3.3.97 TC-106

See **Section 1.13.5 Law Enforcement** and **Section 1.2.1 Expressions of Opinion**.

3.3.98 TC-107

See **Sections 1.8 Air Quality**, **1.12.1 Transportation Networks**, **1.13.5 Law Enforcement**, and **1.13.6 Fire Protection and Emergency Medical Services**.

3.3.99 TC-108

See **Section 1.13.5 Law Enforcement.**

3.3.100 TC-109

See **Sections 1.8 Air Quality**, **Section 1.11.1 Economic and Socioeconomic Conditions**, and **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**.

3.3.101 TC-110

See **Section 1.2.1 Expressions of Opinion**, **Section 1.11.1 Economic and Socioeconomic Conditions**, and **Section 1.3 Purpose and Need**.

3.3.102 TC-111

See **Section 1.12.1 Transportation Networks** and **Section 1.13.5 Law Enforcement.**

3.3.103 TC-112

See **Section 1.2.1 Expressions of Opinion**.

3.3.104 TC-113

Comment noted and made part of the administrative record.

3.3.105 TC-114

See **Section 1.11.2 Environmental Justice**, **Section 1.10 Cultural and Paleontological Resources**, and **Section 1.5 General Environmental Concerns**. The reference to "Alameda County Coroner" has been corrected to be Riverside County Coroner.

3.3.106 TC-115

See **Section 1.13.5Law Enforcement** and **Section 1.7 Water Resources**.

3.3.107 TC-116

See **Section 1.2.1 Expressions of Opinion** and **Section 1.3 Purpose and Need**.

3.3.108 TC-117

See **Section 1.2.1 Expressions of Opinion**. See also **Section 1.12.1 Transportation Networks**, **Section 1.11.1 Economic and Socioeconomic Conditions**, **Section 1.18 Mitigation Measures**, **Section 1.1.1 General EIS Issues**, and **Section 1.12.2 Land Use**.

3.3.109 TC-118

See **Section 1.12.2 Land Use**, **Section 1.14.3 Visual Resources**, and **Section 1.14.2 Noise**.

3.3.110 TC-119

See **Section 1.1.4 Cooperating Agency**.

3.3.111 TC-120

See **Section 1.6 Land Resources**. Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities include under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

3.3.112 TC-121

Comment noted and made part of the administrative record. See **Section 1.12.1 Transportation Networks**.

3.3.113 TC-122

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**, **Section 1.1.2 Extension of the Comment Period**, **Section 1.11 Economic and Socioeconomic Conditions**, and **Section 1.12.1 Transportation Networks**.

3.3.114 TC-123

Comment noted and made part of the administrative record.

Appendix E Part 7

Public Comment Report (Public Comment Report August 2012)

UNITED STATES DEPARTMENT OF INTERIOR
BUREAU OF INDIAN AFFAIRS

Horseshoe Grande EIS

Public Comment Report

AUGUST 2012

This page is intentionally blank.

Table of Contents

SECTION 1 General Comments and Master Responses 1

1.1 NEPA Procedural Issues 2
1.1.1 General EIS Issues 2
1.1.2 Extension of the Comment Period 2
1.1.3 Scoping 2
1.1.4 Cooperating Agency 3
1.2 Non-NEPA Issues 3
1.2.1 Expressions of Opinion 3
1.2.2 Matters beyond the Scope of the EIS 4
1.3 Purpose and Need 5
1.4 Alternatives 8
1.5 General Environmental Concerns 12
1.6 Land Resources 12
1.7 Water Resources 15
1.7.1 Impacts to Flooding and Runoff 15
1.7.2 Impacts to Water Supply and Water Quality 20
1.7.3 Impacts to Groundwater 22
1.8 Air Quality 22
1.8.1 Air Quality – Construction Impacts 22
1.8.2 Air Quality – Operational Impacts 27
1.9 Biological Resources 29
1.10 Cultural and Paleontological Resources 31
1.10.1 Cultural Resources 31
1.10.2 Paleontological Resources 31
1.11 Economic and Socioeconomic Conditions 34
1.11.1 Economic and Fiscal Resources 34
1.11.2 Environmental Justice 39
1.12 Resource Use Patterns 41
1.12.1 Transportation Networks 41
1.12.2 Land Use 56
1.13 Public Services 61
1.13.1 Water Supply 62
1.13.2 Wastewater Service 63
1.13.3 Solid Waste Service 64
1.13.4 Electricity and Natural Gas 65
1.13.5 Law Enforcement 66
1.13.6 Fire Protection and Emergency Medical Services 69
1.13.7 School Services 72
1.14 Other Values 73
1.14.1 Hazardous Materials 73
1.14.2 Noise 75
1.14.3 Visual Resources 81
1.14.4 Recreational Resources 83
1.15 Cumulative Effects 83
1.16 Indirect Effects 85
1.17 Growth-Inducing Effects 85
1.18 Mitigation Measures 85

SECTION 2 Comment Log, Written Comments, and Public Hearing Transcript 86

SECTION 3 Detailed Responses to Public Comments 98

3.1 Detailed Responses to Comment Letters Submitted by Agencies and organizations 98
3.1.1 Agency/Organization Comment Letter #A01 98
3.1.2 Agency/Organization Comment Letter #A02 112
3.1.3 Agency/Organization Comment Letter #A03 126
3.1.4 Agency/Organization Comment Letter #A04 126
3.1.5 Agency/Organization Comment Letter #A05 126
3.1.6 Agency/Organization Comment Letter #A06 129
3.1.7 Agency/Organization Comment Letter #A07 129
3.1.8 Agency/Organization Comment Letter #A08 130
3.1.9 Agency/Organization Comment Letter #A09 132
3.1.10 Agency/Organization Comment Letter #A10 133
3.1.11 Agency/Organization Comment Letter #A11 134
3.1.12 Agency/Organization Comment Letter #A12 135
3.1.13 Agency/Organization Comment Letter #A13 136
3.1.14 Agency/Organization Comment Letter #A14 136
3.1.15 Agency/Organization Comment Letter #A15 137
3.1.16 Agency/Organization Comment Letter #A16 138
3.1.17 Agency/Organization Comment Letter #A17 140
3.1.18 Agency/Organization Comment Letter #A18 140
3.1.19 Agency/Organization Comment Letter #A19 141
3.1.20 Agency/Organization Comment Letter #A20 142
3.1.21 Agency/Organization Comment Letter #A21 142
3.1.22 Agency/Organization Comment Letter #A22 142
3.1.23 Agency/Organization Comment Letter #A23 144
3.1.24 Agency/Organization Comment Letter #A24 145
3.1.25 Agency/Organization Comment Letter #A25 145
3.1.26 Agency/Organization Comment Letter #A26 147
3.1.27 Agency/Organization Comment Letter #A27 147
3.1.28 Agency/Organization Comment Letter #A28 147
3.1.29 Agency/Organization Comment Letter #A29 149
3.1.30 Agency/Organization Comment Letter #A30 149
3.1.31 Agency/Organization Comment Letter #A31 158
3.1.32 Agency/Organization Comment Letter #A32 162
3.1.33 Agency/Organization Comment Letter #A33 162
3.1.34 Agency/Organization Comment Letter #A34 163
3.1.35 Agency/Organization Comment Letter #A35 164
3.1.36 Agency/Organization Comment Letter #A36 164
3.2 Detailed Responses to Letters Submitted by Individuals 172
3.2.1 Individual Letter 1 172
3.2.2 Individual Letter 2 172
3.2.3 Individual Letter 3 172
3.2.4 Individual Letter 4 172
3.2.5 Individual Letter 5 172
3.2.6 Individual Letter 6 172
3.2.7 Individual Letter 7 173
3.2.8 Individual Letter 8 173

3.2.9 Individual Letter 9 173
3.2.10 Individual Letter 10 173
3.2.11 Individual Letter 11 173
3.2.12 Individual Letter 12 174
3.2.13 Individual Letter 13 174
3.2.14 Individual Letter 14 174
3.2.15 Individual Letter 15 174
3.2.16 Individual Letter 16 174
3.2.17 Individual Letter 17 175
3.2.18 Individual Letter 18 175
3.2.19 Individual Letter 19 175
3.2.20 Individual Letter 20 175
3.2.21 Individual Letter 21 175
3.2.22 Individual Letter 22 175
3.2.23 Individual Letter 23 176
3.2.24 Individual Letter 24 176
3.2.25 Individual Letter 25 176
3.2.26 Individual Letter 26 177
3.2.27 Individual Letter 27 177
3.2.28 Individual Letter 28 177
3.2.29 Individual Letter 29 178
3.2.30 Individual Letter 30 178
3.2.31 Individual Letter 31 178
3.2.32 Individual Letter 32 178
3.2.33 Individual Letter 33 178
3.2.34 Individual Letter 34 178
3.2.35 Individual Letter 35 178
3.2.36 Individual Letter 36 179
3.2.37 Individual Letter 37 179
3.2.38 Individual Letter 38 179
3.2.39 Individual Letter 39 180
3.2.40 Individual Letter 40 180
3.2.41 Individual Letter 41 180
3.2.42 Individual Letter 42 180
3.2.43 Individual Letter 43 180
3.2.44 Individual Letter 44 180
3.2.45 Individual Letter 45 180
3.2.46 Individual Letter 46 181
3.2.47 Individual Letter 47 181
3.2.48 Individual Letter 48 181
3.2.49 Individual Letter 49 181
3.2.50 Individual Letter 50 182
3.2.51 Individual Letter 51 182
3.2.52 Individual Letter 52 182
3.2.53 Individual Letter 53 182
3.2.54 Individual Letter 54 187
3.2.55 Individual Letter 55 187
3.2.56 Individual Letter 56 187
3.2.57 Individual Letter 57 187
3.2.58 Individual Letter 58 187
3.2.59 Individual Letter 59 190
3.2.60 Individual Letter 60 190

3.2.61 Individual Letter 61 191
3.2.62 Individual Letter 62 191
3.2.63 Individual Letter 63 191
3.2.64 Individual Letter 64 191
3.2.65 Individual Letter 65 191
3.2.66 Individual Letter 66 191
3.2.67 Individual Letter 67 192
3.2.68 Individual Letter 68 192
3.2.69 Individual Letter 69 192
3.2.70 Individual Letter 70 192
3.2.71 Individual Letter 71 192
3.2.72 Individual Letter 72 192
3.2.73 Individual Letter 73 192
3.2.74 Individual Letter 74 193
3.2.75 Individual Letter 75 193
3.2.76 Individual Letter 76 193
3.2.77 Individual Letter 77 193
3.2.78 Individual Letter 78 193
3.2.79 Individual Letter 79 193
3.2.80 Individual Letter 80 193
3.2.81 Individual Letter 81 194
3.2.82 Individual Letter 82 194
3.2.83 Individual Letter 83 194
3.2.84 Individual Letter 84 194
3.2.85 Individual Letter 85 194
3.2.86 Individual Letter 86 194
3.2.87 Individual Letter 87 194
3.2.88 Individual Letter 88 195
3.2.89 Individual Letter 89 195
3.2.90 Individual Letter 90 195
3.2.91 Individual Letter 91 195
3.2.92 Individual Letter 92 195
3.2.93 Individual Letter 93 195
3.2.94 Individual Letter 94 195
3.2.95 Individual Letter 95 195
3.2.96 Individual Letter 96 196
3.2.97 Individual Letter 97 196
3.2.98 Individual Letter 98 196
3.2.99 Individual Letter 99 196
3.2.100 Individual Letter 100 196
3.2.101 Individual Letter 101 196
3.2.102 Individual Letter 102 196
3.2.103 Individual Letter 103 197
3.2.104 Individual Letter 104 197
3.2.105 Individual Letter 105 197
3.2.106 Individual Letter 106 197
3.2.107 Individual Letter 107 197
3.2.108 Individual Letter 108 197
3.2.109 Individual Letter 109 197
3.2.110 Individual Letter 110 198
3.2.111 Individual Letter 111 198
3.2.112 Individual Letter 112 198

3.2.113 Individual Letter 113 198
3.2.114 Individual Letter 114 198
3.2.115 Individual Letter 115 198
3.2.116 Individual Letter 116 198
3.2.117 Individual Letter 117 198
3.2.118 Individual Letter 118 199
3.2.119 Individual Letter 119 199
3.2.120 Individual Letter 120 199
3.2.121 Individual Letter 121 199
3.2.122 Individual Letter 122 199
3.2.123 Individual Letter 123 199
3.2.124 Individual Letter 124 199
3.2.125 Individual Letter 125 200
3.2.126 Individual Letter 126 200
3.2.127 Individual Letter 127 200
3.2.128 Individual Letter 128 200
3.2.129 Individual Letter 129 200
3.2.130 Individual Letter 130 200
3.2.131 Individual Letter 131 200
3.2.132 Individual Letter 132 200
3.2.133 Individual Letter 133 201
3.2.134 Individual Letter 134 201
3.2.135 Individual Letter 135 201
3.2.136 Individual Letter 136 201
3.2.137 Individual Letter 137 201
3.2.138 Individual Letter 138 201
3.2.139 Individual Letter 139 201
3.2.140 Individual Letter 140 202
3.2.141 Individual Letter 141 202
3.2.142 Individual Letter 142 202
3.2.143 Individual Letter 143 202
3.2.144 Individual Letter 144 202
3.2.145 Individual Letter 145 202
3.2.146 Individual Letter 146 202
3.2.147 Individual Letter 147 203
3.2.148 Individual Letter 148 203
3.2.149 Individual Letter 149 203
3.2.150 Individual Letter 150 203
3.2.151 Individual Letter 151 203
3.2.152 Individual Letter 152 203
3.2.153 Individual Letter 153 203
3.2.154 Individual Letter 154 204
3.2.155 Individual Letter 155 204
3.2.156 Individual Letter 156 204
3.2.157 Individual Letter 157 204
3.2.158 Individual Letter 158 204
3.2.159 Individual Letter 159 204
3.2.160 Individual Letter 160 204
3.2.161 Individual Letter 161 205
3.2.162 Individual Letter 162 205
3.2.163 Individual Letter 163 205
3.2.164 Individual Letter 164 205

3.2.165 Individual Letter 165 205
3.2.166 Individual Letter 166 205
3.2.167 Individual Letter 167 205
3.2.168 Individual Letter 168 206
3.2.169 Individual Letter 169 206
3.2.170 Individual Letter 170 206
3.2.171 Individual Letter 171 206
3.2.172 Individual Letter 172 206
3.2.173 Individual Letter 173 206
3.2.174 Individual Letter 174 206
3.2.175 Individual Letter 175 207
3.2.176 Individual Letter 176 207
3.2.177 Individual Letter 177 207
3.2.178 Individual Letter 178 207
3.2.179 Individual Letter 179 207
3.2.180 Individual Letter 180 207
3.2.181 Individual Letter 181 207
3.2.182 Individual Letter 182 208
3.2.183 Individual Letter 183 208
3.2.184 Individual Letter 184 208
3.2.185 Individual Letter 185 208
3.2.186 Individual Letter 186 208
3.2.187 Individual Letter 187 208
3.2.188 Individual Letter 188 208
3.2.189 Individual Letter 189 209
3.2.190 Individual Letter 190 209
3.2.191 Individual Letter 191 209
3.2.192 Individual Letter 192 209
3.2.193 Individual Letter 193 209
3.2.194 Individual Letter 194 209
3.2.195 Individual Letter 195 209
3.2.196 Individual Letter 196 210
3.2.197 Individual Letter 197 210
3.2.198 Individual Letter 198 210
3.2.199 Individual Letter 199 210
3.2.200 Individual Letter 200 210
3.2.201 Individual Letter 201 210
3.2.202 Individual Letter 202 210
3.2.203 Individual Letter 203 211
3.2.204 Individual Letter 204 211
3.2.205 Individual Letter 205 211
3.2.206 Individual Letter 206 211
3.2.207 Individual Letter 207 211
3.2.208 Individual Letter 208 211
3.2.209 Individual Letter 209 211
3.2.210 Individual Letter 210 212
3.2.211 Individual Letter 211 212
3.2.212 Individual Letter 212 212
3.2.213 Individual Letter 213 212
3.2.214 Individual Letter 214 212
3.2.215 Individual Letter 215 213
3.2.216 Individual Letter 216 213

3.2.217 Individual Letter 217 213
3.2.218 Individual Letter 218 213
3.2.219 Individual Letter 219 213
3.2.220 Individual Letter 220 214
3.2.221 Individual Letter 221 214
3.3 Detailed Responses to Comments Submitted at the August 5, 2009 Public Hearing 215
3.3.1 TC-001 215
3.3.2 TC-002 215
3.3.3 TC-003 215
3.3.4 TC-004 215
3.3.5 TC-005 215
3.3.6 TC-006 215
3.3.7 TC-007 215
3.3.8 TC-008 215
3.3.9 TC-009 215
3.3.10 TC-010 215
3.3.11 TC-011 215
3.3.12 TC-012 215
3.3.13 TC-013 216
3.3.14 TC-014 216
3.3.15 TC-015 216
3.3.16 TC-016 216
3.3.17 TC-017 216
3.3.18 TC-018 216
3.3.19 TC-019 216
3.3.20 TC-020 216
3.3.21 TC-021 216
3.3.22 TC-022 216
3.3.23 TC-023 216
3.3.24 TC-024 216
3.3.25 TC-025 217
3.3.26 TC-026 217
3.3.27 TC-027 217
3.3.28 TC-028 217
3.3.29 TC-029 217
3.3.30 TC-030 217
3.3.31 TC-031 217
3.3.32 TC-032 217
3.3.33 TC-033 217
3.3.34 TC-034 217
3.3.35 TC-035 217
3.3.36 TC-036 217
3.3.37 TC-037 218
3.3.38 TC-038 218
3.3.39 TC-039 218
3.3.40 TC-040 218
3.3.41 TC-050 218
3.3.42 TC-051 218
3.3.43 TC-052 218
3.3.44 TC-053 218
3.3.45 TC-054 218

3.3.46 TC-055 218
3.3.47 TC-056 218
3.3.48 TC-057 218
3.3.49 TC-058 218
3.3.50 TC-059 218
3.3.51 TC-060 219
3.3.52 TC-061 219
3.3.53 TC-062 219
3.3.54 TC-063 219
3.3.55 TC-064 219
3.3.56 TC-065 219
3.3.57 TC-066 219
3.3.58 TC-067 219
3.3.59 TC-068 219
3.3.60 TC-069 219
3.3.61 TC-070 219
3.3.62 TC-071 219
3.3.63 TC-072 220
3.3.64 TC-073 220
3.3.65 TC-074 220
3.3.66 TC-075 220
3.3.67 TC-076 220
3.3.68 TC-077 220
3.3.69 TC-078 220
3.3.70 TC-079 220
3.3.71 TC-080 220
3.3.72 TC-081 220
3.3.73 TC-082 220
3.3.74 TC-083 220
3.3.75 TC-084 220
3.3.76 TC-085 221
3.3.77 TC-086 221
3.3.78 TC-087 221
3.3.79 TC-088 221
3.3.80 TC-089 221
3.3.81 TC-090 221
3.3.82 TC-091 221
3.3.83 TC-092 221
3.3.84 TC-093 221
3.3.85 TC-094 221
3.3.86 TC-095 222
3.3.87 TC-096 222
3.3.88 TC-097 222
3.3.89 TC-098 222
3.3.90 TC-099 222
3.3.91 TC-100 222
3.3.92 TC-101 222
3.3.93 TC-102 222
3.3.94 TC-103 222
3.3.95 TC-104 222
3.3.96 TC-105 222
3.3.97 TC-106 222

3.3.98 TC-107 223
3.3.99 TC-108 223
3.3.100 TC-109 223
3.3.101 TC-110 223
3.3.102 TC-111 223
3.3.103 TC-112 223
3.3.104 TC-113 223
3.3.105 TC-114 223
3.3.106 TC-115 223
3.3.107 TC-116 223
3.3.108 TC-117 223
3.3.109 TC-118 223
3.3.110 TC-119 224
3.3.111 TC-120 224
3.3.112 TC-121 224
3.3.113 TC-122 224
3.3.114 TC-123 224

SECTION 1

General Comments and Master Responses

S E C T I O N 1

General Comments and Master Responses

The extended comment period for the Soboba Band of Luiseño Indians Horseshoe Grande Fee-to-Trust Project Draft Environmental Impact Statement (DEIS) occurred between July 2, 2009 and September 15, 2009. During the comment period, the Bureau of Indian Affairs (BIA) received 257 total comment letters. Of this total, 8 letters were from organizations, 28 letters were from public agencies, and 221 letters were from the general public. Verbal comments were also submitted at a public hearing held on August 5, 2009.

Pursuant to the National Environmental Policy Act (NEPA), Section 1503.4(b), "the lead agency shall consider and respond to all substantive comments received on the EIS (or summaries thereof where the response has been exceptionally voluminous)." BIA responds to both written and verbal comments in this appendix to the Final EIS (FEIS). The responses to the comments are organized in the three sections described below. Also below is a summary of how the comments received were organized and provided with a response.

Comment Organization

Letters received via mail or fax and statements transcribed at the public hearing were organized by assigning a letter number to each letter. If a letter was from an agency or organization it was labeled with an "A" before its letter number. After assigning letter numbers, comments were read for theme or concern. Individual substantive comments were identified in both the letters and the public hearing transcript, and were assigned comment numbers. The comment numbers are shown in brackets on the letters and transcript in Section 2.

Section 1

Section 1 provides a master response for each comment group. The master response addresses the general theme of the comment group. Some comments were not able to be allocated to a comment group. These comments are addressed in Section 3 with individual responses.

Section 2

Section 2 is a Comment Log, which lists the names of individuals, agencies, and organizations that submitted written and verbal comments. Copies of all public comment letters received during the public comment period are also included in Section 2, as well as the transcript of the public hearing held on August 5, 2009.

Section 3

Section 3 contains individual responses to each comment. As stated, individual substantive comments within the comment letters and the public hearing transcript have been bracketed and

numbered. Individual responses are provided for each bracketed comment number. Where appropriate, comment responses refer to other individual responses or to master responses.

The EIS has been modified where appropriate in response to comments, and the nature and the location of the EIS modification identified in the response.

1.1 NEPA PROCEDURAL ISSUES

1.1.1 General EIS Issues

Summary of Comments: The DEIS contained deficiencies, discrepancies, omissions, suspect methodology, false and misleading statements, confusing and possibly purposely deceitful language, and incomplete sections. The DEIS does not present a thorough analysis with unbiased information, contains inaccurate information, and fails to represent the true nature of the environmental effects of the project.

Response: This public comment report contains responses to comments that refer to a specific concern. One of the primary purposes of the NEPA process is to improve the quality of the EIS using the response-to-comment process. General comments regarding the quality of analysis within the DEIS are noted and addressed by responding to specific topical comments.

1.1.2 Extension of the Comment Period

Summary of Comments: The BIA received numerous requests for an extension of the original comment period. Given the length and complexity of the DEIS and alleged deficiencies within the DEIS, the comment period should be extended to allow for adequate review of the DEIS and the submission of comments.

Response: Pursuant to Section 1506.10 of the Council of Environmental Quality's Regulations for Implementing NEPA, the lead agency (in this case, BIA) shall provide a minimum of 45 days for comment on draft environmental effect statements. The Notice of Availability for the DEIS provided a 75-day public comment period, thereby granting a 30-day extension to the typical 45-day public comment period. The comment period started July 2, 2009 and ended September 15, 2009. Pursuant to Section 1506.10(d), failure to file timely comments shall not be a sufficient reason for extending prescribed periods.

1.1.3 Scoping

Summary of Comments a: Copies of the public letters received by the BIA during the public scoping period should not have been sent to the Tribe.

Response a: The term "scoping" refers to the formal public comment and involvement period, which determines the range of issues and alternatives to be assessed during the environmental review process (CEQ Regulations for implementing NEPA, §1501.7). The Notice of Intent (NOI) published in the Federal Register on December 14, 2007, in soliciting public comment on the proposed project, stated the following: "Before including your address, phone number, e-mail address or other personal identifying information, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so." Comments submitted during the scoping period – as well as those comments on the DEIS submitted during the public comment period – are a matter of public record. When requested by the commenter, personal identifying information in a comment was redacted prior to inclusion of the comment in the Scoping Report.

Summary of Comments b: The verbal comments submitted at the January 8, 2008 Public Scoping Meeting were not recorded.

Response b: The Public Scoping Meeting minutes were included as Appendix F of the Scoping Report.

1.1.4 Cooperating Agency

Summary of Comments: The BIA has not consulted sufficiently with local and state agencies. In particular, the BIA has failed to adequately address the City of San Jacinto's (City) input as a Cooperating Agency.

Response: As part of the scoping process, the BIA may request that another agency having jurisdiction by law, or having special expertise with respect to anticipated environmental issues, be a "Cooperating Agency". Cooperating agencies participate in the scoping process and, on BIA's request, may develop information to be included in the EIS.

On December 12, 2007, BIA sent out Cooperating Agency letters to the following agencies: Riverside County, U.S. Environmental Protection Agency (EPA), the National Indian Gaming Commission (NIGC), City of San Jacinto (City), USFWS, and the California Department of Transportation (Caltrans). The City and EPA agreed to participate as Cooperating Agencies. Cooperating Agencies were issued a copy of the Administrative EIS, and both the City and EPA subsequently submitted comments to the BIA. These comments were reviewed and taken into consideration in the DEIS. In addition, throughout the 75-day public comment period, occurring July 2, 2009 through September 15, 2009, Cooperating Agencies were afforded another opportunity to comment on the DEIS.

In its verbal comments submitted at the August 5, 2009 public hearing, the City requested a meeting with the BIA. In response, the BIA, its consultants, and the Tribe met with the City on December 2, 2009, to afford the City the opportunity to clarify its previously submitted comments. In addition, the meeting set a framework for future technical meetings. Technical meetings to discuss socioeconomic and fiscal effects, public safety, and traffic issues were held on the following dates:

- Socioeconomic and Fiscal Effects: January 21, 2010
- Public Safety Effects: January 28, 2010
- Traffic Effects: March 3, 2010

The EIS considers the input provided by the City during these meetings.

1.2 NON-NEPA ISSUES

1.2.1 Expressions of Opinion

Summary of Comments: Some comments received were expressions of opinion either for or against the Proposed Action and Alternatives. Two sets of signatures were received petitioning against the project. A collection of 381 signatures were presented in one petition and 19 signatures in the additional petition. Some commenters asked that the project be put to a vote.

Other comments were made on the perceived relationship between the federal government and the Tribe, the Tribe and the City, and the Tribe and neighboring communities. Some comments alleged that the Tribe was trying to capitalize on abuses committed against the Tribe in the past and stated that BIA must not make environmental decisions based on sensitive issues of the past. Other commenters described their perception of Tribal culture. Some comments described a perceived indifference of the Tribe to

residents' expressed concerns over the environmental effects of current and proposed Tribal operations. Other commenters stated that the Tribe might construct an entirely different project upon approval of the fee-to-trust action.

Some comments expressed support for Tribal economic development and the pursuit of self-sufficiency, condemned alleged racial overtones of some of the public comments submitted, and highlighted the Tribe's positive contributions to the community. One comment stated that the residential communities were developed next to the Reservation without considering the effects to the Tribe.

Response: Expressions of opinion are noted and made part of the administrative record. There are two minimum requirements to warrant a response in the FEIS: 1) the comments must raise a substantive environmental issue, and 2) they must also be related to either the decisions to be made by the Federal agencies based on the FEIS, or to the expected result of these decisions, i.e. the project. Where these expressions of opinion result in specific environmental concerns, other topical categories address these concerns. Responses are not required for comments expressing a general opinion, for or against, the project or project proponent if those comments do not also raise a substantive environmental issue.

1.2.2 Matters beyond the Scope of the EIS

1.2.2.1 Governor Schwarzenegger's Proclamation on Tribal Gaming

Summary of Comments: The Governor's May 2005 Proclamation on Indian Gaming (Proclamation) has implications for the proposed project. The Proclamation states the Governor's opposition to "proposals for the federal acquisition of lands within an urbanized area where lands sought to be acquired in trust are to be used to conduct or facilitate gaming." The proposed project is located in an urbanized area and should be subject to the Proclamation.

Response: The Governor's Proclamation contains a list of the "urbanized areas" to which the Proclamation applies. Neither the City of San Jacinto nor the City of Hemet appear on the list.

1.2.2.2 Indian Gaming Regulatory Act (P.L. 100-497)

Summary of Comments: The Tribal-State Compact stipulates that land used for gaming or ancillary developments to enhance gaming must meet the standards of IGRA. However, the proposed project is off-Reservation and would therefore violate IGRA.

Response: IGRA generally prohibits gaming on lands acquired for Indians in trust by the Secretary of the Interior after the date of enactment, October 17, 1988. There is an exception for lands that were contiguous to Reservation boundaries on that date. *See* 25 U.S.C. §2719(a)(1). A determination whether this land meets the requirements of IGRA will be made at a later date.

1.2.2.3 Other Legal Issues

Summary of Comments: In the recent U.S. Supreme Court ruling of *Carcieri v. Salazar*, the Secretary of the Interior could not approve a fee-to-trust request made by the Narragansett Tribe because the Tribe was not a federally recognized Tribe before the ratification of the Indian Reorganization Act in 1934. Because there exist outstanding questions regarding the decision, all fee-to-trust acquisitions in California should be postponed until these questions are answered.

Response: The ruling of the U.S. Supreme Court in *Carcieri v. Salazar*, 555 U.S 379 (2009), is applicable only to the Secretary's authority to acquire land in trust for tribes. The holding in the case is not applicable to environmental review under NEPA. Whether the Secretary has authority

to acquire land in trust for Soboba will be made in the final trust acquisition decision, and need not be addressed in the EIS.

1.2.2.4 CEQA Compliance

Summary of Comments: The EIS "must mirror" the California Environmental Quality Act (CEQA) when determining the effects of the project on air quality. Furthermore, the DEIS should have discussed the applicability of California law, including CEQA and Native American burials and remains statutes, to the proposed project.

Response: CEQA applies to projects that require discretionary approval by a state or local government agency in California. The proposed project is a federal project, with the Bureau of Indian Affairs as the lead agency, and does not require approval by state or local agencies. Therefore, CEQA's requirements do not apply to the proposed project. See also Sections 2.8 (Air Quality) and 2.10 (Cultural Resources) of this public comment report for a discussion of the applicability of state and local laws to the proposed project.

1.3 PURPOSE AND NEED

Summary of Comments a: The project could be built on existing Reservation land; therefore, there is no need for additional land. The project could be built on land adjacent to the existing casino or on the Oaks Retreat property. Alternatively, the Tribe could elect to build only the hotel next to the existing golf course; hotel patrons and golfers can travel the one mile distance between the golf course and the existing casino location.

Response a: As described in Section 1.3 of the FEIS, the location of the Project Site would allow the Tribe to fully capitalize on the proposed hotel/casino complex's proximity to the Golf Course and Country Club in order to offer a destination resort, which is a primary reason for proposing the project at this location. In real terms, it is not feasible to relocate the Golf Course and Country Club to the existing gaming parcel. There is not enough developable land to create an 18-hole golf course near the existing casino, nor is it economically feasible to construct an additional golf course near the existing casino with the existing golf course remaining in operation. The purpose of the proposed hotel/casino complex is to diversify the economic enterprises of the Tribe and to allow for these enterprises to compliment by creating a business cluster, or economic synergy. An integrated complex offers customers many possible activities in one location. Thus, the proposed development would act as a destination center for tourists and businesses, while also catering to local interests. The intent of the Tribe is to differentiate its hotel, casino, golf course, and related facilities from those of nearby competing tribes.

Section 1.3 of the FEIS has been amended to clarify the purpose and need of the project, as follows:

> The **restoration of the Project Site to tribal ownership coupled with the transfer of the Project Site into trust will restore tribal control and administration over part of the Tribe's aboriginal territory that is immediately adjacent to the existing Reservation. In addition, the proposed acquisition would** facilitate the Tribe's need for cultural and social preservation, expression and identity, political self-determination, self-sufficiency, and economic growth by providing an **enhanced** Tribal land base and homeland that:
>
> - is subject to Tribal **management, protection and conservation of the land base, and natural and cultural resources through the Tribe's exercise of governmental powers**;
>
> - allows for a diversified and productive economic base **subject to the Tribe's self determined management and conservation priorities that will** support the Tribe's

financial integrity and well-being of its members **by enhancing the total acreage of the land base and increasing the conservation of natural and cultural resources under tribal jurisdiction and sovereignty**;

- assures the preservation of a homeland **that is restricted against future alienation and immune from state and local taxation and regulation**;

- allows the Tribe to avail itself **of the benefits of** Federal laws that apply to lands held in trust status and **the** consolidation of Tribal lands.

The statutory authority for acquiring lands in trust status for Indian tribes is provided in the Indian Reorganization Act of 1934 (IRA), with regulations under 25 U.S.C. §465 and codified as 25 C.F.R. Part 151. The Land Acquisition Policy presented in 25 C.F.R. Section 151.3 states that, "land may be acquired for a tribe in trust status when that land is within the tribe's reservation boundaries; or is already owned by the tribe; or the Secretary of the Interior determines that land acquisition is necessary to facilitate tribal self-determination, economic development or Indian housing." **Accordingly, the Tribe considers each of the goals stated above to be essential to the preservation of the Tribe's cultural, social, economic and sovereign well being and achieving these goals provides the basis for taking the land into trust pursuant to 25 U.S.C. § 465 and the implementing regulations under 25 C.F.R. Part 151.**

The need for this acquisition in trust of the Project Site is best understood in the unique context of California Indian history. This history shares many of the same generalities of Indian history in other states. However, the history in California differs remarkably in a few significant respects. First, as to population, even the most conservative estimates underscore the extreme pressure applied to California's Indian population since European contact. In the American period, beginning in 1851, the California Indian population was just over 100,000. By 1890, this population had been reduced to 15,293. That is an 85 percent decline in population in only 39 years.

Second, as to land, in 1848 following the signing of the Treaty of Guadalupe Hidalgo the United States acceded to Mexico's claims of dominion over the California Territory. This territory included over 70,000,000 acres of land to which the California Indians held aboriginal title. A combination of historic events including 18 unratified treaties with the United States and the Act of March 3, 1851, 9 Stat. 631, entitled "An Act to Ascertain and Settle the Land Claims in the State of California," this acreage was vastly reduced to only a miniscule amount. In 1937, the Bureau of Indian Affairs was administering only 368,000 acres on behalf of California Indians.

This history placed in the context of the Soboba Band of Luiseño Indians also demonstrates a stark decline in population as a result of external pressures. In 1891, the Mission Indian Commission reported that there were approximately 200 Soboba Indians living on the reservation. By 1950, there were only 116 Soboba Indians living on the Reservation (Soboba Band of Luiseno Indians v. United States, 37 Ind. Cl. Comm. 326, 425 (1976)).

The need for this trust acquisition is also apparent in the present day statistics of California Indian tribal land held in trust by the U.S. in comparison to the lower 48 states as a whole. Of the approximately 55 million acres of land held in trust by the U.S. for the benefit of Indian tribes and individual Indians, the DOI and BIA currently administer only 451,586 acres of land held in trust by the U.S. for the benefit of 102 Federally-recognized Indian tribes and individual Indians in California as reservation lands, rancherias, and public domain allotments.

Summary of Comments b: The Tribe claims that it wants to preserve ancestral lands, but proposes to develop those lands under the Proposed Action.

Response b: The majority of the Project Site is not proposed for development under the Proposed Action and Alternatives. Of the 534.91± acres of the Project Site, the Proposed Action would develop no more than 55± acres, or 10 percent of the Project Site. Alternative 3 would yield the largest development footprint by developing approximately 67± acres, or approximately 13 percent of the entire Project Site. As described in Section 4.5 of the FEIS, the Proposed Action and Alternatives would not have an effect on any known significant archaeological or historical resources. One historical resource is eligible for the National Register of Historic Places (NRHP) due to its significant association with the local manufacturing. However, this facility is not located within the Development Site outlined in the Proposed Action and Alternatives and would, therefore, not be adversely affected.

Summary of Comments c: A Las Vegas-style high-rise hotel/casino is not the appropriate answer to the Tribe's need for economic development. In addition, the Tribe already has sufficient income from its existing economic ventures to meet the needs of its membership.

Response c: The comment is noted and made part of the administrative record. As described in Section 2.1.1 of the FEIS, the tallest proposed structure (the hotel) would not exceed a height of five stories, or 70 feet above grade, and would not tower over the existing landscape. As presented in the public scoping meeting handout, the top three floors of the proposed hotel would be approximately 38 feet above Soboba Road. According to Section 403 of the 2007 California Building Code, a high-rise building is defined as a building of any type of construction or occupancy having floors (as measured from the top of the floor surface) used for human occupancy located more than 75 feet (22,860 mm) above the lowest floor level having building access. Under this definition, the proposed hotel would not qualify as a high-rise building.

Furthermore, under the principle of Tribal sovereignty and self-determination recognized by the U.S. Supreme Court since 1832 and reaffirmed repeatedly by the U.S. Congress, the Tribe is entitled to exercise its sovereignty over reservation lands and choose how best to manage its territory. *See, e.g.*, *Worcester v. Georgia*, 31 U.S. 515, 559 (1832) (Indian tribes "exercise inherent sovereign authority over their members and territories"); Indian Self-Determination Act of 1975 (Public Law 93-638).

Summary of Comments d: There is no evidence that the Project Site is part of the Tribe's ancestral territory; therefore, the Tribe's need to reacquire aboriginal territory as stated in Section 1.3 of the DEIS is not applicable to the proposed fee-to-trust action.

Response d: See Section 3.5.1 of the FEIS and **Section 1.10.1** of this public comment report for a technical discussion of the Tribe's ancestral territory.

Summary of Comments e: The Tribe contends that it needs the Development Site for the Proposed Action because the existing gaming parcel is in a flood zone. However, according to the FEMA Flood Insurance Rate Map, both sites are within the same Flood Zone X.

Response e: The development restrictions posed by the existing flood easement represent one element that contributes to the overall encumbrance to the current gaming parcel. As observed on Figure 3-4 of the FEIS, Flood Zone X does extend to both the existing gaming parcel and the Project Site. However, the Project Site is not encumbered by the additional restrictions precluding expansion of the current gaming parcel, which include the surrounding land uses, flood easements surrounding the parcel, and land assignments to Tribal members under Tribal law (see Section 2.3.2 of the FEIS). See Section 2.7 of this report for additional information regarding Water Resources and the effects resulting from the presence of Flood Zone X.

Summary of Comments f: Under Alternatives 2 and 3, the casino would not be relocated. Why, then, would the Project Site need to be placed in trust?

Response f: 25 CFR 151 states that the Secretary of the Interior can accept property into federal trust status on behalf on a Tribe. As stated in Section 1.4 of the FEIS, if the BIA determines that a fee-to-trust proposal meets statutory requirements and the benefits of the Proposed Action outweigh the potential negative effects, it will consider approval of the Tribe's application and take the proposed lands into trust for a Tribe. There are additional criteria a fee-to-trust application must meet, such as a Tribe must own the subject property and demonstrate a purpose and need to exercise its sovereign powers over the subject property. In addition to the execution of sovereignty, there are other benefits which a Tribe realizes with trust lands. Some of these benefits include tax exemptions, removal of land use restrictions, and compliance requirements with only federal regulation. See Section 1.4 of the FEIS for additional discussion of 25 CFR Part 151.

1.4 ALTERNATIVES

Summary of Comments a: The DEIS does not assess a reasonable range of alternatives.

Response a: As stated in Section 2.3, "The National Environmental Policy Act requires agencies to rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, to briefly discuss the reasons for their having been eliminated (40 CFR 1502.14). As required by NEPA, the range of alternatives considered in detail includes only those alternatives that would fulfill the purpose and need for the Proposed Action described in Section 1.3**"** of the FEIS.

As discussed in Section 2 of the FEIS, there were six total alternatives considered in the DEIS. Each alternative included the fee-to-trust action, expect for Alternative 4 (No Action Alternative). The alternatives are summarized as follows:

1. Proposed Action A - Hotel/Casino Complex, with realignment of Lake Park Drive
2. Proposed Action B – Hotel/Casino Complex, without realignment of Lake Park Drive
3. Alternative 1 – A reduced version of Proposed Action A
4. Alternative 2 – Hotel and Conference Center Facilities
5. Alternative 3 – Commercial Alternative
6. Alternative 4 - No Action Alternative

The BIA NEPA Handbook (59 IAM 3, §1502.14) states that the "Differences in the proposed action, such as size or location, are appropriate alternatives to consider, but by themselves are not sufficient to meet CEQ regulations. Viable alternatives are other possible means to meet the purpose and need, such as a sports complex instead of a casino to meet the need for tribal income." With the same composition and magnitude of facilities, Proposed Action A and Proposed Action B were too similar to be considered distinct alternatives. The greatest difference between Proposed Action A and Proposed Action B was the realignment of Lake Park Drive. Alternatives 1-3 were included in the DEIS to present a reasonable range of alternatives to accomplish the purpose and need. Alternative 4 is a mandatory alternative under NEPA.

Section 2.3 has been amended to clarify the alternatives considered but not analyzed, as follows: "Two alternatives were considered but not analyzed in detail for this FEIS. One of the alternatives is a portion of land in an incorporated area of Riverside County that will be deeded in fee to the Tribe when the Soboba Settlement Agreement becomes fully effective; the other alternative is adjacent to the site of the existing casino. The information below summarizes these two alternatives and briefly discusses the reasons for their elimination from further review."

Section 2.3 goes on to summarize the two additional alternatives considered for analysis and briefly discusses the reasons for their elimination from further review. As described therein, neither alternative would fulfill the purpose and need for the Proposed Action. Section 2.3.1 and Section 2.3.2 have been amended to provide additional detail and context regarding these two alternatives.

Summary of Comments b: There should be enough developable land on the existing 6,865 acre Reservation to accommodate the project.

Response b: Please see **Section 1.3** of this public comment report for a discussion of the Purpose and Need for the Proposed Action.

Summary of Comments c: Esplanade Avenue should be extended to the Reservation.

Response c: An alternative access point to the Reservation from Esplanade Avenue would require the building of a bridge across the San Jacinto River. While this alternative access would help alleviate traffic from Lake Park Drive, the access route would run parallel to Lake Park Drive and traffic would continue to utilize Ramona Expressway/Mountain Avenue which would not create a significant reduction of traffic except for Lake Park Drive between Ramona Expressway and Soboba Road and Ramona Expressway/Mountain Avenue between Lake Park Drive/Main Street and Esplanade Avenue. It would also create additional traffic effects along Soboba Road from Lake Park Drive to Esplanade Avenue where the alternative access would then be created to cross the San Jacinto River and intersect with Ramona Expressway/Mountain Avenue at Esplanade Avenue.

Summary of Comments d: The Proposed Action and Alternatives should be built on the existing gaming parcel, or land should be acquired adjacent to the parcel for that purpose.

Response d: Please see **Section 1.3** of this public comment report for a discussion of the Purpose and Need for the Proposed Action.

Summary of Comments e: The Proposed Action and Alternatives should be built away from residential areas. Instead, an alternative compatible with the City of San Jacinto General Plan should have been considered.

Response e: One of the purposes of the Proposed Action is to diversify the economic enterprises of the Tribe and to allow for these enterprises to compliment by creating a business cluster, or economic synergy. The Tribe has determined that this commercial development of the Project Site is necessary to fulfill the stated needs of the Tribe. Please see **Section 1.3** for discussion of the Purpose and Need for the Proposed Action. See also **Section 1.12.2** of this public comment report for a response to comments regarding project consistency with the City of San Jacinto General Plan.

Summary of Comments f: There is a risk that the Tribe would construct an entirely different project upon approval of the fee-to-trust action.

Response f: Speculation about alternative developments falls outside the scope of the NEPA process. See **Section 1.2** of this public comment report for additional information on non-NEPA topics.

Summary of Comments g: Some details of the Proposed Action and Alternatives need to be clarified, including the location of the proposed wastewater treatment plant facility. The Scoping Report states that it would be on the existing Reservation; however, a DEIS map shows the facility is located on a portion of the Project Site.

***Response g*:** The majority of the wastewater treatment facilities (i.e. reactor, percolation ponds) would be located on the existing Reservation (see Figure 2-4 of the EIS). Pipes would need to be installed along Soboba Road to tie-in the proposed facilities. The proposed facilities would be tied into the on-Reservation wastewater treatment plant during the construction phase, when the Development Site is highly disturbed.

Summary of Comments h: Some details of the Proposed Action and Alternatives need to be clarified, including the exact heights of buildings and structures above grade, using more detailed site plans.

Response h: The site plans included in the FEIS are considered conceptual, but accurate enough to perform effects analysis. The size and height of the proposed facilities, as presented in Section 2.0 of the FEIS, are figures used in this environmental analysis.

Summary of Comments i: The location of the second fire station under the Proposed Action and Alternatives needs to be clarified.

Response i: As described in the Draft Operations Plan for Soboba Fire Department (Appendix G of the FEIS) and Section 2.1.1 of the FEIS: The Tribal fire department headquarters would be developed on Soboba Road, towards the southeastern corner of the Project Site, during construction of the hotel/casino complex. The other Tribal fire station would be located near the intersection of Soboba Road and Castile Canyon Road on the existing Reservation.

Summary of Comments j: Is the wastewater treatment plant proposed under Alternative 3?

Response j: At the time of construction, the Tribe will either enter into a contract with Eastern Municipal Water District (EMWD) or construct an on-Reservation wastewater treatment plant (WWTP). This either-or scenario applies to all Alternatives, save for Alternative 4 (No Action Alternative). Additional detail regarding wastewater service options has been added to Section 2.1.1 of the FEIS, as follows:

> WASTEWATER TREATMENT AND DISPOSAL
>
> **At the time of construction, the Tribe will either enter into a contract with EMWD for wastewater service or construct an on-Reservation wastewater treatment plant. The Golf Course and Country Club will continue to utilize EMWD services regardless of which wastewater option is pursued. The on-Reservation WWTP is considered a separate but related project to the Proposed Action and Alternatives. However, for purposes of this environmental review, both options are examined. The following describes the operations of each option.**
>
> EMWD SERVICE OPTION
>
> **Under this option, wastewater service for the proposed developments will be provided by EMWD. The facilities included in Proposed Action A are expected to generate an average daily flow of 313,000 GPD. EMWD has provided a will-serve letter and confirmed that it has the capacity and capability to service the proposed developments (Appendix E). Wastewater generated by the proposed developments would be processed by EMWD's Hemet/San Jacinto Regional Water Reclamation Facility (RWRF). The Hemet/San Jacinto**

RWRF currently has a capacity of 11 million GPD, but this facility was awarded approximately $112.6 million to expand facility capacity to 14 million GPD by 2014 (Wesson 2010). Wastewater generated at the proposed facilities will undergo secondary and tertiary treatment and will be sold by EMWD as recycled water. This water will be to the standards of California Title 22 and available for multiple uses, such as irrigation, but not for direct human consumption.

The necessary infrastructure is in place on the Project Site to service the proposed developments. Figure 2-3 provides the location of EMWD pipes in the area of Project Site. As observed, existing EMWD infrastructure traverses the Development Site. The necessary facilities, piping, and connections would be installed during construction, when the Development Site is highly disturbed.

ON-RESERVATION WWTP

Under this option, the Tribe would construct an on-Reservation tertiary sequencing batch reactor (SBR) WWTP capable of handling 1.2 million gallons per day (GPD). This facility would service the entire Reservation, as well as the facilities under the Proposed Action and Alternatives. Total projected wastewater generation for the year 2030 for Proposed Action A and the Reservation was calculated to be 545,323 GPD. The proposed WWTP would meet California Title 22 requirements for reuse of treated effluent. System reuse of the effluent could include agricultural irrigation, landscape irrigation, filling of decorative water features, surface cleaning (i.e. parking lots), toilet flushing, and fire control. Wastewater would be delivered to the WWTP by a force main from a central plant located on the Project Site and on-Reservation (see **Figure 2-4**).

Summary of Comments k: Some details of the Proposed Action and Alternatives need to be clarified, including whether the hotel/casino proposed under Alternative 1 would be lower in height than under the Proposed Action.

Response k: Alternative 1 is a 20 percent reduction of Proposed Action A. The hotel is the tallest structure in both alternatives. Proposed Action A includes the development of a 300 room hotel, while Alternative 1 proposes a 240 room hotel. To perform a conservative effects analysis, Alternative 1 was assumed to be the same height (70 feet above grade) as the Proposed Action.

Summary of Comments l: Past actions of the Tribe, unrelated to the Horseshoe Grande Project, were breaches of the Tribal-State Compact (see Appendix I of the FEIS). Language within the Compact would permit the Tribe to operate two casinos at once, and the Tribe might decide to keep the existing casino in operation once the new casino is fully operational. The Tribal-State Compact should be re-negotiated prior to a fee-to-trust decision. In addition, the Tribal Environmental Ordinance (Ordinance No. GC00-8) is inadequate, which brings into question the Tribe's compliance with the Tribal-State Compact.

Response l: Neither the State of California nor the National Indian Gaming Commission has ever found the Tribe to be in breach of the Tribal-State Compact. The Compact permits the Tribe to operate a total of 2,000 gaming devices (Compact § 4.3.2.2) in no more than two gaming facilities (Compact § 4.2). Those limitations, as well as the other provisions of the Compact, remain acceptable to the Tribe, making renegotiation of the Compact unnecessary. The Compact requires the Tribe in adopting an environmental protection ordinance to make a good faith effort to incorporate the policies and purposes of the National Environmental Policy Act and the California Environmental Quality Act (Compact § 10.8.1), an obligation which may be enforced against the Tribe by the State. The Tribe adopted such an ordinance in 2000 (Ordinance No. GC00-8), and the State has never questioned its sufficiency under the Compact.

1.5 GENERAL ENVIRONMENTAL CONCERNS

Summary of Comments: The project would have significant detrimental effects to the environment and nearby residential communities. Some comments list potential effects categories (e.g., traffic, noise, air quality) and do not describe the specific effects to environmental resources.

Response: General comments stating that the project would be beneficial or detrimental to the environment are noted and made part of the administrative record. Commenters listing various categories of environmental effects can refer to the specific resource categories that follow in this public comment report for a summary of more specific comments and responses concerning each environmental resource.

1.6 LAND RESOURCES

Summary of Comments a: The proposed construction is in an active fault area where facilities would be subject to fault rupture, landslide/debris flow or settlement. A high-rise building would be especially vulnerable to seismic activity. As summarized, the DEIS fails to address the fact that the Project Site is located within a designated California Alquist-Priolo Earthquake Fault Zone and as such must be evaluated in accordance with the Alquist-Priolo Earthquake Fault Zoning Act. A study must be performed and endorsed by a California licensed geologist and include hazard analysis and mitigation. What mitigation measures are proposed to provide reasonable safety in the event of a major earthquake?

Response a: As described in Section 2.1.1 of the FEIS, the tallest proposed structure (the hotel) would not exceed a height of five stories, or 70 feet above grade, and would not tower over the existing landscape. As presented in the public scoping meeting handout, the top three floors of the proposed hotel would be approximately 38 feet above Soboba Road. According to Section 403 of the 2007 California Building Code, a high-rise building is defined as a building of any type of construction or occupancy having floors (as measured from the top of the floor surface) used for human occupancy located more than 75 feet (22,860 mm) above the lowest floor level having building access. Under this definition, the proposed hotel would not qualify as a high-rise building.

Nevertheless, a building of any height could be affected in the event of seismic activity. A fault investigation and geotechnical study (Appendix L of the FEIS) was conducted by Mr. Greg Chandra of LandMark Geotechnical Engineers and Geologists, who is a registered and licensed engineer with the State of California. The exploration consisted of on-site trench excavations and from available Riverside County GIS data. A map was prepared showing the identified faults and the setback distances in accordance with the Alquist-Priolo Earthquake Fault Zoning Act. With the exception of the parking garage proposed in the northern portion of the property, all structures are located outside of these setback distances in accordance with the Alquist-Priolo Earthquake Fault Zoning Act for human occupancy structures. However, the parking garage is not designed for human occupancy, so the current placement of the parking garage within the designated setback is still in accordance with the Alquist-Priolo Earthquake Fault Zoning Act.

Summary of Comments b: Is the *Preliminary Fault Hazard Evaluation Report* completed by LandMark for the proposed construction adequate? The project should be investigated and analyzed for all possible geologic hazards including slope stability, rock fall hazards, landslide hazards, surface fault rupture, fissures, liquefaction potential, collapsible and/or expansive soils, subsidence, wind and water erosion, debris flows, and ground-shaking potential. Mitigation measures would need to be described where hazards are identified. The geotechnical report and all other geotechnical materials should be appended to the FEIS for public review.

Response b: A comprehensive geotechnical report was prepared by a California licensed engineer (LandMark). The report addresses potential Project Site hazards such as ground-shaking, surface rupture,

liquefaction, landslides, volcanic hazards, tsunamis, sieches, flooding, and expansive soil. The report presents recommendations where hazards are identified; these recommendations have been incorporated as mitigation measures within the FEIS in Section 5.1. The LandMark report is appended to the FEIS as Appendix L. Additional detail that summarizes the LandMark report has been added to Section 3.1.1 to better characterize the geologic setting of the Project Site, as follows:

> **The San Jacinto Valley is incorporated within the Perris Plain of southern California. The Perris Plain is a major topographic feature between the San Jacinto (northeast) and Elsinore (southwest) fault zones. The plain is an undulating surface eroded on primarily plutonic igneous rocks and lies 7,000 feet below the summits of the San Jacinto Mountains. The San Jacinto Mountains are located to the northeast and are part of the Peninsular Ranges. The Peninsular Ranges are a northwest-southeast orientated complex of blocks separated by similarly trending faults. They extend 125 miles (200 km) from the Transverse Ranges and the Los Angeles Basin south to the Mexican border and beyond another 775 miles (1,250 km) to the tip of Baja California, Mexico. Faults dominate the structure of the Peninsular Ranges. Major faults are the San Jacinto Fault and related branches within the San Jacinto Fault Zone. The Peninsular Ranges contain extensive pre-Cretaceous igneous rocks associated with the Nevadan plutonism. Recent evidence of tectonic activity includes epicenter swarms, earthquakes (San Jacinto 1918 and Borrego Valley 1968), and alignment of hot springs (Appendix L). The surrounding geology includes the foothills of the San Jacinto Mountains to the north, east, and south and the San Jacinto Fault Zone and river floodplain are to the west.**

Section 4.1.1 has also been amended to reflect the results of the geotechnical investigation, as follows:

1.6.1.1 Geology

In 2007, Landmark Geo-Engineers and Geologists explored the subsurface of the Development Site using two electric cone penetrometer soundings to approximate depths of 50 feet below existing ground surface. The location of these soundings can be found on Plate 2 of **Appendix L**. The findings from the preliminary geotechnical study are summarized throughout this section and can be found in detail in **Appendix L**.

In 2010, additional tasks were performed related to the geotechnical conditions at the Project Site. Tasks included the following:

- Field exploration and in-situ testing of Development Site soils;
- Laboratory testing for physical and/or chemical properties of Project Site soils; and
- Engineering analysis, evaluation, and recommendations.

The data and information gained from these investigations will be used to develop design criteria prior to the construction phase of Proposed Action A.

As stated in **Section 3.1.2**, alluvium (Q_{al}) is present underlying the Development Site. Alluvium consists of unconsolidated stream, river channel, and alluvium fan deposits. More specifically, the Development Site is underlain by interbedded sands, silts, and clays with near surface silty sands, sandy silts, and clayey silts. The near surface soils are expected to have a low shrink-swell expansion rate. The subsurface soils are medium dense to very dense in nature. Analysis performed by LandMark concluded that the soils of Development Site are classified Site Class D

or a stiff soil profile under Chapter 16 of the 2007 California Building Code (2006 International Building Code) and generally suitable for construction of the proposed developments.

Groundwater was neither encountered in the borings during the time of exploration (March – April, 2007) nor in the ten borings advanced in January 2010. Historic groundwater records in the vicinity of the Project Site indicate that groundwater has fluctuated between 128 and 193 feet below the ground surface within the last 14 years according to the Western Municipal Water District and the San Bernardino Valley Municipal District cooperative well measure program records. Therefore, liquefaction is unlikely to be a potential hazard at the site since the groundwater is deeper than fifty feet, the maximum depth that liquefaction is known to occur.

The geotechnical investigation evaluated the potential for other hazards including landslides, volcanic hazards, tsunamis, sieches, and flooding. Landslides are shown on the A-P earthquake fault zone map (Plate A-5) in the vicinity of the Project Site and there is the possibility of rockfalls from loose rocks on the San Jacinto Mountains (located across Soboba Road to the east of the Project Site) during strong seismic events or heavy rains. No ancient landslides, within the immediate vicinity of the Project Site, are shown on the California Geologic Map, Santa Ana Sheet (see Regional Geologic Map Plate A-3) and no indications of landslides were observed during the site investigation. Therefore, the hazard of landsliding occurring at the Project Site is considered to be low to moderate.

The Project Site is not located in proximity to any known volcanically active area and the risk of volcanic hazards is considered low.

The Project Site does not lie near any large bodies of water, so the threat of tsunami, sieches, or other seismically-induced flooding is unlikely. The Project Site is located within a FEMA 500-year flood zone a (0.2 percent annual chance flood) and is located to the north and east of a FEMA 100-year flood zone (1 percent annual chance flood) located within and in the vicinity of the San Jacinto River Channel (**Appendix L**).

Mitigation measures are incorporated in **Section 5.9.2** for Development Site preparation (clearing and grubbing, major and minor building pad preparation, fill slope bench/key preparation, trench backfill, moisture control and drainage, observation and density testing, auxiliary structures foundation preparation), foundations and settlements, deep foundations, slabs-on-grade, concrete mixes and corrosivity, excavations, lateral earth pressures, seismic design, and pavements).

Summary of Comments c: Mitigation measures regarding the safety of patrons in the parking garage and evacuation plans for the hotel need to be described.

Response c: All structures will be constructed under the California Building Code (CBC) seismic parameters based on the Maximum Considered Earthquake (MCE). These parameters are summarized in the geotechnical Report (LandMark). Evacuation plans will be developed following final design and construction of all structures including the parking garage.

Summary of Comments d: Soboba Road frequently washes out during rains. Soils present on the property have eroded into 'mud rivers' in the past.

Response d: Appropriate engineered storm drain infrastructure would be designed and incorporated into all road widening and improvement projects as part of the proposed construction. As described in Section 2.0 of the FEIS (Site Drainage subsection), across the Project Site, the installation of storm drain facilities, including improved channels/culverts, detention basins, and the improvement of Soboba Road

would provide a system to control storm water flows, thereby reducing the potential for surface water flooding and provide a means to safely convey such flows through the Project Site for appropriate discharge. Inlets would be placed at appropriate intervals to capture runoff, and convey it to the grassy swales surrounding the Project Site. The grassy swales would accommodate overland drainage to allow the Development Site to drain under overflow conditions. This system would provide adequate storage for a 10-year storm event.

Summary of Comments e: The project fails to analyze the potential for significant paleontological resources and fails to propose appropriate mitigation measures.

Response e: Preliminary soil borings advanced to 50 feet below the ground surface (bgs) did not encounter bedrock. Potential paleontological resources would only be expected at depths where bedrock is encountered. Soil grading and earthwork operations are not planned at depths where bedrock is present; therefore, potential paleontological resources will not be disturbed.

Summary of Comments f: The multitude of issues regarding soil, groundwater, EPA standards, and seismic issues should all be specifically detailed in the FEIS with judicially enforceable mitigation measures already in place and described in the FEIS.

Response f: Comment acknowledged. A comprehensive geotechnical study (see Section 3.1 and Appendix L of the EIS) was performed by LandMark regarding potential seismic hazards present at the Project Site. The work included advancement of soil borings and evaluation of geotechnical conditions and seismic hazards. The report includes recommendations regarding the seismic hazards and soil conditions present at the Project Site, which have been incorporated as mitigation measures within the FEIS in Section 5.1. **Section 1.18** of this public comment report discusses the enforceability of mitigation measures.

1.7 WATER RESOURCES

1.7.1 Impacts to Flooding and Runoff

1.7.1.1 Floodplain Status

Summary of Comments: As delineated on Panel No. 06065C 1490G and 1495G effective August 28, 2008 of the Flood Insurance Rate Maps (FIRM), the Project Site is located within the Zone X-shaded floodplain limits. However, Figure 3-4 of the DEIS depicts the Project Site within Zone X. Furthermore, the DEIS did not discuss the Hemet Dam inundation area or whether the levees in the Project Area would survive inundation in the event of a dam failure.[1]

Response: Figure 3-4 of the DEIS referenced the then current FIRM (Community-Panel Number 065056 0005 D, revised May 17, 1990) and the Project boundaries. This figure has been updated using the new FIRM that was revised in August 2008 (Community-Panel Number 06065C- 1490G and -1495G). The Project Site is partially within the shaded X zone. This delineation reflects an area that is protected from the 1 percent chance flood event (100-year flood event) by levees. The FIRM also states that this levee is a "Provisionally Accepted Levee". A Provisionally Accepted Levee is a levee that has not been certified by the Federal Emergency Management Agency as being able to withstand flood forces. Under this condition, the area behind the levee is mapped as if the levee did not exist. Once the levee is accepted by

[1] The inundation area represents the potential flooded area that would result from a dam failure of Hemet Dam.

FEMA, the area behind the levee will be considered to be protected against the 100-year flood. The status of the levee certification is pending.

The text in Section 3.2.1 of the FEIS has been amended to reflect that the Project is partially in a shaded X zone and not an X zone.

> The improvements contemplated as part of the Proposed Action are located within **a shaded** Zone X on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), **Community-Panel Number 06065C- 1490G and -1495G~~Community-Panel Number 065056 0005 D~~,** revised **August~~May 1~~28,~~7,~~ 2008~~1990~~** (**Figure 3-4**). The relevant part of the **shaded** Zone X definition is "areas protected by levees from 100-year flood". The northwest portion of the Project Site, located within the active channel of the San Jacinto River and not planned for development, is identified as Zone A on the same Community-Panel Map. Zone A is defined as "Areas of 100-year flood; base flood elevations and flood hazard factors not determined." This northwest area is also within the Lake Hemet Dam inundation zone (City of Hemet General Plan, 1992).

During a dam failure the levees will withstand flows up to the 100-year flow as indicated on the FIRM. The northwest portion of the property would still be subject to inundation, as explained in Section 3.2.1 of the FEIS.

Furthermore, Figure 3-5 and detail has been added to Section 3.2.1 to clarify the location and purpose of the flowage and flood easements present of the Project Site, as follows:

> **A flood easement, adopted in 1964, is present on a portion of the Project Site and held by RCFCWCD. The easement was prepared prior to development in the area and before the building of the levee. Figure 3-5 shows the easement as it applies to the Project Site. The conditions of the Project Site have changed since the easement was granted, including the development of the levee along the river to protect the area from a 100-year flood.**

1.7.1.2 Drainage

Summary of Comments: The locations of the Proposed Drainage Facilities would be in conflict with the layout of the proposed building structures. Drainage patterns and runoff from the proposed Development Site need to be clarified. In addition, erosion is a concern due to the location of detention basins outlets, which could potentially effect the existing levee along the eastern bank of the San Jacinto River.

Response: Figures 2-5, 2-8, 2-10, 2-12, and 2-14 of the FEIS has been revised to clearly show the locations of the proposed drainage facilities. The text descriptions of the drainage facilities within each relevant section of the FEIS have also been changed. These facilities have been slightly adjusted for each Alternative to minimize the potential effect to sensitive species and habitat. It should be noted that the drainage plan is schematic and a more detailed design process will be required. The results of the preliminary drainage study (Appendix K to the FEIS) are appropriate for this level of study/design.

The final design of detention basins will acknowledge the levee and incorporate avoidance of effects into the design. This includes a soil buffer between the levee and basin to avoid seepage from the basin into the levee, and bank stabilization measures in the basin nearest to the levee. The outlet of drainage pipes will be designed with outlet protection to avoid conditions that would result in scour or deposition. The outlets will be located such that they are away from facilities and would not effect existing structures such as levees or buildings.

For clarification, Section 4.2.1 has been amended to account for the drainage facilities, as follows:

4.2.1 Drainage

The developments proposed under Proposed Action A would change up to 55 acres of existing natural vegetation in the watershed and replace it with a designed landscape and impervious surfaces including building structures, parking lots, and roadways. The changes in runoff resulting from the increase in impervious surface include increased stream volumes and velocities, increased peak discharges with a shortened time to peak flows, and lessened groundwater contributions during non-precipitation periods. Without mitigation these effects may effect downstream properties and subject new structures to potential flooding.

The Project Site is currently affected by runoff from a number of unnamed drainage courses northeast of Soboba Road, as described in **Section 3.2.1.** These drainage areas are tributary to the Project Site, and currently affect the use of the Golf Course and the movement of vehicles through the area. A preliminary drainage study (Preliminary Drainage Study) has been completed by Engineering Resources of Southern California, Inc. (ERSC, 2008) for the Project Site in order to ascertain the affects of off-site tributary areas on the proposed developments and to determine potential on-site and off-site effects from the proposed developments. The report, which is contained in **Appendix K**, is summarized below.

The Preliminary Drainage Study evaluated three (3) separate drainage issues:

- First, determine the location and amount of off-site flows tributary to the Project Site. These flows originate east of Soboba Road, as displayed in **Figure 3-5**, and have been identified by drainage sub-areas to ascertain the location and volume of existing stormwater flows.

- Second, determine the additional increase in storm water runoff generated by new development. RCFCWCD requires that the developed runoff peak flow cannot exceed the existing peak flow. In this instance, onsite flows for the Development Site would be collected, conveyed, and discharged to the golf course ponds to attenuate storm water flows so that peak hour volume is temporarily stored or retained and subsequently discharged further downstream in a controlled manner.

- Third, develop a conceptual drainage plan that will capture existing off-site storm water flows along Soboba Road, along with increased flows from the Development Site, and direct them safely through the site or discharge into the golf course ponds. This conceptual design is portrayed within **Appendix K** in addition to proposed facilities as shown in **Figure 2-5**.

The RCFCWCD requires hydrologic conditions to be studied using 1-hour, 3-hour, 6-hour, and 24-hour duration events for the 2-year, 5-year, and 10-year period frequencies. Detention basins and basin outlet structures would be sized to ensure that none of the above storm events have a higher peak discharge in the post-development condition than in the pre-development condition. In addition, basins and outlet structures must be capable of passing the 100-year storm without damage to the proposed developments or the structure. **Tables 4-1(A)** through **4-1(C)** below provide the results of the hydrologic modeling for the existing and proposed conditions of the Project Site during a 1-Hour, 3-Hour, 6-Hour, and 24-Hour storms, under a 2-Year, 10-Year and 100-Year return period storm events. **Appendix K** provides greater details and calculations for the results presented in the following tables.

The Preliminary Drainage Study identified the need for a number of storm drain facilities, including improved channels and culverts, detention basins, and the improvement of drainage along Soboba Road (see **Sections 2.1.1** and **3.2.1**, and **Figures 2-5** and **3-8**). In addition to the use of the golf course ponds, detention basins are primarily proposed to the west of the Development Site and golf course. The purpose of the golf course ponds and basins is to attenuate storm water flows so that peak hour volume is temporarily stored or retained and subsequently discharged further downstream in a controlled manner. In addition, the ponds and basins will provide water quality treatment of storm runoff. The basins also allow runoff from smaller rainfall events to continue to infiltrate and recharge the groundwater basin. Proposed culverts and pipes would be designed to convey water through the Project Site for appropriate discharge in accordance with Riverside County drainage manual. Improvements to Soboba Road include the installation of culverts/channels and the possible need to curb the median area. The drainage system would collect storm water flows from some of the drainage areas, referred to as Sub-basins in the Preliminary Drainage Study, in channels on the east side of the roadway, where it will be conveyed by culverts to prevent the overtopping of Soboba Road. The culverts would connect to a storm drainage pipe network that would safely pass the flows through the Project Site for discharge to an extended detention basin located to the west of the golf course.

The projected flood volume during the 2-year, 24-hour storm event is 2.0 Ac-Ft. The incremental increase in volume due to developed conditions is 1.6 Ac-Ft and 2.0 Ac-Ft during the 10-year and 100-year storm, respectively, as displayed in the **Tables 4-1** above. Based on the results noted above it is expected that the golf course ponds will provided the adequate storage to retain the incremental increase in volume generated by the proposed development as compared to the undeveloped condition, for compliance with the Riverside County drainage manual. Changes to the location of Lake Park Drive or other minor land use modifications would not affect the intent of the drainage system as proposed, although the location and size of the facilities may need to be modified.The installation of the proposed detention basins, channels, roadway improvements, culverts, and storm drainage pipe networks would provide a system to control storm water flows, thereby reducing the potential for surface water flooding and providing a means to safely convey such flows through the Project Site for appropriate discharge. Therefore, the incorporation of the proposed developments would reduce the potential effects to less than significant for structures proposed as part of Proposed Action A, along with downstream and off-site drainage systems.

1.7.1.3 Runoff Volume

Summary of Comments: The volume and timing of runoff from the Project Site could affect the San Jacinto River and the underlying groundwater. The proposed impervious surfaces and site grading under the Proposed Action and Alternatives would affect runoff volume in the Project Area. The FEIS should provide the schematics, calculations, and detailed locations of the proposed BMPs.

The hydrologic and water quality effects of the Project would occur in both the Project Area and downstream along the San Jacinto River; therefore, the FEIS should consider both areas.

Response: As described in Section 4.2.1 the FEIS, there will be an increase in runoff volume and peak flow from the Project Site because of the Project. This increase is a consequence of the addition of impervious areas for roads, parking lots, and buildings. The results of the Project drainage study were presented in FEIS Table 4-1 and summarize the runoff from the Project Site for several different size storm events under the Proposed Action and Alternatives. The FEIS also describes best management practices (BMPs) to control the additional runoff generated by the Project.

The drainage report (FEIS, Appendix K) indicated that runoff from the Project Site would increase the volume of runoff available to San Jacinto River because of the Project (see Tables 4-1(a, b, and c). Without the addition of the BMPs, runoff from the proposed facilities is 6.2 cfs for the 100-year, 24-hour storm, compared with 53,000 cfs for the San Jacinto River 100-year event flow. This represents 0.01 percent of the San Jacinto River 100-year flood. However, the proposed facilities will include BMPs such as detention basins and the golf course ponds to collect and treat stormwater runoff, resulting in no net increase in site drainage because of the Project.

The proposed developments include the use of the golf course ponds and detention basins as shown in Figure 2-4, Figure 2-8, Figure 2-10, and Figure 2-12 of the FEIS to treat the runoff and control the incremental volume of runoff generated because of the proposed developments. This volume of detention basins will be sufficient to capture the incremental increase in runoff from the 100-year, 24-hour storm (Table 4-1(c) of the FEIS).

By collecting and treating runoff from the Project Site, significant effects to the San Jacinto River and downstream areas would not occur (see Section 4.2 of the FEIS). The BMPs are intended to keep the water quality and runoff effects on the Project Site. One type of BMP proposed is the use of porous pavement that would promote infiltration rather than direct runoff as occurs with typical pavement. Table 2-2 of the FEIS lists the proposed BMPs.

1.7.1.4 Flowage Easement

Summary of Comments: A portion of the Development Site is located within a flowage easement, which restricts use of the land. The easement needs to be quit claimed prior to development of the Proposed Action and Alternatives. The FEIS should discuss the effects of this easement and any proposed mitigation.

Response: Flowage easement 4020-112C is shown on Figure 3-5 and is intended to provide a pathway for surface-water coming off the San Jacinto Mountains. The existing and proposed hydrologic facilities (see Section 2.1.1) will adequately capture and transfer surface-water flows to the San Jacinto River. The Tribe will pursue resolution of the easement with Riverside County Flood Control & Water Conservation District (RCFCWCD) before development of the Project either through a quit claim of the easement or meeting with RCFCWCD to discuss appropriate restrictions on the parcels given the current floodplain status based on the FIRM and the flood control benefits of the proposed hydrologic facilities.

1.7.1.5 Construction Impacts

Summary of Comments: The FEIS should describe how construction of the Proposed Action and Alternatives would comply with the statewide stormwater construction permit and the Riverside County stormwater discharge permit.

Response: The FEIS cites that the Tribe will conform to the federal National Pollution Discharge Elimination System (NPDES, Clean Water Act) which is administered by the EPA. The EPA delegates NPDES permitting authority to the RWQCB in California, but EPA alone has authority to enforce water quality standards on Indian trust lands. In compliance with NPDES, the Tribe will prepare a Storm Water Pollution and Prevention Plan (SWPPP) for the proposed construction and submit it to EPA for approval. All construction activities on the Project Site will fall under the SWPPP. The SWPPP will identify all BMPs that will be constructed and the benefits to water quality afforded by the BMPs. Construction will conform to the water quality framework described in Section 3.2.3 of the FEIS.

1.7.2 Impacts to Water Supply and Water Quality

1.7.2.1 Water Supply

Summary of Comments: The Tribe is not legally entitled to the water right to provide water service to the proposed facilities. How would the proposed water use affect the other users of the groundwater basin?

Response: The Tribe is party to the Soboba Band of Luiseno Indians Water Settlement Act (H.R. 4841) that adjudicated the water supply for the region. As part of the Settlement, the Tribe gave up a surface water right and received assurance of a specified groundwater supply. Section 3.2.2 of the FEIS describes the Water Rights Settlement and the Hemet/San Jacinto Groundwater Management Area Water Management Plan (WMP)[2] that followed the Settlement. The Tribe has first priority right under the Settlement and the Tribe's anticipated current and future water rights are included in the Settlement and the WMP. The WMP also states that EMWD and Lake Hemet Municipal Water District will implement the WMP for the Canyon and Intake aquifers to "address the current overdraft, and recognize and take into account the Tribal Water Right" (Water Resources & Information Management Engineering, Inc., 2007).

The anticipated water demand from this project is described in Section 4.8.1 of the FEIS (Table 4-46). Table 4-46 lists the projected water demands for the first year of facilities operation. The total projected demand is 2,148 acre-feet. This is less than the 2,900 acre-feet annually allotted to the Tribe through the water rights settlement for the first year after the settlement (see Section 3.2.2). Through the Settlement, the Tribe may increase its pumping to 4,010 acre-feet after 20 years. As sated in Section 4.2.1 of the FEIS, the project "would result in less than significant effects to the San Jacinto Groundwater Basin as the WMP will account for any overdraft caused by the proposed developments." Therefore, the Tribe's allocated withdrawals to service the proposed facilities are not expected to significantly affect the region's groundwater supply. The future use of recycled wastewater will reduce some of the water demand, especially the demand for golf course irrigation water.

The Settlement is a legally binding document that the Tribe and other parties must follow. Failure to comply with the Settlement would result in further legal action by the parties to the Settlement. The Tribe is bound by the terms and conditions of the Settlement. The Proposed Action and Alternatives would be in compliance with the Water Rights Settlement and Groundwater Management Plan.

1.7.2.2 Water Quality

Summary of Comments: The Project would affect water quality. Water quality issues include the use of recycled effluent for irrigation, underground storage tanks at the proposed gas station, the wastewater treatment plant, and stormwater runoff quality. There is concern about compliance of the Project activities with the statewide general stormwater permit, the Riverside County MS4 stormwater permit, and the Santa Ana River Basin Plan. These water quality effects are a concern for local and regional areas. There is also the need for detailed engineering specifics for the BMPs proposed for the Project.

The DEIS discusses the development of a 1.2 million gallon per day wastewater treatment plant and the use of recycled water from that facility. The storage of the effluent during periods when demand for recycled water is low may negatively affect water quality, and the groundwater basin could be affected by the application of recycled water to the golf course or other uses of the water. The percolation of stored

[2] This report can be found at: http://project.wrime.com/Hemet/Documents/HSJ_WMP_final.pdf

effluent to the groundwater and the proximity of the WWTP facilities to other water supply features may be problematic.

Runoff of sediment and other pollutants from the construction area during a storm may affect water quality. Furthermore, leach fields used for sewage disposal at the existing casino may affect water quality.

Response: At the time of construction, the Tribe will either enter into a contract with EMWD for wastewater service, or construct an on-Reservation wastewater treatment plant. The FEIS includes a will-serve letter from EMWD (Appendix H of the FEIS). The required EMWD infrastructure exists on the Project Site and no off-site construction improvements are anticipated. However, for purposes of this environmental review, both wastewater service options are explored in the FEIS. Below is a discussion of the proposed on-Reservation WWTP in response to the comments registered above.

A tertiary wastewater treatment system is a service option for the proposed facilities in the Alternatives. That system would produce effluent suitable for reuse. Although the discharge of effluent is regulated by EPA through NPDES (Clean Water Act), the Tribe proposes to operation the proposed WWTP to meet California Title 22 requirements for reuse of treated effluent (see Section 2.1.1). The Tribe will conform to all discharge standards when using or disposing of all recycled water. Application of recycled water for landscaping and golf courses is appropriate because the vegetation will polish the effluent by removing any remaining nutrients beyond the level mandated for the tertiary effluent. The use of recycled water for the golf course irrigation will offset the current pumping for golf course irrigation.

The entire Reservation would be connected to the new tertiary WWTP and thereby replace existing septic tanks and leach fields on the Reservation. Overall, the switch from septic tanks to a WWTP will benefit the underlying aquifer by eliminating the poor quality of water that percolates to the aquifer from leach fields.

Treated effluent from the WWTP may have to be stored or used for other purposes during periods when the irrigation demand is low. Generally, the effluent will be used for agricultural irrigation, landscape irrigation, filling of decorative water features, surface cleaning (i.e. parking lots), toilet flushing, and fire control. During periods when effluent flows exceed the demand for recycled water, water would be discharged to percolation ponds for storage. The discharge would conform to effluent standards for discharge to percolation ponds and be consistent with the Basin Plan (see Section 2.1.1). Percolation pond discharge would follow secondary treatment standards with other constituents of concern limited to concentrations that are consistent with non-degradation of the receiving aquifer based on the beneficial uses of the receiving waters identified in the Basin Plan. Also, the storage of water in the pond will encourage settling of suspended material and subsequent percolation into the soil that will provide additional polishing of the effluent.

Section 3.2.3 describes the stormwater permit and waste discharge permits that apply to the Project. The Tribe will comply with all construction and discharge permits for the Project Site and the WWTP. Construction will occur in compliance with NPDES (Clean Water Act) as administered by EPA. The Project will include BMPs to control water pollution generated through construction activities (see Section 2.1). Section 4.1.1 describes the commitment to prepare a SWPPP and follow the plan throughout construction activities. BMPs are used to control runoff from the Project and provide a level of treatment for the runoff from the paved surfaces (see Table 2-2). The details of the BMPs (exact location, size, shape, operation) will be determined in final engineering and summarized in the SWPPP.

The underground storage tanks (UST) at the proposed gas station will conform with Federal regulations for UST installation in or adjacent to identified active fault zones (40 C.F.R. Part 280, Subpart B), as well

as with State and Riverside County regulations (County of Riverside Ordinance No. 617). Section 2.1.1 and Section 5.1.3 of the FEIS identify the criteria that will be used to locate and monitor the UST's associated with the Project.

The proposed BMPs, such as the detention basins, will also serve to capture the "first flush" of runoff that is generated at the start of a runoff event. The first flush is the initial runoff from a site and is known to contain the heaviest pollutant loads. Although rainfall events larger than a 2-year event may result in some runoff to the San Jacinto River, the pollutant load associated with the first flush will be captured in the BMPs.

Detailed engineering design will occur following the FEIS and the selection of the Preferred Alternative. The design will conform to the mitigation measures and design elements described in this FEIS.

1.7.3 Impacts to Groundwater

Summary of Comments: The Proposed Action and Alternatives would affect the availability of the groundwater supply, groundwater overdraft, water conservation, and groundwater pollution. Can the local aquifer produce the necessary supply for the proposed facilities without adding to the overdraft? In addition, how would the proposed facilities affect other users of the groundwater basin? The application or storage of treated effluent could potentially pollute groundwater within the Project Area. Stormwater runoff from the Project Site could affect water quality.

Response: As mentioned above in Section 2.7.2.1, the Water Rights Settlement specifies the available water supply for the Tribe (see Section 3.2.2 of the FEIS). The Tribe's supply comes from groundwater and is first priority from the Canyon and Intake aquifers (see Figure 3-3 of the EIS). Tribal water use and use by others in the groundwater management area is considered in the Groundwater Management Plan. The plan seeks to balance supplies with demand and incorporates groundwater recharge and water banking as methods to control and reduce groundwater overdraft. On April 20, 2007, the Army Corps of Engineers issued a notice of availability for the NEPA FEIS that was performed for the Settlement's effects on the Groundwater Management Plan. EPA also reviewed this EIS and concurred with the finding of no significant impact.

The treated effluent that would be reused for landscaping and other uses would conform to all federal standards (i.e. Clean Water Act) for the discharge of treated effluent. Therefore, effects to groundwater quality from the application of the treated effluent are not significant.

Stormwater runoff will be captured in drainage facilities and stored in detention basins before any release to the San Jacinto River. The detention basins will capture much of the runoff from storm events especially the first flush from the Project Site. The first flush typically contains the lowest quality water because it picks the pollutants stored on the paved surfaces during the dry period before the rainfall. In the detention basin, suspended material will drop out along with pollutants that are adhered to the suspended material. Water will leave the basin through evaporation and percolation. Percolation of the water through the soil layer will provide additional water quality treatment and will increase the groundwater recharge.

1.8 AIR QUALITY

1.8.1 Air Quality – Construction Impacts

Summary of Comments a: Construction of the Project would create more air pollution which would negatively effect air quality, especially for seniors; and fine particulate matter in diesel exhaust is an air toxic. Mitigation measures are needed in the project plans for dust and diesel exhaust, and with respect to

clean diesel rules. We disagree that air quality would not be negatively affected by the construction project.

Response a: The construction of the Proposed Action would have limited potential to incrementally contribute to existing violations of state and federal air quality standards in the project vicinity for ozone, PM_{10}, and $PM_{2.5}$. Incremental effects would be small, temporary, and would cease upon completion of the construction project.

Emissions from patron and service vehicles are presently regulated under 40 CFR 86 et seq. and state standards. Since the Proposed Action and Alternatives are not federally-sponsored transportation projects and motor vehicle usage would be in compliance with state emissions standards under the State Implementation Plan (SIP), General Conformity Thresholds apply only to facility emissions. As presented in Section 4.3 of the FEIS, since temporary construction emissions for the Proposed Action and Alternatives are all below General Conformity significance thresholds, no long-term risk assessment of the diesel particulate matter (DPM) or CO component of construction equipment engine exhaust is warranted, because corresponding short-term DPM and CO emissions would be small and will present no significant risk to public health.

Mitigation measures listed in Section 5.3.1 of the FEIS describe the best management practices (BMPs) which would be implemented to ensure that fugitive dust emissions do not affect adjacent land users, and that VOC emissions are minimized during construction.

Summary of Comments b: Soil stabilizers were not used during other Tribal projects.

Response b: Comment noted and made part of the administrative record. As described in Section 5.3 of the FEIS, soil stabilizers would be utilized during the construction phase of the project to control fugitive dust emissions.

Summary of Comments c: Air quality effects cannot be less-than-significant because the area is in nonattainment [O_3, $PM_{2.5}$, PM_{10}]. Mitigation measures for nonattainment pollutants are needed in the project plans (and FEIS). A General Conformity determination is also needed in the FEIS.

Response c: Emissions from patron and service vehicles are presently regulated under 40 CFR 86 et seq. and state standards. Since the Proposed Action and Alternatives are not federally-sponsored transportation projects and motor vehicle usage would be in compliance with state emissions standards under the State Implementation Plan (SIP), General Conformity Thresholds apply only to facility emissions. FEIS Tables 4-6 through 4-8 show that construction and operational emissions related to the Proposed Action do not exceed the General Conformity significance thresholds for all pollutants. Section 176(c) of the Clean Air Act contains the General Conformity Rule (40 CFR 51.850-860 and 40 CFR 93.150-160). The General Conformity Rule requires that a federal agency responsible for a proposed action (i.e., project) in a National Ambient Air Quality Standards (NAAQS) nonattainment or maintenance area endeavor to ensure that the proposed action conforms to the applicable SIP. This means that federally supported or funded activities shall not 1) cause or contribute to any new air quality standard violation, 2) increase the frequency or severity of any existing standard violation, or 3) delay the timely attainment of any standard, interim emission reduction, or other milestone. Emissions of attainment pollutants are exempt from the General Conformity Rule. A federal action would comply with an applicable SIP if it does not exceed identified annual emission de minimis thresholds, the magnitudes of which are based on the severity of the nonattainment rating of the project region. Actions that exceed these thresholds are required to conduct in depth conformity determinations. Since the General Conformity significance thresholds define significance in the context of the SIP, construction and

operational activities related to the Proposed Action would result in a less than significant effect since the de minimis requirement is satisfied.

Since the Project Site would be subject to Tribal sovereignty SCAQMD California Environmental Quality Act (CEQA) significance thresholds do not apply

Summary of Comments d: The CO_2 [GHG] effects cannot be less-than-significant because of the new requirements [AB 32 et seq.]. The FEIS needs to more completely assess GHG emissions (including CH_4 and N_2O, not just CO_2) that would result from the construction of the project, including cumulative effects, and with respect to AB 32. How would the project mitigate GHG emissions to a level of insignificance consistent with SCAG's responsibility under AB 32 and SB 375?

Response d: There currently are no federal regulatory standards relating to GHG emissions from construction projects. The following language has been added for clarification to Section 4.3.1 and similar language has been added to Sections 4.3.2 through 4.3.5:

Climate Change Proposed Project

USEPA has not promulgated explicit guidance or methodology to conduct project-level GHG analysis. The Council on Environmental Quality (CEQ) issued a draft guidance memorandum in February 2010 for analyzing the environmental effects of GHG emissions and climate change in National Environmental Policy Act (NEPA) documents. Specifically, the guidance states that if a proposed action would be reasonably anticipated to cause <u>direct</u> emissions of 25,000 metric tons (MT) or more of CO_2 equivalent (CO_{2e}) GHG emissions on an annual basis, agencies should consider this as an indicator that a quantitative and qualitative assessment may be meaningful to decision-makers and the public. For long-term actions that have annual direct emissions of less than 25,000 MT of CO_{2e}, CEQ encourages federal agencies to consider whether the action's long-term emissions should receive similar analysis. CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs (CEQ 2010).

Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction would be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012.

The project would potentially result in a significance impact if it would result in the direct generation of more than 25,000 MT of CO_{2e}. The Tribe does not have any specific GHG reduction thresholds however, AB 32 requires that by 2020 the state's greenhouse gas emissions be reduced to 1990 levels or roughly a 28.3% reduction. Significance thresholds have not been adopted but are currently being discussed. AB 32 is specific as to when thresholds

shall be defined. AB32 guidelines are not directly applicable to the proposed project but will be considered in the determination of impacts for this analysis.

Construction Related GHG Emissions

Construction-related emissions are based on the previous assumptions and include GHG sources such as construction equipment, material delivery trucks, and construction worker vehicles. Estimated GHG emissions would be 36.96 MT CO_{2e} (Appendix Y). Given the fact that the total emissions will ultimately contribute to the 2020 cumulative emission levels, it is acceptable to average the total construction emissions over a 30 year period (SCAQMD 2008). The annual and total level of GHG emissions expected to occur from construction of the Proposed Project is well below the level recommended by CEQ for further analysis.

GHG emissions would be generated throughout the operational life of the Proposed Project via both mobile and area source emissions. Mobile emissions would be related to increased vehicle trips resulting from both employee and patron trips. Area source emissions would occur from stationary sources such as uses within the gaming facility, water conveyance, wastewater treatment plant/MVC and solid waste generation. Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. N_2O. To simplify greenhouse gas calculations, both CH_4 and N_2O are converted to equivalent amounts of CO_2 and are identified as CO_{2e}. In other words CO_{2e} is an equivalent volume or mass of CO_2 converted from global warming potentials of other gases that may cause equivalent warming.

Transportation Related GHG Emissions

Emissions from daily trips were quantified utilizing emission levels reported in grams/mile from the EMFAC2007 emission model. Vehicle emissions were then calculated using URBEMIS and converted to carbon dioxide equivalent (CO_{2e}) per year. The default setting for vehicle fleet mix was used as the Proposed Project would generate VMTs mostly from workers and patrons commuting to and from the project site. The fleet mix also incorporates buses and heavy truck trips. Emissions due to new vehicle trips are estimated to be 24,243.31 MT of CO_{2e} per year BAU (Appendix Y).

Electricity Related GHG Emissions

The generation of CO_2, CH_4, and N_2O from electricity is calculated utilizing methodologies within the California Climate Action Registry General Reporting Protocol Version 3.1-January 2009 (Registry Protocol). The Registry Protocol Electricity Emission Factors in pounds of GHG per kilowatt-hour for CO_2, CH_4, and N_2O are 0.72412, 0.0000302 and 0.0000081, respectively. The Proposed Project is expected to use up to 58,683,012.3 KWh per

year of electricity for the gaming floor, restaurants, retail shops, wastewater treatment plant and the operation of the mechanical vapor compressor (MVC). This would generate approximately 19,358.49 MT of CO_{2e} per year BAU (Appendix Y).

Water Usage Related GHG Emissions

Water demand from the Proposed Project would indirectly utilize energy associated with the preparation and conveyance of clean water to the project site. It is estimated that indirect electricity for water conveyance requires 12,700 kilowatt hours (kWh) per Million Gallons (MG) (Source: http://www.greenbuildingadvisor.com/book/export/html/18037). Water demand from the local utility is estimated at 11,730,651 gallons each year, which would require 148,979 kWh of electrical energy to supply the expected yearly. This energy consumption would generate approximately 49 MT of CO_{2e} per year (Appendix Y).

Wastewater Treatment Related GHG Emissions

An additional component of GHGs from comes from the natural biochemical breakdown of waste within the water. As water is treated initially, suspended solids are allowed to settle to the bottom while cleaner water on top is siphoned off leaving wastewater sludge. The sludge is then collected where it can be further broken down within anaerobic digesters that are sealed off from ambient air sources. The waste then is further broken down by bacteria creating methane (CH_4) and to a lesser extent Oxides of Nitrogen. The California Air Pollution Control Officers Association CAPCOA guidance for GHG mitigation strategies estimates that the CH_4 created by the proposed 200,000 gallons per day (gpd) plant.

NO_X (CO_{2e}) emissions from wastewater treatment are estimated to be roughly 22 percent of CH_4 (CO_{2e}) (Source: Draft Methane and Nitrous from Non-Agricultural Sources April 2005). Based on the Project's anticipated water usage of 114,245,000 gallons or 432,464,369.26 liters of water per year and utilizing CAPCOA's baseline CO_{2e} approximation, that for each liter of wastewater the Project would produce 873.57 MT CO_2e from CH_4. It is estimated that the project would produce 192.19 MT from CH_4. Utilizing the 22% ratio of NO_X to CH_4, NO_X generation could be as high as 21 MT. Therefore, the wastewater treatment plant is estimated to produce approximately 1,065.77 MT CO_2e per year (Appendix Y).

Solid Waste Related GHG Emissions

Solid waste generated from the Proposed Project would ultimately be discarded as trash and then deposited into a landfill. The decomposition of organic matter such as food, paper, yard trimmings and wood are anaerobicly digested by bacteria, which primarily produces GHG's as a bi-product. However, organic decomposition occurs at different rates and is a function of the material content. The Environmental Protection Agency (EPA) published various emission rates with units of Metric Tons of Carbon Dioxide Equivalent per Ton (Source: Solid Waste

management and Greenhouse Gases; A Life-Cycle Assessment of Emissions and Sinks). Solid waste generated from the Proposed Project is estimated to generate 1,984 tons of trash each year. Utilizing the EPA emission factors, the CO_{2e} emissions are expected to be approximately 114.86 MT per year (Appendix Y).

Thus, total overall operational GHG emissions resulting from the Proposed Project are estimated to be approximately 47,533.23 MT CO_{2e} per year. Left unmitigated, this would be considered a significant impact. Mitigation Measures to achieve a 28.3% reduction from BAU are presented in Section 5.3.2.

In addition, in response to the Presidential Memo Regarding Fuel Efficiency Standards (May 21, 2010), EPA and the National Highway Traffic Safety Administration are working in concert to develop GHG regulations for heavy-duty engines and vehicles, as well as to improve fuel efficiency in light-duty vehicles. However, since the Proposed Action does not involve the manufacture of vehicles, those regulations would not apply.

Summary of Comments e: The FEIS needs to more rigorously assess air quality effects that would result from the construction of the project, including localized effects (CO hotspots) and sensitive receptors (seniors), and with respect to the [SCAQMD] 2007 AQMP.

Response e: In October 2008, ENTRIX performed a CO hotspots analysis for the vicinity of Ramona Expressway and Lake Park Drive assuming worst-case traffic congestion and calm wind conditions. Results of this analysis are shown in Tables 4-9 and 4-10 within the FEIS, which demonstrate that the highest predicted concentration is well below state and federal standards. The effect is less than significant.

Since the Project Site would be subject to Tribal sovereignty and immune from state and local regulation, local rules, including the SCAQMD 2007 AQMP, do not apply. Emissions standards from patron and service vehicles are presently regulated under 40 CFR 86 *et seq*.

Summary of Comments f: The air quality analysis (URBEMIS) used square footage of buildings to be constructed, not total development footprint (land area).

Response f: The URBEMIS model was re-run using current (2009-10) software and refined assumptions, including improved values for building square footage and land area, in order to bring the results up-to-date. Section 4.3 of the FEIS has been updated with the new results. Compared to the former version of URBEMIS, the most current URBEMIS model shows increased construction emissions of NO_x, PM_{10}, and $PM_{2.5}$, and decreased construction emissions of VOC and CO. As shown in Table 4-6 of the FEIS, construction emissions related to Proposed Action A do not exceed the General Conformity significance thresholds for all pollutants, which are used to ensure that the proposed developments conform to the applicable SIP. Therefore, construction activities related to Proposed Action A would still result in a less than significant effect under the most current URBEMIS model, and no new mitigation measures are required.

1.8.2 Air Quality – Operational Impacts

Summary of Comments a: Project operation would create more air pollution which would negatively affect air quality, especially for seniors; air quality on weekends is poor; and fine particulate matter in

diesel exhaust is an air toxin. We disagree that air quality would not be negatively affected by operation of the project, and the pollution cannot be effectively mitigated.

Response a: Emissions from patron and service vehicles are presently regulated under 40 CFR 86 et seq. and state standards. Since the Proposed Action and Alternatives are not federally-sponsored transportation projects and motor vehicle usage would be in compliance with state emissions standards under the SIP, General Conformity Thresholds apply only to facility emissions. As described in Section 4.3 of the FEIS, incremental effect from the proposed facilities would remain below the thresholds for significance under the General Conformity Rule. Although the operation of the Proposed Action and Alternatives is not expected to result in significant effects to local air quality, the mitigation measures specified in Section 5.3.2 would be implemented to ensure that the design and operation of the proposed developments would be consistent with regional efforts to attain the NAAQS.

Summary of Comments b: The URBEMIS modeling is inadequate because a) it does not account for special events with large attendance; b) CH_4 and N_2O emissions are left out; and c) it uses square footage of buildings, not total development footprint (land area).

Response b: The URBEMIS model was re-run using current (2009-10) software and refined assumptions, including improved values for special events and building square footage and land area, in order to bring the results up-to-date. URBEMIS software only calculates emissions for criteria air pollutants (VOC, NOX, CO, SO_2, PM_{10} and $PM_{2.5}$) from land use development projects during both short-term construction and long-term operational phases. CH_4 and N_20 are not considered criteria air pollutants by the EPA, and therefore not required for analysis in the FEIS. Tables 4-6, 4-7, 4-8, 4-11 through 4-18 in Section 4.3 of the FEIS have been updated with the new results.

Summary of Comments c: Indirect GHG emissions from electric power consumption were not addressed.

Response c: Please see new language added in Response 1.8.1(d) above.

Summary of Comments d: The EPA must be notified so that proper permitting and mitigation issues will be resolved prior to the project. BIA must address air quality issues before any project is approved and get the proper permitting in place.

Response d: The EPA is a Cooperating Agency for this project (see **Section 1.1.4** above). The Proposed Action does not fall under EPA jurisdiction as a stationary source (i.e., Title V of the Clean Air Act Amendments of 1990); therefore no federal permitting requirements would apply. See also **Section 1.8.1**, ***Response d*** above.

Summary of Comments e: Has the Tribe consulted with the SCAQMD on air quality issues? Although there is a recommendation that the Tribe should meet the standards SCAQMD, the recommendation is simply an unenforceable promise.

Response e: The Tribe has not consulted with SCAQMD for the Proposed Action. Local rules, including SCAQMD stationary source permit requirements and emissions standards, do not apply to this project. A mitigation measure included in Section 5.3.2 of the FEIS states that the Tribe should solicit input from the SCAQMD on the preliminary plans of proposed facilities to reduce VOC, NOx, fine particulate matter, and other emissions. The enforceability of mitigation measures is discussed under **Section 1.18** of this public comment report.

Summary of Comments f: The baseline figures for the GHG significance discussion need to be updated along with significance criteria for consistency with current CARB guidelines. Cumulative GHG effects need to be evaluated in relation to city/county general plans and pursuant to AB 32 and SB 375.

Response f: Please see Responses 1.8.1(d).

1.9 BIOLOGICAL RESOURCES

Summary of Comments a: There is information missing from the EIS regarding the Multi Species Habitat Conservation Plan (MSHCP), species covered by the MSHCP, mitigation measures for those species, required species surveys, as well as the potential role the MSHCP may play in association with Endangered Species Act (ESA) regulatory compliance requirements associated with the proposed project alternatives.

Response a: In 2007, the Bureau of Indian Affairs (BIA), as the Lead Agency, decided to comply with the requirements of a Section 7 interagency coordination process to satisfy ESA regulatory compliance requirements independent of the MSHCP. As such the MSHCP, an ESA Section 10 regulatory compliance process, was not included in the DEIS. However, during the course of federal consultation it was determined that compliance with the MSHCP was warranted under ESA.

On September 2, 2010 the BIA consulted with Regional Conservation Authority (RCA) and FWS regarding project compliance with ESA. The BIA requested that RCA; 1) identify the areas within the Project Site that are subject to the MSHCP; and 2) that RCA develop a proposal for mitigation of project effects to the MSHCP.

RCA reviewed the boundaries of the Project Site with respect to the MSHCP Conservation Criteria. RCA determined that approximately 125 acres in the northern portion of the Project Site should be deeded to RCA for conservation to address the fee-to-trust action's effects to the MSHCP. Also, approximately 32 acres in the southern portion of the Project Site (south of Lake Park Drive) would be conserved due to the presence of Los Angeles pocket mouse (LAPM) and San Bernardino kangaroo rat (SBKR) (ENTRIX June 2010 report(s)). In addition, RCA would be deeded an additional 22 acres as mitigation to offset project effects.

A section describing the MSHCP and its regulatory function has been included in Section 3.4.3 of the FEIS under the Regulatory Framework heading. Sections 3.4.5, 3.4.7, and 4.4 address species which are covered by the MSHCP and have the potential (individuals or habitat) to occur in the Project Area. Section 4.4 contains additional language about the effects of the fee-to-trust action on the MSHCP and the WRCRCA's ability to administer the plan. Section 5.4 addresses any species (including MSHCP covered species) that might be affected by the Proposed Action and Alternatives, as well as potential mitigation measures that may reduce or remove any potential effects. Section 3.4.6 and 3.4.7 of the FEIS has been updated to include results from additional surveys that were completed for the SBKR, LAPM, and Burrowing owl (BUOW) within the Project Area.

Field surveys for SBKR were carried out according to USFWS and CDFG permit conditions. These surveys were designed to detect LAPM by trapping areas that exhibited habitat conditions typical of those occupied by the pocket mouse, which fortunately are very similar to those of SBKR in the project area. While LAPM were not the primary focus of the trapping effort, it was reasoned that the presence of LAPM in the southern and northern areas of the Project Site reflects the overall abundance of the pocket mouse in this general area of the San Jacinto River system. In addition, field surveys and site monitoring for BUOW were completed in April 2010, according to USFWS and RCA protocol.

Summary of Comments b: The potential effects of the Proposed Action and Alternatives on critical habitat for the SBKR should be further analyzed and discussed in the FEIS.

Response b: The designation of critical habitat for SBKR was removed from the proposed project area by the USFWS on October 17, 2008 (50 CFR part 17). Some areas adjacent to the proposed project area in the vicinity upstream from the E Main St Bridge remain as designated critical habitat. At present, a 20-foot high levee separates this area from the proposed project area. Potential effects that may occur as a result of the Proposed Action are discussed in Section 4.4 of the EIS. Mitigation measures have been developed to mitigate effects this project may have on SBKR critical habitat, they are discussed in Section 5.4 of the EIS.

Summary of Comments c: Table 3-11 of the DEIS contains errors and should include additional species.

Response c: In response to these concerns, Table 3-11 in Section 3.4.5 was reviewed. The results of this review lead to the table being updated for the Southwestern willow flycatcher (WIFL), the addition of the Arroyo toad and Riverside fairy shrimp, as well as the confirmation that the table is correct to not include the Palm Spring ground squirrel. Table updates and edits have been completed in the FEIS. Text describing the geographic region for the WIFL has been modified. Text has been added to the table concerning the Arroyo toad and Riverside fairy shrimp. A species description has been added for the Arroyo toad in Section 3.4.6.

Summary of Comments d: The potential effects of the Proposed Action and Alternatives on critical habitat for the Coastal California gnatcatcher (CCGN) should be further analyzed and discussed in the FEIS.

Response d: A review of the current information and the MSHCP for CCGN distribution and habitat use was completed. This review supported the information contained within the DEIS. That is, the potential for the presence of CCGN habitat within the proposed project area is low. Additionally, if a habitat patch exists, it probably is not suitable for resident or breeding populations. It should be noted that there is no formally designated CCGN critical habitat on the Project Site.

Summary of Comment e: Current disking activity on the Project Site is causing habitat destruction and soil loss.

Response e: USFWS has reviewed the additional field surveys that were completed and agree that mowing the property for weed abatement is not likely to result in impacts to federally listed species. There are no known listed or sensitive species on the properties, and the vegetation is composed of virtually all non-native invasive species. Furthermore, the Tribe will be conducting weed abatement using a new “brush hog”; therefore no disking, ripping, or other soil disturbance is anticipated (Pavelka, 2010).

Summary of Comments f: Development of commercial areas would affect biodiversity.

Response f: Potential effects to species associated with the Proposed Action and Alternatives are addressed within the FEIS in Section 4.4. Mitigation measures have been developed, with respect to the MSHCP and other guidelines associated with federally listed species, in an effort to limit adverse effects to biodiversity in the area. These measures can be found in Section 5.4 of the FEIS.

1.10 CULTURAL AND PALEONTOLOGICAL RESOURCES

1.10.1 Cultural Resources

Summary of Comments: There is concern regarding the ethnographic and historical data presented in the EIS relating to the prehistoric tribes that occupied the region centered around the Project Site near San Jacinto, California. The Project Site is outside the Soboba Band of Luiseno Indians' aboriginal territory, the Band never owned the land, no artifacts were recovered during investigations to suggest their occupation, and the Project has the potential to adversely affect cultural resources that are present within the Project Site. California laws, such as CEQA as well as statutes that protect Native American burials and remains, apply to this Project and should be considered in the FEIS. In addition, the cultural resources technical report (Appendix R) was not publicly accessible and therefore a thorough analysis of the effects to cultural resources could not be reviewed by the public. The report should be submitted to the State Historic Preservation Office (SHPO) for review and concurrence.

Response: United States courts have confirmed that the Soboba Band of the Luiseño Indians have occupied the area and subsisted on the land since at least 1815 (Byrne v. Alas et al, Supreme Court of California (74 Cal.628; 16P.523; January 31, 1888). Furthermore, the ethnographic and documentary information presented in the FEIS, collected from a variety of different sources, confirms that at the point of European contact, the Project Area was occupied by the Luiseno people, with the Luiseno-Cahuilla village of "Savado", or Soboba, located only one mile southeast of the Project Site (see Section 3.5.1 of the FEIS). As Luiseno people were known to utilize lands surrounding their villages, which represent a traditional use area, the Project Site is considered the Tribe's aboriginal territory.

Addressing CEQA's requirements for addressing Project effects to cultural resources is outside the scope of the NEPA review process and is not addressed here. See also Section 2.2.2.5 of this public comment report for a response to non-NEPA issues beyond the scope of this FEIS.

After consultation with the SHPO in the Office of Historic Preservation within the California Department of Parks and Recreation, the BIA received a letter from the SHPO on October 6, 2008 that agreed with the findings of the Section 106 technical report and the BIA conclusions, and held "no objection to your [BIA's] proposed finding of No Adverse Effect" upon historic properties. Three historic properties, RJ-1, RJ-2, and RJ-3, are located within the Project area but will not be affected by Project construction. No prehistoric resources are expected to be encountered during construction, but in the event of an unanticipated discovery of Native American burials, remains, or grave goods, these items would become subject to the Native American Graves Protection and Repatriation Act. In addition, if other unanticipated discoveries of cultural resources are found during construction, the BIA is required to comply with 36 CFR Part 800 which describes a process for protecting resources found after Section 106 review, resource evaluation, and consultation with the SHPO and other consulting parties. An Unanticipated Discoveries Plan has been developed and is included as Appendix AA to the FEIS.

The Section 106 technical report is confidential consistent with 36 CFR 800 and the National Historic Preservation Act. The FEIS summarizes the content of the report, identifies cultural resources located within the Area of Potential Effect, evaluates those resources to determine their eligibility for the National Register of Historic Places, and describes mitigation measures so that effects to historic properties are avoided.

1.10.2 Paleontological Resources

Summary of Comments: Information concerning the potential presence of paleontological resources was not adequately discussed in the DEIS. Potential effects to these resources was also not addressed in the

DEIS. Planning and monitoring during construction to avoid effects to paleontological resources is required.

Response: An additional section has been added to the FEIS to describe the presence and probability of locating paleontological sites within the Project area and the potential for effects to those resources. The following text has been added to Section 3.5 of the FEIS:

3.5.2 PALEONTOLOGICAL RESOURCES

Paleontological resources are fossilized remains of prehistoric plants and animals. These remains often appear as fossilized skeletal matter, imprints, or endocasts, and reside in sedimentary rock layers. Paleontological resources are important due to their scientific and educational value in providing information about the history of the earth and its past ecological settings. They are also non-renewable resources.

Riverside County's (2009) paleontological sensitivity map indicates that the Project Site is located in a region with high paleontological sensitivity. A search of the University of California Museum of Paleontology (UCMP) database indicated that 1364 paleontological specimens have been collected in Riverside County (UCMP 2009). The majority of the specimens are plants. The vast majority of specimens have been documented within the Mt. Eden formation and date to the Late Miocene epoch (UCMP 2009). None of the fossils identified by UCMP were located within the Project Site.

Paleontological resources in Riverside County are protected by a variety of federal, state, and local regulations and guidelines, including NEPA, CEQA, the Antiquities Act of 1906, the California Public Resources Code, and the Riverside County General Plan.

The following text has been added to Section 4.5 of the FEIS:

4.5.2 PALEONTOLOGICAL RESOURCES

4.5.2.1 PROPOSED ACTION A – HOTEL/CASINO COMPLEX WITH REALIGNMENT OF LAKE PARK DRIVE

While the project area is located in a region with high paleontological sensitivity, construction associated with the project is not anticipated to result in significant adverse effects to paleontological resources. Preliminary soil borings advanced to 50 feet bgs did not encounter bedrock. Potential paleontological resources would only be expected at depths where bedrock is encountered. Soil grading and earthwork operations are not planned at depths where bedrock is present; therefore potential paleontological resources will not be disturbed. This material is sufficiently young geologically that it is very unlikely to contain fossils. In the unlikely event that paleontological resources are uncovered during ground-disturbing activities, an Unanticipated Discoveries Plan (Appendix AA) has been prepared.

The following text has been added to the cumulative effects discussion in Section 4.10.3 of the FEIS:

Paleontological Resources

The geographic boundary of the analysis of cumulative effects to paleontological resources is defined as the Project Site and surrounding area. Cumulative effects to paleontological

resources could occur in the Project Site and surrounding area if urban development occurs on sites that contain fossils. When these resources are destroyed or displaced, important information is lost about the history of the earth and its past ecological settings.

Riverside County's (2009) paleontological sensitivity map indicates that the Project Site is located in a region with high paleontological sensitivity. A search of the University of California Museum of Paleontology (UCMP) database indicated that 1364 paleontological specimens have been collected in Riverside County (UCMP 2009). The majority of the specimens are plants. The vast majority of specimens have been documented within the Mt. Eden formation and date to the Late Miocene epoch (UCMP 2009). None of the fossils identified by UCMP were located within the Project Site.

While the Project area is located in a region with high paleontological sensitivity, construction associated with the project is not anticipated to result in significant adverse effects to paleontological resources. Preliminary soil borings advanced to 50 feet bgs did not encounter bedrock. Potential paleontological resources would only be expected at depths where bedrock is encountered. Soil grading and earthwork operations are not planned at depths where bedrock is present; therefore potential paleontological resources will not be disturbed. This material is sufficiently young geologically that it is very unlikely to contain fossils. Therefore, Proposed Action A would not significantly contribute to the cumulative loss of paleontological resources. In the unlikely event that paleontological resources are uncovered during ground-disturbing activities, an Unanticipated Discoveries Plan (see Appendix AA) has been prepared.

The following text has been added to the indirect effects from off-site traffic mitigation discussion in Section 4.11.2 of the FEIS:

Paleontological Resources

The construction of the roadway improvements is unlikely to disturb or destroy paleontological resources. As discussed in Section 4.10.3, a search of the University of California Museum of Paleontology (UCMP) database indicated that 1364 paleontological specimens have been collected in Riverside County (UCMP 2009); however, none of the fossils identified by UCMP were located within the Project Site. Furthermore, as described in Section 4.10.3, construction activities are not planned at depths where bedrock is present; therefore potential paleontological resources will not be disturbed. In the unlikely event that paleontological resources are uncovered during ground-disturbing activities, an Unanticipated Discoveries Plan (see Appendix AA) has been prepared. Therefore, a less than significant indirect effect to paleontological resources would result.

The following text has been added to the indirect effects from off-site pipeline construction discussion in Section 4.11.3 of the FEIS:

Paleontological Resources

The construction of pipelines is unlikely to disturb or destroy paleontological resources. As discussed in Section 4.10.3, a search of the University of California Museum of Paleontology (UCMP) database indicated that 1364 paleontological specimens have been collected in Riverside County (UCMP 2009); however, none of the fossils identified by UCMP were located within the Project Site. Furthermore, as described in Section 4.10.3, construction activities are not planned at depths where bedrock is present; therefore potential

paleontological resources will not be disturbed. In the unlikely event that paleontological resources are uncovered during ground-disturbing activities, an Unanticipated Discoveries Plan (see Appendix AA) has been prepared. Therefore, a less than significant indirect effect to paleontological resources would result.

1.11 ECONOMIC AND SOCIOECONOMIC CONDITIONS

1.11.1 Economic and Fiscal Resources

Summary of Comments a: .The proposed fee-to-trust action would take property out of the tax system decreasing local taxes. Decreased tax revenues may reduce funding for infrastructure improvements, education and other public services, particularly if the Proposed Action results in an increased demand for public services. The DEIS does not include a Memorandum of Understanding to contract for city or county services.

Response a: The Proposed Action would decrease the local property tax base. See Section 4.6 of the FEIS for a detailed discussion on the potential fiscal effects resulting from the Proposed Action. In 2008, Riverside County received $234,090 in property taxes from the Project Site – less than 0.01 percent of the $2.4 billion the County received in property tax revenue that year.[3] Thus, the effects of removing the Project Site from the County tax base will be minimal accounting for less than .01 percent in foregone County property tax revenue annually.

Of the County property tax revenue in 2008, 47.4 percent was allocated to education. The proposed fee-to-trust transfer will decrease education funding by $110,958.66 – a 0.01 percent reduction. However, as described in Section 5.8.8 of the EIS, the Tribe shall provide reasonable in-lieu development fees and property taxes to the San Jacinto Unified School District to mitigate recognized effects to the district. Please see **Section 1.13.7** of this public comment report for a more detailed discussion of mitigation measures to reduce effects to school services.

Regarding any effect of decreased property taxes on the provision of fire protection and emergency medical response, the Tribe would provide primary fire protection and medical services to the Project Site, which would relieve the local community of some financial burden. In addition, on August 8, 2011 Soboba General Council approved a Memorandum of Understanding (MOU) governing the provision of law enforcement services to the Development Site (see Appendix AC of the FEIS). The MOU provides a funding mechanism for one full-time deputy over a 24-hour time period, which equates to five sworn deputy positions, and one non-sworn Community Service Officer to meet the law enforcement needs of the proposed project. For a more detailed discussion of effects to public services, please see **Section 1.13 Public Services** of this public comment report.

Summary of Comments b: Community effects of the proposed action include a perceived negative effect of the gaming industry on property values, personal wealth of patrons (particularly lower socioeconomic residents who are believed to use casinos more frequently), gambling addicts, and additional work for local police and other services.

Response b: The Proposed Action will not increase gaming facilities in the area. The current state of the personal wealth of patrons and gambling addicts will not be affected by increased gaming facilities since no change in the number of gaming facilitates will occur under the Proposed Action.

[3] Larry Ward with the Riverside County Assessor – County Clerk – Recorder Office, '2007 – 2008 Annual Report' accessed online at http://riverside.asrclkrec.com/acr/docs/2008-2009%20Annual%20Report%20Final.pdf

In addition, as described in Section 2.1.1 and Section 4.6 of the FEIS, the Tribe's gaming compact with the State requires that a portion of the revenues generated by the Tribe's gaming facilities must be remitted to two state-administered funds: (1) a Revenue Sharing Trust Fund that is distributed among non-gaming California tribes; and (2) a Special Distribution Fund that is used to compensate the State for the costs incurred in the administration and oversight of compact compliance, and for grants to gambling addiction programs and to governmental agencies effected by tribal gaming. Riverside County and local governmental agencies in the County receive in excess of $10 million a year from the Special Distribution Fund for such purposes as law enforcement, fire and emergency medical services, environmental programs, water supplies and waste disposal, public health, roads, and recreation and youth programs. In 2007 alone, proceeds from the Soboba Casino accounted for nearly $1.0 million of that amount, which was supplemented by another $1.5 million that the Tribe voluntarily donated to local charities and nonprofit organizations. As noted in Section 2.1.1, for fiscal year 2008-2009, Soboba Casino accounted for $1.47 million of the Special Distribution Fund (California State Controller's Office 2010).

Summary of Comments c: The proposed action may increase competition for local businesses and put them at an unfair disadvantage (having to pay property taxes so may be undercut by Tribal resources). The proposed action may lead to urban decay, which is not currently addressed.

Response c: The extent to which the Proposed Action would effect specific local business establishments is unknown. The Proposed Action may increase competition for patrons at similar businesses in the local area. If the total number of patrons visiting similar businesses in the local area is fixed, than the increased competition may potentially result in a reduction in patronage at similar businesses – potentially reducing local area businesses' revenue. However, the Proposed Action is anticipated to increase visitation to the local area resulting in an increase in the total number of patrons in the local area – potentially increasing local area business' revenue. Thus, the direction and magnitude of the effects of increased competition is unknown. Urban decay is not expected to result from the Proposed Action since the Proposed Action will attract new patrons to the local area. The following subsection/text was added to Section 4.6 of the FEIS to account for potential effects from urban decay.

Urban Decay

The purpose of this section is to identify and evaluate the potential for the proposed developments to result in physical blight/urban decay in response to concerns raised during the public comment period. This analysis takes into account the market conditions in the area of analysis available through secondary sources.

Background and Terminology

In general, urban decay can be described as the physical effect, including facilities that are poorly maintained and in disrepair, deterioration of buildings and improvements, visual and aesthetic impacts, increase in property crime (e.g., graffiti) and increased demand for emergency services, which result from increases in retail closures and long-term vacancies. A 2004 study by the Bay Area Economic Forum described the urban decay process as follows:

> ***"Vacant buildings, along with their large parking lots, can attract litter, graffiti, and vandalism, as well as loiters and homeless populations. A decaying building both worsens its own prospects for refurbishment and weakens the vitality of the buildings around it. And big box stores, which are built quickly and cheaply, often have a lower quality of construction than other buildings, meaning they tend to deteriorate faster."***

The initial impetus of urban decay often originates from financial conditions faced by individual property owners; if a landlord is no longer collecting rent on a vacant property

and does not believe that it can be re-leased, the incentive to maintain the property may evaporate. The effect can spread to adjacent properties and become self-fulfilling as customers start to avoid the area, and other property owners or tenants perceive an area as no longer viable. Urban decay can be reinforced by a reduction in the fiscal resources of local governing entities because of declining sales and property tax revenue.

Urban Decay in the Context of Proposed Action A

The purpose of this analysis is to assess if development of the hotel and commercial enterprise under Proposed Action A would have a negative effect on businesses in downtown San Jacinto, which can lead to urban decay. The two types businesses that could potentially be affected under Proposed Action A are hotels and retail establishments.

As discussed in more detail in Section 3.6.2, there are two hotels in San Jacinto. Both of these hotels are low-price, budget facilities. Additionally, no new hotels are currently planned in the area. In comparison, the hotels proposed under Proposed Action A and B and Alternatives 1 and 2 are more high-end, luxury facilities in terms of the services they will offer. The clientele for these would not be the same as those who might stay at the two hotels in San Jacinto. Given that the proposed developments will not result in less people staying at the hotels in San Jacinto, no effect is anticipated on the hotel businesses in downtown San Jacinto because of Proposed Actions A.

In terms of retail businesses, a Retail MarketPlace Profile from ESRI of the ten-mile trade area of Hemet, which includes San Jacinto, reveals that the retail demand in the area is over $1.2 billion dollars.[4] Further, according to this profile, the leakage factor for this area is 17, meaning that a large number of the areas households are travelling long distances to shop. In most cases, they are going farther than 15 miles to shopping centers in Moreno Valley and Temecula. Given that leakage is a measure of retail sales lost by a community to a competitive market, indicating the need for more retail development in an area, there appears to be a shortage of retail businesses in the area. At the same time, the 2010 Edition of the California Retail Survey ranks Riverside County as number one in population growth.[5] However, more importantly, San Jacinto is ranked number five in terms of "Relative Strength" of the retail market among all cities in California.[6] The Relative Strength Ratio measures the long-term retail sales growth trend in one local market compared to growth fluctuations in statewide retail sales, and since it covers a period of the last five years, it provides a good comparison of longer-term sales growth trends relative to statewide averages. Given these facts, especially the strong growth and high retail demand in San Jacinto, the proposed commercial development is not anticipated to cause urban decay by taking business away from retail establishments in downtown San Jacinto. Based on available information, there appears to be sufficient demand in the area to accommodate new retail businesses without hurting existing ones.

Summary of Comments d: Using outdated data does not take into account the current economic downturn.

---

4 City of Hemet, May 2006, *Hemet Now*, "Hemet Retail Demand Tops $1 Billion."

5 The Eureka Group, 2010, "California Retail Survey – 2010 Edition."

6 "The Relative Strength Ratio measures the long-term retail sales growth trend in one local market compared to growth fluctuations in statewide retail sales. Since the Ratio covers a period of the last five years, it provides Survey users with an easily understood comparison of longer-term sales growth trends, relative to statewide averages. The ratio is derived by dividing the percentage increase in retail sales in a specific county or city over the past five years by comparable percentage increases for total statewide retail sales." The Eureka Group, 2010, "California Retail Survey – 2010 Edition."

Response d: The analysis of economic resources covers effects on economic production (output), labor income, and employment as estimated by IMPLAN (IMpact Analysis for PLANning), a regional economic model that is commonly used to estimate economic effects. The DEIS included 2006 IMPLAN data, which at the time was the best available data set. The FEIS has been updated using 2008 IMPLAN data, which is the most current and best available data set. Figures were also updated to reflect the current pricing of goods and services that will be required to construct the proposed developments. For example the DEIS states that the approximate construction cost of the proposed developments was $300 million, but the price difference in materials and services raises the estimated construction cost to $335 million.

In summary, the updated economic data and model produced varying results in regards to the total economic effect for the proposed developments under the Proposed Action. Economic effects resulting from construction decreased from $471 million to $400 million, with a decrease in construction labor income from $190 million to $130 million. However, economic effects resulting from operations increased (direct revenue figures are considered privileged information and not presented in the DEIS), with an increase in permanent labor income from $72 million to $157 million. Permanent jobs, however, decreased from 1,753 to 1,602 full-time employee positions.

Given the minor decrease in economic effects, fiscal effects also experienced a slight decrease. Sales tax revenues for the Proposed Action was adjusted from $1.15 million to $810,000 annually, where the State would realize $670,000 annually and the local municipalities would realize $140,000 annually. The total state income tax was reduced from $1.98 million to $1.71 million annually, but Federal income tax revenues increased from $7.92 million to $7.97 million annually.

Summary of Comments e: The Proposed Action is predicted to increase jobs and economic activity, which is much needed in the County. To fully understand these benefits, a breakdown of employment at the existing facility needs to be presented next to the employment resulting from the Proposed Action.

Response e: The construction, operation, and maintenance of the Proposed Action will result in significant spending, income generation, and employment in the local area. These effects are presented in Table 4-23 and 4-24 and discussed in Section 4.6 of the FEIS. The construction-related effects of the Proposed Action may result in up to 1,084 jobs, $130.4 million in labor income, and $400 million in output within Riverside County. The operation-related effects of the Proposed Action may result in up to 2,384 jobs, $189.3 in labor income, and $44.9 in output within Riverside County. The operation-related effects *include* output, income, and employment effects of the current Soboba operation.

The 'No Action' option in Table 4-23 and 4-24 in Section 4.6 represents the existing operation conditions including existing employment. The construction phase of the Proposed Action A will create up to 1,084 jobs, which is compared to the 'No Action' alternative of 0 construction-related jobs. The Proposed Action will directly employ 1,635 employees at the new casino/hotel facilities, which is compared to the 'No Action' alternative of 1,000 operation-related jobs, resulting in 653 new direct jobs related to the Proposed Action. Additionally, 731 people will be employed in Riverside County as a result of the indirect and induced effects of the Proposed Action, which is compared to the 'No Action' alternative of 285 indirect jobs and 318 induced jobs.

Summary of Comments f: Some commenters' believe the proposed action will increase property values. Others believe it will decrease home values.

Response f: The effects of the Proposed Action on local property values are complex. The value of a property is derived from its property/home attributes (e.g. lot size, number of rooms, exterior material) and neighborhood attributes (e.g. walkability, proximity to parks/golf courses, safety). Changing a

property/neighborhood attribute has the potential to result in an increase or decrease in property values. For example, local area property values may increase if the facilities resulting from the Proposed Action are generally perceived as desirable. If the facilities resulting from the Proposed Action are generally perceived as undesirable, local area property values may fall.

The Proposed Action may specifically affect the neighborhood attributes of three communities: Soboba Springs Mobile Home Park, Soboba Springs, and Soboba Heights. The body of existing literature does not allow for a conclusive determination to be made regarding effects to property values in the area of the Project Site. The market values for these properties currently reflect proximity to the golf course, gaming, and other attributes of the Soboba Reservation. It is difficult to accurately forecast how property values will react to the presence of the proposed facilities. Some home buyers may find the development of the new hotel/casino complex a desirable attribute, positively effecting property values. Some buyers may not consider the proposed facilities a desirable attribute, negatively effecting property values. See Section 4.6 of the FEIS for additional discussion of this issue.

The Proposed Action will result in the Soboba Springs Mobile Home Park being surrounded by the Soboba Reservation with the exception of a road granting entry. While this property currently internalizes proximity to the golf course, gaming, and other attributes of the Soboba Reservation in its property value, the effect of the 'island effect' on property values is not conclusive based on empirical review. As described in Section 4.6 of the FEIS, the 'Island Effect' can be expected to effect property values, but the direction and magnitude of the effect is unknown. However, the Soboba Springs Mobile Home Park is owned by a single owner, so any positive/negative property value effects will be limited. Any decrease in County property tax revenue resulting from a decrease in the Soboba Springs Mobile Home Park will be minor. The following text was added to Section 4.6 of the FEIS:

> **An 'Island Community' is formed when a small piece of fee land is privately held within a large area of trust land and occupants of the fee land must traverse trust land for ingress/egress. The effects to abutting property values and the creation of an 'Island Community' within trust land ('Island Effect') are not conclusive based on empirical review. While the creation of trust property can be expected to effect property values, the direction and magnitude of the effect is unknown.**
>
> **In cases like Strate v. A-1 Contractors (1997), Brendale v. Confederated Tribes and Bands of the Yakima Indian Nation (1989), and Montana v. United States (1981) (as discussed in Tsosie, 2001) the difficulties of governing non-Indian fee lands within reservation boundaries is highlighted. The creation of checkerboard reservations (fee land surrounded by trust land) may burden the administration of governing by state/local v. tribal governments. In cases like Solem v. Bartlett (1984) (as discussed in Sherrill v. Oneida Indian Nation of New York, 544 U.S. (2005)) the fee land islands within trust land is expected to adversely affect private landowners neighboring tribal land.**
>
> **Fee property in an area dominated by trust land may be scarce or in shortage (Rosser, 2008). The purchase of fee land over trust land may be preferable to individuals and even Indians living in the area due to their ability to own the property. This may put a premium on fee land nearby trust land (through real or perceived advantages of owning land), driving up the price of the property resulting in a higher sales price for sellers of such property. One example is where a plaintiff owned a 'very small island of fee land' surrounded by Navajo trust land (Krakoff, 2004). The owner of the land runs a hotel and was actually able to benefit financially by being within Navajo Nation boundaries through increased visitation.**

The literature suggests the need for additional research to fully understand the effects of tribal land acquisition programs on non-Indian small property owners (Rosser, 2008). Thus, the magnitude and direction of effect to property values is unknown and inconclusive. However, in this instance, Lake Park Drive and Soboba Road would remain under the jurisdiction of the City of San Jacinto and residents of local communities would not have to pass through trust land to access their homes. These right-of-ways would remain under the jurisdiction and management of the City of San Jacinto as result of the fee-to-trust action, therefore, values of abutting fee properties to trust lands may or may not experience an "island effect" given that residents can directly access their properties. Refer to Section 2.1.1 and Figure 2-6 for additional information on the right-of-ways on the Project Site.

Summary of Comments g: A decrease in the local tax base may adversely affect the ability to repay the City's Lake Park bridge construction bond.

Response g: As concurred by General Accounting Manager Mr. Tom Prill of the City of San Jacinto (pers. comm. on December 8, 2010), the City paid off the outstanding bond debt for the Lake Park Bridge project in September 2009 and there are no outstanding bonds currently allocated to the Project Site.

1.11.2 Environmental Justice

Summary of Comments a: The DEIS does not adequately address the environmental justice issues. The DEIS ignores the disproportionate economic, environmental, and health effects of the project on the minorities and low-income senior citizens/retirees (on fixed income) in communities surrounding the Development Site, and does not provide any mitigation of these effects.

Response a: The analysis of environmental justice employed data available from the U.S. Census Bureau and other reliable sources in order to identify minority and low-income groups in the Project Site and surrounding area. The smallest geographic unit for which data on poverty rates and incomes are available is the Census Block Group. Most of the property is located in Census Tract 43510, Block Group 1, with a small portion in Census Tract 43509, Block Group 1. The Project itself will be entirely located in Census Tract 43510, Block Group 1. In response to public comment, a deeper analysis was conducted to compare the average poverty rate in the Block Groups within the 11-mile radius surrounding the Project Site with poverty rates in Census Tract 43510, Block Group 1, and Census Tract 43509, Block Group 1. This comparison is provided below:

Average Poverty Rate in Block Groups within an 11-Mile Radius of the Project Site: 16.6 Percent
Poverty Rate in Census Tract 43510, Block Group 1: 15.7 Percent
Poverty Rate in Census Tract 43509, Block Group 1: 7.4 Percent

This data suggest that the poverty rate in the Project Site is lower than that in the general area surrounding the Project. An analysis of the age of the population was also carried out to examine how the percentages of older population in the two Block Groups compare to that in the general area. The results are presented below:

Average Percentage of Population 65 Years and Older in Block Groups within an 11-Mile Radius of the Project Site: 24 Percent
Average Percentage of Population 65 Years and Older in Census Tract 43510, Block Group 1: 25 Percent
Average Percentage of Population 65 Years and Older in Census Tract 43509, Block Group 1: 6 Percent

The data on age of the population suggests that while the percentage of people over 65 years of age is slightly higher (one percentage point) than the average in the area, it is not considerably high to be an

environmental justice concern. Therefore, while the analysis acknowledges that there may be groups of low-income, older people present in the vicinity of the Project, our data does not provide enough evidence at that level to support this.

Table 3-20 in the FEIS has been modified to add data at the Block Group level for the two Block Groups in which the Property is located. Also, average data for all Block Groups within the 11-mile radius of the Project Site is also presented in **Table 3-20**. The related text under the subheading "Income-Related Measures of Social Well-Being" has also been modified as follows to incorporate Block Group level discussion, and some additional discussion on the communities of Soboba Springs Mobile Home Park, Soboba Springs, and Soboba Heights:

> As derivatives of total personal income, per capita and median household income and poverty rates represent widely used economic indicators of social well-being. **Table 3-20(A)** presents these socioeconomic data for the Project Site and surrounding area, Riverside County, and California. These data are also presented for the two Block Groups in which the Project Site is located (Census Tract 43510, Block Group 1 and Census Tract 43509, Block Group 1) and for the average of all Block Groups within the 11-mile radius of the Project Site. In 2008, per capita personal income in Riverside County was $30,341, which is about 70 percent of the statewide level of $43,687 (2010 dollars). There is some disparity between local and statewide level of $41,214 (2010 dollars). Based on these figures, per capita personal income in Riverside County ranked 36th in the state. There is some disparity between local and statewide conditions in the context of per capita as well as median household incomes. Based on 2000 Census data (2010 dollars), median household incomes in Riverside County and California were $53,688 and $59,454, respectively. Median household income levels were even lower in San Jacinto at $38,340. As for the Reservation, the median household income was $80,699 in 1999. Finally, poverty rates represent the percentage of an area's total population living at or below the poverty threshold established by the U.S. Census Bureau. Based on 2000 Census data, the poverty rate was 20.3 percent in San Jacinto, 17.7 percent on the Reservation, 14.2 percent in Riverside County, and 14.2 percent in the State of California.
>
> **The smallest geographic unit for which data on poverty rates and incomes are available is the Census Block Group. Most of the property is located in Census Tract 43510, Block Group 1, with a small portion in Census Tract 43509, Block Group 1. The Project itself will be entirely located in Census Tract 43510, Block Group 1. The communities of Soboba Springs Mobile Home Park, Soboba Springs, and Soboba Heights are also mostly located in Census Tract 43510, Block Group 1, while the Calicinto Ranch, which runs programs for children of incarcerated parents, is located in Census Tract 43509, Block Group 1. Analysis was conducted to compare the average poverty rate in the Block Groups within the 11-mile radius surrounding the Project Site with poverty rates in Census Tract 43510, Block Group 1, and Census Tract 43509, Block Group 1. This comparison is provided in Table 3.20(A). These data suggest that the poverty rate in the Project Site is lower than that in the general area surrounding the Project.**

All efforts have been made to obtain, present, and analyze the most current published data from reliable sources in Sections 3.6.3 and 4.6 of the FEIS. It is important to point out, however, that some data at the lowest geographic units of analysis, such as Census Block Groups and Census Blocks, are only available for 2000. Analyses at these levels are critical for identifying low-income and minority groups directly adjacent to Project Site.

Summary of Comments b: The FEIS should consider the negative social effects of gambling on low income groups, minorities, senior citizens, and problem gamblers. Problem gamblers are more likely to

commit crimes, which could pose a safety risk to the surrounding communities. The DEIS does not address the issue of effects on problem gamblers and their families, nor does it provide any mitigation measures (such as outreach programs).

Response b: Regarding concerns about the social effects of gambling on low income groups, minorities, senior citizens, and problem gamblers, the Proposed Action will not increase gaming facilities (i.e. slot machines) in the area. The existing casino is located approximately one mile from the proposed casino, which implies that the communities that will have access to gaming facilities at the proposed casino currently have access to the same number of gaming facilities in the general area. Therefore, while the analysis acknowledges the negative effects of gambling in general, given that the Proposed Action will not add to the existing gaming facilities in the area, there is no evidence to conclude that additional effects of gambling on any groups would occur due to the Proposed Action compared to existing conditions. In addition, the Tribe's gaming compact with the State contains provisions to mitigate for the effects of gambling (see **Section 1.11.1: Response b** of this public comment report).

1.12 RESOURCE USE PATTERNS

1.12.1 Transportation Networks

1.12.1.1 Effects to Nearby Residential Communities

Summary of Comments: The DEIS did not analyze potential effects to residents of the surrounding communities, particularly Soboba Springs Mobile Home Park and the Soboba Springs and Soboba Heights communities. Residents testified during public meetings that during special events, access to their homes was blocked due to "bumper-to-bumper" traffic along Lake Park Drive and Soboba Springs Road. The only mitigation proposed for the "bumper-to-bumper" traffic expected to be generated by special events at the proposed arena, creating access issues for the Soboba Springs Mobile Estates park, potentially blocking the park's only egress point by the traffic on Lake Park Drive, and effecting the Soboba Springs community and the Soboba Heights community, is to provide off-site parking "near major thoroughfares" and shuttles from the parking center.

Residents have expressed concern that they would not be able to enter or exit their park during events, because the only park entrance is located on Lake Park Drive and there is no traffic light at that point on Lake Park Drive. The DEIS did not adequately address this issue.

Response: The updated traffic impact analysis (Appendix T of the FEIS) has analyzed the traffic effects to residential communities by analyzing the intersection of Soboba Springs Drive/Lake Park Drive (the Soboba Springs Mobile Estates access) as well as the intersection of Chabella Drive/Soboba Road.

As discussed in Section 4.7 of the FEIS, for Opening Year (2010) with project traffic conditions and without improvements, the intersection of Soboba Springs Drive/Lake Park Drive is projected to operate at unacceptable Levels of Service (LOS) under Proposed Action A, Proposed Action B, and Alternative 1. Mitigation measures have been incorporated into Section 5.7 of the FEIS in order for the intersection of Soboba Springs Drive/Lake Park Drive to operate at acceptable LOS during the peak hours for Opening Year (2010) with project traffic conditions.

For Year 2025 with project traffic conditions and without improvements, the intersection of Soboba Springs Drive/Lake Park Drive is projected to operate at unacceptable LOS under Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Section 4.10 of the FEIS). Mitigation measures have been incorporated into Section 5.7 of the FEIS in order for the intersection of

Soboba Springs Drive/Lake Park Drive to operate at acceptable LOS during the peak hours for Year 2025 with project traffic conditions.

As discussed in Section 4.7 of the FEIS, for Opening Year (2010) with project traffic conditions and without improvements, the intersection of Soboba Road/Chabella Drive is projected to operate at acceptable LOS.

For Year 2025 with project traffic conditions and without improvements, the intersection of Soboba Road/Chabella Drive is projected to operate at unacceptable LOS for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Section 4.10 of the FEIS). Mitigation measures have been incorporated into Section 5.7 of the FEIS in order for the intersection of Soboba Road/Chabella Drive to operate at acceptable LOS during the peak hours for Year 2025 with project traffic conditions.

A Transportation Management Plan (TMP) has been prepared and will be implemented as a mitigation measure to account for traffic during special events (see Section 5.7 and Appendix AB of the FEIS). Issues discussed in the TMP includes parking, site access, event notification, channelization, manual traffic control measures, valet/VIP services, designated parking areas, emergency/fire/medical services, and a monitoring measure.

As part of this analysis, consideration was given to the Soboba Springs Drive/Lake Park Drive intersection in order to provide mitigation measures to reduce traffic effects for these residents during times of special events. Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages (Appendix AB of the FEIS). In order to provide local residents with ease of access to and from their communities, the TMP recommended that traffic control personnel/police be situated at the project accesses and the intersections of Soboba Road/Chabella Drive, Soboba Road/Lake Park Drive, and Soboba Springs Drive/Lake Park Drive. Using traffic control personnel/police at the project accesses and the intersections of Soboba Road/Chabella Drive, Soboba Road/Lake Park Drive, and Soboba Springs Drive/Lake Park Drive would allow for traffic to flow to and from the Development Site as well as allow local residents access to and from their communities. Each intersection should have a minimum of one traffic control personnel/police directing traffic.

1.12.1.2 Emergency Evacuation, Emergency Response, and Access Issues

Summary of Comments: The California Gambling Control Commission has a regulation to address Emergency Evacuation and Preparedness Plans. The DEIS fails to adequately address this concern and something that is clearly required and must be included in a plan adopted under the California Gaming Control Commission regulation (CGCC-7). There is a critical need for safe emergency exits in case of an earthquake as well as the need for emergency vehicles to have access to the area. How would emergency medical services maneuver through heavily congested traffic to respond to medical emergencies? The road system here is inadequate to accommodate large amounts of traffic and in an emergency people would be trapped. Furthermore, residential communities will become islands in the event of the fee-to-trust transfer, which will result in restricted access and increased response times for emergency services.

In the interest of public safety, the project should provide an Alternate or Secondary Access(s).

Response: In response to concerns raised by the public, the TMP (see Section 5.7 and Appendix AB of the FEIS) was prepared to address traffic associated with special events and would be implemented as a mitigation measure. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured and the response protocol to be followed in the

event of an emergency situation. The proposed protocol includes response times and other goals for emergency response. Also noted in the TMP is that with more than one access point, good emergency access is assured because there are two ways of reaching any point within the Project Site.

According to the TMP, in the event of an emergency, ambulances and emergency response vehicles can utilize shoulders, two way left-turn medians, and opposing traffic lanes (in this case the northbound lane(s) on Soboba Road and westbound lane(s) on Lake Park Drive) to arrive to and depart from the facility or surrounding neighborhoods in a timely manner. Concerning traffic congestion in the event of a large-scale emergency, both Soboba Road and Lake Park Drive can be utilized as thoroughfares for both patrons and employees of the Project Site and the surrounding communities as a means of evacuation. As the roadways are currently constructed, this would allow for a total of 4 outbound lanes (2 lanes on Soboba Road and 2 lanes on Lake Park Drive) to be used for an evacuation. The shoulders can also be used as either general public outbound lanes or emergency personnel inbound/outbound lanes. The TMP concludes that it is safe to assume that the roadways have the capacity to evacuate the area within approximately one hour time.

The following language has been added to the "Parking and Access" discussion under Section 2.1.1 of the FEIS in order to clarify the accessibility of Lake Park Drive and Soboba Road upon the proposed fee-to-trust transfer:

> **During the public comment period, concerns were raised that the Proposed Action and Alternatives could restrict public access and the provision of public services to the Soboba Springs Mobile Estates and the Golf Course and hillside communities. Tribal Resolution No. CR07-HGFTT-51 (see Appendix J) acknowledges the existing easement for roadway, water lines and underground conduits and incidental purposes along the Project Site, which includes a roadway easement for Lake Park Drive and Soboba Road. Furthermore, the Resolution acknowledges, as an exception to title of the Project Site, "rights of the public in and to any portion of the subject property lying within any lawfully established streets, roads, or highways." Finally, Soboba Road beyond the existing Reservation and Lake Park Drive are public roads and would continue to be public roads in the event of the fee-to-trust transfer. Neither roadway is included in the legal descriptions for the subject fee-to-trust parcels. A plat map prepared by First American Title Company illustrates the exclusion of public roadways from the parcels proposed for the fee-to-trust transfer (see Figure 2-6). As Lake Park Drive and Soboba Road form no part of the subject parcels, the trust acquisition should have no effect on the public's right to use the roads or the ability of law enforcement personnel to access local communities. Therefore, access to the residential communities nearby the Project Site would remain unimpeded.**

Please see Section 2.12.2.2 Jurisdictional Issues above for a more detailed discussion of Land Use issues.

1.12.1.3 Mitigation Implementation

Summary of Comments a: The following comments pertain to the implementation schedule and assigning financial responsibility for proposed mitigation measures:

- The DEIS offers as mitigation measures the installation of traffic lights at various intersections, both on the Reservation and in the cities of San Jacinto and Hemet. Another proposed mitigation measure is the alteration of Lake Park Drive and Soboba Road to secondary highway width at certain points adjacent to the Project. The installation of traffic lights off the Reservation (a mitigation measure specified in the DEIS) relies upon funds being provided by the Tribe to the cities and the cooperation of the cities in the installation of signals. Furthermore, the DEIS proposes improvements that include

two traffic signals on Soboba Road and two traffic signals on I-215 freeway ramps. The DEIS does not provide an implementation schedule or assign financial responsibility on any party for installing the traffic control signals.

- Relative to mitigation proposed for the intersection of Florida and San Jacinto, the DEIS does not identify how the necessary improvements will be funded. The DEIS states that signal mitigation fees would be paid, but signal mitigation fees are for installation of signals only and intersection improvements are not included in the fee. Furthermore, please clarify who would be responsible for intersection improvement implementation. The DEIS should include language calling for an agreement between the City and the Tribe clearly outlining responsibilities and appropriate payment for services and costs.
- The Tribe should be required to make any off-site improvements where the Proposed Action and Alternatives alone would have a significant traffic effect. The payment of fair share fees would not be considered sufficient mitigation. In those cases where the Proposed Action and Alternatives contribute to a cumulative effect, the payment of fair share would be acceptable, provided the fair share is computed on the basis of the percentage of the traffic contributed by the Proposed Action and Alternatives compared to traffic growth.

Response a: As discussed in Section 5.7.1 of the FEIS, the Tribe shall contribute to the funding of mitigation for traffic improvements in the Project Site and surrounding area. The contribution shall be based on the amount of traffic generated by land uses on the Project Site as a percentage of the overall traffic volume. This percentage will be derived from the results included in the traffic impact analysis (Appendix T of the FEIS). The Tribe's contribution shall be provided to the agency undertaking the improvement (e.g., Caltrans, Riverside County, City of San Jacinto). In the case of improvements that are identified as the sole responsibility of the Tribe, the Tribe must contribute 100 percent of the necessary funds. The intersections that the Tribe will pay for in full are the ones pertaining to site access and require the creation of new access points.

The Record of Decision (ROD) is the document that commits the agency to mitigation, not the FEIS. Pursuant to the NEPA process, the ROD serves as an agreement between parties to implement all prescribed mitigation measures. Please see Section 2.18 of this public comment report for a more detailed discussion on mitigation adoption.

Summary of Comments b: The traffic study identified the intersection of Florida and San Jacinto at a "D" level of service for 2010 with mitigation improvements. The improvements included adding an additional westbound through lane, an additional eastbound left turn lane and an eastbound right turn lane. Any proposed mitigation measure which itself causes effects, needs to be analyzed in the FEIS. Adding additional through lanes and turn lanes will require condemnation of land to facilitate the additional right of way. The DEIS does not address this effect and a full analysis of this necessary widening should be performed. As the Tribe does not have authority to condemn land, are they expecting the City of Hemet to assume responsibility?

Response b: Table 5-4 of the FEIS shows that Opening Year (2010) with project traffic conditions improvements include adding an additional westbound through lane. The westbound shared through-right turn lane can be accommodated by restriping the existing westbound right turn lane to a shared through-right turn lane while striping a receiving lane on the west leg of the intersection.

The same table shows that for Year 2025 with project traffic conditions, an additional eastbound left turn lane will be required. It should be noted that an eastbound right turn lane improvement is not recommended. The additional eastbound left turn lane will require restriping of the eastbound lanes and

widening at the intersection on the west leg and east leg with removal of the landscaping within the right-of-way.

Summary of Comments c: The DEIS finds that six intersections and three freeway segments will operate at unacceptable LOS during peak hours without improvements. Yet, the only improvements that are proposed include two traffic signals on Soboba Road and two traffic signals on I-215 freeway ramps. The DEIS does not explain how two traffic signals will increase LOS to acceptable levels on six intersections.

Response c The traffic impact analysis proposed mitigation measures for all intersections and freeway segments which were projected to operate at unacceptable levels of service to bring those intersections and freeway segments to acceptable levels of service. It should be noted that the amount of intersection delay acceptable for an unsignalized intersection is substantially less than for a signalized intersection. For instance, the Highway Capacity Manual describes Level of Service D for an unsignalized intersection to have 35.0 seconds of delay for any one movement, while an average of 55.0 seconds of delay is acceptable for all movements combined at a signalized intersection. Level of Service E for an unsignalized intersection may have 50.0 seconds of delay for any one movement, while an average of 80.0 seconds of delay is acceptable for all movements combined at a signalized intersection.

All relevant, reasonable traffic mitigation measures that could improve the proposed project have been identified. Good faith efforts have been made throughout the environmental review process to design the project so as to minimize traffic effects and to propose mitigation measures that are intended to further minimize effects to transportation networks.

As described in Section 5.7 of the FEIS, the Tribe shall contribute to the funding of mitigation for traffic improvements in the Project Site and surrounding area, including those identified in Section VI and Appendix G of the Traffic Impact Study (see Appendix T) and summarized in Table 5-4. The contribution shall be based on the amount of traffic generated by land uses on the Project Site as a percentage of the overall traffic volume. The Tribe's contribution shall be provided to the agency undertaking the improvement (e.g., Caltrans, Riverside County, City of San Jacinto). In the case of improvements that are identified within this document as the sole responsibility of the Tribe, the Tribe's contribution must provide 100 percent of the necessary funds. The intersections that the Tribe will pay for in full are the ones pertaining to site access and require the creation of new access points.

Summary of Comments d: The DEIS suggests potential sites for off-site parking, each of which is an educational facility, including four elementary schools. The use of elementary schools and high schools as mitigation for event parking is not fully explained and we have concerns whether this mitigation measure is adequate, particularly when those educational facilities are likely to have their own nighttime activities requiring their use of their parking structures.

Response d: A TMP has been prepared and will be implemented to account for traffic during special events. This study includes information pertaining to event parking during special events and potential mitigation measures. The TMP does not call for the use of schools to manage event traffic. Language that appeared in Section 5.7.1 of the DEIS pertaining to off-site parking at educational facilities has been removed. This language was initially added to mitigate for the increased traffic during special events by reducing the number of vehicles that would drive to the Development Site, not due to a concern regarding the sufficiency of on-site parking. As the TMP will be implemented to manage traffic from special events, the provision of off-site parking is no longer necessary. Furthermore, as described in Section 2.1 of the FEIS, the parking lot for the existing Soboba Casino would provide overflow parking for the Proposed Action and the Tribe would provide shuttle service.

It should be noted that the project utilizes shared parking procedures recommended by the Urban Land Institute (ULI). The idea of shared parking is that the various land uses have peak parking demands at different points in time, on different days of the week, and the number of parking spaces required is not the sum of the parking requirements for each land use, but rather less. The peak demands for the various land uses can be non-coincidental with an opportunity for sharing of parking. In addition, interaction between the hotel and casino will occur with the patron of the hotel visiting the casino and restaurants without the need for an additional parking space. Other interaction will occur between the hotel and convention center.

Summary of Comments e: As part of the Proposed Action and Alternatives, Soboba Road, which would serve 30 percent of the traffic to and from the proposed project, should be improved to an all-weather facility with sufficient capacity to serve the forecasted traffic of over 30,000 vehicles per day. In addition to carrying routine high traffic volumes to and from the proposed facility, the availability of Soboba Road as an all-weather roadway with adequate capacity would be crucial in the event of evacuations and other emergencies.

Response e: Soboba Road is classified as a Secondary highway on the City of San Jacinto General Plan Circulation Element and County of Riverside General Plan Circulation Element. A Secondary highway cross-section reflects two lanes in each direction (four lanes total). The traffic impact analysis recommends that Soboba Road be constructed as a four-lane Secondary highway between Gilman Springs Road and Lake Park Drive for Opening Year (2010) and Year 2025 traffic conditions.

Mitigation measures to improve Soboba Road are described in Section 5.7.1 and shown in Table 5-4 of the FEIS, while site-specific circulation and access recommendations for the Proposed Action and Alternatives are depicted on Figures 5-1a through Figure 5-5b of the document.

Summary of Comments f: The current casino generates traffic difficulties (e.g. speeding) that have not been adequately addressed or mitigated by the City and Tribe.

Response f: The reasons for funding or denying past requests for road improvements are not part of this project and are outside the scope of this analysis.

Summary of Comments g: Proposed mitigation measures do not mention whether or not the agencies responsible for these proposed improvements have been contacted and given their approval to make these improvements.

Response g: The appropriate agencies have been contacted and have reviewed the traffic impact analysis. Based on comments from these agencies, an updated traffic impact analysis has been prepared (see Appendix T).

Summary of Comments h: Additional mitigation measures should be considered, including the following:

- Widen the road between the casino and Lake Park Drive and make the traffic split three ways between Esplanade Avenue, Main Street, and Soboba Road;
- Build another bridge at the end of San Jacinto Street to cross the river to ease traffic which would be on the west side of the Soboba Springs Country Club, or build a fjord across the river to Valle Vista as an emergency access route;

All traffic improvements should be completed before the Proposed Action and Alternatives are considered.

Response h: Section 5.7.1 of the FEIS includes a mitigation measure which would widen Lake Park Drive and Soboba Road adjacent to the Development Site. With more than one entrance, good emergency access is assured because there are two ways of reaching any point within the site. The City of San Jacinto General Plan Circulation Element does not recommend another bridge to cross the river at the end of San Jacinto Street or Valle Vista. Mitigation measures to reduce traffic effects are described in Section 5.7.1 and shown in Table 5-4 of the FEIS, while site-specific circulation and access recommendations for the Proposed Action and Alternatives are depicted on Figures 5-1a through Figure 5-5b of the document. Improvements to Lake Park Drive and Soboba Road would occur during the first phase of development.

As stated in Section 5.7.1, improvements to Lake Park Drive and Soboba Road would be performed in conjunction with the development of the proposed facilities; traffic signals shall be installed when warranted at the Development Site entrances/Soboba Road intersections; and, on-site traffic signing/striping shall be implemented in conjunction with detailed construction plans for the Development Site.

1.12.1.4 Requests for Additional Analysis

Summary of Comments a: The DEIS analysis of effects to transportation networks is inadequate in scope and the number of intersections analyzed. At a minimum, the traffic study should analyze the following local intersections:

- Soboba Road/Gilman Springs Road
- Ramp terminals at the interchange of Gilman Springs Road and SR-79 (Sanderson Avenue)
- Ramp terminals at the interchange of SR-60/Gilman Springs Road
- SR-74/Ramona Expressway
- Ramona Expressway/Sanderson Avenue (in San Jacinto)
- Ramona Expressway/Bridge Street
- Mountain Avenue/Soboba Street
- Mountain Avenue/Ramona Expressway/Cedar Avenue
- San Jacinto Street at Devonshire Avenue
- San Jacinto Street at Menlo Avenue
- State Street at Florida Avenue
- State Street at Devonshire Avenue
- State Street at Menlo Avenue
- State Street at Esplanade Avenue
- State Street at Stetson Avenue
- State Street at Domengioni Parkway

Furthermore, the FEIS should include an analysis of the following roadway segments:

- Soboba Road between the project and Gilman Springs Road

- Gilman Springs Road between Soboba Road and SR-60 (for analysis purposes this segment may need to be subdivided)
- SR-79 between Gilman Springs Road and I-10 (for analysis purposes this segment may need to be subdivided)
- Ramona Expressway between Main Street in San Jacinto and Perris City Limits (for analysis purposes this segment may need to be subdivided)
- Mountain Avenue/Ramona Expressway between Main Street in San Jacinto and SR-74 (for analysis purposes this segment may need to be subdivided)

Response a: According to the County of Riverside Traffic Impact Analysis Preparation Guide, April 2008, "the minimum area to be studied shall include any intersection of "Collector" or higher classification street, with "Collector" or higher classification streets, at which the proposed project will add 50 or more peak hour trips, not exceeding a 5-mile radius from the Project Site." The additional intersections and roadway segments requested for analysis which adhere to these guidelines have been added to the updated traffic impact analysis, inclusive of the following:

Intersections

- Soboba Road/Gilman Springs Road
- Ramona Expressway/Sanderson Avenue (In San Jacinto)
- San Jacinto Street at Devonshire Avenue
- San Jacinto Street at Menlo Avenue
- State Street at Florida Avenue

Mountain Avenue/Soboba Street was already assessed in the traffic impact analysis.

The following requested intersections do not meet the minimum 50 peak hour trips threshold:

- Mountain Avenue/Ramona Expressway/Cedar Avenue
- State Street at Devonshire Avenue
- State Street at Menlo Avenue
- State Street at Esplanade Avenue
- State Street at Stetson Avenue
- State Street at Domengioni Parkway

Sections 4.7 and 4.10 provide a summary of the study area intersection LOS for Opening Year (2010) and Year 2025 traffic conditions. The Opening Year (2010) study area intersections are projected to operate at acceptable LOS during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 traffic conditions (see Tables 4-27, 4-31, 4-35, 4-39, and 4-43 in the FEIS). The Year 2025 study area intersections are projected to operate at acceptable LOS during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 traffic conditions (see Table 100(a) in the FEIS).

Roadway Segments

- Soboba Road between the project and Gilman Springs Road

- Gilman Springs Road north of Soboba Road (added to the updated traffic impact analysis until it exceeds the 5 mile radius threshold)
- Ramona Expressway from Main Street to west of Sanderson Street (added to the updated traffic impact analysis until it exceeds the 5 mile radius threshold)
- Mountain Avenue/Ramona Expressway from Main Street to east of Soboba Street (added to the updated traffic impact analysis until the proposed project does not meet the 50 peak hour trip threshold)

The following requested intersections and roadway segment are located beyond a 5-mile radius of the Project Site:

- Ramp terminals at the interchange of Gilman Springs Road and SR-79 (Sanderson Avenue)
- Ramp terminals at the interchange of SR-60/Gilman Springs Road
- Ramona Expressway/Bridge Street
- SR-79 between Gilman Springs Road and I-10

Sections 4.7 and 4.10 provide a summary of the study area roadway segments LOS for Opening Year (2010) and Year 2025 traffic conditions. The Opening Year (2010) study area roadway segments are projected to operate at acceptable LOS during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 traffic conditions (see Table 4-27b in the FEIS). The Year 2025 study area roadway segments are projected to operate at acceptable LOS during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 traffic conditions (see Table 4-100(b) in the FEIS).

As described in Section 5.7 of the FEIS, the Tribe shall contribute to the funding of mitigation for traffic improvements in the Project Site and surrounding area, including those identified in Section VI and Appendix G of the Traffic Impact Study (see Appendix T) and summarized in Table 5-4. The contribution shall be based on the amount of traffic generated by land uses on the Project Site as a percentage of the overall traffic volume. The Tribe's contribution shall be provided to the agency undertaking the improvement (e.g., Caltrans, Riverside County, City of San Jacinto). In the case of improvements that are identified within this document as the sole responsibility of the Tribe, the Tribe's contribution must provide 100 percent of the necessary funds. The intersections that the Tribe will pay for in full are the ones pertaining to site access and require the creation of new access points.

Summary of Comments b: According to the traffic study, the proposed effects on the I-10 and I-215 freeways were analyzed. However, the study did not address effects to Highway 79 expansion and re-alignment which is slated for construction in year 2011 and represents the primary north-south corridor in the San Jacinto Valley. At a minimum, the FEIS should analyze effects to the intersection of:

- Highway 79 and Florida Avenue
- Highway 79 and Esplanade Avenue

Response b: According to the County of Riverside Traffic Impact Analysis Preparation Guide, April 2008, "the minimum area to be studied shall include any intersection of "Collector" or higher classification street, with "Collector" or higher classification streets, at which the proposed project will add 50 or more peak hour trips, not exceeding a 5-mile radius from the Project Site." The additional intersections requested for analysis are located beyond the 5-mile radius from the Project Site.

Summary of Comments c: The DEIS fails to address the effects that the Proposed Action and Alternatives will have on Gilman Springs Road.

Response c: The updated traffic impact analysis (Appendix T of the FEIS) has analyzed the intersection of State Street/Gilman Springs Road at Soboba Road as well as the roadway segment north and east of the intersection. As stated in Section 3.7 of the FEIS, the intersection of State Street/Gilman Springs Road at Soboba Road operates at unacceptable LOS during the peak hours and appears to currently warrant a traffic signal for existing traffic conditions. As discussed in Section 4.7 of the FEIS, the Opening Year (2010) traffic conditions show that the intersection of State Street/Gilman Springs Road at Soboba Road is projected to operate at acceptable LOS during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Tables 4-27(a), 4-31, 4-35, 4-39, and 4-43 in the FEIS).

As discussed in Section 4.10 of the FEIS, the Year 2025 traffic conditions show that the intersection of State Street/Gilman Springs Road at Soboba Road is projected to operate at acceptable Levels of Service during the peak hours, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Table 4-100(b) of the FEIS).

The roadway segment of Gilman Springs Road, north of Soboba Road currently operates at an unacceptable LOS for existing traffic conditions. The Opening Year (2010) traffic conditions show that the roadway segment of Gilman Springs Road, north of Soboba Road is projected to operate at an acceptable LOS, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Table 4-27(b) in the FEIS). The Year 2025 traffic conditions show that the roadway segment of Gilman Springs Road, north of Soboba Road is projected to operate at an acceptable LOS, with improvements for Proposed Action A, Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 (see Table 5-4 in the FEIS).

Summary of Comments d: A TMP should be prepared to handle major special events like concert and other intense short-term peaks using the proposed convention center. The TMP should be submitted to the review and approval of all affected jurisdictions (including but not limited to, County Transportation Sheriff, CHP, CAL Fire, and the City of San Jacinto). The TMP should address such matters as:

- Special traffic controls, including Traffic Officers
- Need for off-site parking, if necessary,
- Bus or shuttle services,
- Pedestrian circulation,
- Avoidance of vehicular/pedestrian conflicts
- Other measures as may be appropriate

Response d: The Proposed Action and Alternatives are not subject to review and approval of state, county, or local officials. However, a TMP has been prepared for the project which addresses these points (see Appendix AB) as follows:

Special traffic controls, including Traffic Officers: Manual traffic control points should be manned with traffic control personnel/police in order to route traffic flow at intersections and at parking areas. At a minimum, traffic control personnel/police should be situated at each project access to be utilized for "special event" operations and at the intersection of Soboba Road/Lake Park Drive to account for site access (see Figures 1 to 5). In order to provide local residents with ease of access to and from their communities, it is recommended that traffic control personnel/police also be situated at the intersections

of Soboba Springs Drive/Lake Park Drive and Soboba Road/Chabella Drive during events. Using traffic control personnel/police at the project accesses and the intersections of Soboba Road/Chabella Drive, Soboba Road/Lake Park Drive, and Soboba Springs Drive/Lake Park Drive will allow for traffic to flow to and from the project site as well as allow local residents access to and from their communities during special events. Each intersection should have a minimum of one traffic control personnel/police directing traffic.

Traffic control personnel/police can also be utilized within the project site to direct vehicles to the appropriate parking areas prior to an event and assist in the release of traffic when the event has ended.

On-site and off-site traffic control personnel/police should communicate to each other via "walkie-talkies" in order to be in constant contact. All on-site and off-site traffic control personnel/police should be trained prior to starting work in the field and should be equipped with appropriate safety equipment (i.e. orange vest, etc.).

Need for off-site parking, if necessary, and bus or shuttle services: See **Section 1.12.1.3 Mitigation Measures:** ***Response d*** of this public comment report.

Pedestrian circulation and avoidance of vehicular/pedestrian conflicts: Pedestrian conflicts should be minimized as much as possible by directing pedestrians to designated pedestrian crossings. Pedestrian crossings should be clearly marked and signed for both pedestrians and vehicular traffic. Clearly identified pedestrian walkways should be situated as to minimize any potential conflict with vehicular traffic.

Other measures as may be appropriate: The TMP addresses parking, site access, event notification, channelization, manual traffic control, valet/VIP area, designated parking areas, emergency/fire/medical services, and a monitoring program.

Summary of Comments e: The DEIS states that traffic control will be provided on-site for special events. However, the DEIS fails to analyze off-site effects and the need for off-site traffic control and associated effects on police services and public works. A full analysis of off-site effects should be provided along with appropriate mitigation measures.

Response e: See ***Response d*** above.

Summary of Comments f: The Traffic Impact Analysis Preparation Guide developed by the Riverside County Transportation Department requires that the traffic and circulation effects of a proposed development project, General Plan Amendments, and Specific Plans be analyzed. A thorough analysis of traffic patterns must be completed by the Tribe prior to approval of the Proposed Action and Alternatives. A project scoping form must be submitted for approval prior to the preparation of the traffic study. A Traffic Impact Analysis must be developed which takes into consideration all of the traffic concerns the citizens of the three communities have already communicated such as zoning, city sphere of influence, intersections, traffic volumes, special events traffic and traffic speed.

Response f: The County is not the lead agency or a cooperating agency for this project. A traffic impact analysis and a TMP have been prepared for the project consistent with the requirements of NEPA. In response to the issues raised on traffic and transportation in the vicinity of the three neighborhoods, additional data was collected and analyzed at the intersections of these three neighborhoods. These findings were considered in the revised TIA and during the development of the TMP (see **Section 1.12.1.1** of this public comment report for a response to comments concerned about traffic effects to nearby residential communities).

1.12.1.5 Traffic Study Analysis

Summary of Comments a: The methodology employed by the traffic study is suspect. The DEIS incorporates a ten percent reduction in trips generated based on double counting but does not identify the assumption used in generating the figure. The DEIS also fails to provide sufficient detail to support the basis for the trip generation methodology used. Moreover, instead of using traffic data from neighboring casinos such as Pechanga, Morongo, and Fantasy Springs, which are Indian gaming casinos and would be more likely to result in realistic trip generation data for the Project, the DEIS appears to rely on a 2002 report and background documents used in a study in northern California casinos. Thus, the DEIS provides misleading and inaccurate information about trips generated by the Project

Response a: The ten percent reduction in vehicle trips was used as a conservative estimate to account for the internal capture present within the project. This percentage was derived from other similar projects in California. This internal capture was applied to the casino, events center, convention center, and hotel. It was not applied to the service station with convenience market or the fire station. It is reasonable to assume that this project will have interaction between the casino, events arena, convention center, and hotel without additional vehicle trips occurring between each land use. The "Horseshoe Grande Development Market Analysis – Draft Report" confirmed that nearly all of the hotel guests are expected to also visit the casino; hence they are accounted for within the trip generation characteristics of the casino itself.[7]

Located in Appendix T of the traffic effect analysis is the Shingle Springs Rancheria Interchange Transportation Circulation Report dated April 2002. This report was used to derive the traffic generation rates. This comprehensive analysis has also been used as a basis for trip generation in the County of San Bernardino as well as in Northern California for Indian gaming style casinos. As part of formulating trip generation rates, this study used multiple approaches. One approach reviewed a marketing study performed for an earlier, and larger, version of the project. Another approach investigated trip generation characteristics at other casinos, including both information within traffic studies for other casinos, and the results of surveys conducted at two Northern California Indian gaming casinos for the project. The March 1999 Institute of Transportation Engineers Journal article titled "Gaming Casino Traffic" summarized the results of year long traffic counts at St. Louis, Missouri area casinos. This article provided for the factoring of traffic counts or trip generation rates collected during an off-peak month to a peak month condition. By using this information, the traffic counts were able to be adjusted to establish trip generation rates for peak month conditions.

This report also included a comparison to the "Report on the Potential Impacts of Tribal Gaming on Northern and Eastern San Diego County" prepared by the San Diego County Department of Public Works and the "Trip Generation Rates for Las Vegas Area Hotel-Casinos" prepared by the Institute of Transportation Engineers Journal to validate the trip generation rates.[8][9]

This report is the best known source for trip generation rates for an Indian gaming casino. Trip generation information is not available for the Pechanga, Morongo, and Fantasy Springs casinos.. Difficulty would arise in discerning which vehicle trips to the casino were used for which land use and of these vehicle trips, which vehicle trips utilized multiple land uses thus accounting for interaction. This

[7] Based on the confidentiality of certain data and values, the "Horseshoe Grande Development Market Analysis – Draft Report" is bound under separate cover for confidentiality and cannot be obtained under the Freedom of Information Act. Accordingly, some of these data are omitted from the presentation of results in the FEIS.

[8] County of San Diego, November 1, 2000, *Report on the Potential Impacts of Tribal Gaming on Northern and Eastern San Diego County*, prepared for the County of San Diego Board of Supervisors.

[9] Ackeret, K. and R. C. Hosea, III, 1992, "Trip Generation Rates for Las. Vegas Area Hotel-Casinos," *ITE Journal*, Vol. 62: 5, pp. 33-37, Institute of Transportation Engineers, Washington, D.C.

difficulty would also prove problematic in generating accurate trip generation rates since land uses and quantities differ between the casinos. Using traffic counts to generate the total number of daily, morning peak hour, and evening peak hour trip generation rates also poses the problem of relating this data to the project. For example, trips generated at a casino half the size of the project cannot be multiplied by two to estimate Project trips because trip generation rates for a casino are not linear, but are u-shaped. This has been shown in the Shingle Springs Rancheria Interchange Transportation Circulation Report dated April 2002 that was used as the methodology for computing the project's trip generation.

Summary of Comments b: The DEIS did not consider the possibility of creating an alternative access point to the reservation from Esplanade Avenue. Doing so could alleviate some traffic effects at the Lake Park Drive and Ramona Expressway intersection, as well as effects on local residents that have expressed concerns regarding access to their properties during special events. Doing so would create an alternative route that could assist in rapid evacuation in case of an emergency. Given the above, BIA should strongly consider a mitigation measure requiring the extension of Esplanade Avenue in order to more efficiently serve the Project area and protect area residents as well as visitors to the Project.

Response b: While this alternative access would help alleviate traffic from Lake Park Drive, the access route would run parallel to Lake Park Drive and traffic would continue to utilize Ramona Expressway/Mountain Avenue which would not create a significant reduction of traffic except for Lake Park Drive between Ramona Expressway and Soboba Road and Ramona Expressway/Mountain Avenue between Lake Park Drive/Main Street and Esplanade Avenue. It would also create additional traffic effects along Soboba Road from Lake Park Drive to Esplanade Avenue where the alternative access would then be created to cross the San Jacinto River and intersect with Ramona Expressway/Mountain Avenue at Esplanade Avenue.

As a means to address the concerns of residents, the intersections of Soboba Springs Drive/Lake Park Drive and Chabella Drive/Soboba Road were added to the analysis. Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP (see **Section 1.12.1.1** of this public comment report).

Summary of Comments c: Traffic during special events is a major concern. While the DEIS acknowledges that the proposed Events Arena could create 6,848 daily trips, and while the Scoping Report stated that the BIA would do so, no analysis of that many cars on the roadways at one time was included in the DEIS. Instead, the DEIS simply finds that "the on-site and off-site roadway improvements prescribed in Section 5.7.2 and the intersection improvements shown in Table 5-4 would improve traffic conditions during normal operations as well as during special events". Notably, the DEIS does not assert that traffic effects would be less than significant during events, only that conditions would be "improved".

Response c: For the Proposed Action A, the traffic generation for the events arena is approximately 6,848 daily vehicle trips. These 6,848 vehicle trips are the daily total and do not represent the peak hour total or a total to be expected to occur at one specific period during the day. To account for traffic conditions during special events, a TMP has been prepared (see Appendix AB). The TMP provides mitigation measures for on-site and off-site traffic conditions during special events. The on-site and off-site roadway improvements prescribed in Section 5.7.1 and the intersection improvements shown in Table 5-4 are projected to mitigate the study area intersections and roadway segments to operate at acceptable LOS during the peak hours. Furthermore, traffic conditions will be alleviated by the two access points built into the Proposed Action and Alternatives.

An updated traffic impact analysis (Appendix T of the FEIS) was prepared in accordance with Riverside County and City of San Jacinto traffic impact analysis preparation guidelines. Typically, traffic

mitigation is based upon the weekday peak hours when ambient traffic volumes are the highest. The manual "A Policy on Geometric Design of Highways and Streets" prepared by the American Association of State Highway and Transportation Officials, 2001, states that it is recommended that the hourly traffic volume that should generally be used in roadway design is the 30th highest hourly volume of the year. For example, roadway design is not typically based upon the holiday volumes around a shopping mall or for a special event. For those hours where traffic is above the 30th highest hourly volume, a TMP (see Appendix AB) has been prepared. The TMP implements traffic solutions for special events at the casino and outlines steps to minimize traffic impacts and delays associated with this project. The TMP summarizes the procedures that may be used to minimize traffic impacts and the process for distribution of accurate and timely information to the public. The TMP will be implemented as a mitigation measure to account for traffic during special events (see Section 5.7 and Appendix AB of the FEIS). Issues discussed in the TMP includes parking, site access, event notification, channelization, manual traffic control measures, valet/VIP services, designated parking areas, emergency/fire/medical services, and monitoring measure.

Summary of Comments d: The Proposed Action would increase traffic by 100 times the number of existing daily trips.

Response d: The Proposed Action is not expected to increase the number of daily traffic trips by a factor of 100. As stated in Section 3.7 of the FEIS, the existing casino at 23333 Soboba Road generates approximately 2,957 daily vehicle trips. Proposed Action A is projected to generate a total of approximately 22,525 daily vehicle trips (see Section 4.7 of the FEIS). Approximately 19,568 more daily vehicle trips would occur under Proposed Action A than are currently generated by the existing casino, which is a magnitude of approximately 6.6 times greater than the number of existing daily trips.

Summary of Comments e: Existing vehicle counts show a staggering amount of traffic for local roads in the Project Area. This 24 hour traffic is definitely detrimental to the surrounding communities. The Proposed Action and Alternatives would exacerbate existing conditions.

Response e: Traffic counts have been included in Section 3.7 of the FEIS and mitigation measures have been recommended in Section 5.7 of the FEIS in order to achieve acceptable Level of Service for study area intersections and roadway segments for Year 2025 traffic conditions.

Summary of Comments f: Pedestrian safety has not been addressed in the DEIS.

Response f: An updated traffic impact analysis has been prepared in accordance with Riverside County and City of San Jacinto traffic impact analysis preparation guidelines (Appendix T of the FEIS) and would be implemented as a mitigation measure (see Section 5.7 of the FEIS). See ***Response d*** in **Section 1.12.1.4** of this public comment report for a discussion of how the TMP addresses pedestrian circulation and avoidance of vehicular/pedestrian conflicts.

Summary of Comments g: The Oaks Retreat facilities will bring more traffic to the area and the mitigation measures (i.e. traffic lights) for that project are still being negotiated after two years.

Response g: The Tribe has entered into an agreement with the City of San Jacinto to provide funding for the traffic/transportation mitigation measures developed during the NEPA process for that project. This agreement was adopted on January 28, 2010 and resulted in the City of San Jacinto's withdraw of an administrative protest to the action.

Summary of Comments h: The DEIS's traffic analysis relies on methodologies and assumptions that are wholly inappropriate for the project, resulting in serious underestimates of traffic. Since special events

would occur on the weekend, the analysis should have been based on weekend traffic counts. In order to provide a conservative analysis, the traffic analysis should have assumed 100 percent use of the convention center and events arena during peak hour to account for special events.

Response h: An updated traffic impact analysis was prepared in accordance with Riverside County and City of San Jacinto traffic impact analysis preparation guidelines. Typically, traffic mitigation is based upon the weekday peak hours when ambient traffic volumes are the highest. The manual "A Policy on Geometric Design of Highways and Streets" prepared by the American Association of State Highway and Transportation Officials, 2001, states that it is recommended that the hourly traffic volume that should generally be used in roadway design is the 30th highest hourly volume of the year. For example, roadway design is not typically based upon the holiday volumes around a shopping mall or for a special event. For those hours where traffic is above the 30th highest hourly volume, a TMP (see Appendix AB) has been prepared. The TMP implements traffic solutions for special events at the casino and outlines steps to minimize traffic impacts and delays associated with this project. The TMP summarizes the procedures that may be used to minimize traffic impacts and the process for distribution of accurate and timely information to the public. The TMP will be implemented as a mitigation measure to account for traffic during special events (see Section 5.7 and Appendix AB of the FEIS). Issues discussed in the TMP includes parking, site access, event notification, channelization, manual traffic control measures, valet/VIP services, designated parking areas, emergency/fire/medical services, and monitoring measure.

Summary of Comments i: No worksheets are provided in the report or appendix to verify any of the calculations or methodology used to forecast Opening Year (2010) peak hour turning movement volumes. Also, using a traffic forecast model to estimate near-term traffic volumes is less accurate than using existing peak hour traffic count data along with cumulative data to estimate near-term traffic volumes.

Response i: The traffic impact analysis (Appendix T of the FEIS) was prepared in accordance with Riverside County and City of San Jacinto traffic impact analysis preparation guidelines. The peak hour traffic turning movement volumes were derived in accordance with City of San Jacinto guidelines. Existing delay is based upon manual morning and evening peak hour intersection turning movement counts obtained by Kunzman Associates, Inc. in April/October/November 2007 and January 2010. Traffic count worksheets are provided in Appendix B of the revised traffic impact analysis (Appendix T of the FEIS).

Summary of Comments j: HCM delay calculations for Intersection #2 San Jacinto Street (NS) at Ramona Boulevard/Main Street (EW) were performed using Traffix version 7.8. Traffix is limited in its ability to analyze 5-legged intersections. The analysis performed in this study assumes a 4-legged intersection with the northwest leg (Ramona Boulevard) and west leg (Main Street) combined. In order to properly analyze this intersection per HCM methodology, the lane group and demand flow rate, the saturation flow rate, the capacity and volume/capacity ratio, and delays must be calculated for all 5 approached individually. This can be done manually or by using software capable of this analysis such as Synchro 7.

Response j: The updated traffic impact analysis has analyzed intersections (HCM delay methodology) using Traffix version 7.9. The commenter is correct that Traffix is limited in its ability to analyze 5-legged intersections. However, this intersection has been analyzed in accordance with commonly accepted practice in the County of Riverside.

Summary of Comments k: The community can't wait until 2025 for improvements as the safety concerns and effects will be immediate.

Response k: Several improvements will occur prior to 2025. Section 5.7.1 of the FEIS discusses mitigation measures to reduce project effects on transportation networks. Figures 5-1 through 5-5 show prescribed mitigation measures for the Proposed Action and Alternatives for both opening year and 2025. Table 5-4 shows the intersection improvements prescribed for the Proposed Action and Alternatives for opening year and 2025.

Summary of Comments l: Has the City of San Jacinto permitted realignment of Lake Park and Soboba Road? This would be a major disruption of access to communities, utility interruption, increased pollution, and it is not a mitigated issue.

Response l: Realignment of Lake Park Drive hinges on which project alternative is chosen. This process is ongoing. The City of San Jacinto has not yet permitted the realignment.

Summary of Comments m: The new casino and hotel will be closer to the main roads and it won't take as long to get to the new casino as it does now. It will all be on the city streets.

Response m: Comment is noted and made part of the administrative record.

1.12.2 Land Use

1.12.2.1 Consistency with the City of San Jacinto General Plan

Summary of Comments: If the Project Site is taken into trust, local jurisdictions will no longer have input into use of the Project Site. The Proposed Action and Alternatives are incompatible with the City of San Jacinto's land use and zoning designations for the Project Site, and the Proposed Action would not be allowable according to the City's existing land use regulations. The project would be inconsistent with numerous goals and policies specified in the San Jacinto General Plan. The FEIS should model its analysis of land use compatibility after the 2006 EIS for the Oneida Nation of New York Conveyance of Lands into Trust.

The DEIS did not adequately address the project's immediate and long-term compatibility effects with surrounding land uses. It is not ethical to alter zoning after residents purchased their homes in the area based on the understanding that nearby uses would remain light residential in character, and the Project Site would be developed as per the Soboba Springs Redevelopment Project.

Response: Implementation of the Proposed Action would result in the federal government taking the Project Site into trust for the benefit of the Tribe. As described in Section 4.7 of the FEIS, Tribal lands are not subject to County or City rules and regulations once the land is in trust. Application and enforcement of local land use and zoning enactments on trust lands is beyond the jurisdiction of local governments. Tribes retain jurisdiction over land use and zoning matters on lands they control.

A detailed evaluation of potential conflicts between the Proposed Project alternatives and adopted City land use regulations and policies was included within Section 4.7 of the DEIS. The significance of potential conflicts with local land use plans resulting from the proposed project will be considered by the BIA during the decision-making process.

Another issue raised in comments is the Proposed Project's immediate and long-term incompatibility effects with surrounding land uses. A project's "incompatibility" would manifest itself in specific environmental effects (e.g., noise, air quality, traffic, etc.). Section 4.0 of the FEIS details the various environmental effects that may result from the construction and operation of the Proposed Action and

Alternatives. The level of the project's "incompatibilities" is measurable by the resulting effects before and after stated mitigation in Chapter 5.0 of the FEIS.

While the BIA was the lead agency for the 2006 EIS for the Oneida project, that project is fundamentally different in scope and magnitude than the Proposed Action. The Oneida project proposed a 17,370-acre conveyance to federal trust status, a magnitude of 32 times larger than the 534.91± acre conveyance under the Proposed Action. The Oneida project included state, county, and local land use elements, whereas the entirety of the Project Site is located within the City of San Jacinto boundaries and sphere of influence. The nature of the Proposed Action is singular (i.e. commercial development), whereas the Oneida project proposed multiple uses, including commercial, residential, governmental services, fishing, hunting, agricultural use, and co-generation energy production. While the Oneida EIS was used as a guidance document, the differences between the Oneida project and the Proposed Action were considered too great to precisely model the land use analysis for the Proposed Action after the analysis within the Oneida EIS.

1.12.2.2 Jurisdictional Issues

Summary of Comments: The proposed fee-to-trust action would cause the three residential communities nearby the Project Site to become "islands" of U.S. territory within the borders of a sovereign nation, resulting in:

- Different laws between adjacent trust and non-trust parcels;
- Effects to utilities, law enforcement, fire protection, and emergency response;
- The reduction of property values;
- The Tribe controlling ingress and egress;
- The hindrance of emergency evacuation; and
- The transformation of portions of Lake Park Drive and Soboba Road into Indian Reservation Roads (IRRs).

The DEIS failed to adequately address these issues, and the creation of "islands" would be unprecedented in U.S. law. Please explain how, if at all, the Riverside Local Area Formation Commission (LAFCO) regulations would affect the proposed fee-to-trust transfer. The number of homes that may become part of jurisdictional "islands" totals 385 and includes the Soboba Springs Mobile Estates, the Soboba Heights community, the community adjacent tot the Soboba Springs Country Club, and nearby ranches.

Response: Concerns over differing sets of laws between adjacent trust and non-trust parcels are noted and made part of the administrative record. The existing environment already includes adjacent trust and non-trust parcels with differing sets of laws. Similarly, statements made that the creation of "islands" would be unprecedented are noted and made part of the administrative record. Whether the creation of "islands" is unprecedented in the greater body of U.S. law is outside of the scope of this NEPA analysis.

Numerous comments expressed concern that the Tribe would have the ability to legally restrict movement along Soboba Road and Lake Park Drive and to otherwise interfere with the rights-of-way established adjacent to the Project Site. Commenters cited the Tribe's authority to control access on Soboba Road within the existing Reservation as evidence that the Tribe might attempt to similarly restrict access elsewhere. However, Soboba Road within the Reservation is not a public roadway and is maintained by the Tribe. Soboba Road beyond the existing Reservation and Lake Park Drive are public roads and would continue to be public roads in the event of the fee-to-trust transfer. In fact, neither roadway is included in the legal descriptions for the subject fee-to-trust parcels. A plat map prepared by First American Title Company illustrates the exclusion of public roadways from the parcels proposed for the fee-to-trust

transfer, and is included in the FEIS as Figure 2-6. As Lake Park Drive and Soboba Road form no part of the subject parcels, the trust acquisition should have no effect on utility infrastructure or the public's right to use the roads.

The CEQ Regulations for implementing NEPA, 40 C.F.R. §1502.16(c), require analysis of the "[p]ossible conflicts between the proposed action and the objectives of Federal, regional, State, and local land use plans, policies, and controls for the area concerned." The Riverside County LAFCO regulates boundary changes proposed by public agencies within the County. LAFCO is not involved with determining land use planning or policies, but instead governs jurisdictional boundaries at the city and county levels. The Tribe is not a signatory to LAFCO; therefore, if the lands are transferred into trust status LAFCO policies will no longer apply to the Project Site.

See Section 2.10.1 Economic and Fiscal Resources of this public comment report for a discussion of potential effects to property values for the three nearby residential communities, including the potential for an 'island effect' on the Soboba Springs Mobile Estates.

1.12.2.3 Community Character and Quality of Life

Summary of Comments: The project would affect the quality of life in the surrounding communities by permanently changing the rural residential community character. It is not appropriate to site a high-rise resort in the middle of a predominately senior citizen residential area. The Tribe pledged in its 1999 Compact to "…prevent the deterioration of the standard of living, quality of life and well-being of all persons;" however, this pledge is not being fulfilled due to negative effects from the existing casino and Soboba Springs Country Club. The proposed developments would forever change the existing community character through increased traffic, noise, crime, reduced property values, effects to wildlife, and the degradation of scenic views. The DEIS did not provide an adequate analysis of those potential effects to community character and quality of life. Finally, the potential changes to community character cannot be sufficiently mitigated.

Response: The environmental review conducted for the project addresses issues associated with the physical environmental effects of the construction and operation of the proposed development. Comments referred to issues such as "quality of life" and "community character" when discussing the perceived inadequacies of the DEIS.

While not a specific NEPA category, "quality of life" and "community character" are described by several commenters as categories that encompass specific environmental topics that are combined to define the experience of living in the Project area. For example, Comment Letter #A02 includes effects to traffic, noise, water supply, crime, and public services in the commenter's definition of "quality of life" within comment #A02-141. Comment Letter #A30 includes crime, air quality effects, and noise in its definition of how the Tribe has allegedly not honored its commitment in the 1999 Compact to "…prevent the deterioration of the standard of live, quality of life and well-being of all persons…" (comments #A30-309 through #A30-311).

Quality of life and community character are subjective categories that are defined by each person based on his or her own interpretations. Looking deeper into what each element of commenters' statements means, one recognizes that they can be broken down into various environmental categories. Therefore, these subjective categories actually consist of individual environmental topics chosen based on the individual commenter's particular interpretation.

For purposes of NEPA review, the categories included in community character are broken down into discrete physical environmental categories such as lighting, noise, air quality, traffic, crime, and so on.

The existing setting is described in the affected environment section within Chapter 3.0 of the FEIS. The environmental effects are analyzed and described within Chapter 4.0 of the FEIS. Please see Table 4 below for those environmental issues that are addressed within the FEIS.

Table 4 Environmental Issues Addressed within the FEIS

Environmental Issue	Affected Environment Section	Environmental Consequences Section
Land Resources[1]	3.1	4.1
Water Resources[2]	3.2	4.2
Air Quality	3.3	4.3
Biological Resources	3.4	4.4
Cultural Resources	3.5	4.5
Economic and Socioeconomic Conditions	3.6	4.6
Resource Use Patterns[3]	3.7	4.7
Public Services[4]	3.8	4.8
Other Resources[5]	3.9	4.9

Topography, Geology, Soils, Seismic Hazards, Mineral Resources1
Surface Water, Drainage, Flooding, Groundwater, Water Quality[2]
Transportation Networks, Land Use, Agriculture[3]
Water Supply, Wastewater Service, Solid Waste, Electricity and Natural Gas, School Services[4]
Hazardous Materials, Noise, Visual Resources, Recreational Resources[5]

Section 4.0 Environmental Consequences of the DEIS concluded that, without mitigation, significant environmental effects would occur in several areas. The environmental issue, coupled with the phase of project development/operation, will dictate whether an effect would be site specific or if it could occur within the project vicinity or region. The DEIS found that the Proposed Action would result in following significant effects without the application of mitigation:

- Land Resources (Seismic Hazards);
- Water Resources;
- Air Quality;
- Biological Resources;
- Transportation Networks;
- Public Utilities and Services (Wastewater Service);
- Hazardous Materials;
- Noise; and
- Visual Resources.

Where possible or available, the DEIS disclosed those environmental effects that may occur outside of the Project Site on the surrounding residential communities or within the region. An example would be noise, which was cited several times as an element that factored into commenters' definitions of "community character" and "quality of life". The noise assessment provided in Section 4.9 of the DEIS discloses noise generated from the proposed developments during construction and operation. Some of this noise could potentially affect the Project Site and surrounding residential communities. In analyzing noise effects, the

nearest sensitive receptors were identified. These are the Soboba Springs Mobile Estates, located approximately 170 feet to the south of the Development Site and approximately 50 feet from Soboba Road and Lake Park Drive (see Figure 4-6 of the FEIS); and the golf course community, located approximately 300 feet to the north of the Development Site. The section assesses the level of noise that may reach these sensitive noise receptors based on the attenuation of sound over distance.

Other examples exist where the DEIS analysis considers the effects of the project on the nearby residential communities, including under Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7). The FEIS does not attempt, nor does NEPA require, a synthesizing of all recognized environmental effects into new categories termed "quality of life" or "community character."

1.12.2.4 Lighting and Glare

Summary of Comments a: The project could cause light pollution and reduce the Project Area's dark sky.

Response a: The FEIS describes the potential for the Proposed Action to increase ambient lighting and adversely affect night time activities. As such, there is a potential for light pollution.[10] The proposed mitigation measure for lighting fixtures (see Section 5.7.2) incorporates many of the recommendations from the International Dark-Sky Society's *Guidelines for Good Lighting Plans* (see www.darkskysociety.org). In addition, the measures require a qualified lighting professional review the light and glare reduction plan. This professional would evaluate the proposed lighting fixture locations by type and wattage for appropriateness to the site and use, and to minimize off-site and night sky spillover. The professional would also review or create a photometric study to identify any "hot spots" where the light is too bright or where it would create unnecessary spillover onto adjacent properties.

As described within Section 4.7 of the FEIS, the application of the prescribed mitigation measures (Section 5.7.2 of the FEIS) would reduce potential effects to less than significant levels. However, minimizing light pollution is essential to maintaining the area's night sky and night time activities. Therefore, the following clarification was made to the following mitigation measure (Section 5.7.2 of the FEIS):

> Lighting Fixtures: ~~**To the extent feasible, a**~~**All** permanent ~~**exterior**~~ lighting that **could increase exterior lighting levels will have the International Dark-Sky Society's Fixture Seal of Approval for dark sky friendly fixtures.** ~~**will incorporate cutoff shields and non-glare fixture design.**~~ All permanent exterior lighting **will incorporate cutoff shields and non-glare fixture design and** will be directed onsite and downward. New lighting will be oriented to ensure that no light source is directly visible from neighboring residential areas and will be installed with motion-sensor activation **where feasible.** Decorative lighting will be directed away from sensitive receptors and will not generate light beyond the Development Site's boundaries.

Summary of Comments b: Would security lighting for the facilities would be on 24 hours a day, 7 days a week?

Response b: Although there are some areas of the Development Site where security lighting would not be necessary all the time (for instance the arena buildings when not in use), other areas would require lighting 24 hours a day, 7 days a week. For structures requiring lighting at all times, such as the parking

[10] The International Dark-Sky Society defines light pollution as glare, light trespass, and light which is reflected into the night sky, contributing to sky glow, through the use of unshielded, misplaced, excessive, or unnecessary outdoor night lighting.

garage, the lighting would conform to the mitigation measure as listed above. In addition, mitigation for Alternative 3 requires that all lighting not required for security, including business signage, be turned off after regular business hours and that campers are prohibited from using exterior area lighting between the hours of 10 PM and 7 AM (see Section 5.7.2 of the FEIS).

1.12.2.5 Other Land Use Comments

Summary of Comments: Easement agreements allowing for secondary ingress and egress, land for recreational vehicle storage, and a 10' perimeter strip on the former Daon Property need to be addressed prior to the proposed fee-to-trust transfer. This property is currently owned by the Tribe and comprises the portion of the Project Site directly adjacent to the Soboba Springs Mobile Estates.

Bonds issued for the Soboba Springs Redevelopment Project under Special Assessment District 94-1 were not addressed in the DEIS.

Response: Code of Federal Regulations Title 25, Part 151 sets forth the authorities, policy, and procedures governing the acquisition of land by the United States in trust status for individual Indians and tribes. These regulations require that in the event the Secretary of the Interior approves a request for the acquisition of land from unrestricted fee status to trust status, the Secretary shall acquire, or require the applicant to furnish, title evidence meeting the standards established by the U.S. Department of Justice (25 C.F.R. sec. 151.13). After examining the title evidence, the Secretary shall notify the applicant of any liens, encumbrances, or infirmities which may exist. If the liens, encumbrances, or infirmities make title to the land unmarketable, the Secretary shall require their elimination prior to taking final approval action on the acquisition. The easements in question do not appear to render title to the relevant parcels unmarketable.

Bonds for Special Assessment District 94-1 were discussed in Section 3.7.2 of the DEIS. As discussed therein, the Tribe owns APN 433-100-015, 39.18+ acres of the Golf Course and Country Club, which is subject to Special Assessment District 94-1. The 2005/06 San Jacinto Annual Report on Assessment Districts indicated that the balance of debt to be collected was $382,994. The 2006/07 version of the annual report was not available. According to the City of San Jacinto, as of June 11, 2008 the outstanding principal was $275,000. However, in September 2008 this balance was paid in full and the Tribe cleared of payment liability to the City.[11]

1.13 PUBLIC SERVICES

Summary of Comments a: The fee-to-trust action and the proposed realignment of Lake Park Drive and Soboba Road would disrupt utility services to nearby residents.

Response a: As discussed in Section 4.8 of the FEIS, prior to excavation for the proposed developments, Underground Service Alert (USA) of Southern California would be contacted, which would then automatically notify all USA members (utility services providers) that might have underground facilities at the excavator's work site. In response, the USA member(s) will mark or stake the horizontal path of underground facilities, provide information about the facilities, and/or give clearance to dig. This simple safety service not only protects the excavator from personal injury, but also prevents underground facilities from being damaged, and would thereby avoid interruption of service to the surrounding communities due to project construction. Utilities that could require relocation due to the Lake Park realignment would be scheduled to minimize disruptions (if they occur) to homes and businesses

[11] Personal communication with Tom Prill, General Accounting Manager, City of San Jacinto, June 11, 2008.

Summary of Comments b: The Tribe should give the utility companies a detailed plan of the project prior to any fee-to-trust acquisition approval so that the terms and conditions can be discussed and mitigated. The Proposed Action and Alternatives would lead to progressively more expensive costs to the nearby communities for utilities and public services.

Response b: Draft and Final Will Serve letters (see Appendix Z of the Final FEIS) were obtained for solid waste, electricity, and natural gas services after discussion with the service providers, in which ENTRIX provided maps showing the location of the proposed developments under the Proposed Action and Alternatives, the applicable Assessor Parcel Numbers (APNs), and estimates of the amount of service that would be demanded by the proposed developments. If and when the BIA approves the proposed fee-to-trust action, the Tribe's existing contracts with these providers would be re-negotiated to include the provision of services to the proposed developments. As with all other commercial costumers, the contracts would specify the price to be paid by the Tribe for these services and, in the case of electricity and natural gas, for connection of the proposed developments to the infrastructure adjacent to the Project Site. Therefore, no costs would be borne by taxpayers as a result of the Tribe expanding its existing contracts with solid waste, natural gas, and electricity service providers.

See the subheading "Water Supply" below for a discussion of how water demand by the proposed developments has the potential to affect available water supply. As described therein, the total projected demand for the Proposed Action is 2,148 acre-feet. This is less than the 2,900 acre-feet annually allotted to the Tribe through the Water Rights Settlement for the first year after the settlement (see Section 3.2.2 of the FEIS).

Potential effects to the provision of public services (Law Enforcement, Fire Protection and Emergency Medical Services, and School Services) are discussed in Section 4.8 of the FEIS and under the appropriate subheadings below. The agreements and measures described therein would ensure that the proposed developments do not generate an additional tax burden on the local communities.

Summary c: Removal of the Project Site from taxation would reduce funding for local government services.

Response c: As discussed in Section 4.6 of the FEIS, the reduction in property taxes associated with the removal of the subject property from the tax rolls ($0.24 million) would be partially offset by the generation of local sales tax receipts of approximately $0.22 million annually. The remaining shortfall would be more than compensated for by revenue contributed by the Special Distribution Fund. Soboba Casino accounted for $1.47 million of the Special Distribution Fund for fiscal year 2008-2009. Therefore, the proposed fee-to-trust action is not expected to result in the reduction of funding for public services.

1.13.1 Water Supply

Summary of Comments: The Proposed Action and Alternatives would affect the availability of the groundwater supply, groundwater overdraft, water conservation, and groundwater pollution. Can the local aquifer produce the necessary supply for the proposed facilities without adding to the overdraft? In addition, how would the proposed facilities affect other users of the groundwater basin? The application or storage of treated effluent could potentially pollute groundwater within the Project Area. Stormwater runoff from the Project Site could affect water quality.

Response: The Tribe is party to the Water Rights Settlement that adjudicated the water supply for the area. As part of the settlement the Tribe gave up a surface water right and received assurance of a specified groundwater supply. Section 3.2.2 of the FEIS describes the Water Rights Settlement and the

Water Management Plan that followed the settlement. The Tribe has first right under the settlement and the Tribe's anticipated current and future water rights are included in the settlement and the Water Management Plan. The WMP also states that EMWD and Lake Hemet Municipal Water District will implement the WMP for the Canyon and Intake aquifers to "address the current overdraft, and recognize and take into account the Tribal Water Right" (Water Resources & Information Management Engineering, Inc., 2007).

The anticipated water demand from this project is described in Section 4.8.1 of FEIS (Table 4-46). Table 4-46 lists the projected water demands for the first year of Project operation. The total projected demand is 2,148 acre-feet. This is less than the 2,900 acre-feet annually allotted to the Tribe through the water rights settlement for the first year after the settlement (see Section 3.2.2). Through the settlement, the tribe may increase its pumping to 4,010 acre-feet after 20 years. The future use of recycled wastewater will reduce some of the water demand, especially the demand for golf course irrigation water.

The water rights settlement is a legally binding document that the Tribe and other parties must follow. Failure to comply with the settlement would result in further legal action by the parties to the settlement. The Tribe is bound by the terms and conditions of the settlement.

1.13.2 Wastewater Service

Summary of Comments: There is concern regarding the storage of the effluent during periods when demand for recycled water is low. Percolation of stored effluent to the groundwater and the proximity of the WWTP facilities to other water supply features could affect water quality. The application of recycled water to the golf course could result in effects to the groundwater basin. The FEIS should clarify which government entity would be responsible for monitoring and enforcement over the WWTP. The DEIS did not propose mitigations for noise, smell, lighting, aesthetics, or any other nuisances from the WWTP.

Response: At the time of construction, the Tribe will either enter into a contract with EMWD for wastewater service, or construct an on-Reservation wastewater treatment plant. The EIS includes a will-serve letter from EMWD (Appendix H of the EIS). The required EMWD infrastructure exist on the Project Site and no off-site construction is anticipated. However, for purposes of this environmental review, both wastewater service options are explored in the EIS. Below is a discussion of the proposed on-Reservation WWTP in response to the comments registered above.

An on-Reservation tertiary wastewater treatment system is a proposed wastewater service option for the Project. That system will produce effluent suitable for reuse and will conform to all federal discharge standards when using or disposing of all recycled water. Application of recycled water for landscaping and golf courses is appropriate because the vegetation will polish the effluent by removing any remaining nutrients beyond the level mandated for the tertiary effluent. The use of recycled water for the golf course irrigation will offset the current pumping for golf course irrigation.

The entire reservation will be connected to the new tertiary WWTP and thereby replace existing septic tanks and leach fields on the reservation. Overall, the switch from septic tanks to a WWTP will benefit the underlying aquifer by eliminating the poor quality of water that percolates to the aquifer from leach fields.

Treated effluent from the WWTP may have to be stored or used for other purposes during periods when the irrigation demand is low. Generally, the effluent will be used for agricultural irrigation, landscape irrigation, filling of decorative water features, surface cleaning (i.e. parking lots), toilet flushing, and fire control. During periods when effluent flows exceed the demand for recycled water, water would be

discharged to percolation ponds for storage. The discharge would conform to effluent standards for discharge to percolation ponds and be consistent with the Basin Plan (see Section 2.1.1). Percolation pond discharge would follow secondary treatment standards with other constituents of concern limited to concentrations that are consistent with non-degradation of the receiving aquifer based on the beneficial uses of the receiving waters identified in the Basin Plan. Also, the storage of water in the pond will encourage settling of suspended material and subsequent percolation into the soil that will provide additional polishing of the effluent.

Section 3.2.3 describes the stormwater permit and waste discharge permits that apply to the Project. The Tribe will comply with all construction and discharge permits for the Project Site and the WWTP.

Regarding concerns over noise, smell, lighting, and aesthetics effects from the WWTP, the best management practices (BMPs) which would be used for the Proposed Action and Alternatives are specified in Section 2.1.1 of the EIS under the heading "Wastewater Treatment and Disposal." The BMPs include the following:

- Treatment structures that provide complete containment during wastewater treatment and storage;
- Alarm and automatic flow diversion systems to prevent system bypass or overflow;
- Odor abatement systems;
- Tertiary treatment;
- Denitrification;
- Disinfection of treated effluent;
- Recycling of wastewater using agronomic application rates;
- Appropriate biosolids storage and disposal practices; and
- Certified operators to assure proper operation and maintenance.

1.13.3 Solid Waste Service

Summary of Comments: Solid waste would be generated by the Proposed Action and Alternatives. The DEIS failed to disclose the ultimate disposal location for the solid waste generated. Would the solid waste generated by the Proposed Action and Alternatives have a negative effect on ground or surface water? Based on the number of tons projected to be generated by the Proposed Action, frequent refuse collection would be necessary.

Response: Section 4.8 of the EIS discloses the disposal location for solid waste generated by the Proposed Action and Alternatives. As described therein, waste would either be hauled to the Lambs Canyon Landfill for disposal, approximately 10 miles northwest of the Project Site or, if the waste is recyclable, transported by CR&R to its material recovery facility (MRF) in Perris. CR&R employees would perform the sorting of recyclable materials at the MRF; these materials include paper, wood, glass, plastic, lumber, concrete, and metals. The portion of the commercial solid waste stream that is typically recycled is around 50 percent. The remaining waste would be hauled to the Lambs Canyon Landfill after being compressed at the MRF. A Final Will Serve letter was obtained from CR&R on December 29, 2009 (see Appendix Z of the FEIS), stating that CR&R has the capacity to absorb the solid waste generated by the Proposed Action and Alternatives.

As the solid waste will be processed by CR&R and either recycled or disposed of in a suitable location (Lambs Canyon Landfill), a less than significant effect to ground or surface water is anticipated. Regarding the comment expressing concern that frequent refuse collection would be necessary, potential effects to traffic, air quality, and noise are already incorporated in those respective analyses in Section 4.0 of the FEIS.

1.13.4 Electricity and Natural Gas

Summary of Comments: The three residential communities near the Project Site have the potential to be affected by increased demand on power lines in the area and to experience loss of service during construction and upgrading of the Proposed Action and Alternatives. Have Southern California Edison (SCE) and the Southern California Gas Company (SCGC) been consulted about the Proposed Action and Alternatives? The project would require the construction of extra power lines and grids; what would be the cost to tax payers would be for this new infrastructure?

Response: Draft Will Serve letters were obtained from SCE and SCGC in 2006 and 2008, respectively (see Appendix Z of the FEIS). A Final Will Serve letter was obtained from SCE on January 25, 2010. SCGC's Final Will Serve letter was received on December 22, 2009 (see Appendix Z of the FEIS for copies of the Final Will Serve letters for this project), which states that "gas service to the project could be provided from the nearest existing, 2" M in Chabela Dr. (Cross of Soboba Rd.)." Appendix Z includes a map recently provided by SCGC showing the location of this infrastructure. Both letters were obtained after discussion with the service providers, in which maps were provided showing the location of the proposed developments under the Proposed Action and Alternatives, the applicable Assessor Parcel Numbers (APNs), and estimates of the amount of energy that would be demanded by the proposed developments. If and when the BIA approves the proposed fee-to-trust action, the Tribe's existing contracts with these providers would be re-negotiated to include the provision of services to the proposed developments. As with all other commercial accounts, the contracts would specify the price to be paid by the Tribe for energy usage and connection of the proposed developments to the infrastructure adjacent to the Project Site. Therefore, no costs would be borne by taxpayers as a result of the Tribe expanding its existing contracts with SCE and SCGC.

No new off-site infrastructure improvements are anticipated to be necessary as a result of the proposed developments. As indicated in the Final Will Serve letter obtained from SCGC, infrastructure to the Project Site already exists that could provide natural gas service. Electricity to the Project Site could be provided by the 12,000-volt pole line paralleling Lake Park Drive (see Section 4.8 of the FEIS). As indicated in the Final Will Serve letter obtained from SCE, the electrical loads of the proposed developments are "within parameters of projected load growth which SCE is planning to meet in this area."

Utility easements would not be affected by the proposed fee-to-trust action. As discussed in Section 4.7 of the FEIS, Tribal Resolution No. CR07-HGFTT-51 (see Appendix J) acknowledges the existing easement for roadway, water lines and underground conduits and incidental purposes along the Project Site, which includes a roadway easement for Lake Park Drive and Soboba Road. Furthermore, the Resolution acknowledges, as an exception to title of the Project Site, "rights of the public in and to any portion of the subject property lying within any lawfully established streets, roads, or highways." Therefore, the easements would remain protected under the proposed fee-to-trust action, and service to surrounding communities would not be affected. In addition, as discussed in Section 4.8 of the FEIS, prior to excavation for the proposed developments, Underground Service Alert (USA) of Southern California would be contacted, which would then automatically notify all USA members (utility services providers) that might have underground facilities at the excavator's work site. In response, the USA member(s) will mark or stake the horizontal path of underground facilities, provide information about the

facilities, and/or give clearance to dig. This simple safety service not only protects the excavator from personal injury, but also prevents underground facilities from being damaged, and would thereby prevent interruption of service to the surrounding communities due to project construction.

1.13.5 Law Enforcement

Summary of Comments a: Law enforcement services would be delayed due to the increased traffic from the proposed project. In addition, ingress and egress of law enforcement personnel could be restricted if the fee-to-trust action creates jurisdictional "islands."

Response a: In response to concerns raised by the public, a TMP (see Section 5.7 and Appendix AB of the FEIS) was prepared to address traffic associated with special events and would be implemented as a mitigation measure. See **Section 1.12.1.2** of this public comment report for a discussion of how adequate emergency access to local communities would be assured.

Soboba Road beyond the existing Reservation and Lake Park Drive are public roads and would continue to be public roads in the event of the fee-to-trust transfer. In fact, neither roadway is included in the legal descriptions for the subject fee-to-trust parcels. A plat map prepared by First American Title Company illustrates the exclusion of public roadways from the parcels proposed for the fee-to-trust transfer, and is included in the FEIS as Figure 2-6. As Lake Park Drive and Soboba Road form no part of the subject parcels, the trust acquisition should have no effect on the public's right to use the roads or the ability of law enforcement personnel to access local communities. Please see **Section 1.12.2.2 Jurisdictional Issues** above for a more detailed discussion of Land Use issues.

Summary of Comments b: Criminal incidents in the Project Area have increased in part due to the Tribe's existing casino clientele or to residents of the Reservation. Studies show that crime increases after a casino opens. Therefore, the number of criminal incidents would increase should the Proposed Action and Alternatives be developed. The DEIS fails to adequately address the increase in criminal activity that would result from development of the Proposed Action and Alternatives.

Response b: As described in Section 4.8 of the FEIS: "A potential effect related to casino development is the increase in the incidence of crime in the area due to the casino. However, since the casino is only being relocated under Proposed Action A, changes in the crime rate should not differ from the present situation. Based on this and discussions presented in Section 3.~~7~~**.4**8, no crime-related effects associated with casinos are anticipated as a result of Proposed Action A. Thus, the crime rate in the area will not be affected by the proposed casino development."

Summary of Comments c: Calls for law enforcement services would increase under the Proposed Action and Alternatives. The DEIS fails to adequately address the increased demands on local law enforcement due to the Proposed Action and Alternatives.

Response c: In its August 27, 2009 public comment letter, the RCSD projected the law enforcement impact from the proposed project. According to the RCSD, the scope of the project, increased traffic volume, and the temporary population increase associated with events at the events arena would result in increased calls for service to local law enforcement. The letter concluded that the anticipated law enforcement needs for the Proposed Action would be met by staffing a full-time, sworn deputy over a 24-hour time period, which equates to staffing five sworn deputy positions, and one non-sworn Community Service Officer. The MOA approved by the Tribe on August 13, 2011 (see Appendix AC) provides a funding mechanism for these staffing needs; therefore, the Proposed Action would have a less than significant effect on local law enforcement.

Summary of Comments d: PL 280 has negative fiscal effects on local governments and fails to provide sufficient protection for all residents near and within reservations. Has the Tribe agreed to PL 280 law in writing? The Tribe is trying to dismantle PL 280.

Response d: PL 280 does not require Tribal consent. An assessment of the general effectiveness of PL 280 or the effects of that law on local governments is outside the scope of this analysis under NEPA. Speculation regarding repeal of PL 280 is likewise outside the scope of this analysis under NEPA. However, the effect of PL 280 as it relates to the Proposed Action is discussed under Section 2.1.1 of the FEIS:

> Prior to the enactment of Public Law 83–280 (PL 280) in 1953, jurisdiction over crimes involving Indians in Indian country was generally shared by Tribal and Federal law enforcement. PL 280 shifted this jurisdiction to the State level for certain States, and gave other States an option to assume such jurisdiction in the future. PL 280 does not require Tribal consent and effectively applies the same laws to Indians living both on and off reservations. Under PL 280, the State of California is one of six states required to accept jurisdiction over crimes committed by or against Indians in Indian country. The law provides no new funding to assist the State in meeting its obligations under PL 280.
>
> Under PL 280, the Riverside County Sheriff's Department (RCSD) and California Highway Patrol (CHP) are responsible for responding to emergencies on the Reservation, and would be responsible for calls to the Project Site upon conveyance of the property to trust status.

Summary of Comments e: The FEIS should note that the Tribe had a contract with RCSD, which it later canceled.

Response e: The following language has been added to Section 3.8 of the FEIS:

> **In 2005 RCSD signed a five-year contract with the Tribe for a deputy to be dedicated to patrolling the Reservation; however, the following year the Tribe canceled the agreement, citing dissatisfaction with the level of service provided.**

It should be noted that the MOU approved by the Tribe (see Appendix AC of the FEIS) would provide a funding mechanism for the provision of law enforcement services to the Development Site.

Summary of Comments f: A Tribal escort could be required for law enforcement, fire protection, and emergency response personnel to access the Project Site and surrounding communities, which would increase response times.

Response f: The tribally approved MOU would (see Appendix AC of the FEIS) ensure that RCSD officers are allowed to access to the Development Site without interference and unnecessary delay, and without Tribal escort. In addition, the MOU would provide a framework for the Tribe and RCSD to cooperate in good faith to develop protocols for coordination of RCSD officers entering the Development Site with Tribal casino security and Tribal Law Enforcement. This MOU will serve as a legally binding contract between the Tribe and RCSD once executed by the Riverside County Board of Supervisors.

Summary of Comments g: Criminals have been able to take refuge on the Reservation from law enforcement authorities.

Response g: Under PL 280, the RCSD and CHP are responsible for responding to emergencies on the Reservation.

Summary of Comments h: What enhanced access features would increase safety?

Response h: As discussed in Section 4.8 under Law Enforcement, safety features built into the Proposed Action include:

- In comparison to the current location of the Tribe's casino, the location of the Development Site near the intersection of Soboba Road and Lake Park Drive would enhance access to and from the proposed facilities and would increase customer safety in case of an emergency.

- Safety within the proposed facilities would be insured through strict adherence to a set of development standards, as discussed in Section 2.1.1.2 of the FEIS.

- Finally, the traffic mitigation measures discussed in Section 5.7.1 of the FEIS would increase traffic safety, thereby reducing the amount of calls for law enforcement to mediate traffic accidents.

In addition, in response to concerns raised by the public, a TMP (see Section 5.7 and Appendix AB of the FEIS) was prepared to address traffic associated with special events and would be implemented as a mitigation measure. See **Section 1.12.1.2** of this public comment report for a discussion of how adequate emergency access to local communities would be assured.

Summary of Comments i: There must be a judicially enforceable public safety agreement between the Tribe and RCSD.

Response i: On August 13 2011, the Tribe approved an MOU governing the provision of law enforcement services to the Development Site (Appendix AC). This MOU will serve as a legally binding contract between the Tribe and RCSD once executed by the Riverside County Board of Supervisors.

Summary of Comments j: The methodology used in the DEIS to present the existing level of crime in the Project Area is questionable.

Response j: Section 3.8 of the FEIS has been updated to incorporate the most recent data available for calls for law enforcement service to the Reservation and existing casino, as provided by RCSD. According to these data, the rate of calls for law enforcement service to both the Reservation and existing casino during this period was highest in 2005 (154 and 541 calls, respectively). The number of calls fell each year between 2005 and 2008, with 29 calls for service to the Reservation and 293 calls for service to the existing casino in 2008. The number of calls rose slightly between 2008 and 2009. Compared to the data previously provided by RCSD for the years 2006, 2007, and the first five months of 2008, the new data show fewer calls for service to the existing Reservation. For example, data previously provided by RCSD showed 224 calls for service to the Reservation in 2006, whereas the most recent data provided by RCSD show 67 calls for service in that year. Conversely, the new data show a slight increase in calls for service to the existing casino for the years 2006 and 2007, compared to data previously provided by RCSD.

Summary of Comments k: The DEIS fails to assess the ability of local law enforcement to maintain the existing level of service to surrounding communities in light of increased demands from the project.

Response k: As described within this section of the public comment report and within Sections 4.8 and 4.10 of the FEIS, the Proposed Action and Alternatives would have a less than significant effect on local

law enforcement. Therefore, the project would not affect the ability of local law enforcement to maintain the existing level of service for surrounding communities.

Summary of Comments l: The DEIS fails to propose appropriate mitigation measures to reduce effects to law enforcement.

Response l: As described within this section of the public comment report and within Sections 4.8 and 4.10 of the FEIS, the Proposed Action and Alternatives would have a less than significant effect on local law enforcement. Therefore, no mitigation measures are required.

1.13.6 Fire Protection and Emergency Medical Services

Summary of Comments a: The FEIS should include an emergency evacuation plan, particularly in light of the expected increase in traffic. The California Gambling Control Commission requires an Emergency Evacuation and Preparedness Plan for this type of project. Emergency response would be delayed due to the increased traffic from the Proposed Action and Alternatives, and ingress and egress of emergency response personnel could be restricted if the fee-to-trust action creates jurisdictional "islands." There is a need for alternate or secondary road access to provide adequate circulation and emergency ingress and egress.

Response a: In response to concerns raised by the public, a TMP (see Section 5.7 and Appendix AB of the FEIS) was prepared to address traffic associated with special events and would be implemented as a mitigation measure. See **Section 1.12.1.2** of this public comment report for a discussion of how adequate emergency access to local communities would be assured.

Soboba Road beyond the existing Reservation and Lake Park Drive are public roads and would continue to be public roads in the event of the fee-to-trust transfer. In fact, neither roadway is included in the legal descriptions for the subject fee-to-trust parcels. A plat map prepared by First American Title Company illustrates the exclusion of public roadways from the parcels proposed for the fee-to-trust transfer, and is included in the FEIS as Figure 2-6. As Lake Park Drive and Soboba Road form no part of the subject parcels, the trust acquisition should have no effect on the public's right to use the roads or the ability of law enforcement personnel to access local communities. Please see **Section 1.12.2.2 Jurisdictional Issues** above for a more detailed discussion of Land Use issues.

Summary of Comments b: A Tribal escort could be required for fire protection and emergency response personnel to access the Project Site, which would increase response times.

Response b: As described in Section 3.8 of the FEIS, in response to a series of violent incidents in December 2007, California Department of Forestry and Fire Protection (CDF) required its rescue crews to wait for an escort from RCSD before responding to emergency calls on the Reservation. The policy was lifted within a few weeks. Two isolated incidents on the Reservation in May 2008 caused CDF to temporarily reinstate the policy; however, the policy was reversed on June 13, 2008. Currently, CDF rescue crews do not require an escort to respond to emergency calls to the Reservation.

RCFD currently has unimpeded access to all facilities on the Project Site. Upon development of the proposed Tribal fire stations, the Tribe will pursue an MAA with RCFD.

Summary of Comments c: The DEIS failed to analyze the direct and cumulative effects to the Riverside County Fire Department's (RCFD) ability to provide an acceptable level of service to local communities. Effects to public safety (including fire) should be analyzed based on calls for service per 1000 population, and the FEIS should assess secondary effects on the provision of fire protection and emergency medical service to surrounding communities. A mitigation plan should be developed to address effects.

Response c: The methodology employed for this effects analysis was derived in consultation with CDF/RCFD Chief Tracy Hobday where the frequency of fire department calls is roughly proportional to the number of employees and patrons visiting a casino; therefore, the DEIS estimated the projected increase in fire protection service calls by comparing the Proposed Action and Alternatives to the demand on similar existing facilities (see Section 4.8 of the FEIS). Section 4.8 determined that the proposed fire stations, project safety features, and mitigation measures prescribed in Section 5.8.7 would ensure that effects to Riverside County Fire Department and CDF are not significant; therefore, no secondary effects would be anticipated, nor would additional mitigation measures beyond those prescribed in Section 5.8.7 be warranted. Cumulative effects to Fire Protection and Emergency Medical Services are discussed in Section 4.10.

Summary of Comments d: Fire and medical service would be influenced by PL 280.

Response d: As described in Section 2.1.1 of the FEIS, Public Law 83–280 (PL 280) affects jurisdiction over crimes involving Indians in Indian country in six states, including California. PL 280 does not affect the level of fire and medical service provided to reservations and surrounding communities.

Summary of Comments e: There must be a judicially enforceable agreement between the Tribe and RCFD, and that details of this agreement would be necessary in order to fully assess the effects of the proposed project.

Response e: As described in Section 4.8 of the FEIS, Tribal consultants met with Chief John Hawkins on April 23, 2008 to present the Proposed Action and Alternatives and discuss the implications of the Tribal fire stations. Upon development of the subject fire stations under the Proposed Action and Alternatives, the Tribe would negotiate with RCFD to establish a Mutual Aid Agreement, under which the Tribe and the RCFD would share fire service resources. This would also include the City of San Jacinto due to its contractual relationship with RCFD to provide fire protection services. An additional Mutual Aid Agreement would be pursued with the City of Hemet. Mutual Aid Agreements are typically not pursued until a fire station has been constructed.

Section 4.8 of the DEIS projected the increase in fire protection service calls by comparing the Proposed Action and Alternatives to the demand on similar existing facilities. As described therein, James Barron, Interim Fire Chief of the Tribal fire department, has confirmed that the staffing levels called for under the Draft Operations Plan (see Appendix G) for the proposed Tribal fire stations would be sufficient to respond to service calls to the Project Site and the Reservation. Therefore, while Mutual Aid Agreements would be pursued by the Tribe with the Cities of San Jacinto and Hemet, the proposed Tribal fire stations would be sufficient to service the projected level of demand from the Proposed Action and Alternatives.

Summary of Comments f: Would one or two fire stations be developed under the Proposed Action and Alternatives?

Response f: As described in Section 2.1.1 of the FEIS,

> Two Tribal fire stations will be developed under Proposed Action A and in accordance with the Draft Tribal Fire Operations Plan (attached as Appendix G of the EIS). The Tribal fire department headquarters would be developed on Soboba Road, towards the southeastern corner of the Project Site, during construction of the hotel/casino complex. The other Tribal fire station would be located near the intersection of Soboba Road and Castile Canyon Road on the existing Reservation. The two stations would total approximately 13,500 square-feet and will serve the Project Site along with the entire Reservation. The two-story buildings would have a maximum height of 40 feet above

grade, with sufficient pavement and parking made available to maneuver and house the necessary fire equipment and fire trucks, and to provide for employee parking. The headquarters and satellite fire station would include apparatus storage bays, equipment storage rooms, restrooms, and office space. These facilities would use the Tribe's existing water supply network and proposed on-Reservation wastewater facilities.

The two Tribal fire stations described for Proposed Action A are also included under the other action alternatives (Proposed Action B, Alternative 1, Alternative 2, and Alternative 3).

Summary of Comments g: The EIS should be restructured to provide for a separate public safety section.

Response g: Comment noted and made part of the administrative record. The structure of the EIS is based off guidelines set forth in the BIA NEPA Handbook (59 IAM 3).

Summary of Comments h: Effects from the Proposed Action and Alternatives on the level of service provided by the Department would need to be mitigated by the Development Impact Fee Program, which would fund capital improvements such as land, equipment purchases, and fire station construction. The Proposed Action and Alternatives must comply with local regulations which affect the provision of fire protection and emergency medical services. The Tribe should prepare a Fire Protection/Vegetation Management Plan, to be submitted to the review and approval of affected jurisdictions.

Response h: Upon transfer of the Project Site from fee-title to trust status, the Developer Impact Fee Program would no longer apply. Furthermore, as described in Section 4.8 of the FEIS, under Proposed Action and Alternatives, two fire stations would be developed to serve the Reservation and Project Site (see Section 2.1.1 Proposed Developments for a description of the proposed facilities): one on the Project Site and the other located near the center of the Reservation. James Barron, Interim Fire Chief of the Tribal fire department, has confirmed that the staffing levels called for under the Draft Operations Plan (see Appendix G) will be sufficient to respond to service calls to the Project Site and the Reservation.[12]

In addition, other local regulations would no longer apply upon transference of the subject property to trust status. However, the Tribe will adopt and comply with the development standards specified in Section 2.0 of the FEIS, including:

- The Tribe will adopt Uniform Building Code standards when constructing the proposed facilities (see Appendix I of the EIS). These standards include all fire, plumbing, electrical, mechanical, and other related building codes. The Tribe will also adhere to the standards set forth in the Federal Americans with Disabilities Act [42 U.S.C. §12101, et seq.].

- The Tribe will adopt and comply with standards no less stringent than the fire protection features identified in the California Fire Code and Riverside County Fire District Fire Prevention Bureau Requirements, including but not limited to the following:

    - The proposed facilities will be of Type I non-combustible, fire-resistive construction materials as defined by the California Building Code;

[12] Personal communication with James Barron, Fire Chief, Soboba Fire Department, June 26, 2008.

- The proposed facilities will be equipped with hydraulically calculated automatic sprinkler systems. This system will be designed to comply with the California Building Code;

- The proposed facilities will be equipped with automatic fire detection and alarm system.

In addition, as specified under Section 3.8 of the FEIS, the Tribal fire department would adopt the land use/fire suppression goals of California Department of Forestry and Fire Protection (CDF)/Riverside County Fire Department for heavy urban areas.

Summary of Comments i: The FEIS should address the financial feasibility of the Tribe's proposed fire stations.

Response i: The financial feasibility of the Tribe's proposed developments is outside the scope of this analysis under NEPA.

1.13.7 School Services

Summary of Comments: New jobs added by the Proposed Action and Alternatives would exacerbate the current overcrowding of local schools by causing an influx of new families into the area. The DEIS should have included projections on the number of new children entering the school system due to the Proposed Action and Alternatives, and should have specified judicially enforceable mitigation measures.

Response: Section 4.10 of the FEIS acknowledges that development of the Proposed Action and Alternatives would result in additional demands on the local education system. This section also acknowledges that the fee-to-trust action would result in "lost revenues" from developer school effect fees and property taxes, which would constitute a negative financial effect to San Jacinto Unified School District (SJUSD).

Section 5.8.8 of the FEIS prescribes mitigation measures to reduce potential effects to the SJUSD:

> The Tribe shall provide reasonable in-lieu development fees and property taxes to the San Jacinto Unified School District to mitigate recognized effects to the district. The Tribe shall consult with the district to determine the amount and schedule of payments to reasonably mitigate fee and tax loss to the district and increased student enrollment in the district's schools.

Currently, SJUSD's developer fee for development of land within the district is $0.47 per square-foot of total building area. This is an increase of $0.05 from the developer fee being charged at the time the EIS was written. Payment of these in-lieu school impact fees to the district would provide San Jacinto Unified School District with the resources to mitigate effects that may occur as a result of the Proposed Action A. Accordingly, the discussion of cumulative effects to school services in Section 4.10 of the EIS is revised as follows:

> Pursuant to Government Code Section 65995 et seq. and Education Code Section 17620 et seq., school districts are authorized to levy fees on new commercial-industrial development to fund the "construction or reconstruction of school facilities" necessary to accommodate the students from new development. Currently, the district's developer fee

for development of land within the district is ~~$0.42~~ **$0.47** per square-foot of total building area.

Based on the development of a 729,500 square-foot facility under the Proposed Action A, the calculated school impact fees from development would be approximately $343,000. Calculated school impact fees from development of Proposed Action B, Alternative 1, Alternative 2, and Alternative 3 would be $336,000, $270,000, $129,000, and $67,000, respectively.

Impacts to school enrollment are usually tied more directly to new housing than to employment. As discussed in Section 4.10 of the FEIS, given Riverside County's substantial supply of vacant housing, the Proposed Action and Alternatives would not result in the development of additional housing in the region. Therefore, only a nominal effect to school enrollment is expected. As the SJUSD developer fees are intended to compensate for effects of new development on schools, including increased student enrollment, the in-lieu payments prescribed above would reduce potential effects to school services to less than significant.

The enforceability of mitigation measures is discussed in **Section 1.17 Mitigation Measures** of this public comment report.

1.14 OTHER VALUES

1.14.1 Hazardous Materials

Summary of Comments a: The proposed underground storage tanks (USTs) pose a risk to groundwater in the Project Area. These USTs should be constructed and operated in accordance with applicable Federal regulations.

Response a: As described in Section 5.1.3 of the FEIS, all USTs associated with the gas station would be installed consistent with Federal regulations (40 C.F.R. Part 280, Subpart B). As specified in Section 5.9.1, all USTs would have double walls with integrated leak detection systems and associated alarms. If a leak were to occur within the inner tank, the outer tank would contain the leak, while a pressure sensor sends a signal to the indicator panel and alarm unit. Leak detection will be regularly monitored by personnel trained in emergency response procedures.

Summary of Comments b: Who would monitor hazardous materials and what emergency service provider would respond to hazardous waste spills that may affect workers and/or neighboring communities?

Response b: As stated in Section 2.1.1 of the EIS, the Tribe would conform to all regulations set forth in the Occupation Safety and Health Act (OSHA) [29 USC 651-678]. OSHA establishes monitoring, protection, and record keeping policies for businesses that use hazardous materials. In accordance with OSHA, a hazardous materials safe handling and response plan will be developed and maintained. These plans contain guidance for employees in the event of a spill or exposure of a hazardous material. In the unlikely event of a hazardous waste spill that threatens neighboring communities, the appropriate authorities (i.e. police, fire department) would be notified immediately.

Summary of Comments c: The project must incorporate spill prevention of hazardous materials.

Response c: Detailed spill prevention procedures are outlined in the FEIS and will be included in written standard operation procedures (SOPs). These procedures include:

- Fuel, oil, and hydraulic fluids will be transferred directly from a service truck to construction equipment tanks and will not be stored on-Site. Other potentially hazardous materials to be used during construction (paint, cleaners, sealants, etc.) will be stored in a locked utility building and handled as per specifications;

- Refueling will be conducted with approved pumps, hoses, and nozzles and will be performed away from bodies of water to prevent potential contamination;

- Catch-pans will be placed under equipment to catch potential spills during servicing;

- All disconnected hoses will be placed in containers to collect residual fuel from the hose;

- Service trucks will be provided with spill containment equipment, such as absorbents;

- All containers used to store hazardous materials will be inspected at least once per week for signs of leaking or failure;

- The amount of hazardous materials use in project construction and operation will be consistently kept at the lowest volumes needed;

- During construction, the contractor will be requested to avoid and minimize the use of hazardous materials to the fullest extent practicable.

Summary of Comments d: Current practices have resulted in the improper use and storage of chemicals associated with the Soboba Springs golf course. Without enforceable mitigation measures, there is no guarantee that the Proposed Action and Alternatives would not result in similar unsafe practices.

Response d: The mitigation measures specified in Section 5.9.1 of the FEIS would reduce potentially significant hazardous materials effects to less than significant. See **Section 1.18 Mitigation Measures** of this public comment report for a discussion of mitigation measure enforceability.

Summary of Comments e: The proposed USTs would be located in close proximity to groundwater. This groundwater supplies many of the City's residents and businesses as a drinking water source.

Response e: According to a summary of Site conditions prepared by LandMark GeoEngineers and Geologists, historical records were reviewed regarding ground water levels in the vicinity of the Site. Over 14 years (1993-2007), groundwater levels ranged from 128 – 193 ft below ground surface. Data were obtained from the Western Municipal Water District and the San Bernardino Valley Municipal Water District cooperative well measuring program records.

As described above, all USTs will have double walls with integrated leak detection systems and associated alarms. If a leak were to occur within the inner tank, the outer tank would contain the leak, while a pressure sensor sends a signal to the indicator panel and alarm unit. Leak detection will be regularly monitored by personnel trained in emergency response procedures.

Based on the depth of ground water resources (>100 ft bgs) and the UST leak detection construction, potential effect to ground water resources are less than significant.

1.14.2 Noise

1.14.2.1 Noise – Construction Impacts

Summary of Comments a: Noise mitigation measures were not applied during construction of the Soboba Springs Country Club clubhouse; therefore, there is no guarantee that the construction noise mitigation measures proposed in the FEIS would be implemented.

Response a: For the Proposed Action and Alternatives, construction noise mitigation measures listed in Section 5.9.2 of the FEIS are recommended. These mitigation measures would serve to minimize the effects of construction noise in the vicinity of the Development Site. For a discussion of the enforceability of mitigation measures, please see **Section 1.18** of this public comment report.

Summary of Comments b: Excessive noise from construction would have negative effects on the local communities.

Response b: The noise analysis contained in Section 4.9 of the FEIS demonstrates that construction effects could be perceived as slightly to moderately loud with a significant effect, about 10 dBA, over existing levels. However, any peak noise levels would be temporary and intermittent, during daylight hours only, and will attenuate with distance. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, as well as one between the Golf Course Community and Soboba Road, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS to lower received noise levels by about an additional 3 dBA overall. Mitigated construction noise levels are shown in Table 4-69 of the FEIS.

Summary of Comments c: Noise from construction equipment would be created 7 am to 7 pm Monday through Saturday.

Response c: Comment acknowledged. These construction hours would be consistent with the City of San Jacinto noise ordinances found in Section 8.40.040.

1.14.2.2 Noise – Operational Impacts

1.14.2.2.1 Residential Communities

Summary of Comments a: Excessive noise from operation of the Proposed Action and Alternatives would negatively effects seniors' lifestyle. Noise levels would increase especially for the Mobile Home Park residents and excessive noise exacerbates health issues. However, the EIS states that noise levels are not significant to nearest residents.

Response b: As described within Section 4.9 of the FEIS, unmitigated operational noise levels would be significant under the Proposed Action and Alternatives. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS to lower received noise levels by about an additional 3 dBA overall. Implementation of this and other mitigation measures specified within Section 5.9.2 of the FEIS would result in less than significant effects for the Proposed Action and Alternatives, with the exception of Alternative 3, which would remain significant even after mitigation implementation.

Summary of Comments c: The EIS does not provide adequate data regarding the noise effect on the surrounding communities (e.g., Soboba Springs Mobile Estates), nor does it provide sufficient mitigation measures for the noise effect of the Proposed Action and Alternatives on those communities.

Response c: The effect of noise generated by the Proposed Action and Alternatives is discussed for the Soboba Springs Mobile Estates, the Golf Course community, and the hillside residential community in Section 4.9 of the FEIS. Implementation of the mitigation measures specified within Section 5.9.2 of the FEIS would result in less than significant effects to the local residential communities, with the exception of Alternative 3, which would generate a significant noise effect even after mitigation implementation.

1.14.2.2.2 Events Center / Arena

Summary of Comments: The noise that would be generated from the proposed open air event arena adjacent to a senior community is unacceptable. Loud music from concerts at night would be especially problematic. Special events associated with the Project could lead to increased noise in the vicinity. Despite the Scoping Report's indication that it would do so, the EIS did not address this concern at all.

Response: The events center (indoor arena/theater) is designed as a fully enclosed structure with sound isolation and absorbing features incorporated which will prevent the propagation of significant noise beyond the property line. There will be no outdoor concert events at the facility, only indoor events. The noise analysis contained in Section 4.9 of the FEIS demonstrates that mitigated operational effects would be less than significant.

Potential noise effects from the events center are discussed under Section 4.9 of the FEIS. For clarification, text within that section was revised as follows:

> **Events Center: The events center (indoor arena/theater) is designed as a fully enclosed structure with sound isolation and absorbing features incorporated which will prevent the propagation of significant noise beyond the property line. There will be no outdoor concert events at the facility, only indoor events.** Noise from a rock concert may reach 120 dBA at a close distance **indoors (Medlin and Associates 2004)**. This is considered the worst-case scenario for inside the events center. The closest noise-sensitive receptor (the Soboba Springs Mobile Estates) would be located approximately 300 feet from the events arena (see Figure 4-6). **Due to engineered soundproof construction techniques, a 50 dBA attenuation would be achieved, from about 120 dBA on the interior to about 70 dBA on the exterior of the building. It follows that residual** noise from the events center would greatly decrease over this distance **to about 51 dBA, which is less than the 60 to 65 dBA background and would thus not be an impact. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which would result in an approximately 5 dBA decrease of noise levels from the event center.** In addition, noise from the events center would only be expected to occur during special events and would not form a permanent part of the background noise level. **Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 to lower received noise levels by about an additional 3 dBA overall. Mitigated construction noise levels are shown in Table 4-69 above. T**he level of noise reaching the Soboba Springs Mobile Estates from the events center is **therefore not** expected to surpass the significance threshold of an increase of 5 dBA from ambient noise levels.

1.14.2.2.3 Parking and Traffic

Summary of Comments a: We would be subjected to the noise of vehicles (e.g., cars, SUVs, motorcycles, and motorbikes) going to and from the facilities. The EIS claim that parking garage noise events would be infrequent is unsupported.

Response a: The noise analysis contained in Section 4.9 of the FEIS demonstrates that mitigated noise levels from the parking garages would be less than significant, taking into account that noise levels associated with parking structure activities are caused by purely random human behavioral events which may or may not occur during any given period of time. The parking structures will incorporate acoustic materials to reduce the effect of intermittent vehicle noises on the Soboba Springs Mobile Estates mobile home park as described in FEIS Section 5.9.2. This mitigation is designed precisely to deal with the unpredictable nature of noise events typical of parking structures.

Unmitigated noise levels experienced by the Soboba Springs Mobile Estates from traffic would be significant under the Proposed Action and Alternatives (70 dBA L_{eq}). There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS to lower received noise levels by about an additional 3 dBA overall. Implementation of this mitigation measure would result in an overall increase in the level of noise to approximately 3 dBA, which is below the significance threshold of an increase of 5 dBA.

Summary of Comments b: Alternative 3 proposes an RV park only a few feet from the Soboba Springs Mobile Estates. Noise from the RV Park would disturb the nearby residents.

Response b: Measures that would mitigate the effects of noise from the RV-park under Alternative 3 on are described in Section 5.9.2 of the EIS. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS to lower received noise levels by about an additional 3 dBA overall. However, as described in Section 4.9 of the FEIS, even with implementation the prescribed mitigation measures, the operational noise effects would remain significant under Alternative 3.

1.14.2.2.4 Facilities & Grounds

Summary of Comments a: Noise would be created 7 am to 7 pm Monday through Saturday by the casino, including delivery at loading docks, maintenance, and lawn care. Noise from maintenance does not appear to have been addressed in the EIS.

Response a: Noise effects from loading docks, maintenance, and lawn care are discussed in Section 4.9 of the DEIS and mitigation measures were prescribed under Section 5.9.2. Unmitigated and mitigated operational noise effects under the Proposed Action A are shown in Tables 4-72 and 4-73 of the FEIS, respectively. As shown in these tables, unmitigated noise effects from loading docks are less than significant. Noise from landscape maintenance equipment (lawnmowers, edgers, trimmers, etc.) would be no different than presently generated at the Soboba Springs Country Club golf course or private residences.

Summary of Comments d: Noise levels will at least double if two casinos are open with supporting buildings.

Response d: Only one casino would operate. Per the FEIS Executive Summary, Purpose and Need (Section 1.3), and Proposed Action (Section 2.1), the Tribe would relocate its existing casino, which presently resides on trust lands, to the Project Site. The structure of the existing Soboba Casino, located less than a half mile from the Project Site, would then be used for Tribal functions and programs, such as Tribal general membership meetings and gatherings. Conversion of the existing casino to meeting hall would coincide with the opening of the new casino with no overlapping functions.

Summary of Comments e: Noise does not stop at the borders of the Reservation. Noise generated within the existing boundaries of the Reservation disturbs the nearby residential communities.

Response e: Noise currently generated from the Reservation and existing casino is outside the scope of this analysis under NEPA as it is not part of the proposed project. The noise effects of the Proposed Action and Alternatives on nearby residential communities are discussed within Section 4.9 of the FEIS.

Summary of Comments f: The EIS noise discussion is inadequate because it analyzed Alternative 3, a proposed retail and office complex, neither of the proposed projects, nor one of the other alternatives.

Response f: Noise effects from each of the alternatives are discussed within Section 4.9 of the FEIS. The supporting technical tables are shown within Appendix X of the FEIS.

Summary of Comments g: Because there are currently no facilities on the Development Site, any new sources of noise would be significant, not less-than-significant as the EIS states. The EIS did not disclose the existing baseline noise levels in the area.

Response g: The effects analysis conducted for noise employed federal and local standards and significance thresholds. See Section 3.9.2 and 4.9.1 for additional discussion of the regulatory framework employed for this analysis. As described therein, the mitigated noise expected to be produced by the Proposed Action or Alternatives does not break the threshold criteria for noise, with the exception of Alternative 3.

As described in Section 3.9 of the FEIS, baseline ambient noise measurements conducted in 2004 by Medlin and Associates for the Development Site and surrounding area yielded average levels of 64.3 dBA and 65 dBA at distances of approximately 75 and 150 feet from the roads, respectively, corresponding with the 60 to 65 dBA noise level reported in the San Jacinto General Plan. Since no major development (i.e., no significant changes in traffic volumes) has taken place in the vicinity of the Development Site since 2004, the noise study cited above is still considered valid and is referenced for this analysis in the following sections as appropriate.

Summary of Comments h: The EIS provided no analysis of the combined noise effects from project build-out; only for each use individually.

Response h: The following text has been modified within Section 4.9.1 of the FEIS to clarify the combined noise effects from the proposed developments:

> **Conclusion: <u>The simultaneous "worst case" combined unmitigated effects of</u>** road traffic, parking structures, **<u>the events arena,</u>** and ancillary equipment associated with the Proposed Action A **<u>could possibly increase average ambient noise levels for the Soboba Springs Mobile Estates by approximately 6 dBA over existing ambient levels, which would be a significant effect. However, the mitigation measures specified in Section 5.9.2 would reduce noise effects to the Soboba Springs Mobile Estates to less than significant, at an increase of 4 dBA overall. Specifically, construction of a higher sound wall, without gaps, between Lake</u>**

Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 to lower received noise levels by about an additional 3 dBA overall.

The mitigated change would not exceed the threshold of significance of an increase in 5 dBA from ambient noise levels. **D**uring special events at the **indoor** events center, **outside** noise levels **would not** exceed this threshold and would therefore be **less than** significant.

The simultaneous "worst case" combined unmitigated effects of the proposed developments on the Golf Course and hillside communities (69 dBA Leq and 62 dBA Leq, respectively) would not exceed an increase in 5 dBA from ambient noise levels, and would thus be less than significant. Mitigation measures to reduce noise effects are described in Section 5.9.2 **would result in an overall noise environment of 68 and 62 dBA Leq for the Golf Course and Hillside communities, respectively. Noise calculation spreadsheets are contained in Appendix X.**

Section 4.10 of the EIS was revised to clarify the cumulative noise effects for the Proposed Action A:

As shown in Table 100(a), the LOS for the intersection of Soboba Springs Drive and Lake Park Drive would be Level F, without improvements, for Year 2025 with Proposed Action A traffic conditions. Similarly, the intersection of Soboba Road at Chabella Drive would operate at LOS F, without improvements, for Year 2025 with Proposed Action A traffic conditions. The noise associated with increased traffic volumes, combined with the unmitigated noise generated by the proposed facilities, would result in a significant effect of an increase over 5 dBA from ambient noise levels (65 dBA). The unmitigated cumulative noise level would be 71 dBA Leq at the Soboba Springs Mobile Estates and 70 dBA Leq at the Golf Course residential community. Noise effects at the Hillside residential community would be less than significant, at 62 dBA Leq.

To ensure that noise effects from operation of Proposed Action A do not contribute to cumulative noise effects, noise control measures would be implemented. With the implementation of the mitigation measures described in Section**s 5.7** and 5.9.2, the noise effects from operation of the proposed developments may be reduced to less than significant **(68 dBA Leq and 69 dBA Leq at the Soboba Springs Mobile Estates and the Golf Course residential community, respectively) .**

1.14.2.2.5 Mitigation

Summary of Comments a: The proposed noise barriers and buffers would not mitigate noise for neighborhoods that are not next to the Development Site. Noise travels up and over sound barriers, which would do nothing to help mitigate effects on the Hill community.

Response a: The Hill community is approximately 2,000 feet (610 meters) from the northeast corner of the facility, and over 3,000 feet (915 meters) from the main building. This distance affords considerable noise attenuation, including terrain effects (absorption). For example, 75 to 80 dBA traffic noise would be attenuated down to about 40 or 45 dBA, which would be less than significant since the low-density residential (LDR) noise threshold is 65 dBA under the Land Use Element (see EIS Section 3.7.2). In addition, there will be no outdoor concert events at the facility, only indoor events, which would not affect the Hill community. As discussed in Section 4.9 of the FEIS, noise effects to the hillside community would be less than significant under the Proposed Action and Alternatives. The primary source of noise which could affect the Hillside community during both the construction and operational

phases is traffic, which would be attenuated by distance to 62 dBA L_{eq}. This is below the LDR noise threshold of 65 dBA under the Land Use Element and is therefore not a significant effect.

Summary of Comments b: The EIS does not provide adequate noise mitigation measures for the operational phases of the project alternatives.

Response b: As described in Sections 4.9 and 4.10 of the FEIS, with the exception of Alternative 3 the mitigation measures prescribed for the operational phase of the proposed developments (see Section 5.9.2 of the FEIS) would reduce direct and cumulative noise effects to less than significant. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, as well as one between the Golf Course Community and Soboba Road, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS to lower received noise levels by about an additional 3 dBA overall.

Summary of Comments c: The mitigation measures identified for operational noise do not appear to include identifiable performance standards (e.g., that construction of a sound wall would be an "optional" mitigation measure).

Response c: Per EIS Section 5.9.2, the sound wall is not optional, but rather an additional noise control measure which would be implemented to further reduce noise effects on the Soboba Springs Mobile Estates. Please see Section 1.18of this report for information on the enforceability of the prescribed mitigation measures. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in Section 5.9.2 of the FEIS. The sound wall would be approximately 6 feet high and would lower received noise levels by about an additional 3 dBA overall, which is the performance standard. The barrier material would have to be solid and massive (i.e., mortared architectural concrete blocks), with no significant gaps in construction. Parking structure noises could result in an increase of 1 to 3 dBA over the existing ambient noise level of 60 to 65 dBA depending on the frequency and distance. This noise level would not be expected to be noticeable nor significant at the nearest residences (Soboba Springs Mobile Estates). For the Soboba Springs community, due to its close proximity (170 feet) to the proposed south parking structure under the Proposed Action A, construction of a mitigating sound wall between re-routed Lakeside Drive and the community would lower received noise levels to existing (pre-project) LDR background levels, i.e., 60 to 65 dBA.

The enclosed Central Plant (HVAC ancillary equipment) would be located furthest away from any residences, adjacent to the golf course on the north end of the facility. Per FEIS Section 4.9.1, HVAC equipment placed inside enclosures which create natural noise barriers or dissipation, would have noise levels reduced by 8 dBA or more compared to unenclosed equipment.

1.14.2.2.6 Plans, Ordinances, Codes

Summary of Comments a: There is an issue of compatibility with Riverside County's General Plan's noise requirements. Noise from the proposed project would cross property lines into the City of San Jacinto residences which have a Noise ordinance with fine-punishable offenses. Several municipal noise codes would be violated by the proposed project.

Response a: The noise analysis within Section 4.9 of the FEIS demonstrates that mitigated operational effects of the Proposed Action and Alternatives would be less than significant which is *de facto*

compliance with applicable plans, ordinances, and codes. However, mitigated effects of Alternative 3 would remain significant and would therefore be inconsistent with local noise ordinances.

Summary of Comments b: Would the Proposed Action comply with city noise ordinances or would the Tribe be able to bypass the ordinances?

Response b: The proposed noise mitigations (FEIS Section 5.9.2) would otherwise enable compliance with Chapter 8.40 of the City of San Jacinto Municipal Code, with the exception of Alternative 3, which would remain significant even with mitigation. However, since the Proposed Action "is subject to Tribal sovereignty" and "is restricted against future alienation and immune from state and local taxation and regulation" by state and local agencies, the City of San Jacinto Municipal Code noise requirements are not enforceable against the Tribe. For a discussion of the enforceability of the mitigation measures prescribed in the FEIS, please see **Section 1.18** of this public comment report.

1.14.3 Visual Resources

Summary of Comments: Mountain views from residential homes and nearby communities would be irreparably damaged or eliminated by the Proposed Action and Alternatives. These views are an important scenic resource for the City of San Jacinto.

***Response*:** Specific text describing effects to views of the San Jacinto Mountains was not included within each section. Therefore, the following sentence will be added to the Section 4.9.1 of the FEIS:

> **Proposed Action A Effect Determination (Section 4.9.1)**
> As discussed under Main Street, Verona Avenue, Menlo Avenue, and Soboba Springs Drive below, Proposed Action A would not dominate the view from locations over 0.5 miles away. Because the terrain is consistently level from most viewpoints, this distance would be greatly reduced if there are visual obstructions exist between the viewpoint and the Development Site. Although Proposed Action A would attract attention, the moderate contrast with the existing setting from these viewpoints would be acceptable under the Class III VRM classification. However, Proposed Action A would be proximate to several residential communities and public roads where, as shown by Soboba Road, the changes would create a strong contrast to the existing setting. Due to their size, any viewers within 0.5 miles of the structures who have an unobstructed line-of-sight could not overlook them. In addition, residences and trails at the same elevation or higher than the proposed structures' roofs, as shown by Granite View Drive, would have a clear view of parked vehicles and mechanical equipment. At these locations, viewers could not ignore the strong color and texture contrast with the existing setting. **Views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured.** Therefore, visual standards would not be met and mitigation measures would be warranted.
>
> **Proposed Action B Effect Determination (Section 4.9.2)**
> As discussed under Main Street, Verona Avenue, Menlo Avenue, and Soboba Springs Drive below, Proposed Action B would not dominate the view from locations over 0.5 miles away. Because the terrain is **consistently** level from most viewpoints, this distance would be greatly reduced if there are visual obstructions exist between the viewpoint and the Development Site. Although Proposed Action B would attract attention, the moderate contrast with the existing setting from these viewpoints would be acceptable under the Class III VRM classification. However, Proposed Action B would be proximate to several residential communities and public roads where, as shown by Soboba Road, the changes would create a strong contrast to the existing setting. Due to their size, any viewers within 0.5 miles of the structures who have an unobstructed

line-of-sight could not overlook them. In addition, residences and trails at the same elevation or higher than the proposed structures' roofs, as shown by Granite View Drive, would have a clear view of parked vehicles and mechanical equipment. At these locations, viewers could not ignore the strong color and texture contrast with the existing setting. **Views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured.** Therefore, visual standards would not be met and mitigation measures would be warranted.

Alternative 1 Effect Determination (Section 4.9.13)
As discussed under Main Street, Verona Avenue, Menlo Avenue, and Soboba Springs Drive below, Alternative 1 would not dominate the view from locations over 0.5 miles away. Because the terrain is consistently level from most viewpoints, this distance would be greatly reduced if there are visual obstructions exist between the viewpoint and the Development Site. Although Alternative 1 would attract attention, the moderate contrast with the existing setting from these viewpoints would be acceptable under the Class III VRM classification. However, Alternative 1 would be proximate to several residential communities and public roads where, as shown by Soboba Road, the changes would create a strong contrast to the existing setting. Due to their size, any viewers within 0.5 miles of the structures who have an unobstructed line-of-sight could not overlook them. In addition, residences and trails at the same elevation or higher than the proposed structures' roofs, as shown by Granite View Drive, would have a clear view of parked vehicles and mechanical equipment. At these locations, viewers could not ignore the strong color and texture contrast with the existing setting. **Views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured.** Therefore, visual standards would not be met and mitigation measures would be warranted.

Alternative 2 Effect Determination (Section 4.9.4)
As discussed under Main Street, Verona Avenue, Menlo Avenue , and Soboba Springs Drive below, Alternative 2 would not dominate the view from locations over 0.5 miles away. Because the terrain is consistently level from most viewpoints, this distance would be greatly reduced if there are visual obstructions exist between the viewpoint and the Development Site. Although Alternative 2 would attract attention, the moderate contrast with the existing setting from these viewpoints would be acceptable under the Class III VRM classification. However, Alternative 2 would be proximate to several residential communities and public roads where, as shown by Soboba Road, the changes would create a strong contrast to the existing setting. Due to their size, any viewers within 0.5 miles of the structures who have an unobstructed line-of-sight could not overlook them. In addition, residences and trails at a higher elevation than the proposed structures' parking lot, as shown by Granite View Drive, would have a clear view of parked vehicles. At these locations, viewers could not ignore the strong color and texture contrast with the existing setting. **Views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured.** Therefore, visual standards would not be met and mitigation measures would be warranted.

Alternative 3 Effect Determination (Section 4.9.5)
As discussed under Main Street, Granite View Drive, Verona Avenue, Menlo Avenue, and Soboba Springs Drive below, views to Alternative 3's single story structures would be largely obscured or eliminated by existing landforms, vegetation and structures, except in the immediate vicinity. Although the Alternative 3 would be seen at Main Street, Granite View Drive, and Menlo Avenue, the weak contrast to the existing setting would be acceptable under the Class III VRM classification. However, the Alternative 3 would be highly visible to travelers using Lake Park Drive and Soboba Avenue, as well as to residents bordering the Development Site. At these locations, viewers could not ignore the strong form, color and texture contrast with the existing

setting. **Views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured.** Therefore, visual standards would not be met and mitigation measures would be warranted.

1.14.4 Recreational Resources

Summary of Comments: The City of San Jacinto is not meeting its goal of 5 acres of parkland for every 1,000 residents; in addition, the original master plan for the Soboba Springs Community included parkland. On this basis, designs for the Proposed Action should have included useable parkland.

Response: As stated within Section 3.9.4 of the FEIS, the City falls short on its standard of providing five acres of parkland for every 1,000 residents, as there are currently only 2.99 acres for every 1,000 residents. Pursuant to the California State Quimby Act (California Government Code §66477), the City of San Jacinto requires new residential developments to dedicate 5 acres of parkland per 1,000 residents or an in-lieu fee payment as a condition for approval of a residential subdivision. Section 9(d) of the Quimby Act states that this requirement does not apply to commercial or industrial subdivisions. The Proposed Action and Alternatives are commercial in nature and do not include residential development; therefore, the Quimby Act does not apply to the type of development proposed under the project.

1.15 CUMULATIVE EFFECTS

Summary of Comments: Cumulative effects of the project have not been thoroughly analyzed. The cumulative effects section did not clearly specify which past, present, and reasonable foreseeable projects were included in the analysis. The cumulative effects analysis should include the proposed Tenaya and Festival projects.

Response: According to the City's planning technician, the Tenaya project (now known as "The Villages of San Jacinto") has been approved pending final corrections to the Specific Plan. This project would be located south of Ramona Boulevard and west of Sanderson Avenue, which is approximately six miles from the Project Site. Environmental effects of the Tenaya project were considered in the Final Environmental Impact Report for the Villages of San Jacinto (State Clearinghouse No. 2004122132), released in November 2009. The Festival project, a proposed 756,200 square foot community shopping center development at the intersection of Highway 79 and Ramona Expressway, is on hold. There is no projected date for approval or construction. The Tenaya project is therefore a reasonably foreseeable action, while the Festival project is not.

Cumulative effects are described within Section 4.10 of the FEIS. The cumulative effects analysis for each environmental topic begins with defining the geographic boundary and time frame for the analysis. For many environmental topics, the geographic boundary of the cumulative effects analysis is generally defined as Riverside County. In some cases, a larger or smaller geographic boundary is addressed. For instance, air quality effects are analyzed within the context of the South Coast Air Basin (SCAB), which spans the western portion of Riverside County as well as Los Angeles and Orange counties. In other cases, effects would only be noticeable on a local level. For this reason, effects to some resources, such as socioeconomic and public services, are analyzed within the context of the City of San Jacinto as well as Riverside County.

Environmental topics for which a larger area of analysis was required (e.g. the San Jacinto River Basin for water resources or within Riverside County for solid waste service) consider the overall effects of planned development, including the Tenaya project, within those geographic boundaries. Environmental topics for which a more localized area of analysis was required detail the anticipated effects on a project by project basis. For example, the geographic scope for the lighting and glare cumulative effect analysis includes all areas within a one-mile radius of the Development Site. Similarly, the visual resources

cumulative effect analysis includes all areas within viewing distance of the Key Observation Points (KOPs). The development tracts considered in the lighting and glare and visual resources analyses are shown in Figures 4-14 and 4-15, respectively. These projects were derived from the City of San Jacinto's Tentative Tracts map, found on the Zoning page of the City's website (http://san-jacinto.ca.us/city-govt/zoning.html). The City's planning technician provided the following description of the subject tracts:

- TR 30577: A permit for 73 residential lots expired on January 29, 2006.
- SP 1-05: The Park Hill residential development, planned for 766 lots, was abandoned.
- TR 33509: The permit for development of 37 residential lots was extended a second time to May 26, 2012.
- TR 28224: The Maravella Estates senior housing development was permitted for 223 lots. Forty of these lots have been completed, with Phase 1 recorded; however, the permit for Phase 2 development has expired.
- CUP 10-04: The Maravella 21,240 square foot multi-tenant retail shopping center has received some grading and improvements; however, there is no anticipated construction date.
- TR 32053: Development of 24 out of 178 residential lots has been completed. There is no projected date for completion of the remaining lots.
- TR 30484: A 117-lot residential development was permitted. This permit has been extended three times to January 15, 2012. There is no anticipated construction date.
- TR 31566: This 61-lot residential development tract was not approved.
- TR 34271: This 147 residential lot development is in process. There is no projected construction or completion date.
- TR 33862: The permit for this 98 residential lot development has been extended to April 27, 2012.
- TR 30923: An application to develop 84 residential lots was withdrawn.
- TR 32582: A permit for 192 residential lots has possibly expired. The City is in the process of confirming the status of this permit.
- TR 30379: A permit for 126 residential lots expired on December 12, 2007 and was subsequently extended to August 12, 2015.
- TR 30588: A permit for 85 residential lots expired on May 22, 2006.
- TR 32518: Development of 9 out of 35 residential lots has been completed. There is no projected date for completion of the remaining lots.

The Tenaya project is not included within the above list of tracts because it is located outside of the areas of analysis for lighting and glare and visual resources.

1.16 INDIRECT EFFECTS

Summary of Comments: The DEIS failed to account for the indirect effects of the Proposed Action and Alternatives.

Response: Section 4.11.1 of the FEIS provides discussion on the indirect effects of project implementation for the Proposed Action, the Alternatives, and No Action. Section 4.11.2 assesses indirect effects caused by the recommended traffic mitigation, while Section 4.11.3 examines indirect effects due to the off-site construction of pipelines. Potential effects caused by the treatment and disposal of wastewater at the proposed Tribal WWTP (see Section 2.1.1) are addressed in Section 4.8. The indirect effects of off-site traffic mitigation and pipeline construction are discussed separately in the FEIS because they are separate projects (indirectly resulting at least in part from the Proposed Action or an Alternative) that affect most issue areas.

1.17 GROWTH-INDUCING EFFECTS

Summary of Comments: Growth-inducing effects have not been thoroughly analyzed.

Response: The growth-inducing effects of the Proposed Action and Alternatives are presented in Section 4.12 of the FEIS. The analysis is based on the proposed developments' potential influence on and relationship between regional employment, housing, and commercial and industrial development.

1.18 MITIGATION MEASURES

Summary of Comments: There is no guarantee that the Tribe would comply with its stated mitigation measures or any agreements developed between the Tribe and local authorities. Mitigation measures proposed in the DEIS are inadequate.

Response: It should be noted that the EIS is not the document that commits the agency to mitigation; it is the Record of Decision (ROD) that does so. The EIS may set forth potential measures for consideration. It does not adopt them. This background information should be kept in mind in evaluating the reach of proposed mitigation measures suggested in the EIS for the BIA to adopt in its ROD. The commenters' suggestions become appropriate measures for the BIA to consider in their Record of Decision. As required by 40 CFR 1505, the BIA or other appropriate consenting agency shall be responsible for ensuring that mitigation adopted within the ROD is implemented. A monitoring and enforcement program for mitigation measures shall be adopted and summarized within the ROD (40 CFR 1505.2 [c]). However, many of the mitigation measures recommended in the EIS are self-enforcing and implementation will be ensured through permit conditions or other binding agreements. See the expanded discussion of NEPA procedural requirements for adopting the ROD in Section 1.5.6 the FEIS.

With respect to those commenters who concluded that the DEIS does not conclusively demonstrate that enforceable mitigation measures will actually mitigate the identified effects, that comment is noted. All relevant, reasonable mitigation measures that could improve the proposed project have been identified. Good faith efforts have been made throughout the environmental review process to design the project so as to minimize environmental effects and to propose mitigation measures that are intended to further minimize potential effects.

SECTION 2

Comment Log, Written Comments, and Public Hearing Transcript

S E C T I O N 2

Comment Log, Written Comments, and Public Hearing Transcript

Table 1 below contains the Comment Log, which lists the names of individuals, agencies, and organizations that submitted written and verbal comments. Copies of all public comment letters received during the public comment period follow **Table 1**, as well as the transcript of the public hearing held on August 5, 2009.

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #A01			City of San Jacinto	
Letter #A01.A	Tim Hults	595 S. San Jacinto, Avenue San Jacinto, CA 92583	City of San Jacinto	1/13/12
Letter #A02		PO Box 682, San Jacinto, CA 92581	Save Our Communities	8/1/09
Letter #A03	David H. K. Huff	3535 10th Street, Suite 300 Riverside, CA 92501	Riverside County Counsel	8/18/09
Letter #A04	Scott Morgan	1400 10th Street, PO Box 3044,Sacramento, CA 95812-3044	State of California, Governor's Office of Planning and Research	8/18/09
Letter #A05	Cheryl Schmit	PO Box 355, Penryn, CA 95663	Stand Up for California	8/24/09
Letter #A06	Patty Brandt	1300 I Street, Suite 125, Sacramento, CA 94244-2550	State of California, Dept. of Justice, Office of Attorney General	9/3/09
Letter #A07	Charles V. Landry	3403 10th Street, Suite 320, Riverside, CA 92501	Regional Conservation Authority	9/14/09
Letter #A08	Michael D. Fitts		Endangered Habitats League	9/15/09
Letter #A09	Jim A. Bartel	6010 Hidden Valley road, suite 101, Carlsbad, CA 92011	US FWS/Carlsbad Office	9/15/09
Letter #A10	Edwin J. Evans	2230 Lake Park Drive, San Jacinto, CA 92583	Lake Park Soboba Springs Mobile Estates	9/15/09
Letter #A11	Charles V. Landry	3403 10th Street, Suite 320, Riverside, CA 92501	Regional Conservation Authority	9/14/09
Letter #A12	Pamela J. Walls	3535 10th Street, Suite 300 Riverside, CA 92501	Riverside County Counsel	9/14/09
Letter #A13	Pamela J. Walls	3535 10th Street, Suite 300 Riverside, CA 92501	Riverside County Counsel	9/15/09
Letter #A14	George Hague	26711 Ironwood Avenue, Moreno Valley, CA 92555-1906	Sierra Club/San Gorgonio Chapter	9/14/09
Letter #A15	Kathleen Browne	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	9/15/09
Letter #A16	Jason Neuman	2300 Market Street, 1st Floor, Suite 150, Riverside, CA 92501	Riverside County Fire Department	9/9/09
Letter #A17	Lee A. Wagner	PO Box 512, Riverside, CA 92502	Riverside County Sheriff	8/27/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #A18	David L. Jones	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	8/24/09
Letter #A19		PO Box 1280, Riverside, CA 92502-1280	County of Riverside, Department of Environmental Health	9/9/09
Letter #A20	Ken Baez	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	9/8/09
Letter #A21	Autumn DeWoody	3741 Merced Drive, Unit F2, Riverside, CA 92503	Inland Empire Waterkeeper	9/15/09
Letter #A22	Andrea Lynn Hoch	Governor Arnold Schwarzenegger, Sacramento, CA 95814	California Office of the Governor	9/15/09
Letter #A23	Brian Nakamura	445 East Florida Avenue, Hemet, CA 92543	City of Hemet	9/10/09
Letter #A24	Joseph B. Lewis	PO Box 8300, Perris, CA 92572	Eastern Municipal Water District	9/11/09
Letter #A25	Robert K. Edmunds	One America Plaza, 600 West Broadway, Suite 1100, San Diego, CA 92101	Buchanan Ingersoll Rooney LLP	9/14/09
Letter #A26	Ken Baez	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	9/8/09
Letter #A27		PO Box 1280, Riverside, CA 92502-1280	County of Riverside, Department of Environmental Health	9/9/09
Letter #A28	Ron Goldman	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	9/8/09
Letter #A29	David E. Jones	4080 Lemon Street, 9th Floor, PO Box 1409, Riverside, CA 92502-1409	County of Riverside, Transportation and Land Management	8/24/09
Letter #A30	Patricia Mayne	PO Box 682, San Jacinto, CA 92581	Save Our Communities	9/9/09
Letter #A31	Barry McClellan	595 S. San Jacinto Avenue, San Jacinto, CA 92583	City of San Jacinto	9/15/09
Letter #A32	Danial Kopulsky	464 West 4th Street, 6th Floor MS 725, San Bernadino, CA 92401	State of California, Department of Transportation - District 8	9/15/09
Letter #A33	Scott Morgan	1400 10th Street, PO Box 3044,Sacramento, CA 95812-3044	State of California, Governor's Office of Planning and Research	9/15/09
Letter #A34	Mekbib DeGaga	1995 Market Street, Riverside, CA 92501	Riverside County Flood Control and Water Conservation District	9/28/09
Letter #A35	Scott Morgan	1400 10th Street, PO Box 3044,Sacramento, CA 95812-3044	State of California, Governor's Office of Planning and Research	9/16/09
Letter #A36	Scott Morgan	1400 10th Street, PO Box 3044,Sacramento, CA 95812-3044	State of California, Governor's Office of Planning and Research	9/22/09
Letter #A37	Kathleen M. Goforth	75 Hawtorne Street San Francisco, CA 94105-3901	United States Environmental Protection Agency	9/15/09
Letter #A38	Joseph E. Mudd	1888 Century Park East, Ste.1900 Los Angeles, CA 90067	Freeman, Freeman, Smiley	2/23/12
Letter #1	Shirley J. Ross	862 Bergmano Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #2	Don A. Nelson	1718 Carrera Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #3	Floyd R. Ross	862 Bergmano Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #4	Jacqueline M. Nielsen	1718 Carrera Drive, San Jacinto, CA 92583	Local Resident	7/13/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #5	Peggy L. Washburn	2230-216 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #6	Jack R. Washburn	2230-216 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #7	Leonard G. Burns and Barbara R. Burns	2230 Lake Park Drive, #172, San Jacinto, CA 92583	Local Resident	7/20/09
Letter #8	Michelle Seman	26256 Wisdome Drive, Hemet, CA 92544	Local Resident	7/13/09
Letter #9	Jerry Decker	2230 Lake Park Drive, #107, San Jacinto, CA 92583	Local Resident	
Letter #10	Beverly Williams	2230 Lake Park Drive, #107, San Jacinto, CA 92583	Local Resident	
Letter #11	Janice R. Emmerich	2230 Lake Park Drive, #79, San Jacinto, CA 92583	Local Resident	
Letter #12	Berton J. McComb	22190 Las Palmas Court, San Jacinto, CA 92583-2981	Local Resident	7/14/09
Letter #13	John G. McGibb	2230-247 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #14	Patricia Finn	2230-194 Lake Park Drive, San Jacinto, CA 92583	Local Resident	8/7/09
Letter #15	Bob and Cecelia Morris	2307 Patirot Way, Corona, CA 92882	Local Resident	
Letter #16	Candace Lange	773 Bergano Avenue, San Jacinto, CA 92583	Local Resident	
Letter #17	Charlotte R. Albert	2230 Lake Park Drive #36, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #18	Harold and Francis Retzlaff	2230-68 Lake Park Drive, San Jacinto, CA 92583	Local Resident	8/8/09
Letter #19	Joanne Pirelli	22770 Soboba Road, San Jacinto, CA 92583	Local Resident	
Letter #20	Margaret Rodenbusch	2230-50 Lake Park Drive, San Jacinto, CA 92583	Local Resident	
Letter #21	Doris Mathers	2230-95 Lake Park Drive, San Jacinto, CA 92583	Local Resident	
Letter #22	Beverly Castleton	985 Verona Avenue, San Jacinto, CA 92583	Local Resident	
Letter #23	Marie Lemons	43761 Pioneer Avenue, Hemet, CA 92544	Local Resident	
Letter #24	Thomas & Dee Wickham	953 Verona Avenue, San Jacinto, CA 92583	Local Resident	8/17/09
Letter #25	Sandra Jensen	2230 Lake Park Drive #101, San Jacinto, CA 92583	Local Resident	
Letter #26	Audrey Garnella	44625 Adobe Drive, Hemet, CA 92544	Local Resident	8/27/09
Letter #27	Linda Warwick	42106 San Jose Drive, San Jacinto, CA 92583	Local Resident	8/27/09
Letter #28	Norm Pabst	42121 San Jose Drive, San Jacinto, CA 92583	Local Resident	8/15/09
Letter #29	Ruth Pabst	42121 San Jose Drive, San Jacinto, CA 92583	Local Resident	8/15/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #30	Sarah Torres	42051 San Jose Drive, San Jacinto, CA 92583	Local Resident	8/15/09
Letter #31	Barbara Andersen	Spc. 61, 2230 Lake Park Drive, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #32	Berton J. McComb	22190 Las Palmas Court, San Jacinto, CA 92583-2981	Local Resident	7/14/09
Letter #33	Beverly Williams	2230 Lake Park Drive. 107, San Jacinto, CA 92583	Local Resident	8/15/09
Letter #34	Elizabeth A. Dalton	21100 State Street, Spc 219, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #35	Francis O. McClelland	2230 Lake Park Dr. Sp #225, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #36	Harold and Francis Retzlaff	2230-68 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/11/09
Letter #37	Kaylene Gutierrez	2230 Lake Park Dr., #19, San Jacinto, CA 92583	Local Resident	7/11/09
Letter #38	Kenneth J. Miller	PO Box 282, San Jacinto, CA 92581	Local Resident	
Letter #39	LeDora Gold	2230 Lake Park Dr., #250, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #40	Linda McKee	21928 Springcrest Road, Moreno Valley, CA 92557	Local Resident	9/15/09
Letter #41	Linda L. Warwick	42106 San Jose Drive, San Jacinto, CA 92583	Local Resident	8/27/09
Letter #42	Patricia Finn	2230-194 Lake Park Drive, San Jacinto, CA 92583	Local Resident	8/7/09
Letter #43	Ted and Margaret Bryant	2230-184 Lake Park Drive, San Jacinto, CA 92583	Local Resident	9/14/09
Letter #44	Beth Gristead	PO Box 1516, San Jacinto, CA 92581	Local Resident	9/14/09
Letter #45	R. Dudley Hoover	166 E. Main Street, Suite 1, San Jacinto, CA 92583	Local Resident	9/14/09
Letter #46	John & Elaine Phillips	2365 S. San Jacinto, San Jacinto, CA 92581	Local Resident	9/4/09
Letter #47	Lois Duran	2230 Lake Park Drive, Spc. 119, San Jacinto, CA 92583	Local Resident	9/9/09
Letter #48	Michael Adams & Florence Adams	42131 Granite View Drive, San Jacinto, CA 92583	Local Resident	9/14/09
Letter #49	Armando Pirelli	22770 Soboba Road, San Jacinto, CA 92583	Local Resident	9/12/09
Letter #50	Denise Pirelli	22770 Soboba Road, San Jacinto, CA 92583	Local Resident	9/12/09
Letter #51	Endre Nika and Pirosha Papp	620 S. Camino Los Banos, San Jacinto, CA 92583	Local Resident	9/15/09
Letter #52	Maureen Castello	1912 Medoc Circle., San Jacinto, CA 92583	Local Resident	
Letter #53	Mike Mayne	1766 Carrera Drive, San Jacinto, CA 92583	Local Resident	9/3/09
Letter #54	Robert C. Snyder and Geraldine M. Snyder		Local Resident	9/1/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #55	LaDora Gold	2230 Lake Park Dr., #250, San Jacinto, CA 92583	Local Resident	7/17/09
Letter #56	Joan C. Sayler	21160 State Street, #162, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #57	Herbert M. Henry	21100 State Street, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #58	Don & Jenice Leslie	1793 Messina Drive, San Jacinto, CA 92583	Local Resident	9/8/09
Letter #59	Jimmy V. Malorni		Local Resident	
Letter #60	Jim Turiace	2230 Lake Park Drive, Space 31, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #61	George W. & Dora C. Rainey	2230-121 Lake Park Drive, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #62	Rodney McClelland	2230 Lake Park Drive, Spc 225, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #63	Virginia Shaw-Metivier	2230 Lake Park Drive, Spc 110, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #64	Jose Martinez		Local Resident	9/1/09
Letter #65	William B. Richmond	2230 Lake Park Drive, Spc 54, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #66	Carol M. Leeds		Local Resident	9/1/09
Letter #67	Christine G. Ellison		Local Resident	9/1/09
Letter #68	Clara L. Roesner		Local Resident	9/1/09
Letter #69	Nona L. Casson	754 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #70	Marlene S. Manion	905 Verona Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #71	Jeneane Prince	7171 Calico Circle, Corona, CA 92881	Local Resident	7/13/09
Letter #72	Richard Lee Prince	7171 Calico Circle, Corona, CA 92881	Local Resident	7/13/09
Letter #73	*Name Unreadable*	2230 Lake Park Drive, Spc 215, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #74	Calvin G. Montney	2230 Lake Park Drive, #11, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #75	Mr. and Mrs. Darrell Jacobson	2230 Lake Park Drive, #239, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #76	Vicki L. Rupert	2230 Lake Park Drive, #196, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #77	Dorothy Klingert	2230 Lake Park Drive, #129, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #78	Charmaine Jones	2230 Lake Park Drive, #33, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #79	John Odgen	2230 Lake Park Drive, #33, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #80	Mr. and Mrs. Frank Minjares	2230 Lake Park Drive, #14, San Jacinto, CA 92583	Local Resident	9/1/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #81	Charles and Judy Helberg	2230 Lake Park Drive, #6, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #82	Ronald and Bonnie Evans	2230 Lake Park Drive, #149, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #83	Donald Atwell	2230 Lake Park Drive, #188, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #84	Mr. and Mrs. Steve Klern	2230 Lake Park Drive #90, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #85	Bradley Haas		Local Resident	9/1/09
Letter #86	Jillian T. Schlentz	2230 Lake Park Drive, #67, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #87	Kenneth B. Howe		Local Resident	9/1/09
Letter #88	Samuel Gold	2230 Lake Park Drive, Spc 240, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #89	Milton S. and Joan D. Maxwell		Local Resident	9/1/09
Letter #90	Margaret P. and William L. Wise	2230 Lake Park Drive, #80, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #91	V. A. Thompson	2230 Lake Park Drive, #233, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #92	Nathalie J. Derry	2230-178 Lake Park Drive, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #93	Daniel J. Derry	2230-178 Lake Park Drive, San Jacinto, CA 92583	Local Resident	9/1/09
Letter #94	Patricia Finn	Soboba Springs Mobile Home Park	Local Resident	9/1/09
Letter #95	David A. Ellison		Local Resident	9/1/09
Letter #96	Frances C. Sherwood		Local Resident	9/1/09
Letter #97	Helen McGrew		Local Resident	9/1/09
Letter #98	E. Stephens Difani		Local Resident	9/1/09
Letter #99	Gayle and Clyde Rocco		Local Resident	9/1/09
Letter #100	Michael D. Tracy		Local Resident	9/1/09
Letter #101	Shirley R. Burke		Local Resident	9/1/09
Letter #102	Rose DeWees		Local Resident	9/1/09
Letter #103	Sandra Jensen		Local Resident	9/1/09
Letter #104	Jesse and Olea Hinojos	2230 Lake Park Drive, Spc 21, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #105	Madge Davis	2230 Lake Park Drive, #46, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #106	Margaret Perez	2230 Lake Park Drive, #49, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #107	Margaret Ann Rodenbusch	2230-50 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #108	Cynthia Johnson	2230 Lake Park Drive, #52, San Jacinto, CA 92583	Local Resident	7/13/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #109	Gayleen C. Johnson	2230 Lake Park Drive, #52, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #110	Viola Keffer	2230 Lake Park Drive, Spc 53, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #111	J. Berg	2230 Lake Park Drive, #54, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #112	Robert Johnson	2230 Lake Park Drive, #66, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #113	Mary Cowan	2230-106 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #114	John R. Wilkins	2230-113 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #115	Judith D. Wilkins	2230-113 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #116	Thelma Ames	2230 Lake Park Drive, Spc 140, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #117	Billie E. Jacobson	2231 Lake Park #141, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #118	Barbara Chavez	2230-143 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #119	Luella M. Roquemore	2230-145 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #120	Sylvia Guenther	2230 Lake Park Drive, #174, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #121	Carol Shephard	2230 Lake Park Drive, #187, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #122	Gary Shephard	2230 Lake Park Drive, #187, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #123	Ted W. Bryant	2230 Lake Park Drive, Spc 184, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #124	Margaret Bryant	2230 Lake Park Drive, Spc 184, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #125	Lois Lorentzen	2230 Lake Park Drive, #183, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #126	Leon Thormahlen	2230 Lake Park Drive, #186, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #127	Maureen Shine	2230 Lake Park Drive, #195, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #128	Gerda M. Mann	2230 Lake Park Drive, #211, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #129	Philip R. Mann	2230 Lake Park Drive, #211, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #130	Sasha M. Moore	2230-227 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #131	Thomas G. Wagorn	2230 Lake Park Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #132	Helen Duke	San Jacinto, CA 92583	Local Resident	7/13/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #133	Cathy Johnson	395 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #134	Robert E. and Bebe M. Phillips	1856 Carrera Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #135	Vernon Reed Johnson	395 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #136	Helen C. Pelletier	368 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #137	Shirley A. Payne	365 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #138	Karen Peters	358 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #139	Ben Rodriguez	348 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #140	Patrick Hardiman	487 Buckingham, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #141	Albert Esqueda	486 Buckingham, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #142	Teresa Saldana	416 Buckingham Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #143	Thomas Stancyk Jr.	1074 Liverpool Lane, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #144	Jamie Stancyk	1074 Liverpool Lane, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #145	Susan Pratt	881 Sussex Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #146	Don Leslie	1793 Messina Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #147	Loren Pratt	881 Sussex Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #148	*Name Unreadable*	991 Sussex Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #149	John Morris	977 Sussex Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #150	Thomas Pippenger Jr.	3681 Anchorage Street, Hemet, CA 92545	Local Resident	7/13/09
Letter #151	Andrea Pippenger	3681 Anchorage Street, Hemet, CA 92545	Local Resident	7/13/09
Letter #152	James Culbreth	1028 Oxford Lane, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #153	Lavonne Culbreath	1028 Oxford Lane, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #154	Clifford L. Bronson	341 Wales Ct. San Jacinto, CA 92583	Local Resident	7/13/09
Letter #155	Gene and Adrianne Canfield	1251 Osprey Street, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #156	James A. Peterson	43715 Orinoco Lane, Hemet, CA 92544	Local Resident	7/13/09
Letter #157	Corina Peterson	43715 Orinoco Lane, Hemet, CA 92544	Local Resident	7/13/09
Letter #158	Richard Lemier	11861 Pasco Bonita, Los Alamitos, CA 90720	Local Resident	7/13/09
Letter #159	Julia Lemier	11861 Pasco Bonita, Los Alamitos, CA 90720	Local Resident	7/13/09
Letter #160	George Sagen	11911 Paseo Bonita, Los Alamitos, CA 90720	Local Resident	7/13/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #161	Linda Sagen	11911 Paseo Bonita, Los Alamitos, CA 90720	Local Resident	7/13/09
Letter #162	Bruce Prince	11432 Kearny Way, Garden Grove, CA 92840	Local Resident	7/13/09
Letter #163	Lee Prince	2 McCormick, Irvine, CA 92680	Local Resident	7/13/09
Letter #164	Nanette Prince Egetter	6544 Westview Drive, Riverside, CA 92506	Local Resident	7/13/09
Letter #165	Sharon Applebury	9701 Turtle Dove, Fountain Valley, CA 92708	Local Resident	7/13/09
Letter #166	Karen S. Underhill	2520 W. Ball Road, #7, Anaheim, CA 92804	Local Resident	7/13/09
Letter #167	Robert Prince	777 W. 12th Street, Claremont, CA 91711	Local Resident	7/13/09
Letter #168	Collen Carpenter & Gary S. Carpenter		Local Resident	7/13/09
Letter #169	Lee A. Hasz	1773 Messina Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #170	Brian Yoke	41633 Lori Lane, Hemet, CA 92544	Local Resident	7/13/09
Letter #171	Joseph W. Herbster	878 Torino Avenue, San Jacinto, CA	Local Resident	7/13/09
Letter #172	Linda M. Hasz	1773 Messina Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #173	Geoffry L. Bentley	1713 Messina Drive,	Local Resident	7/13/09
Letter #174	Sue Hartman	927 Torino Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #175	Dolores R. Arciniega	870 Verona, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #176	Myrna Gifford	913 Verona Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #177	Leticia J. Arciniega	890 Verona, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #178	Edwin Leroy Hinman	774 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #179	Martha Jane Hinman	774 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #180	Patricia J. Mayne	1766 Carrera Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #181	Emmett M. Mayne	1766 Carrera Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #182	Geena Copeland		Local Resident	9/1/09
Letter #183	Shirley Mazzei	714 Verona Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #184	John A. Massei	714 Verona Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #185	Patricia G. Prince	847 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #186	Richard C. Prince	847 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #187	Shirley A. Blair	857 Bergamo Avenue, San Jacinto, CA 92583	Local Resident	7/13/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #188	David D. Christian	890 Verona, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #189	Carol Hawkins	42150 Granite View Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #190	Linda Bassett	42161 Granite View Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #191	Mark Bassett	42161 Granite View Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #192	Eliana Arciniega Ecker	42070 Granite View Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #193	Bruce Ecker	42070 Granite View Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #194	Kenneth Miller	42106 San Jose Drive, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #195	Dean King	42171 Granite View Place, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #196	Carmela Heikkila	21932 Soboba Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #197	Joanne and Henry Pirelli	22770 Soboba Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #198	Angela Mendez	21930 Soboba Road, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #199	Mike Olin	21100 State Street, Spc 149, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #200	Amy J. Steinert	21100 State Street, Spc 60, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #201	Leon A. Steinert	21100 State Street, Spc 60, San Jacinto, CA 92583	Local Resident	7/13/09
Letter #202	Richard L. Glover	21100 State Street, #94, San Jacinto, CA 92583	Local Resident	7/14/09
Letter #203	John Bakey	917 Bettina Way, San Jacinto, CA 92583	Local Resident	7/15/09
Letter #204	Roberta A. Cook and Darrel Wood	21100 State Street, #40, San Jacinto, CA 92583	Local Resident	7/16/09
Letter #205	Ron Ernst	21100 State Street, Spc 80, San Jacinto, CA 92583	Local Resident	7/17/09
Letter #206	Mary Jane Dahlstrom	21100 State Street, #119, San Jacinto, CA 92583	Local Resident	7/18/09
Letter #207	Shan Lane	2110 State Street, Spc 2, San Jacinto, CA 92583	Local Resident	7/19/09
Letter #208	Many Brittain	21100 State Street, #272, San Jacinto, CA 92583	Local Resident	7/20/09
Letter #209	Michael G. Lowe		Local Resident	7/21/09
Letter #210	Joyce Boulanger		Local Resident	7/22/09
Letter #211	Susan Lynn	21100 State Street, #8, San Jacinto, CA 92583	Local Resident	7/23/09
Letter #212	(Petition signatures)		Residents of San Jacinto Valley	
Letter #213	Ethel Van Deusen	639 Attenborough Way, San Jacinto, CA 92583	Local Resident	9/17/09

Table 1 Comment Log

Log No.	Name	Address	Agency/Organization	Date of Letter
Letter #214	Charles Sepulveda	466 Meadow View Drive, San Jacinto, CA 92582	Local Resident	9/13/09
Letter #215	(Petition signatures)		Residents of San Jacinto Valley	
Letter #216	James B. Gibford	2230 Lake Park Drive, Spc 162, San Jacinto, CA 92583	Local Resident	
Letter #217	John Londolfi	2047 Saint Emilion Lane, San Jacinto, CA 92583	Local Resident	
Letter #218	Leonard L. Souza	24600 Mountain Avenue, #21, San Jacinto, CA 92544	Local Resident	9/14/09
Letter #219	Paige Duckworth		Local Resident	9/17/09
Letter #220	Mary and Vic Schutt	1240 Lodgepole Drive, Hemet, CA 92545-7872	Local Resident	9/14/09
Letter #221	Ethel Van Deusen	639 Attenborough Way, San Jacinto, CA 92583	Local Resident	9/17/09

SECTION 3

Detailed Responses to Public Comments

S E C T I O N 3

Detailed Responses to Public Comments

Each of the bracketed comments within the comment letters and public hearing transcript contained in Section 2 of this appendix are responded to within this section. Once an issue has been addressed in a response to a comment, subsequent responses to similar comments reference the initial response. If necessary, the chapters in the FEIS have been modified in response to comments, and the nature and the location of the modification is identified in the response. In many instances, the reader is directed to Section 1 of this appendix when a general response has been developed for the specific comment. This format eliminates redundancy where multiple comments have been submitted on the same issue. Responses to bracketed comments within the comment letters are listed below, followed by responses to bracketed comments within the public hearing transcript.

3.1 DETAILED RESPONSES TO COMMENT LETTERS SUBMITTED BY AGENCIES AND ORGANIZATIONS

3.1.1 Agency/Organization Comment Letter #A01

Response #A01-1

Refer to **Section 1.1.4** for a discussion of Cooperating Agency issues and relationships. **Section 1.13.5** includes a discussion specific to criminal incidents and law enforcement in the Project Area. The City of San Jacinto, as a Cooperating Agency, was issued a copy of the Administrative EIS, and the City and subsequently submitted comments to the BIA. These comments were reviewed and taken into consideration in the EIS. In addition, throughout the 75-day public comment period, occurring July 2, 2009 through September 15, 2009, the City was afforded another opportunity to comment on the EIS.

In its verbal comments submitted at the August 5, 2009 public hearing, the City requested a meeting with the BIA. In response, the BIA, its consultants, and the Tribe met with the City on December 2, 2009, to afford the City the opportunity to clarify its previously submitted comments. In addition, the meeting set a framework for future technical meetings. Technical meetings to discuss socioeconomic and fiscal effects, public safety, and traffic issues were held on the following dates:

- Socioeconomic and Fiscal Effects: January 21, 2010
- Public Safety Effects: January 28, 2010
- Traffic Effects: March 3, 2010

The EIS considers the input provided by the City during these meetings.

Response #A01-2

See ***Response #A01-1*** above, and refer to **Section 1.1.4** for a discussion of Cooperating Agency issues. See also **Section 1.12.2** for a discussion of land use issues. Law enforcement and fire protection/emergency medical services are discussed in **Sections 1.13.5** and **1.13.6**, respectively.

Response #A01-3

The EIS describes the Purpose and Need for the Proposed Action in Section 1.3. Refer to **Section 1.3** of this public comment report for a response to comments related to the Proposed Action's Purpose and Need, and to **Section 1.4** for a discussion of Alternatives.

Response #A01-4

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A01-5

Refer to **Section 1.13.5** for a discussion of Law Enforcement issues.

Response #A01-6

Refer to **Section 1.14.2** for a discussion of noise issues.

Response #A01-7

Refer to **Section 1.12.1** for a discussion of Transportation Networks.

Response #A01-8

Refer to **Section 1.11.1 Economic and Fiscal Resources** for a detailed discussion on the potential fiscal effects resulting from the Proposed Action, including tax effects. The effects of removing the Project Site from the County tax base would account for less than .01 percent in foregone County property tax revenue annually. The Tribe shall provide in-lieu development fees and property taxes to the San Jacinto Unified School District to mitigate recognized effects to the district. Also, the Tribe would provide primary fire protection and medical services to the Project Site, which would relieve the local community of some financial burden.

Response #A01-9

See **Sections 1.8.1** and **1.8.2** for discussions of air quality effects due to construction and operation, respectively.

Response #A01-10

See **Section 1.7.2 Impacts to Water Supply and Water Quality** for a discussion of water quality issues, specifically, the wastewater treatment plant and underground storage tanks at the gas station.

Response #A01-11

See **Section 1.18 Mitigation Measures** for a discussion of mitigation measures and related NEPA requirements.

Response #A01-12

Refer to **Section 1.13.5** for a discussion of Law Enforcement and **Section 1.13.6** for a discussion of Fire Protection/Emergency Medical Services.

Response #A01-13

See **Section 1.18** for a discussion of mitigation measures and **Section 1.1.4** for a discussion of cooperating agencies.

Response #A01-14

See **Section 1.1.4** for a discussion of cooperating agencies. See also **Sections 1.3** and **1.4** for discussions of the purpose of and need for the project, and the project alternatives, respectively. See **Section 1.18** for a discussion of mitigation measures.

The BIA, its consultants, and the Tribe met with the City on December 2, 2009, to afford the City the opportunity to clarify its previously submitted comments. In addition, the meeting set a framework for future technical meetings. Technical meetings to discuss socioeconomic and fiscal effects, public safety, and traffic issues were held on the following dates:

- Socioeconomic and Fiscal Effects: January 21, 2010
- Public Safety Effects: January 28, 2010
- Traffic Effects: March 3, 2010

The EIS considers the input provided by the City during these meetings.

3.1.1.A Agency/Organization Comment Letter #A01.A

Response #A01.A-1

The City states that the EIS identifies less than significant impacts for issues that are significant. The examples used by the City include aesthetics, greenhouse gases, and traffic. Please see Aesthetics and Visual Resources below for a response to aesthetics, Air Quality/Greenhouse Gas below for a response to greenhouse gases, and Traffic below for a response to traffic.

The City also claims that the FEIS ensures that impacts to the County are mitigated, while leaving impacts to the City unmitigated. The issues of particular concern to the City are law enforcement, fire protection services, schools, land use, noise and socioeconomic impacts. Please see the responses provided below for Law Enforcement and Fire Protection, Schools, Land Use, and Noise.

The City states that there are a "number of other remaining problematic areas including agriculture, water, the Project's purpose and need, alternatives, and cumulative impacts…" Please see responses below to Agriculture, Water, Alternatives and Purpose and Need, and Cumulative Impacts.

The City states that portions of the document refer to past dates in the future tense. The examples the City uses are on page 1-12, 3-136, 4-578 to 581, and 4-401/402. Changes have been made to the text to correct the errors.

Response #A01.A-2

Aesthetics and Visual Resources
The City claims that we "seriously underestimate" the number of locations that will be impacted by the visual change. The FEIS included 6 Key Observation Points (KOPs):

KOP 1: Residents from the communities along Main Street and Mountain Drive,

KOP 2: Residents from hillside private residents,

KOP 3: Residents on Lake Park Drive, residents from the community off Lake Park Drive,

KOP 4: Residents from Menlo Avenue,

KOP 5: Residents of the retirement community south of Lake Park Drive, and

KOP 6: Residents near Soboba Road.

The FEIS states on page 184 that the intent in KOP selection is to identify locations in proximity to the Development Site, which best represent overall views of the proposed project as seen from public places such as roads, recreation areas and trails as well as adjacent residential communities. The KOPs are generally selected for one or two reasons: (1) the location provides representative views of the landscape along a specific route segment or in a general region of interest; and/or (2) the viewpoint effectively captures the presence or absence of a potentially significant project effect in that location. The KOPs are typically established in locations that provide high visibility to relatively large numbers of viewers and/or sensitive viewing locations such as residential areas, recreation areas, and vista points. Section 4.9 of the FEIS discusses additional KOP selection criteria and results.

While it is not possible to represent every view toward the project, the KOPs identified are representative of typical views with potential for visual effects generated by the proposed project and they facilitate review and discussion. As the following section will show, KOPs chosen are representative of key sensitive viewer types, key sensitive viewer locations and/or key visual simulation locations.

The City states that it is unclear if the FEIS comes to any conclusion of significance as to the visual impacts of the project. Page 4-289 of the FEIS states that the "views of the San Jacinto Mountains, the most scenic feature in the visual landscape, would be partially or completely obscured. Therefore, visual standards would not be met and mitigation measures would be warranted."

i. Views from Main Street would be significant (FEIS page 4-290)

ii. Views from Granite View Drive would be significant (FEIS page 4-290 through 291)

iii. Views from Verona Avenue would be significant (FEIS page 4-291through 292)

iv. Views from Menlo Avenue would be less than significant (FEIS 4-292)

v. Views from Soboba Springs Drive would be significant (FEIS page 4-292 through 293)

vi. Views from Soboba Road would be significant (FEIS page 4-293 through 294)

Page 4-447 of the FEIS states that the project would "contribute to a cumulatively considerable effect on visual resources from six KOPs, because the proposed permanent structures would strongly contrast with the existing setting."

Our introduction to the visual mitigation reads:

> "The following mitigations measures are recommended to reduce the amount of contrast that the proposed developments would have with the existing setting. These mitigations measures should be used in conjunction with each other and where appropriate in order to reduce the amount of contrast from strong to moderate or less. By reducing the contrast rating to moderate or less, the Proposed Action and Alternatives would have a less than significant visual effect on the existing setting." (FEIS page 5-37)

Therefore, we are stating that the project would have significant existing plus project and cumulative impacts prior to mitigation, but that these impacts would be reduced to LTS with these mitigation measures. In addition, our summary pages make it clear that the impact goes from Significant to Less than Significant with mitigation (page ES-26).

Lastly, City claims that "it is imperative that this significant negative environmental impact be recognized and that substantial additional mitigation measures be added in order to ameliorate this impact as much as possible, and not merely leave the people of San Jacinto to suffer." FEIS Pages 5-37 to 5-39 include visual resource measures that address vegetative screening, earth tone color choices, and parking and roof materials. The City does not specify what other measures are needed or why the existing measures are deficient.

Response #A01.A-3/4

Air Quality/Greenhouse Gases:
The City states that the FEIS analysis regarding greenhouse gas (GHG) emissions is legally insufficient because it "merely calculates the percentage that the Project's GHGs are of the State of California's entire GHG emissions.

Section 4.3.1 and 4.10.3 of the FEIS provides information concerning project related and cumulative GHG emissions. Section 4.3.1 of the FEIS has been modified to show a detailed breakdown of the GHG emissions estimated for both construction and operation. The analysis concludes that the project would generate greater than 25,000 MT of CO_2e emissions, which if left unmitigated would be considered a significant impact. Section 5.3.2 of the FEIS presents mitigation measures designed to reduce the emissions by at least 28.3% from business as usual levels. The revised FEIS does not calculate the percentage of the project's GHG emissions against the State of California.

The City states that the GHG cumulative analysis within the FEIS is inadequate because it fails to come to a conclusion regarding significance. The City goes on to state that there are a number of agencies that have established thresholds including the SCAQMD, BAAQMD, and CARB. The FEIS (Section 4.3.1) uses the CEQ identified annual generation rate of 25,000 MT of CO2e as an

indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. Given that the project would generate GHG emissions above the 25,000 MT level, the FEIS then applied a 28.3% reduction requirement from BAU levels to ensure a less than significant impact would result.

The City claims that the FEIS discussion of mitigation for GHG emissions is also insufficient. Section 5.0 provides mitigation measures that, combined with California Regulatory measures, would reduce GHGs by 34.5%. This is sufficient and exceeds the 28.3% goals of AB 32.

The City states that the Appendix shows that CO_2 will barely be affected by the energy efficiency measures. Please refer to the Global Climate Change assessment provided in Appendix Y.

The City also claims that the mitigation measures are "illusory" since the discussion states that they "should be incorporated" and are not required to be incorporated. The City expands the "illusory" claim to other measures such as the facilitation of public transit use and specifically the application of the solar panel mitigation. The mitigation measures presented in the FEIS are designed to a level of detail that is appropriate given the current planning level of project design. Therefore, it is impossible to state and show exactly where the solar panels will be location on the facility. The Record of Decision identifies those mitigation measures the BIA is adopting and committing to implement, including any monitoring and enforcement program applicable to mitigation. The Tribal Council has also adopted a Tribal resolution that commits the Tribe to implement all mitigation measures carried forward in the BIAs Record of Decision.

Lastly, the City claims that the GHGs emitted by this project are cumulatively significant and that additional mitigation measures are needed. The analysis provided in the revised FEIS provides for mitigation that would reduce the GHG emissions by 34.5%, which exceeds the 28.3% BAU reduction sought by the State of California. The reduction provided for with the implementation of the stated mitigation measures would reduce the project's contribution to a less than significant level.

Response #A01.A-5/7

Traffic

The City was pleased to learn that the Project expressly does not include Lake Park Dr. in the fee—to trust transfer; however, they were concerned that the Soboba Springs Mobile Home Estates residents would still have to share their single access road with a large number of additional cars due to the Project, especially during arena events. They go on to state that the FEIS's "…bald conclusion that there will be no traffic impacts appears to be mere wishful thinking." In addition, the City doesn't believe that the transportation management plan contains sufficient mitigation.

The updated traffic impact analysis (Appendix T of the FEIS) has analyzed the traffic effects to the adjacent residential community by analyzing the intersection of Soboba Springs Drive/Lake Park Drive (the Soboba Springs Mobile Estates access). For Opening Year (2010) with project traffic conditions and without improvements, the intersection of Soboba Springs Drive/Lake Park Drive is projected to operate at unacceptable Levels of Service for Proposed Action "A", Proposed Action "B", and Alternative 1 traffic conditions. Improvements have been recommended for the intersection of Soboba Springs Drive/Lake Park Drive to operate at acceptable Levels of Service during the peak hours for Opening Year (2010) with project traffic conditions during the peak hours.

For Year 2025 With Project traffic conditions and without improvements, the intersection of Soboba Springs Drive/Lake Park Drive is projected to operate at unacceptable Levels of Service for Proposed Action "A", Proposed Action "B", Alternative 1, Alternative2, and Alternative 3 traffic conditions. Improvements have been recommended for the intersection of Soboba Springs Drive/Lake Park Drive to operate at acceptable Levels of Service during the peak hours for Year 2025 with project traffic conditions during the peak hours.

A Transportation Management Plan (TMP) has been prepared and will be implemented as a mitigation measure to account for traffic during special events (see Section 5.7 and Appendix AB of the FEIS). Issues discussed in the TMP includes parking, site access, event notification, channelization, manual traffic control measures, valet/VIP services, designated parking areas, emergency/fire/medical services, and monitoring measures.

As part of this analysis, consideration was given to the Soboba Springs Drive/Lake Park Drive intersection in order to provide mitigation measures to reduce traffic effects for these residents during times of special events. Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages (Appendix AB of the FEIS). In order to provide local residents with ease of access to and from their communities, the TMP recommended that traffic control personnel/police be situated at the project accesses and the intersections of Soboba Road/Chabella Drive, Soboba Road/Lake Park Drive, and Soboba Springs Drive/Lake Park Drive. Using traffic control personnel/police at the project accesses and the intersections of Soboba Road/Chabella Drive, Soboba Road/Lake Park Drive, and Soboba Springs Drive/Lake Park Drive would allow for traffic to flow to and from the Development Site as well as allow local residents access to and from their communities. Each intersection should have a minimum of one traffic control personnel/police directing traffic.

The City goes on to states that the general traffic impacts are also substantial and that the project would increase the number of cars on City roads, and that no mitigation was provided for wear and tear of City streets. They go on to claim that the traffic baseline is out of date with no discussion of whether it reflects current conditions. The proposed development will participate in the adopted TUMF (Transportation Uniform Mitigation Fee) program and pay required development impact fees (FEIS page 5-12). The Board of Supervisors of the County of Riverside and the Councils on the Cities of Western Riverside County enacted the TUMF to fund the mitigation of cumulative regional transportation impacts resulting from future development. The mitigation fees collected through the TUMF program will be utilized to complete transportation system capital improvements necessary to meet the increased travel demand and to sustain current traffic Levels of Service. As noted in Section III.C.5 of the traffic study, the peak hour intersection turning movement counts were obtained in April/October/November 2007 and January 2010.

Lastly, the City requests that the identified mitigation measures for transportation impacts be clarified, preferably with diagrams because it is difficult or impossible to understand exactly how far certain proposed improvements would extend, or exactly where they would be located. As noted in Section VI.C of the traffic study (FEIS Appendix T), the improvements off-site to achieve the required LOS at the study intersections are depicted.

Response #A01.A-8/10

Law Enforcement and Fire Protection

The City claims that the Tribe's signing of the MOU with RCSD has predetermined the outcome as to what would be approved, which they say is forbidden under NEPA. The MOU signed between the City and RCSD would only go into effect should the BIA approve the fee-to-trust request. This MOU is a commitment by the Tribe to the BIA to show that the mitigation identified in the FEIS would/could be implemented. The decision to approve/ disapprove the fee-to-trust request lies solely with the BIA, who is not a party to the MOU. As such, the commitment to implement mitigation, which the MOU provides, does not predetermine the outcome as to what would be approved.

The City states that it is not clear how the agreement with the RCSD would reduce the impact since the Tribe could unilaterally cancel the agreement. All mitigation measures, including law enforcement mitigation, would be carried forward by the BIA to the Record of Decision (ROD) for the EIS. For measures carried forward to the ROD, the BIA would have enforcement capability to ensure implementation.

The City claims that City law enforcement would be impacted by the Project and the additional service calls and traffic problems it created. The City goes on to state that there are "simple calculations" that allow for evaluation of how much City law enforcement would be compensated. The EIS consultants met with the City of San Jacinto (Cooperating Agency) on several occasions to discuss potential impacts caused by the Proposed Action including law enforcement. The topic of law enforcement impact was discussed and the City was requested to provide their calculations. After repeated requests by the EIS authors, the City failed to provide the information. The City did send an overall compensation request to the Tribe identifying a number of items that the City would like to receive compensation for including law enforcement compensations. On that list were provisions for police personnel, police car and a new police station. Minus the simple calculations from the City to help determine the nexus between the Proposed Action and the compensation measures identified by the City, the EIS authors turned to RCSD who are under contract to the City to provide law enforcement services. The signed MOU entered into between the Tribe and RCSD covers law enforcement needs as defined by the service provider - Riverside County. The agreement is worded to be inclusive of needs for all law enforcement services, including those that may be needed by the City. The MOU is a commitment by the Tribe to fully implement law enforcement measures identified in the FEIS. No additional changes to the FEIS mitigation are needed.

The City states that they would be impacted due to increased fire calls because they have an existing mutual aid agreement with the CDF and Riverside County Fire Department. The project description includes the inclusion of a new, fully functioning fire department equipped and run by the Tribe upon project operation. This self sufficient facility would operate independent of CDF, Riverside County and the City of San Jacinto. If the Tribe enters into Mutual Aid Agreements after the facility opens, it would be to the benefit of CDF, Riverside County and the City of San Jacinto because the Tribal Fire Department would agree to participate in off reservation calls. No additional mitigation is needed in the FEIS to address Fire Service impacts.

Response #A01.A-11

Schools
The City claims that it is impossible to know if the school mitigation is adequate because a dollar amount has not been identified. The existing school mitigation presented in the FEIS is as follows:

> The Tribe shall provide reasonable in-lieu development fees and property taxes to the San Jacinto Unified School District to mitigate recognized effects to the district. The Tribe shall consult with the district to determine the amount and schedule of payments to reasonably mitigate fee and tax loss to the district and increased student enrollment in the district's schools.

The Tribe is committed through the BIAs Record of Decision and Mitigation Monitoring Plan to follow through with all mitigation measures listed in the FEIS. In addition, the Tribal Council has adopted a Resolution committing the Tribe to implement all mitigation measures. If the fee-to-trust is approved, the Tribe would then be ready to implement these mitigation measures, which includes meeting with the District to determine the amount needed.

The City states that, while they are not opposed to the Tribe benefiting through the creation of new business opportunities in a destination resort-type project, the City does object to "being left to suffer the drawbacks and many of the costs of the new development, while receiving little if any benefits." FEIS Appendix E, Section 1.13 Public Services, Response C states the following:

> As discussed in Section 4.6 of the FEIS, the reduction in property taxes associated with the removal of the subject property from the tax rolls ($0.24 million) would be partially offset by the generation of local sales tax receipts of approximately $0.22 million annually. The remaining shortfall would be more than compensated for by revenue contributed by the Special Distribution Fund. Soboba Casino accounted for $1.47 million of the Special Distribution Fund for fiscal year 2008-2009. Therefore, the proposed fee-to-trust action is not expected to result in the reduction of funding for public services.

Response #A01.A-12

Land Use
The City claims that the FEIS does very little analysis and discounts the overall impacts by relegating the discussion to separate sections, thereby significantly discounting the impacts that would be felt. The Land Use Compatibility discussion begins on page 4-109 of the FEIS and continues to page 4-111. The FEIS analysis concludes that the project would "result in the transformation of the Development Site from its current vacant rural state into a retail and service development characteristic of urban environments." The analysis also states that "(t)he increased traffic, noise, air emissions, and artificial lighting and glare generated by the proposed commercial developments would be inconsistent with the nearby open space and residential communities." While the conclusions of these physical environmental effects are summarized in this section of the FEIS, the reader is directed to the detailed analysis in other sections of the FEIS where the data/analysis is provided (with the exception of artificial lighting and glare). It would be redundant to reproduce the discussions for traffic, noise, and air emissions in the Land Use Compatibility discussions. The existing discussion is proper and no changes are needed.

The City claims that a separate section that "honestly and completely" discloses and analyzes the land use impacts is necessary for a full and legally adequate EIS. The City does not provide details

as to how the existing analysis fails to comply with NEPA other than the point that the reader is directed to other sections for details related to traffic, noise, and air emission impacts. Please see the response above regarding traffic, noise and air emission impacts.

The City states that mitigation measures pertain only to lighting and that substantial additional mitigation measures must be added to reduce other land use impacts. Mitigation measures associated with traffic, noise, air emissions, and artificial lighting and glare are presented in their respective sections of Section 5.0. The introduction to Section 5.7.2 Land Use has been modified as follows to direct the reader to those sections for applicable mitigation.

> "Land Use impacts necessitate mitigation for traffic, noise, air emissions and artificial lighting and glare. Please refer to Section 5.7.1 *Transportation Networks*, 5.9.2 *Noise*, 5.3 *Air Quality* for mitigation to those impacts. The mitigation provided below is for lighting and glare effects."

Response #A01.A-13

Noise

The City states that the section utilizes an eight-year old baseline, without addressing whether existing noise levels have increased in the interim. Since no major development (i.e., no significant changes in traffic volumes) has taken place in the vicinity of the Development Site since 2004, the noise study cited above is still considered valid. If updated measurements were taken and found that traffic has increased. Subsequently the ambient noise levels would have increased and the project's contribution would be less than what is stated in the report. If the travel speeds, vehicle mix and roadway conditions remain the same it takes a doubling of the traffic volume to increase the noise 3 decibels. So, as the ambient traffic increases the Project's percentage reduces. The report would be considered conservative.

The City claims that the FEIS indicates that construction noise would be significant, but concludes a less than significant impact (FEIS 4-264). This is an improper conclusion. See section changes, they applied the Lmax not the Leq. The Leq is below the 75 threshold – no impacts.

The City claims that the FEIS statements (pages 4-300, 327 and 351) that the addition of lower levels of noise would be less than significant due to the masking effects of higher levels of noise is untrue. They claim that noise is additive and that an adequate analysis is needed. Please see section changes.

Response #A01.A-14

Agriculture

The City states that they have identified two parcels on the project site as being "Farmland of Local Importance." This property is located on the vacant property surrounding the mobile home park southeast of Lake Park Drive. The San Jacinto General Plan states that these lands were identified by the Department of Conservation, and that any plans to convert these lands are subject to review under CEQA (San Jacinto General Plan, May 2006).

The City's General Plan EIR failed to identify a significant impact for the conversion of "Farmland of Local Importance" even though the General Plan maps identified this category. The Thresholds used in the City EIR included the conversion of "Prime Farmland, Unique Farmland, or Farmland of Statewide Importance…to non-agricultural use." Farmland of local importance was not included in the agricultural thresholds. The significant impacts resulting from the conversion of these

agricultural lands to non-agricultural uses was considered a significant and unavoidable impact back in 2006 when the City General Plan was adopted.

More recent research conducted for the EIS through the U.S. Department of Agriculture in 2010 concluded that the project site did not contain any prime and unique farmland, or any statewide and locally important farmlands (Robert S. Hewitt, June 18, 2010). These lands are not currently being used for farmland purposes. The majority of these lands would be left undeveloped except for the convenience mart and fire station.

No additional research/information beyond that which exists in the FEIS is needed based on the fact that the more recent research conducted through the U.S. Department of Agriculture in 2010 for the FEIS revealed that no Farmlands of Local Importance existed on the project site, coupled with the fact that the City's own General Plan EIR for General Plan buildout did not identify the conversion of Locally Important Farmland a significant impact.

Response #A01.A-15

Water

The City states that it is not enough for the FEIS to base a less than significant finding on the fact that it has adequate water rights to the groundwater. The City points out that other parties are currently using the groundwater water that the Tribe has rights to, so in the end an overdraft situation may result, which may be a significant impact. The City concludes by stating that the elimination of current users of groundwater may result in a significant impact, depending on what those uses are.

Section 4.8 of the FEIS (Water Supply and Public Services) shows that the Tribe currently has adequate capacity to serve the domestic needs of the existing Reservation plus Proposed Action A. As shown in the Water Supply discussion (FEIS Section 4.8.1), Existing Plus Project demand would total 1.46 million gallons per day (MGD) from the domestic wells and 0.45 MGD from the irrigation wells. The existing capacity for the Soboba wells is 3.75 MGD. The total Existing Plus Project demand is approximately 2.24 MGD below the existing capacity of the Tribe's domestic wells, and 1.71 MGD below the capacity of the irrigation wells. The existing wells were assumed to maintain their current capacities; therefore, a less than significant impact would result given that projected Existing Plus Project demand would be below existing Tribal water capacity. Additionally, the analysis presented in the cumulative 2030 discussion in Section 4.10, Public Services, Water Supply (page 4-433) concludes that existing water supply is sufficient to accommodate the cumulative demands of the Cumulative Plus Project scenario. Therefore, the existing Tribal wells currently produce adequate quantities of water to serve both the existing and cumulative plus project scenarios.

As presented in Section 4.10.3 of the FEIS (Water Resources), the Tribe's Water Rights Settlement, signed by President Obama on July 31, 2008, guarantees the Tribe paramount right to pump approximately 4,010 acre-feet in 2030, increasing to 9,000 acre-feet in 2058. The Hemet/San Jacinto Groundwater Management Area Water Management Plan accounts for future demands on the Hemet/San Jacinto Groundwater Basin and institutes artificial recharge measures to assure an adequate water supply. The WMP also states that EMWD and Lake Hemet Municipal Water District will implement the WMP for the Canyon and Intake aquifers to "address the current overdraft, and recognize and take into account the Tribal Water Right" (Water Resources & Information Management Engineering, Inc., 2007).

Response #A01.A-16

Drainage
The City wants assurance that the on-site development would not result in significant off-site drainage impacts. Page 4-14 of the FEIS concludes that the "incorporation of the proposed developments would reduce the potential effects to less than significant for structures proposed as part of Proposed Action A, along with downstream *and off-site drainage systems*." (emphasis added)

Response #A01.A-17

Cumulative Impacts

The City claims that it is difficult to know by reading the FEIS exactly what other projects are being considered for the cumulative analysis. Beginning on Page 4-396 and continuing to 4-398, the FEIS presents all of the cumulative projects used as a basis for the baseline cumulative conditions. In addition, Figure 4-12 of the FEIS presents "other developments in the project site and surrounding area" (FEIS, page 4-399). The list presents 16 projects that could have cumulative effects when combined with the Proposed Action and Alternatives. Mike Hasapas, Planning Technician for the City of San Jacinto was contacted for additional information on the City's Tentative New Development/Tracts Map.

The City claims that there is little or no disclosure of the cumulative baseline projects' impacts, and no disclosure of those impacts plus project impacts. The cumulative discussion presents approximately 145 pages of cumulative impact discussion beginning on page 4-400 and continuing through Page 4-545. Baseline and project plus baseline conditions are presented in various tables including, but not limited to:

a. Table 4-95: Estimated Regional Population Growth (2000 to 2010)

b. Table 4-96: 2000-2025 Projected Regional Population Growth

c. Table 4-97: Projected Average Annual Day Emissions (Tons/Day) for the South Coast Air Basin

d. Table 4-98: Expected Year of Compliance with Federal and State Standards for South Coast Air Basin

e. Table 4-99: Project Operational Emissions (Facility and Mobile Source) 2023 South Coast Air Basin (Tons Per Year)

f. Tabl4 4-100: Estimated 2025 Intersection Delay and Level of Service

g. Table 4-101: Estimated 2025 Freeway Interchange Delay and Level of Service

h. Table 4-102: Projected (2030) Water Demand Reservation Plus Proposed Action A

i. Table 4-103: Projected (2030) Wastewater Generation for Reservation Plus Proposed Action A (Gallons/Day)

The cumulative impact discussion covering approximately 145 pages within the FEIS presents a comprehensive analysis of the baseline conditions, as well as the baseline plus project conditions. No additional analysis is required.

Response #A01.A-18

Mitigation Measures

The City claims that the mitigation measures are legally deficient, illusory and meaningless because they do not mandate that the measures be implemented. The FEIS identifies mitigation measures to lessen the recognized environmental impacts resulting from proposed projects. As mentioned previously, the BIA will prepare a ROD that will carry forward and mandate implementation of various mitigation measures to be performed by the Tribe over the course of construction and operation of the project. The step of preparing the ROD has yet to be completed; however, when completed the Tribe will be required, with oversight provided by the BIA, to implement all mitigation measures brought forward in the ROD. In addition, the Tribe has agreed, by way of an adopted Tribal Resolution, to implement all mitigation measures identified in the EIS.

The City claims that they have previously been told that the "TASIN" grant process would adequately mitigate any impacts to the City. The authors of this FEIS are not aware of any such claim regarding TASIN. The comment is noted and forwarded to the BIA for consideration.

The development and approval of a ROD by the BIA, as well as the adoption of the Tribal Resolution ensures that all mitigation measures would be carried forward and implemented by the Tribe. Therefore, no change to the mitigation language in the FEIS is required.

Response #A01.A-19

Alternatives and Purpose and Need

City claims that almost any relocation of the casino would lessen or eliminate the majority of the impacts to the City and its citizens. The relocation of the proposed facility to the Reservation would not allow the Tribe to attain a destination resort, which is a key provision within the Purpose and Need. As stated within Section 2.3.2 of the FEIS, the purpose of the casino relocation is to facilitate the Tribe's need for economic growth by providing an adequate gaming parcel as part of a destination resort. Section 1.3.2 *Economic Necessity*, which is part of Section 1.3 *Purpose and Need for the Proposed Action*, states that the location of the gaming facility would allow the Tribe to fully capitalize on the proposed hotel/casino complex's proximity to the golf course and County Club in order to offer a destination resort. The section goes on to state that an integrated complex offers customers many possible activities in one location. The intent of the Tribe is to differentiate its hotel, casino, golf course, and related facilities from those of nearby competing tribes.

The FEIS (Table ES-1 *Summary of Potential Environmental Effects, Mitigation Measures, and Significance*) found that significant impacts to seismic hazards, Western Riverside County MSHCP, federally listed species, migratory birds, transportation networks, special event traffic, land use inconsistency, wastewater service, hazardous materials, noise, and visual resources would be brought to a level of insignificance with implementation of listed mitigation measures in Section 5.0 *Mitigation Measures*. As stated previously, the Tribe would be required to implement all mitigation measures identified in the FEIS. Therefore, impacts after mitigation are expected to be less than significant at the project site.

City claims that the reason for rejecting an off-site alternative is improper since "having the casino located next to the golf course is not identified as a purpose or need of the Project in the EIS." As stated above, Section 1.3.2 *Economic Necessity* is part of Section 1.3 *Purpose and Need for the Proposed Action*. Within Section 1.3.2 is a sub-category *Suitability of the Project Site for Economic*

Development, which addresses the locational issues associated with the casino project and identifies the need to create a destination resort on the project site combining the existing golf course with the gaming project.

The City claims that the Purpose and Need would be met by keeping the land in fee title rather than bringing it into trust. They go on to state that there are no cultural resources or natural resources on the site, so taking the property into trust does not meet the goal of providing a homeland that protects and conserves cultural and natural resources. Please see Section 1-3.1 (Page 1-10) of the FEIS for revised language.

As stated in Section 1.3.2 (page 1-10) of the FEIS "Tribal self-determination and sovereignty provides the essential nature of the need to transfer the Project site from fee-title to federal trust status. The future welfare of the Tribe's members, and the Tribe's continued existence as a sovereign people, depends upon its ability to sustain economic independence. Placing the land into trust would allow the Tribe to exercise its powers of self determination over the Project Site as an integral part of an enhanced tribal land base, and will provide the Tribe with additional opportunities for economic development that rely upon the Project Site's acquisition in trust."

City claims that freeing the land from state environmental laws and removing it from the City tax base results in environmental and economic impacts that are not worthy or permissible goals. Federal laws apply to fee-to-trust requests. In addition to NEPA compliance, prior to constructing the new gaming facility the Tribe will comply with the Tribal-State Compact, which requires that the Tribe prepare and circulate an environmental document pursuant to its own Environmental Protection Ordinance, which incorporates the policies and purposes of the National Environmental Policy Act and California Environmental Quality Act consistent with the Tribe's governmental interests. Lastly, the FEIS found that the fiscal impacts of taking the property into trust are less than significant.

Response #A01.A-20

Conclusion
The City states that they believe the FEIS to be legally inadequate and they urge the BIA and the Tribe to address these inadequacies fully before taking any action. The responses to comments provided above address the issues raised by the City. The BIA believes the FEIS to be legally adequate.

The City cites the City's residents and a letter from "Save our Communities." The attached letter states concerns regarding the following issues:

1. Restricted input of what happens on sovereign Tribal land: The NEPA process is a means to provide input to the federal government prior to the property being taken into trust and the casino facility constructed. The BIA will fully consider all public input prior to decision making. Following fee-to-trust action, federal laws are fully enforceable on Tribal property.

2. Aquifer: SOC states that the overuse of the aquifer could result in serious consequences. Please see Response to Comment 1.7.2.1 Water Supply in FEIS Appendix E, which states that the Tribe's anticipated current and future water rights are included in the Settlement

and the Water Management Plan. The Water Management Plan also states that EMWD and Lake Hemet Municipal Water District will implement the WMP for the Canyon and Intake aquifers to "address the current overdraft, and recognize and take into account the Tribal Water Right" (Water Resources & Information Management Engineering, Inc., 2007).

3. Elimination of all tax revenues: Please see Response to Comment 1.11.1 Economic and Fiscal Resources in FEIS Appendix E, which states that Riverside County received $234,090 in property taxes from the Project Site – less than 0.01 percent of the $2.4 billion the County received in property tax revenue that year. Thus, the effects of removing the Project Site from the County tax base will be minimal accounting for less than .01 percent in foregone County property tax revenue annually. Of the County property tax revenue, 47.4 percent was allocated to education. The proposed fee-to-trust transfer will decrease education funding by $110,958.66 – a 0.01 percent reduction. However, as described in Section 5.8.8 of the EIS, the Tribe shall provide reasonable in-lieu development fees and property taxes to the San Jacinto Unified School District to mitigate recognized effects to the district. Please see **Section 1.13.8** of this public comment report for a more detailed discussion of mitigation measures to reduce effects to school services.

4. Casino is not the answer to need for tribal self-sufficiency: Comment is noted and forwarded to decision makers for their consideration.

5. U.S. citizens should not be harmed by the pursuit of self-sufficiency: The NEPA process is intended to fully disclose the environmental effects of the Proposed Action. The BIA will fully consider all of the information, including comments received, prior to taking a final action with regards to the project.

3.1.2 Agency/Organization Comment Letter #A02

Response #A02-15

Comment noted.

Response #A02-16

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A02-17

For concerns regarding seismic hazards, see **Section 1.6 Land Resources**. See also **Section 1.7.1** for a discussion of flooding and **Section 1.13.6** for a discussion of fire protection. In response to concerns raised by the public, a TMP (see Appendix AB) was prepared. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured.

Response #A02-18

Refer to **Section 1.2.1 Expressions of Opinion** and **Section 1.12.2 Land Use**.

Response #A02-19

Refer to **Section 1.12.2 Land Use**, **1.12.2.1 Consistency with the City of San Jacinto General Plan**.

Response #A02-20

Refer to **Section 1.18 Mitigation Measures**.

Response #A02-21

Refer to **Section 1.18 Mitigation Measures**.

Response #A02-22

Refer to **Section 1.11.1 Economic and Fiscal Resources** for a detailed discussion on the potential fiscal effects resulting from the Proposed Action.

Response #A02-23

Refer to **Section 1.11.1 Economic and Fiscal Resources** for a detailed discussion on the potential fiscal effects resulting from the Proposed Action, including tax effects.

Response #A02-24

The most current published data sources are presented for analysis in Section 4.6 of the EIS.

Response #A02-25

Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities, as described under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

Response #A02-26

Refer to **Section 1.3 Purpose and Need**.

Response #A02-27

Refer to **Section 1.11.2 Environmental Justice**.

Response #A02-28

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional “islands.”

Response #A02-29

Refer to **Section 1.14.3 Visual Resources** and **Section 1.15 Cumulative Effects**.

Response #A02-30

Comment noted and made part of the administrative record.

Response #A02-31

Refer to **Section 1.3 Purpose and Need** and to **Section 1.4 Alternatives**. Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities, as described under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

Response #A02-32

Comment noted and made part of the administrative record.

Response #A02-33

Comment noted and made part of the administrative record.

Response #A02-34

Comment noted and made part of the administrative record.

Response #A02-35

Comment noted and made part of the administrative record.

Response #A02-36

Comment noted and made part of the administrative record.

Response #A02-37

Refer to **Section 1.10.1 Cultural Resources** and **Section 1.3 Purpose and Need**.

Response #A02-38

See ***Response #A02-37***.

Response #A02-39

See ***Response #A02-37***.

Response #A02-40

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site.

Response #A02-41

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site, as well as for a discussion regarding the location of the Project Site relative to Flood Zone X.

Response #A02-42

Speculation about alternative developments falls outside the scope of the NEPA process. See **Section 1.2** of this public comment report for additional information on non-NEPA topics.

Response #A02-43

Refer to **Section 1.8** for a discussion of air quality effects during construction and operation.

Response #A02-44 Refer to **Section 1.12.1 Transportation Networks**. The location of the proposed hotel/casino complex near the intersection of Soboba Road and Lake Park Drive would allow easier access to and from the facilities relative to the location of the existing casino, which is accessible only via Soboba Road. A TMP (Appendix AB of the FEIS) has been conducted to account for traffic during special events. This study includes information pertaining to event parking during special events and potential mitigation measures.

Response #A02-45

Refer to **Section 1.12.1 Transportation Networks**.

Response #A02-46

Speculation regarding repeal of PL 280 is outside the scope of this analysis under NEPA (see **Section 1.13.5 Law Enforcement**). See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A02-47

Speculation regarding the failed passage of SB 331 is outside the scope of this analysis under NEPA. See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A02-48

Refer to **Section 1.12.1 Transportation Networks, 1.12.1.2 Emergency Evacuation, Response and Access**. The TMP (Appendix AB of the EIS) includes an emergency evacuation plan. The emergency evacuation plan presents a strategy for residents in nearby communities and patrons of the proposed developments to retreat from the area in the event of an emergency situation.

Response #A02-49

PL 280 does not require Tribal consent. Speculation regarding repeal of PL 280 is outside the scope of this analysis under NEPA (see **Section 1.13.5 Law Enforcement**).

Refer to **Section 1.12.1 Transportation Networks, 1.12.1.2 Emergency Evacuation, Response and Access**. The TMP (Appendix AB of the EIS) includes an emergency evacuation plan. The emergency evacuation plan presents a strategy for residents in nearby communities and patrons of the proposed developments to retreat from the area in the event of an emergency situation.

Appendix G contains the Fire Department Development Plan that was developed for the proposed casino facility. As description of the fire apparatus and equipment to be used in the new fire station is located

Appendix G. Three apparatus have been identified to meet the projected needs: (1) one Type-1 structural fire engine, (2) one Type-3 brush engine and (3) one aerial truck company . A Smeal 105-foot "quint" ladder truck is earmarked for future purchase for the proposed casino facility. The analysis states that "The importance of building accessibility for firefighting equipment will be emphasized during the project's design review stage to assure public safety." At this time, a helicopter and land pad is not deemed necessary to provide adequate emergency service to the propose gaming facility. All costs associated with equipment and training will be financed by the Tribe.

See also **Section 1.6 Land Resources**.

Response #A02-50

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." See also **Section 1.13.5 Law Enforcement** and **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A02-51

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

Response #A02-52

Refer to **Section 1.5 General Environmental Concerns**. Noise concerns are addressed in **Section 1.14.2**.

Response #A02-53

Refer to **Section 1.13.5 Law Enforcement**.

Response #A02-54

Refer to **Section 1.13.5 Law Enforcement** for a discussion of the agreement between RCSD and the Tribe. See **Section 1.2.1 Expressions of Opinion**.

Response #A02-55

See ***Response #A02-54***.

Response #A02-56

See ***Response #A02-54***.

Response #A02-57

See **Section 1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497)** and **Section 1.10.1 Cultural Resources**.

Response #A02-58

See ***Response #A02-57***.

Response #A02-59

See ***Response #A02-57***.

Response #A02-60

See ***Response #A02-57***.

Response #A02-61

See ***Response #A02-57***.

Response #A02-62

Section 1.3 of the EIS presents overview information on the Tribe. This section conveys that tribal membership was approximately 900 people, with 625 living on the existing Reservation. This information was the best available at the time of the publication of the EIS. At the end of 2011, the Tribe had over 1,100 members, with 482 people living on the Reservation. Of the total Reservation population, approximately 84 percent or 405 people identify themselves as Native American. The Tribe contends that additional lands are needed to support its growing membership, which is a core element of the Purpose and Need of the EIS. See **Section 1.3** for comments related to the Purpose and Need statement.

Response #A02-63

See ***Response #A02-62***.

Response #A02-64

See **Section 1.3** for discussion of the Purpose and Need for the Proposed Action. See also **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan** of this public comment report for a response to comments regarding project consistency with the City of San Jacinto General Plan.

Response #A02-65

See **Section 1.2.1 Expressions of Opinion** and **Section 1.3 Purpose and Need**.

Response #A02-66

See ***Response #A02-65*** reference.

Response #A02-67

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site.

Response #A02-68

See ***Response #A02-67***.

Response #A02-69

See **Section 1.2.1 Expressions of Opinion**.

Response #A02-70

See **Section 1.2.1 Expressions of Opinion**. The economic need for the Proposed Action is described under Section 1.3.2 of the EIS.

Response #A02-71

See **Section 1.5 General Environmental Concerns**.

Response #A02-72

Refer to **Section 1.8 Air Quality**.

Response #A02-73

Refer to **Section 1.8 Air Quality**.

Response #A02-74

Refer to **Section 1.8 Air Quality**.

Response #A02-75

Refer to **Section 1.8 Air Quality**.

Response #A02-76

Refer to **Section 1.8 Air Quality**.

Response #A02-77

Refer to **Section 1.8 Air Quality**.

Response #A02-78

Refer to **Section 1.8 Air Quality**.

Response #A02-79

Please Refer to **Response 1.12.1.5(d).**

Response #A02-80

Refer to **Section 1.8 Air Quality**.

Response #A02-81

See **Section 1.7 Water Resources**.

Response #A02-82

See **Section 1.7 Water Resources**.

Response #A02-83

See **Section 1.7 Water Resources**.

Response #A02-84

See **Section 1.7 Water Resources**.

Response #A02-85

See **Section 1.7 Water Resources**.

Response #A02-86

See **Section 1.14.3 Visual Resources**

Response #A02-87

See **Section 1.14.3 Visual Resources**.

Response #A02-88

See **Section 1.14.3 Visual Resources**. See also **Section 1.18 Mitigation Measures**.

Response #A02-89

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area.

Response #A02-90

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area.

Response #A02-91

The casino was built in 1995 and noise likely increased with casino development and related activity. NEPA requires that the EIS analyze environmental effects compared to the existing condition, which includes the existing casino. Therefore, noise effects described in the EIS reflect the change between the existing conditions (including the existing casino) and the Proposed Action and Alternatives. Refer to **Section 1.14.2** for a discussion of noise effects.

Response #A02-92

Section 1.14.2 addresses noise effects. Only one casino would operate. Per the EIS Executive Summary, Purpose and Need (Section 1.3), and Proposed Action (Section 2.1), the Tribe would relocate its existing casino, which presently resides on trust lands, to the Project Site. The structure of the existing Soboba Casino, located less than a half mile from the Project Site, would [then] be used for Tribal functions and programs, such as Tribal general membership meetings and gatherings. Conversion of the existing casino to meeting hall would coincide with the opening of the new casino with no overlapping functions.

Response #A02-93

An increase of 5-10 miles per hour in the speed limit along Soboba Road and Lake Park would result in a negligible increase (i.e. less than 1 dBA) to ambient noise levels. As discussed in Section 3.9.2 of the FEIS, a change of 1 dBA cannot be perceived by humans, expect in carefully controlled laboratory environments. Therefore, the ambient noise baseline data used in the noise model is reasonably accurate.

Response #A02-94

Section 1.14.2 addresses noise effects. Refer to **Section 1.12.1** for a discussion of the Transportation Networks, which includes a discussion of traffic during special events.

Response #A02-95

The following text has been added to Section 3.9.2 of the EIS, which describes the ambient environment of the Project Site:

> **Residents located in the Golf Course Community have raised concerns to the management of the Golf Course and Clubhouse and the Tribal Chairman regarding noise late at night and early in the morning. Their concerns include car alarms, car stereos, events, vehicle noise, and blowers.**

Response #A02-96

See **Section 1.14.2 Noise**. If the fee-to-trust transfer is approved, the area where the new casino is proposed would become part of the Soboba Reservation and would therefore not be subject to noise ordinances of the City of San Jacinto. Mitigation measures to reduce noise effects are described in Section 5.9 of the EIS.

Response #A02-97

See ***Response #A02-96***.

See also **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan** of this public comment report for a response to comments regarding project consistency with the City of San Jacinto General Plan. Mitigation measures to reduce noise effects are described in Section 5.9 of the EIS. See also **Section 1.14.2 Noise**.

Response #A02-98

Refer to **Section 1.12.1** for a discussion of the transportation networks, including a discussion of the traffic analysis. NEPA requires that the analysis in the EIS evaluate the effects of the project compared to the existing condition (including the existing casino); therefore, the traffic effects assessed in Section 4.7 of the EIS and discussed in **Section 1.12.1** do not reflect the change from before the existing casino was built. Traffic mitigation is described in Section 5.7 of the EIS.

Response #A02-99

Comment noted and made part of the administrative record. Refer to **Section 1.12.1** for a discussion of the transportation networks and traffic in the Project Area.

Response #A02-100

The approval or denial of requests made to the Tribe by the City of San Jacinto for traffic control equipment is outside the scope of this EIS. Refer to **Section 1.12.1 Transportation Networks**. Traffic mitigation for the proposed project is described in Section 5.7 of the EIS.

Response #A02-101

Traffic mitigation (Section 5.7 of the EIS) for the project in would help mitigate traffic safety problems. The mitigation is proposed in order to lessen the traffic effects of the project compared to existing conditions. Refer to **Section 1.12.1** for a discussion of the transportation networks and traffic in the project area.

Response #A02-102

In order to obtain an accurate understanding of how project traffic could affect nearby communities, data on roadway segments was collected in October 2010. Traffic counters were placed at the intersection of these communities and the adjacent roads (i.e. Lake Park Drive, Soboba Drive). This data provided a baseline of existing traffic activity at these communities and allowed for a specific analysis of traffic effects resulting from the project. As presented in Section 4.7.1 of the EIS, the traffic analysis found that the intersection of Soboba Springs Drive (NS) at Lake Park Drive (EW) would not operate at an acceptable level of service and a two-way left turn median on Lake Park Drive would serve as mitigation. This would allow this intersection to operate at an acceptable level of service.

Response #A02-103

The baseline trip data collected for the traffic analysis was collected in 2007 and 2010. The Golf Course and Country Club was opened in April 2008. Therefore, the baseline data collected in 2010 accounts for traffic generated from the Golf Course and Country Club.

Response #A02-104

Numerous comments expressed concern that the Tribe would have the ability to legally restrict movement along Soboba Road and Lake Park Drive and to otherwise interfere with the rights-of-way established adjacent to the Project Site. Commenters cited the Tribe's authority to control access on Soboba Road within the existing Reservation as evidence that the Tribe might attempt to similarly restrict access elsewhere. However, Soboba Road within the Reservation is not a public roadway and is maintained by the Tribe. Soboba Road beyond the existing Reservation and Lake Park Drive are public roads and would continue to be public roads in the event of the fee-to-trust transfer. In fact, neither roadway is included in the legal descriptions for the subject fee-to-trust parcels. A plat map prepared by First American Title Company illustrates the exclusion of public roadways from the parcels proposed for the fee-to-trust transfer, and is included in the EIS as Figure 2-6. As Lake Park Drive and Soboba Road form no part of the subject parcels, the trust acquisition should have no effect on utility infrastructure or the public's right to use the roads.

Response #A02-105 See **Section 1.12.1 Transportation Networks**.

Response #A02-106

Refer to **Section 1.9 Biological Resources**.

Response #A02-107

Refer to **Section 1.9 Biological Resources**.

Response #A02-108

Refer to **Section 1.9 Biological Resources**.

Response #A02-109

See **Section 1.8 Air Quality** for a discussion of project-related greenhouse gas emissions.

Response #A02-110

See **Section 1.7.1** for a discussion of water resources with regard to effects to flooding and runoff.

Response #A02-111

Comment noted and made part of the administrative record. Stormwater runoff is addressed in Section **1.7.1**. Water quality is addressed in **Section 1.7.2**.

Response #A02-112

Refer to **Section 1.13.6** for a discussion of fire protection.

Response #A02-113

Refer to **Section 1.8 Air Quality**. Mitigation measures to reduce emissions are identified in Section 5.3 of the EIS.

Response #A02-114

Refer to **Section 1.9 Biological Resources**.

Response #A02-115

Refer to **Sections 1.7**, **1.9** and **1.12** for a discussion of water resources (including stormwater runoff), biological resources, and transportation networks, respectively. Fire protection is described under **Section 1.13.6**. Evacuation in the event of a large scale emergency is discussed within the TMP (Appendix AB of the EIS) and in **Section 1.12.1.2** of this public comment report.

Response #A02-116

See **Section 1.12.2 Land Use**.

Response #A02-117

Comment acknowledged. Refer to **Section 1.12.2** for a discussion of land use and **Section 1.11.1** for a discussion of economic and fiscal conditions, including property values. Community character and quality of life issues are discussed in **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**.

Response #A02-118

Refer to **Section 1.14.1** for discussion of hazardous materials. **Section 1.7.1** (flooding) and **1.13.6** (fire protection) also respond to this comment. All underground storage tanks would be constructed and operated in accordance with applicable Federal regulations. Whether the Tribe has complied with Federal regulations on their existing Reservation land is outside of the scope of this EIS.

Response #A02-119

Refer to **Section 1.6 Land Resources** and **1.7.1 Impacts to Flooding and Runoff**. The Tribe will adopt Uniform Building Code standards when constructing the proposed facilities (see Appendix I of the EIS).

The TMP (Appendix AB of the EIS) contains a section entitled "Emergency/Fire/Medical Services," which describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header.

Response #A02-120

Refer to **Section 1.13.7** for a discussion of emergency response services and **Section 1.11.1** for a discussion of tax effects. **Section 1.13.5 Law Enforcement** describes the agreement between the Tribe and RCSD. As described in Section 2.1.1 of the EIS, Public Law 83–280 (PL 280) affects jurisdiction over crimes involving Indians in Indian country in six states, including California. PL 280 does not affect the level of fire and medical service provided to reservations and surrounding communities. PL 280 does not require Tribal consent. Speculation regarding repeal of PL 280 is outside the scope of this analysis under NEPA.

Response #A02-121

See ***Response #A02-120***.

Response #A02-122

See **Sections 1.13 Public Services, 1.13.1 Water Supply**, **1.13.2 Wastewater Service**, and **1.13.4 Electricity and Natural Gas**.

Response #A02-123

See **Section 1.13.5 Law Enforcement**.

In response to concerns that the project would increase emergency services costs, see the discussion within **Section 1.13.5 Law Enforcement** regarding the agreement between the Tribe and RCSD. See also **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A02-124

See ***Response #A02-123***.

Response #A02-125

See ***Response #A02-123***.

Response #A02-126

See ***Response #A02-123***.

Response #A02-127

See **Section 1.11.2 Environmental Justice**.

Response #A02-128

See **Section 1.10 Cultural and Paleontological Resources** and **Section 1.3 Purpose and Need**: Response c.

Response #A02-129

The Notice of Intent incorrectly stated that 289.88 ± acres were proposed for fee-to-trust approval. The correct figure, 534.91± acres, has been incorporated into all following project documentation. Section 1.5.1 of the FEIS corrects the error.

Response #A02-130

See ***Response #A02-*129**. The scoping process is initiated very early in the NEPA process, when the proposed project is often not entirely formed. It is common to have incomplete or conflicting information during the initial stages in the NEPA process. BIA considered the scope of the project sufficient to gather substantive public input and published the Notice of Intent, which initiated the public involvement process, on December 14, 2007. This provided the public with notice 43 days prior to the close of the scoping period on January 25, 2008. This length of time exceeds the 30-day minimum scoping period, required under NEPA. As detailed below, multiple opportunities were provided for public and agency involvement during the scoping phase. These efforts include:

- The public comment period, totaling 43 days.
- Invitations to six cooperating agencies to participate in the preparation of the EIS.
- A press release to The Press-Enterprise on December 22 and 23, 2007.
- Notices posted in surrounding libraries. Notice was posted in the Hemet Public Library, Valle Vista Library, and Riverside County Library – San Jacinto branch, as of December 27, 2007.
- Notices were also distributed to the local communities of Hill Community, Lake Park Mobile Home, Soboba Springs Homes on January 4, 2008.
- A public notice was posted on the City of San Jacinto's web site on January 3, 2008. The posting was available for viewing at: http://www.ci.san-jacinto.ca.us/public_notices.html
- A large notice sign was posted on January 4, 2007 at the corner of Soboba Road and Lake Park Drive, the proposed project site, alerting local residents.
- During the public comment period, a public scoping meeting was held at Hemet Public Library in the City of Hemet (January 8, 2008), California, attended by approximately 225 persons.
- Sixty-one comment letters were received by the BIA from individuals.
- Two comment letters were received by the BIA from cooperating agencies.

Response #A02-131

See ***Response #A02-130***.

Response #A02-132

See ***Response #A02-130***.

Response #A02-133

See **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Ordinance**.

Response #A02-134

Refer to **Section 1.13.5 Law Enforcement**. See also **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A02-135

The comment cards distributed at the scoping meeting were on blue paper. When the original comment cards were photocopied, some comments appeared tinted in the scoping report. All original copies of comments were reviewed by BIA as they were received during the public scoping period. The environmental issues described in each comment letter were summarized in Table 3-1 of the Scoping Report, and were also discussed under Section 3.2 Scoping Issues. The nature of each comment letter received was therefore represented in the Scoping Report within the discussion of environmental issues raised by the public.

Response #A02-136

See **Section 1.11 Economic and Socioeconomic Conditions**.

Response #A02-137

See **Section 1.11 Economic and Socioeconomic Conditions** and **Section 1.13.7 School Services**.

Response #A02-138

See **Section 1.11 Economic and Socioeconomic Conditions** and **Section 1.13.7 School Services**.

Response #A02-139

See **Section 1.11.1 Economic and Fiscal Resources**.

Response #A02-140

See **Section 1.11.1 Economic and Fiscal Resources** and **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A02-141

Refer to **Section 1.15** for a discussion on cumulative effects. **Section 1.13** discusses the effect of the project on public services.

Response #A02-142

See **Section 1.13.5 Law Enforcement**. An MOU is not proposed for this project. Agreements between the Tribe and the County regarding the provision of law enforcement and fire protection services are described under **Section 1.13.5** and **1.13.6**, respectively. See also **Section 1.6 Land Resources**. The Tribe will adopt Uniform Building Code standards when constructing the proposed facilities (see Appendix I of the EIS). See also **Section 1.2.1** Expressions of Opinion.

Response #A02-143

Comments noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. See also **Section 1.10.1 Cultural Resources**, **Section 1.12.2 Land Use**, and **Section 1.13.5 Law Enforcement**. Refer to **Section 1.1.4 Cooperating Agency**.

Response #A02-144

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**.

3.1.3 Agency/Organization Comment Letter #A03

Response #A03-145

See **Section 1.1.2 Extension of the Comment Period**.

3.1.4 Agency/Organization Comment Letter #A04

Response #A04-146

Comment noted and made part of the administrative record.

3.1.5 Agency/Organization Comment Letter #A05

Response #A05-147

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. See also **Section 1.2.2 Matter beyond the Scope of the EIS**.

Response #A05-148

See also **Section 1.2.2 Matter beyond the Scope of the EIS**, **1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Compliance**.

Response #A05-149

See also **Section 1.2.2 Matter beyond the Scope of the EIS**, **1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Compliance**.

Response #A05-150

See also **Section 1.2.2 Matter beyond the Scope of the EIS**, **1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Compliance**.

Response #A05-151 Refer to **Section 1.3** regarding Purpose and Need.

Response #A05-152 Refer to **Section 1.11.1** for a discussion of Economic and Fiscal Resources.

Response #A05-153

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." For land use concerns, refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan.**

A TMP has been prepared (Appendix AB of the EIS). The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

As described within Section 2.1.1 of the EIS, the Tribe will adopt a "Responsible Alcoholic Beverage Policy" which would include but not be limited to carding patrons and refusing service to those who have had enough to drink. This policy would be discussed with RCSD.

Air quality is discussed within **Section 1.8**. For the necessary equipment or costs for public safety response, see **Section 1.13 Public Services**.

Response #A05-154

See **Section 1.18 Mitigation Measures**. A TMP has been prepared (Appendix AB of the EIS). The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

Response #A05-155

See **Section 1.11.2 Environmental Justice**.

Response #A05-156

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." For concerns related to crime, and for details regarding the agreement between the Tribe and RCSD, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report.

Response #A05-157

Evacuation plans will be developed following final design and construction of all structures including the parking garage. In addition, a TMP has been prepared (Appendix AB of the EIS). The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header.

Section 2.1.1 of the EIS presents the Development Standards the Tribe would adopt when developing the facilities. After collecting additional site specific data on the seismicity of the Development Site and performing additional geotechnical analysis, the following mitigation measures (Section 5.1.2 and Section 5.1.4 of the EIS) were developed for the Proposed Action and Alternatives:

Implement measures presented in Appendix L: Preliminary Fault Hazard Evaluation Report and Preliminary Geotechnical Investigation, which present recommendations related to the following:

1. **Site Preparation,**
2. **Foundations and Settlements,**
3. **Deep Foundations,**
4. **Slabs-On-Grade,**
5. **Concrete Mixes and Corrosivity,**
6. **Excavations,**
7. **Lateral Earth Pressures, and**
8. **Pavements**

For all other proposed structures, engineering designs should comply with the latest edition of the California Building Code (CBC) for Site Class D using the seismic coefficients provided in the geotechnical report (see Appendix L). A qualified geologist should inspect any excavations (foundation, utility, etc.) on the Development Site during construction for possible indications of faulting. If unanticipated faulting were encountered in these excavations, further relocation of the structures may be necessary to maintain a 50-foot setback of human occupancy structures from active faults, consistent with the Alquist-Priolo Earthquake Fault Zoning Act.

Response #A05-158

See **Section 1.13.3 Solid Waste Service**. Water quality issues are discussed under **Section 1.7.2 Impacts to Water Supply and Water Quality**.

Response #A05-159

Refer to **Section 1.8** for a discussion of air quality. In addition, see **Section 1.18 Mitigation Measures** and **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-160

The Tribal water rights are set in the Water Rights Settlement. The settlement is independent of the Proposed Action and Alternatives and the location of the Project Site. The Tribe will rely on existing groundwater wells for the Reservation supply and therefore, this Project does not grant the Tribe control of the regional water supply. Regarding other issues raised in this comment, refer to **Section 1.7** for a discussion of water resources.

Response #A05-161

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS** for discussion of the Governor's Proclamation on Tribal Gaming and the Indian Gaming Regulatory Act.

Response #A05-162

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-163

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-164

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-165

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-166

See **Section 1.2.1 Expressions of Opinion**.

Response #A05-167

Refer to **Section 1.2.2 Matters beyond the Scope of the EIS**.

Response #A05-168

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. See also **Section 1.13.5 Law Enforcement** for a discussion of the agreement between RCSD and the Tribe.

3.1.6 Agency/Organization Comment Letter #A06

Response #A06-169

See **Section 1.1.2 Extension of the Comment Period**.

Response #A06-170

See **Section 1.1.2 Extension of the Comment Period**.

3.1.7 Agency/Organization Comment Letter #A07

Response #A07-171

Comment noted and made part of the administrative record. See **Section 1.9 Biological Resources**.

Response #A07-172

See **Section 1.9 Biological Resources**.

Response #A07-173

See **Section 1.9 Biological Resources**.

Response #A07-174

See **Section 1.9 Biological Resources**.

Response #A07-175

See **Section 1.9 Biological Resources**.

3.1.8 Agency/Organization Comment Letter #A08

Response #A08-176

Comment noted and made part of the administrative record.

Response #A08-177

Refer to the following sections:

- **Section 1.1.1 General EIS Issues**
- **Section 1.9 Biological Issues**
- **Section 1.7 Water Resources**
- **Section 1.12.1 Transportation Networks**
- **Section 1.8 Air Quality**
- **Section 1.4 Alternatives**

Response #A08-178

See **Section 1.9 Biological Resources**.

Response #A08-179

See **Section 1.9 Biological Resources**.

Response #A08-180

See **Section 1.9 Biological Resources**.

Response #A08-181

See **Section 1.9 Biological Resources**.

Response #A08-182

See **Section 1.9 Biological Resources**.

Response #A08-183

See **Section 1.9 Biological Resources**.

Response #A08-184

See **Section 1.9 Biological Resources**.

Response #A08-185

See **Section 1.9 Biological Resources**.

Response #A08-186

See **Section 1.9 Biological Resources**.

Response #A08-187

See **Section 1.9 Biological Resources**.

Response #A08-188

See **Section 1.9 Biological Resources**.

Response #A08-189

See **Section 1.7 Water Resources**.

Response #A08-190

See **Section 1.7 Water Resources**.

Response #A08-191

See **Section 1.7 Water Resources**.

Response #A08-192

See **Section 1.7 Water Resources**.

Response #A08-193

See **Section 1.7 Water Resources** and **Section 1.16 Indirect Effects**.

Response #A08-194

See **Section 1.7 Water Resources**.

Response #A08-195

See **Section 1.7 Water Resources**.

Response #A08-196

See **Section 1.12.1 Transportation Networks**.

Response #A08-197

See **Section 1.12.1 Transportation Networks**.

Response #A08-198

See **Section 1.8 Air Quality** and **Section 1.15 Cumulative Effects**.

Response #A08-199

See **Section 1.8 Air Quality** and **Section 1.15 Cumulative Effects**.

Response #A08-200

See **Section 1.8 Air Quality** and **Section 1.15 Cumulative Effects**.

Response #A08-201

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A08-202

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A08-203

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A08-204

Comment noted and made part of the administrative record.

3.1.9 Agency/Organization Comment Letter #A09

Response #A09-205

Comment noted and made part of the administrative record.

Response #A09-206

See **Section 1.9 Biological Resources**.

Response #A09-207

See **Section 1.9 Biological Resources**.

Response #A09-208

See **Section 1.9 Biological Resources**.

Response #A09-209

See **Section 1.9 Biological Resources**.

Response #A09-210

See **Section 1.9 Biological Resources**.

Response #A09-211

See **Section 1.9 Biological Resources**.

Response #A09-212

See **Section 1.9 Biological Resources** and **Section 1.4 Alternatives**.

Response #A09-213

See **Section 1.9 Biological Resources**.

Response #A09-214

See **Section 1.9 Biological Resources** and **Section 1.4 Alternatives**.

Response #A09-215

Focused field and trapping surveys were performed for SBKR in August and October 2010. This information is presented in Section 3.4.5 of the EIS and discussed above in **Section 1.9 Biological Resources**. The BIA and USFWS are currently undergoing formal consultation for potential effects to endangered species, including SBKR. Based on preliminary discussions with the USFWS, the biological mitigation measures identified within this FEIS are expected to be carried forward to the Biological Opinion. Additional measures, should they be necessary as determined by the USFWS, will also be incorporated into Record of Decision and applied to the project.

Response #A09-216

The levee that protects the Project Site was engineered and developed to ACOE standards and ACOE has "provisionally accepted" the levee, but has not formally approved it. The floodplain map (Figure 3-4 of the EIS) was developed as if the levee did not exist. If ACOE formally approves the levee, the majority of the 100-year floodplain (Zone X) would be removed from the Project Site. As stated in Section 4.2.1 of the EIS: "In the event that the FEMA determines the levee to be inadequate, a floodplain study would be required for the Project Site to determine the base flood elevation and a grading plan would be prepared to ensure structures are elevated one-foot above the base flood elevation. These actions are identified as mitigation in Section 5.2 (of the EIS)." Considering there were no SBKR found to be present on the Development Site, raising the Development Site to allow for the proposed facilities to be one-foot above the base flood elevation would likely result in the same effects to SBKR on the Development Site as if the levee is formally approved by ACOE.

See **Section 1.7 Water Resources** and **Section 1.9 Biological Resources**.

3.1.10 Agency/Organization Comment Letter #A10

Response #A10-217

See the following sections:

- **Section 1.1.2 Extension of the Comment Period**
- **Section 1.12.1 Land Use**
- **Section 1.2.2 Matters beyond the Scope of the EIS**
- **Section 1.13.2 Wastewater Service** and **Section 1.4 Alternatives**: Response f**.**

- **Section 1.13 Public Services**
- **Section 1.12.1 Transportation Networks**
- **Section 1.5 General Environmental Concerns**
- **Section 1.14.2 Noise**
- **Section 1.4 Alternatives**

Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

Regarding buffers, project effects that depend upon distance from the Development Site are described under EIS Sections 4.7 (see Land Use, subsection Lighting and Glare) and 4.9 (see subsections Visual Resources and Noise). The sound wall is included as a mitigation measure (see Section 5.9.2 Noise).

Response #A10-218

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." Refer also to **Section 1.1.1 General EIS Issues** and **Section 1.4 Alternatives**.

Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities include under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

3.1.11 Agency/Organization Comment Letter #A11

Response #A11-219

Agency/Organization Comment Letter #A11 is a copy of Agency/Organization Comment Letter #A07. See ***Response #A07-171*** through ***Response #A07-175***.

Response #A11-220

See ***Response #A11-219***.

Response #A11-221

See ***Response #A11-219***.

Response #A11-222

See ***Response #A11-219***.

Response #A11-223

See ***Response #A11-219***.

Response #A11-224

See ***Response #A11-219***.

Response #A11-225

See ***Response #A11-219***.

Response #A11-226

See ***Response #A11-219***.

3.1.12 Agency/Organization Comment Letter #A12

Response #A12-227

RCSD submitted a numbered list of comments. The responses are therefore correspondingly numbered below. See the following sections per resource issue raised in comment letter:

1. NEPA Process

- **Section 1.1.2 Extension of the Comment Period**
- **Section 1.1.1 General EIS Issues**
- **Section 1.2.1 Expressions of Opinion**

2. Traffic and Transportation Effects

- **Section 1.12.1 Transportation Networks**
- **Section 1.12.1 Land Use**

The Tribe would not have authority over Lake Park Drive or Soboba Road when the Project Site is taken into trust by DOI. Therefore, the Tribe cannot control or restrict access to the nearby residential communities.

3. Biological Resources and MSHCP Compliance

- **Section 1.9 Biological Resources**

The proposed on-Reservation WWTP and percolation ponds would be regulated by Federal rules, laws, and regulations. These facilities would adhere to EPA guidelines for controlling vector breeding.

With regards to surveys and mitigation, Appendix P provides the survey report for the San Bernardino Kangaroo Rat and Las Angeles Pocket Mouse, while Appendix Q provides the survey report for the Burrowing Owl. In addition, Appendix O provides the completed Biological Opinion undertaken between the BIA and USFWS for the proposed project. Within Appendix O are a number of construction conditions that have been carried forward into the mitigation section of the EIS (See Section 5.4 Biological Resources: USFWS Biological Opinion Measures). Within the Biological Opinion Measures are the construction related measures to be implemented. Additional construction related measures were included in Section 5.4 including the installation of signage, restricting grading activities to daytime hours, installing silt fencing, and preconstruction surveys.

4. Fire Protection and Emergency Services

- **Section 1.13.6 Fire Protection and Emergency Medical Services**

5. Water Resources and Groundwater Contamination

- **Section 1.7 Water Resources**
- **Section 1.18 Mitigation Measures**

6. Cumulative Effects on RCSD

- **Section 1.13.5 Law Enforcement**

7. Public Services

- **Section 1.13.2 Wastewater Service**
- **Section 1.13.3 Solid Waste**

8. Geology and Site Suitability

- **Section 1.6 Land Resources**

9. Paleontological Resources

- **Section 1.10.2 Paleontological Resources**

3.1.13 Agency/Organization Comment Letter #A13

Response #A13-228 Agency/Organization Comment Letter #A13 is a copy of Agency/Organization Comment Letter #A12.

See ***Response #A12-227***.

3.1.14 Agency/Organization Comment Letter #A14

Response #A14-229

See the following sections:

- **Section 1.6 Land Resources**

A licensed California engineer performed the geotechnical investigation of the Development Site. Information from USGS was utilized in the seismic and geotechnical analyses, however USGS is not typically consulted on the issue of site suitability. Furthermore, as stated in Section 5.2 of the EIS, all proposed structures will comply with the latest edition of the CBC for Site Class D using the seismic coefficients provided in the geotechnical report (see Appendix L of the EIS). A qualified geologist will also inspect any excavations (foundation, utility, etc.) on the Development Site during construction for possible indications of faulting.

- **Section 1.12.1 Transportation Networks**
- **Section 1.13.6 Fire Protection and Emergency Medical Services**
- **Section 1.9 Biological Resources**

- **Section 1.8 Air Quality**
- **Section 1.7 Water Resources**
- **Section 1.17 Growth-Inducing Effects**
- **Section 1.15 Cumulative Effects**
- **Section 1.16 Indirect Effects**
- **Section 1.1.1 General EIS Issues**

3.1.15 Agency/Organization Comment Letter #A15

Response #A15-230

Comment noted and made part of the administrative record.

Response #A15-231

Comment noted and made part of the administrative record.

Response #A15-232

Comment noted and made part of the administrative record.

Response #A15-233

See **Section 1.13.6 Fire Protection and Emergency Medical Services** and **Section 1.18 Mitigation Measures.**

Response #A15-234

See **Section 1.8 Air Quality**.

Response #A15-235

See **Section 1.8 Air Quality**.

Response #A15-236

See **Section 1.8 Air Quality**.

Response #A15-237

See **Section 1.14.2 Noise**.

Response #A15-238

See **Section 1.12.1 Transportation Networks**.

Response #A15-239

See **Section 1.12.1 Transportation Networks**.

Response #A15-240

See **Section 1.12.1 Transportation Networks**.

Response #A15-241

See **Section 1.12.1 Transportation Networks**.

Response #A15-242

See **Section 1.12.1 Transportation Networks**.

Response #A15-243

See **Section 1.12.1 Transportation Networks**.

Response #A15-244

See **Section 1.12.1 Transportation Networks**.

Response #A15-245

Comment noted and made part of the administrative record.

3.1.16 Agency/Organization Comment Letter #A16

Response #A16-246

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-247

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-248

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-249

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-250

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-251

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-252

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-253

See **Section 1.13.6 Fire Protection and Emergency Medical Services**. Also see Development Standards in Section 2.1.1 of the EIS where the Tribe will "adopt and comply with Type I non-combustible, fire-resistive construction materials as defined by the CBC."

Response #A16-254

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-255

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-256

Flag lots do not occur on the Project Site.

Response #A16-257

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-258

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-259

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-260

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-261

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-262

Year 1 of the Operational Implementation phase of the proposed fire stations (Phase III of the Fire Department Development Plan; see Appendix G of the EIS) includes the opening of the satellite fire station with a staffed fire engine. This would occur prior to operation of the other proposed facilities under the Proposed Action and Alternatives. Positions would be filled with permanent staff.

Response #A16-263

A comment letter submitted by Robert Betancourt, Jr. during the scoping period suggested the Tribe develop a sailing program.

Response #A16-264

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-265

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-266

Under the subheading "Public Safety" in Section 2.1.1, the following text was modified to clarify the land use/fire suppression goals of California Department of Forestry and Fire Protection (CDF)/Riverside County Fire Department for heavy urban areas, which the Tribal fire department would adopt:

> The Tribal fire department would adopt the land use/fire suppression goals of California Department of Forestry and Fire Protection (CDF)/Riverside County Fire Department for ~~**heavy**~~ urban areas. The goal calls for **a response time of seven minutes and for** ~~**the first arriving unit to be on scene within five minutes from time of dispatch and**~~ setup to be complete within an additional three minutes.[2] This would allow for extinguishing agents to be applied within a goal of ~~**eight**~~ **ten** minutes from the time of dispatch. The goal for the full assignment is to arrive at the scene and be setup for operation within ~~**ten**~~ **15** minutes of dispatch on 90 percent of all fire incidents.

The corresponding footnote states the following:

> **Response time is the time that begins when units are en route to the emergency incident and ends when units arrive at the scene. In addition to response time, dispatch time and turnout time add to the amount of time required before units arrive at the scene. Dispatch time is from the point of receipt of the emergency alarm at the public safety answering point to the point where sufficient information is known to the dispatcher and applicable units are notified of the emergency. Dispatch time is between 90 and 120 seconds. Turnout time is the time beginning when units acknowledge notification of the emergency to the beginning point of response time.**

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A16-267

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

3.1.17 Agency/Organization Comment Letter #A17

Response #A17-268

See **Section 1.13.5 Law Enforcement**.

3.1.18 Agency/Organization Comment Letter #A18

Response #A18-269

No response required.

Response #A18-270

See **Section 1.6 Land Resources**.

Response #A18-271

See **Section 1.6 Land Resources**.

Response #A18-272

See **Section 1.6 Land Resources**.

Response #A18-273

See **Section 1.6 Land Resources**.

Response #A18-274

See **Section 1.6 Land Resources**.

Response #A18-275

See **Section 1.6 Land Resources**. The following mitigation measure has also been added to Section 5.1.4 of the EIS:

> **For all other proposed structures, engineering designs should comply with the latest edition of the California Building Code (CBC) for Site Class D using the seismic coefficients provided in the geotechnical report (see Appendix L). A qualified geologist should inspect any excavations (foundation, utility, etc.) on the Development Site during construction for possible indications of faulting. If unanticipated faulting were encountered in these excavations, further relocation of the structures may be necessary to maintain a 50-foot setback of human occupancy structures from active faults, consistent with the Alquist-Priolo Earthquake Fault Zoning Act.**

Response #A18-276

See **Section 1.6 Land Resources**.

Response #A18-277

See **Section 1.6 Land Resources** and **Section 1.10.2 Paleontological Resources**.

3.1.19 Agency/Organization Comment Letter #A19

Response #A19-278

Refer to the following sections:

- **Section 1.13.2 Wastewater Service**
- **Section 1.13.3 Solid Waste Service**

- **Section 1.7 Water Resources**

3.1.20 Agency/Organization Comment Letter #A20

Response #A20-279

See **Section 1.9 Biological Resources**.

Response #A20-280

See **Section 1.9 Biological Resources**.

Response #A20-281

See **Section 1.9 Biological Resources**.

Response #A20-282

See **Section 1.9 Biological Resources**.

Response #A20-283

See **Section 1.9 Biological Resources**.

3.1.21 Agency/Organization Comment Letter #A21

Response #A21-284

See **Section 1.7 Water Resources**.

3.1.22 Agency/Organization Comment Letter #A22

Response #A22-285

See **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.2 Governor Schwarzenegger's Proclamation on Tribal Gaming**.

Response #A22-286

Comment noted and made part of the administrative record.

Response #A22-287

Comment noted and made part of the administrative record.

Response #A22-288

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**. The EIS describes the purpose and need for the project under Section 1.3.

Response #A22-289

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

The existing Soboba casino is not considered a permanent structure because it is a soft-shell sprung-structure. These types of structures do not withstand the elements like hard-shell structures and do not possess the life-span of a hard-shell, or permanent, structure.

The proposed developments are anticipated to attract a wider array of patrons that will visit for reasons other than gaming (i.e. concert, dining). In addition to gaming patrons, these non-gaming visitors would add to the overall visitation of the facility.

Response #A22-290

The comment cites only part of the footnote in Section 4.2 of the EIS. The complete footnote is: "The Tribe's first priority water right increases to 9000 AFY over a 50-year period (see Section 3.2.2.1). As the Tribe increases its water use for the proposed developments, or for other uses unrelated to the Proposed Action and Alternatives, groundwater pumping by others must decrease, unless balanced by increased artificial recharge. Through the WMP, total groundwater withdrawals from the basin should remain the same or decrease." See **Section 1.7** of this public comment report for additional information regarding the Tribal water supply under the Water Rights Settlement.

Response #A22-291

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A22-292

See **Section 1.13.5 Law Enforcement**.

Response #A22-293

See **Section 1.13.5 Law Enforcement**.

Response #A22-294

See **Section 1.13.6 Fire Protection and Emergency Medical Services**. As described in Section 4.8 of the FEIS, Tribal consultants met with Chief John Hawkins on April 23, 2008 to present the Proposed Action and Alternatives and discuss the implications of the Tribal fire stations. Upon development of the subject fire stations under the Proposed Action and Alternatives, the Tribe would negotiate with RCFD to establish a Mutual Aid Agreement, under which the Tribe and the RCFD would share fire service resources. This would also include the City of San Jacinto due to its contractual relationship with RCFD to provide fire protection services. An additional Mutual Aid Agreement would be pursued with the City of Hemet. Mutual Aid Agreements are typically not pursued until a fire station has been constructed.

Response #A22-295

See **Section 1.12.1 Transportation Networks**.

Response #A22-296

See **Section 1.12.1 Transportation Networks**.

Response #A22-297

See **Section 1.12.1 Transportation Networks**.

Response #A22-298

See **Section 1.12.1 Transportation Networks**.

Response #A22-299

See **Section 1.12.1 Transportation Networks**.

Response #A22-300

See **Section 1.14.2 Noise**.

Response #A22-301 Comment noted and made part of the administrative record. See **Section 1.2.2 Matters beyond the Scope of the EIS**, **1.2.2.2 Governor Schwarzenegger's Proclamation on Tribal Gaming**. See also **Sections 1.1.1 General EIS Issues** and **Section 1.18 Mitigation Measures**.

3.1.23 Agency/Organization Comment Letter #A23

Response #A23-302

See **Section 1.12.1 Transportation Networks**.

Response #A23-303

See **Section 1.12.1 Transportation Networks**.

Response #A23-304

See **Section 1.12.1 Transportation Networks**.

Response #A23-305

See **Section 1.12.1 Transportation Networks**.

Response #A23-306

See **Sections 1.13.5 Law Enforcement** and **1.13.6 Fire Protection and Emergency Medical Services**.

Response #A23-307

Regarding concerns about the social effects of gambling, the Proposed Action will not increase gaming facilities (i.e. slot machines) in the area (see the discussion within **Section 1.11.2 Environmental Justice**). The existing casino is located approximately one mile from the proposed casino, which implies that the communities that will have access to gaming facilities at the proposed casino currently have access to the same number of gaming facilities in the general area. Therefore, while the analysis acknowledges the negative effects of gambling in general, given that the Proposed Action will not add to the existing gaming facilities in the area, there is no evidence to conclude that additional effects of gambling on any groups would occur due to the Proposed Action compared to existing conditions.

Response #A23-308

See **Section 1.1.1 General EIS Issues**.

3.1.24 Agency/Organization Comment Letter #A24

Response #A24-309

Comment noted and made part of the administrative record.

Response #A24-310

See **Section 1.7 Water Resources**.

Response #A24-311

See **Section 1.7 Water Resources**.

Response #A24-312

See **Section 1.7 Water Resources**.

3.1.25 Agency/Organization Comment Letter #A25

Response #A25-313

See **Section 1.2.2 Matters beyond the Scope of the EIS**, **1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497**).

Response #A25-314

See **Section 1.2.2 Matters beyond the Scope of the EIS**, **1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497**). As stated within Section 1.2 of the EIS, "The 34 parcels considered in this FEIS are contiguous with the northwestern portion of the Reservation."

Response #A25-315

See ***Response #A25-314***.

Response #A25-316

See ***Response #A25-314***.

Response #A25-317

See **Section 1.12.1 Transportation Networks**.

Response #A25-318

See **Section 1.12.1 Transportation Networks**.

Response #A25-319

See **Section 1.12.1 Transportation Networks**.

Response #A25-320

See **Section 1.12.1 Transportation Networks**.

Response #A25-321

See **Section 1.12.1 Transportation Networks**.

Response #A25-322

See **Section 1.12.1 Transportation Networks**.

Response #A25-323

See **Section 1.12.1 Transportation Networks**.

Response #A25-324

See **Section 1.12.1 Transportation Networks**.

Response #A25-325

See **Section 1.12.1 Transportation Networks**.

Response #A25-326

See **Section 1.12.1 Transportation Networks**.

Response #A25-327

See **Section 1.9 Biological Resources**.

Response #A25-328

See **Section 1.9 Biological Resources**.

Response #A25-329

See **Section 1.9 Biological Resources**.

Response #A25-330

See **Section 1.9 Biological Resources**.

Response #A25-331

See **Section 1.9 Biological Resources**.

Response #A25-332

See **Section 1.9 Biological Resources**.

Response #A25-333

See **Section 1.9 Biological Resources**.

Response #A25-334

See **Section 1.10 Cultural and Paleontological Resources** and **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.5 CEQA Compliance**.

3.1.26 Agency/Organization Comment Letter #A26

Response #A26-335

Agency/Organization Comment Letter #A26 is a copy of Agency/Organization Comment Letter #A20. See ***Response #A20-279*** through ***#A20-283***.

Response #A26-336

See ***Response #A26-335***.

Response #A26-337

See ***Response #A26-335***.

Response #A26-338

See ***Response #A26-335***.

Response #A26-339

See ***Response #A26-335***.

3.1.27 Agency/Organization Comment Letter #A27

Response #A27-340

Agency/Organization Comment Letter #A27 is a copy of Agency/Organization Comment Letter #A19. See ***Response #A19-278***.

3.1.28 Agency/Organization Comment Letter #A28

Response #A28-341

Agency/Organization Comment Letter #A28 is a copy of Agency/Organization Comment Letter #A15. See ***Responses #A15-230*** through ***#A15-245***.

Response #A28-342

See ***Response #A28-341***.

Response #A28-343

See ***Response #A28-341***.

Response #A28-344

See ***Response #A28-341***.

Response #A28-345

See ***Response #A28-341***.

Response #A28-346

See ***Response #A28-341***.

Response #A28-347

See ***Response #A28-341***.

Response #A28-348

See ***Response #A28-341***.

Response #A28-349

See ***Response #A28-341***.

Response #A28-350

See ***Response #A28-341***.

Response #A28-351

See ***Response #A28-341***.

Response #A28-352

See ***Response #A28-341***.

Response #A28-353

See ***Response #A28-341***.

Response #A28-354

See ***Response #A28-341***.

Response #A28-355

See ***Response #A28-341***.

Response #A28-356

See ***Response #A28-341***.

Response #A28-357

See ***Response #A28-341***.

3.1.29 Agency/Organization Comment Letter #A29

Response #A29-358

Agency/Organization Comment Letter #A29 is a copy of Agency/Organization Comment Letter #A18. See ***Responses #A18-269*** through ***#A18-277***.

Response #A29-359

See ***Response #A29-358***.

Response #A29-360

See ***Response #A29-358***.

Response #A29-361

See ***Response #A29-358***.

Response #A29-362

See ***Response #A29-358***.

Response #A29-363

See ***Response #A29-358***.

Response #A29-364

See ***Response #A29-358***.

Response #A29-365

See ***Response #A29-358***.

Response #A29-366

See ***Response #A29-358***.

3.1.30 Agency/Organization Comment Letter #A30

Response #A30-367

See **Section 1.1.1 General EIS Issues**.

Response #A30-368

See **Section 1.1.1 General EIS Issues**.

Response #A30-369

The letter claims that the "Procedural and Other Legal Issues" described in Section 3.2.2 of the Scoping Report were not covered in the EIS, which included the following:

- The Notice of Intent published in the Federal Register on December 14, 2007 incorrectly stated the number of acres the Tribe is requesting to place into trust. What measures have been taken to correct this statement?

The Notice of Intent incorrectly stated that 289.88 ± acres were proposed for fee-to-trust approval. The correct figure, 534.91± acres, has been incorporated into all following project documentation. Section 1.5.1 of the EIS corrects the error.

- According to 25 U.S.C. Section 2719 of the Indian Gaming Regulatory Act (IGRA), gaming regulated by the Act shall not be conducted on lands placed into trust after October 17, 1988, with some exceptions. Would this affect the Proposed Action?

See **Section 1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497)**.

- Did the scoping process provide adequate advance notice to the community?

The scoping process provided advance notice to the community with the Notice of Intent. The Notice of Intent, which initiated the public involvement process, was published on December 14, 2007. This provided the public with notice 43 days prior to the close of the scoping period on January 25, 2008. This length of time exceeds the 30-day minimum scoping period, required under NEPA. As detailed below, multiple opportunities were provided for public and agency involvement during the scoping phase. These efforts include:

  - The public comment period, totaling 43 days.
  - Invitations to six cooperating agencies to participate in the preparation of the EIS.
  - A press release to The Press-Enterprise on December 22 and 23, 2007.
  - Notices posted in surrounding libraries. Notice was posted in the Hemet Public Library, Valle Vista Library, and Riverside County Library – San Jacinto branch, as of December 27, 2007.
  - Notices were also distributed to the local communities of Hill Community, Lake Park Mobile Home, Soboba Springs Homes on January 4, 2008.
  - A public notice was posted on the City of San Jacinto's web site on January 3, 2008. The posting was available for viewing at: http://www.ci.san-jacinto.ca.us/public_notices.html
  - A large notice sign was posted on January 4, 2007 at the corner of Soboba Road and Lake Park Drive, the proposed project site, alerting local residents.
  - During the public comment period, a public scoping meeting was held at Hemet Public Library in the City of Hemet (January 8, 2008), California, attended by approximately 225 persons.
  - Sixty-one comment letters were received by the BIA from individuals.
  - Two comment letters were received by the BIA from cooperating agencies.

- When will detailed conceptual site plans be available for the community to view?

Conceptual site plans for each Alternative are provided in Section 2.0 of the EIS as Figure 2-1(a), Figure 2-7, Figure 2-9, Figure 2-11(a), and Figure 2-13(a).

- As recorded on December 31, 1981 and February 5, 1982 in Riverside County, the owners of the Soboba Springs Mobile Estates and the Daon Corporation entered into easement agreements. The agreements allowed for a secondary ingress and egress, land for RV storage, and a 10' perimeter strip on what was then the Daon Property adjacent to the Soboba Springs Mobile Estates. The Tribe now holds the land title to the former Daon Property, and thus is bound by the easement agreements. These title restrictions must be addressed through negotiations by the Tribe and BIA with the owners of the Soboba Springs Mobile Estates before the land is placed into trust.

Refer to **Section 1.12.2** for a discussion of land use issues.

- The Soboba Springs Mobile Home Estates community will be an "island" in the middle of the reservation once the land is placed into trust. Does this affect Local Agency Formation Commissions?

Refer to **Section 1.12.2** for a discussion of land use issues.

Response #A30-370

Sovereign power and tribal programs are discussed both in the Scoping Report and in the EIS. Page 1 of the Scoping Report describes that the purpose of the Proposed Action is to "improve the tribal economy in order to better enable the Tribe to provide governmental services, perform governmental functions, create jobs and career opportunities for tribal members and develop programs that would assist tribal members to attain economic self-sufficiency" (emphasis added). This line of thought is continued in Section 1.3.2 of the EIS where the links between economic development and reinvestment in the Tribal community are discussed. The rights afforded to the Tribe by being a federally recognized Indian Tribe and the sovereign powers a Tribal Nation may exercise over reservation lands is further discussed in Section 1.3.1 of the EIS. This section also presents information on Tribal self-determination and government operations.

Response #A30-371

The Tribe gradually purchased the title to properties that constitute the Project Site from June of 2001 to January of 2007. The Tribe considers the Project Site aboriginal territory and it is a tribal policy to reacquire all aboriginal territory and transfer it to trust status. The historical review performed for the EIS substantiates the presence of the Tribe in the area of the Project Site since 1815 (see Section 1.3 of the EIS). Refer to **Section 1.10** for further discussion this issue.

Response #A30-372

Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities include under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

Response #A30-373

Section 2.3.2 of the EIS discussed the insufficiency of the present gaming parcel. The Tribe is seeking to create a destination resort by locating their gaming operation next to the Soboba Springs Golf Course and Country Club and compliment these businesses with additional amenities, such as the proposed hotel, conference center, and events arena. Refer to **Section 1.3** for comments related to the purpose and need statement.

Response #A30-374

The TMP (Appendix AB of the EIS) includes an emergency evacuation plan. The emergency evacuation plan presents a strategy for residents in nearby communities and patrons of the proposed developments to

retreat from the area in the event of an emergency situation. See Appendix AB of the EIS and **Section 1.12.1 Transportation Networks** for additional discussion on the TMP.

Response #A30-375

Section 1.3 of the EIS presents overview information on the Tribe. This section conveys that tribal membership was approximately 900 people, with 625 living on the existing Reservation. This information was considered best available at the time of the publication of the EIS. The Tribe contends that additional lands are needed to support its growing membership, which is a core element of the purpose and need of the EIS. See **Section 1.3** for comments related to the purpose and need statement.

Response #A30-376

See **Section 1.4 Alternatives**.

Response #A30-377

See **Section 1.18 Mitigation Measures**.

Response #A30-378

See **Section 1.3 Purpose and Need**.

Response #A30-379

Refer to **Section 1.12.1 Transportation Networks**.

Response #A30-380

Refer to **Section 1.12.1 Transportation Networks**.

Response #A30-381

See **Section 1.12.2 Land Use**.

Response #A30-382

Refer to **Section 1.12.1 Transportation Networks, 1.12.1.2 Emergency Evacuation, Response and Access**.

Response #A30-383

See **Section 1.13.5 Law Enforcement**.

Response #A30-384

See **Section 1.11.1 Economic and Fiscal Resources**.

Response #A30-385

See **Section 1.11.1 Economic and Fiscal Resources**.

Response #A30-386

See **Section 1.11.1 Economic and Fiscal Resources**.

Response #A30-387

See **Section 1.11.2 Environmental Justice**.

Response #A30-388

See **Section 1.13.5 Law Enforcement**.

Response #A30-389

See **Section 1.11.2 Environmental Justice**.

Response #A30-390

See **Section 1.4 Alternatives** and **Section 1.12.2 Land Use, 1.12.2.5 Other Land Use Comments**.

Response #A30-391

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

Response #A30-392

See **Section 1.6 Land Resources**.

Response #A30-393

See **Section 1.7 Water Resources**.

Response #A30-394

See **Section 1.8 Air Quality**.

Response #A30-395

See **Section 1.11.2 Environmental Justice**.

Response #A30-396

See **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan**.

Response #A30-397

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A30-398

See **Section 1.13.7 School Services**.

Response #A30-399

See **Section 1.14.2 Noise** and **Section 1.18 Mitigation Measures**.

Response #A30-400

See **Section 1.14.3 Visual Resources**. The scenic quality rating of grade C is based upon BLM's methodology outlined earlier in the chapter. As stated in Section 3.9.3, the scenic quality rating unit (SQRU) is defined by similar topography. The San Jacinto basin has distinct topographical features that differentiate it from the San Jacinto Mountains. While the San Jacinto Mountains are considered in the scenic quality rating under surrounding topography, they are not considered under other visual factors in this SQRU. The three communities surrounding the Project Site are considered under the cultural modification section.

Due to the sloping topography and vegetation, the only public viewpoint that includes an open and clear view of the Soboba Golf Course lakes is the top of the Lake Park Drive bridge over the San Jacinto River. Drivers can currently see these lakes for at most 30 seconds before moving out of visual range. Public views partially obscured by vegetation and topography also occur along Soboba Road and several residential streets in the San Jacinto foothills. All other views of these lakes are from private residences or the golf course itself. Therefore, these lakes do not contribute to the visual landscape on a large scale within the SRQU.

The Visual Resources Management (VRM) analysis (Sections 3.9.3 and 4.9 of the EIS) considered the immediate views from public roads and private residences close to the Development Site. The six Key Observation Points (KOPs) were chosen because they represented views with the greatest visual effect of the proposed developments to the surrounding community. The KOPs included views from the hillside community, the communities along Main Street and Mountain Drive, and Soboba Springs Mobile Estates, among other views.

Contrast ratings are dependent on the perspective of each viewpoint. Some of these viewpoints show a reduced Project effect due to terrain, vegetation, and development. However, five of the six viewpoints include at least one “Strong” rating under the Proposed Project analysis. Therefore, the analysis agrees with the statement that many visual Project features from many different perspectives mandate a “Strong” contrast rating.

Response #A30-401

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project’s effect on lighting and glare in the Project Area.

Response #A30-402

See **Section 1.14.2 Noise**.

Response #A30-403

See **Section 1.14.3 Visual Resources**.

Response #A30-404

See **Section 1.14.1 Hazardous Materials**.

Response #A30-405

See **Section 1.8 Air Quality**.

Response #A30-406

See **Section 1.9 Biological Resources**.

Response #A30-407

See **Section 1.9 Biological Resources**.

Response #A30-408

See **Section 1.14.1 Hazardous Materials**.

Response #A30-409

See **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Ordinance**. Refer also to **Section 1.1.4 Cooperating Agency**. Comments noted and made part of the administrative record. These comments are directed towards separate projects from the Proposed Action and Alternatives, and are therefore outside the scope of this NEPA analysis.

Response #A30-410

See **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Ordinance**. Refer also to **Section 1.1.4 Cooperating Agency**. Comments noted and made part of the administrative record. These comments are directed towards separate projects from the Proposed Action and Alternatives, and are therefore outside the scope of this NEPA analysis.

Response #A30-411

See **Section 1.2.2 Matters beyond the Scope of the EIS, 1.2.2.1 1999 Tribal-State Compact and the Tribal Environmental Ordinance**. Refer also to **Section 1.1.4 Cooperating Agency**. Comments noted and made part of the administrative record. These comments are directed towards separate projects from the Proposed Action and Alternatives, and are therefore outside the scope of this NEPA analysis.

Response #A30-412

See **Section 1.1.4 Cooperating Agency** and **Section 1.1.2 Extension of the Comment Period**.

Response #A30-413

See the following sections:

- **Section 1.6 Land Resources**
- **Section 1.18 Mitigation Measures**
- **Section 1.7 Water Resources**
- **Section 1.14.2 Noise**
- **Section 1.14.3 Visual Resources**
- **Section 1.8 Air Quality**

- **Section 1.4 Alternatives**

Response #A30-414

See **Section 1.7 Water Resources**.

Response #A30-415

See **Section 1.8 Air Quality** and **Section 1.1.4 Cooperating Agency**.

Response #A30-416

See **Section 1.9 Biological Resources**.

Response #A30-417

See **Section 1.11.1 Economic and Fiscal Resources** and **Section 1.11.2 Environmental Justice**. Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities include under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

The Tribe is a Federally-recognized Indian tribe, possessing sovereign status and powers by virtue of such recognition (Federal Register, Vol. 70, No. 226, p. 71194, November 25, 2005).

Response #A30-418

See the following:

- **Section 1.12.2 Land Use**
- **Section 1.14.4 Recreational Resources**
- **Section 1.13.6 Fire Protection and Emergency Medical Services**
- **Section 1.12.1 Transportation Networks**
- **Section 1.14.3 Visual Resources**
- **Section 1.4 Alternatives**

Response #A30-419

See **Section 1.13.5 Law Enforcement** and **Section 1.1.1 General EIS Issues**.

Response #A30-420

See **Section 1.13.5 Law Enforcement** and **Section 1.1.1 General EIS Issues**.

Response #A30-421

See **Section 1.13.5 Law Enforcement** and **Section 1.1.1 General EIS Issues**.

Response #A30-422

See **Section 1.13.5 Law Enforcement** and **Section 1.1.1 General EIS Issues**.

Response #A30-423

See **Section 1.14.2 Noise** and **1.13.5 Law Enforcement**. Refer also to **Section 1.14.3 Visual Resources**.

Response #A30-424

As stated under Section 3.9.3 of the EIS (Visual Resources) under Key Observation Points: Selection Methods, the intent of viewpoint selection is to identify those locations which best represent overall views of the proposed project as seen from public places. Each key observation point represents several viewing locations. While not every view can be shown in this analysis, viewpoints were selected based on the greatest effect to public viewing.

Response #A30-425

See ***Response #A30-424*** above.

Response #A30-426

Comment noted and made part of the administrative record. This comment is directed towards a separate project from the Proposed Action and Alternatives, and is therefore outside the scope of this NEPA analysis.

Response #A30-427

See **Section 1.11.1 Economic and Fiscal Resources**.

Response #A30-428

See **Section 1.12.1 Transportation Networks**.

Response #A30-429

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare**.

Response #A30-430

See **Section 1.11.2 Environmental Justice**.

Response #A30-431

This issue is outside the scope of this NEPA analysis.

Response #A30-432

See **Section 1.13.5 Law Enforcement**.

Response #A30-433

See **Section 1.13.5 Law Enforcement**.

Response #A30-434

The reference to Soboba Road as a lightly traveled road has been removed in the EIS. As stated in Section 4.7, Soboba Road currently carries approximately 6,400 to 9,100 vehicles per day in the study area, while Lake Park Drive currently carries approximately 11,700 vehicles per day in the study area.

Traffic counts have been included in Section 2 of the updated traffic impact analysis (Appendix T of the FEIS) and mitigation measures have been recommended in order to achieve acceptable Level of Service for study area intersections and roadway segments for Year 2025 traffic conditions. Noise and air quality concerns related to traffic are addressed in Sections 4.9 and 4.3 of the FEIS, respectively. Safety concerns are addressed by the TMP (see **Sections 1.12.1 Transportation Networks**).

Response #A30-435

See **Section 1.12.2 Land Use**.

Response #A30-436

See **Section 1.14.4 Recreational Resources**.

Response #A30-437

See **Section 1.18 Mitigation Measures**.

Response #A30-438

See **Section 1.2.1 Expressions of Opinion**.

Response #A30-439

See **Section 1.2.1 Expressions of Opinion**.

3.1.31 Agency/Organization Comment Letter #A31

Response #A31-440

Comment noted and made part of the administrative record.

Response #A31-441

See **Section 1.1.4 Cooperating Agency**.

Response #A31-442

See **Section 1.1.4 Cooperating Agency**.

Response #A31-443

See **Section 1.1.4 Cooperating Agency** and **Section 1.12.2 Land Use**.

Response #A31-444

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A31-445

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A31-446

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A31-447

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** and **Section 1.11 Economic and Socioeconomic Conditions**.

Response #A31-448

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

Response #A31-449

See the following sections:

- **Section 1.11 Economic and Socioeconomic Conditions**
- **Section 1.13 Public Services**
- **Section 1.12.1 Transportation Networks**
- **Section 1.1.1 General EIS Issues**

Response #A31-450

Land use issues are described under Section 4.7 of the EIS.

Response #A31-451

See **Section 1.12.2 Land Use**.

Response #A31-452

See **Section 1.12.2 Land Use**.

Response #A31-453

See **Section 1.4 Alternatives** and **Section 1.14.2 Noise**.

Response #A31-454

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #A31-455

See **Section 1.12.2 Land Use**.

Response #A31-456

See **Section 1.12.2 Land Use**, **Section 1.4 Alternatives**: Response d, and **Section 1.1.4 Cooperating Agency**, and **Section 1.3 Purpose and Need**.

Response #A31-457

See **Section 1.2.2 Matters beyond the Scope of the EIS**, **1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497**). As stated within Section 1.2 of the EIS, "The 34 parcels considered in this FEIS are contiguous with the northwestern portion of the Reservation."

Response #A31-458

References to "Section 3.7.4" in the EIS were changed to "Section 3.8". This is the section that immediately follows Section 3.7.3 and discusses effects to public services, including law enforcement. Refer to **Section 1.13.5** for a discussion of law enforcement issues.

Response #A31-459

See **Section 1.13.5 Law Enforcement**.

Response #A31-460

See **Section 1.13.5 Law Enforcement**.

Response #A31-461

See **Section 1.13.5 Law Enforcement**.

Response #A31-462

See **Section 1.13.5 Law Enforcement**.

Response #A31-463

See **Section 1.13.5 Law Enforcement**.

Response #A31-464

See **Section 1.13.5 Law Enforcement** and **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

Response #A31-465

See **Section 1.13.6 Fire Protection and Emergency Medical Services**.

Response #A31-466

See **Section 1.12.1 Transportation Networks**.

Response #A31-467

See **Section 1.12.1 Transportation Networks**.

Response #A31-468

See **Section 1.12.1 Transportation Networks**.

Response #A31-469

See **Section 1.12.1 Transportation Networks**.

Response #A31-470

See **Section 1.12.1 Transportation Networks** and **Section 1.18 Mitigation Measures**.

Response #A31-471

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area. See also **Section 1.18 Mitigation Measures**.

Response #A31-472

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area. See also **Section 1.18 Mitigation Measures** and **Section 1.4 Alternatives**.

Response #A31-473

Refer to **Section 1.12.2 Land Use**, **1.12.2.1 Consistency with the City of San Jacinto General Plan**. See also **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area.

Response #A31-474

See **Section 1.8 Air Quality** and **Section 1.12.1 Transportation Networks**.

Response #A31-475

See **Section 1.8 Air Quality** and **Section 1.18 Mitigation Measures**.

Response #A31-476

See **Section 1.8 Air Quality** and **Section 1.13.2 Wastewater Service**.

Response #A31-477

See **Section 1.8 Air Quality**.

Response #A31-478

See **Section 1.14.2 Noise**.

Response #A31-479

See **Section 1.14.2 Noise**.

Response #A31-480

See **Section 1.14.2 Noise**.

Response #A31-481

See **Section 1.14.2 Noise**.

Response #A31-482

See **Sections 1.14.1 Hazardous Materials**, **1.7 Water Resources**, and **1.13.2 Wastewater Service**.

Response #A31-483

See **Section 1.9 Biological Resources**.

Response #A31-484

See **Sections 1.7 Water Resources** and **1.13.2 Wastewater Service**.

Response #A31-485

See **Section 1.11.1 Economic and Fiscal Resources** and **Section 1.13.7 School Services**.

Response #A31-486

See **Section 1.4 Alternatives** and **Section 1.12.2 Land Use**.

Response #A31-487

See **Section 1.15 Cumulative Effects**.

Response #A31-488

See **Section 1.11.2 Environmental Justice** and **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

Response #A31-489

See **Section 1.1.1 General EIS Issues** and **Section 1.1.4 Cooperating Agency**.

3.1.32 Agency/Organization Comment Letter #A32

Response #A32-490

Comment noted and made part of the administrative record. Section 4.7 of the EIS assesses the effects of the project on transportation networks. Cumulative effects are described within Section 4.10 of the EIS.

3.1.33 Agency/Organization Comment Letter #A33

Response #A33-491

Comment noted and made part of the administrative record. The letter attached to the State Clearinghouse comment letter is from the California Regional Water Quality Control Board. Comments raised within this letter are responded to in **Section 1.7 Water Resources** and **Section 1.13.2 Wastewater Service**.

3.1.34 Agency/Organization Comment Letter #A34

Response #A34-492

See **Section 1.7 Water Resources**.

Response #A34-493

See **Section 1.7 Water Resources**.

Response #A34-494

See **Section 1.7 Water Resources**.

Response #A34-495

See **Section 1.7 Water Resources**.

Response #A34-496

See **Section 1.7 Water Resources**.

Response #A34-497

See **Section 1.7 Water Resources**.

Response #A34-498

See **Section 1.7 Water Resources**.

Response #A34-499

See **Section 1.7 Water Resources**.

Response #A34-500

See **Section 1.7 Water Resources**.

Response #A34-501

See **Section 1.7 Water Resources**.

Response #A34-502

See **Section 1.7 Water Resources**.

Response #A34-503

See **Section 1.7 Water Resources**.

Response #A34-504

See **Section 1.7 Water Resources**.

3.1.35 Agency/Organization Comment Letter #A35

Response #A35-505

Agency/Organization Comment Letter #A35 is a copy of Agency/Organization Comment Letter #A04. See ***Response #A04-146***.

3.1.36 Agency/Organization Comment Letter #A36

Response #A36-506

Comment noted and made part of the administrative record. The letter attached to the State Clearinghouse comment letter is a copy of Agency/Organization Comment Letter #A32. See ***Response #A32-490***.

3.1.37 Agency/Organization Comment Letter #A37

Response #A37-507

BIA appreciates EPA's comments on the DEIS as a cooperating agency under the sited regulations and statutes. BIA acknowledges EPA's determination of "Environmental Concerns" under the provided EPA rating guidance for select resource analyses included in the DEIS.

Response #A37-508

In the comments below, BIA intends to clarify EPA's request for a jurisdictional delineation for the on-Reservation wastewater treatment plant's (WWTP) percolation ponds (see Comments A37-510 and A37-511 below); the representation of EPA's role in regulating wastewater treatment and reuse (see Comments A37-512 and A37-513 below); additional mitigation measures pertaining to construction emissions (see Comment A37-515 through A37-519 below); and, the incorporation of sustainable and energy efficient technologies into the project description (see Comments A37-521 through A37-523 below).

Response #A37-509

BIA will issue a copy of the Final EIS to EPA at the information provided in the agency's DEIS comment letter.

Response #A37-510

A wetlands/WOUS delineation was performed for the percolation pond site in 2008. It was determined that these three ephemeral washes were not likely jurisdictional. However, these results were not submitted to the Army Corp of Engineers (ACOE) for concurrence or the issuance of a National Pollutant Discharge Elimination System (NPDES) permit due to the possibility that this facility may or may not be constructed. Section 2.1 of the EIS has been revised to include an

additional wastewater service option where the Tribe would contract with Eastern Metropolitan Water District (EMWD). These revisions to the project description are provided below. Furthermore, as stated in the wastewater mitigation Section 5.8.2 of the EIS, "The potential Tribal wastewater facilities and system would likely be permitted and operational before the proposed developments are operational. This project is considered a separate, but related Tribal initiative that will obtain the necessary federal permits and abide by the established federal operating guidelines."

Wastewater Treatment and Disposal

The facilities proposed in Proposed Action A, would generate an average daily flow of 313,000 gallons per day (GPD). The Tribe has two options for wastewater service: (1) enter into a contract with EMWD for wastewater service or, (2) utilize an on-Reservation wastewater treatment plant, which would be constructed to serve the existing Reservation and casino project site. The existing Golf Course and Country Club would continue to utilize EMWD services regardless of which wastewater option is pursued for the other project features. Option #2, the on-Reservation WWTP, is considered a separate but related project to the Proposed Action and Alternatives as it is undergoing a separate process for approval. However, for purposes of this environmental review, both options are examined for potential environmental effects. The following describes the components of each option.

Option #1: EMWD Service Option

Under Option #1, the Tribe would utilize a will-serve letter with EMWD, which confirms that the existing EMWD facilities have capacity and capability to service the proposed developments (Appendix E). Wastewater generated by the proposed developments would be processed by EMWD's Hemet/San Jacinto Regional Water Reclamation Facility (RWRF). The Hemet/San Jacinto RWRF currently has a capacity of 11 million GPD, but has expansion plans/approvals to 14 million GPD by 2014 (Wesson 2010). Wastewater will undergo secondary and tertiary treatment and meet the Title 22 standards.

The necessary infrastructure is in place on/near the Project Site to service the proposed developments. **Figure 2-3** provides the location of EMWD pipes in the area of Project Site. As observed, existing EMWD infrastructure traverses the Development Site. The necessary facilities, piping, and connections would be installed during construction, when the Development Site is highly disturbed.

Option #2: On-Reservation WWTP

Under Option #2, the Tribe would construct an on-Reservation tertiary sequencing batch reactor (SBR) WWTP capable of handling 1.2 million gallons per day (GPD). This facility would service **existing and planned future uses on the** Reservation, as well as the facilities under the Proposed Action and Alternatives. Total projected wastewater generation for the year 2030 for Proposed Action A **and the Reservation** was calculated to be 545,323 GPD. The proposed WWTP would meet California Title 22 requirements for reuse of treated effluent. System reuse of the effluent could include agricultural irrigation, landscape irrigation, filling of decorative water features, surface cleaning (i.e. parking lots), toilet flushing, and fire control. Wastewater would be delivered to the WWTP by a force main from a central plant located on the Project Site and on-Reservation (see **Figure 2-4**).

Response #A37-511

While five tributary washes were found to be present on the northern portion of the project site, no WOUS were found to be present on or near the development site. Therefore, no jurisdictional waters will be affected by the proposed developments.

As stated in comment A37-510 above, in the event that the Tribe elects to develop the on-Reservation WWTP option, a jurisdictional report will be prepared and submitted to ACOE for jurisdictional determination. If impacts to waterways cannot be avoided or minimized, mitigation for this project will be developed in coordination with ACOE and EPA using the most recent mitigation requirements.

Response #A37-512

The following text has been included in Section 4.11.1 to clarify EPA's role in permitting the on-Reservation WWTP percolation ponds.

> The EPA is the permitting authority for discharge projects occurring on tribal trust lands. **Based on a preliminary assessment of the percolation pond site, it was found that the waters present on the site are likely non-jurisdictional. Therefore, it is assumed at this time that the construction and operations of the percolation ponds will result in a less than significant effect to jurisdictional waters protected under the Clean Water Act, and EPA will not be required to issue a NPDES permit since EPA does not regulate wastewater discharge when it occurs via land disposal. However, if the Tribe elects to construct the on-Reservation wastewater treatment system, ACOE and EPA will be consulted for a final jurisdictional determination on the percolation pond site. If waters present on the site are determined to be jurisdictional, ACOE and EPA would be required to issue a NPDES permit prior to the construction of these facilities.**

Response #A37-513

All references to EPA standards for treated effluent have been removed from the EIS.

Response #A37-514

As stated in EPA Comment A37-513, there are no federal guidelines for the use of recycled water. Therefore, the reference that commits the Tribe to "monitor the treatment and disposal in accordance with EPA guidelines" has been removed from the EIS.

Response #A37-515

The Final EIS includes a revised air quality analysis that utilizes the most recent emissions modeling and regulatory frameworks. The emissions related to construction activities are not forecasted to exceed any general conformity thresholds, therefore not warranting mitigation measures. However, the EIS does include the recommendation of implementing fugitive dust mitigation measures that intend to minimize construction effects to nearby residents (see Sections 4.3.1 and 5.3 of the EIS). In order to further minimize potential effects to nearby receptors (i.e. residents), the mitigation measures provided by EPA, including the preparation of a Construction Emissions Mitigation Plan (CEMP), will be added to the existing recommendations in Section 5.3 of the EIS.

Response #A37-516

As stated in Response A of Section 1.8.1 of the public comment report,

> The construction of the Proposed Action would have limited potential to incrementally affect the attainment status of the SCAB for ozone, PM_{10}, and $PM_{2.5}$. Incremental effects would be small, temporary, and would cease upon completion of the construction project.
>
> As presented in Section 4.3 of the FEIS, since temporary construction emissions for the Proposed Action and Alternatives are all below General Conformity significance thresholds, no long-term risk assessment of the diesel particulate matter (DPM) or CO component of construction equipment engine exhaust is warranted, because corresponding short-term DPM and CO emissions would be small and will present no significant risk to public health. Mitigation measures listed in Section 5.3.1 of the FEIS describe the best management practices (BMPs) which would be implemented to ensure that fugitive dust emissions do not affect adjacent land users, and that VOC emissions are minimized during construction.

Response #A37-517

See responses to Comments A37-515 and A37-516 above. The recommended Fugitive Dust Source Controls will be added to Section 5.3 of the EIS.

Response #A37-518

See responses to Comments A37-515 and A37-516 above. The recommended Mobile and Stationary Source Controls will be added to Section 5.3 of the EIS.

Response #A37-519

See responses to Comments A37-515 and A37-516 above. The recommended Administrative Controls will be added to Section 5.3 of the EIS.

Response #A37-520

Since the publication of the DEIS, the Tribe has installed facilities to address potential contamination activities at the Golf Course maintenance area. These measures include the installation of a wash pad that drains to an on-site waste water treatments system.

However, the following mitigation measures will remain as recommendations in Section 5.9.1 of the EIS:

- Pollution control and prevention equipment, such as an oil-water separator and washrack, is needed for the golf course maintenance wash area.
- To reduce the potential for accidental releases, fuel, oil, and hydraulic fluids shall be transferred directly from a service truck to construction equipment tanks and shall not otherwise be stored on-site.

Paint, thinner, solvents, cleaners, sealants, and lubricants used during construction shall be stored in a locked utility building, handled per the manufacturers' directions, and replenished as needed.

Response #A37-521

BIA appreciates EPA's comment regarding the use of *green* technology to develop an energy efficient facility. However, considering the less than significant results determination regarding energy supply/use, the inclusion of these technologies is at the discretion of the Tribe and would require a revision to the project description and subsequent residual effects analyses.

Response #A37-522

See response to Comment A37-521 above.

Response #A37-523

The Final EIS includes finalized Will-Serve Letters from Southern California Edison and Southern California Gas Company that state these utility providers have the capacity and capability to service the proposed developments. BIA appreciates EPA's comment regarding the minimization of energy use and LEED certification. However, considering the less than significant results determination regarding energy supply/use, the inclusion of these technologies is at the discretion of the Tribe and would require a revision to the project description and subsequent residual effects analyses.

Response #A37-524

The proposed Tribal Fire Station that is located on the Horseshoe Grande property is considered part of the "Development Site" and is fully evaluated throughout the EIS. Please see Figures 1-1 and 2-1A for clarification. The approximate location of the second proposed Tribal Fire Station that would be located near the intersection of Soboba Road and Castille Canyon Road on the existing Reservation, however, the precise location has not yet been decided by the Tribe. Section 5.8.7 has been revised to clarify that "**in the event that the second on-Reservation fire station is constructed, all required permitting will be obtained prior to construction.**"

Response #A37-525

BIA has taken the position that the possible on-Reservation WWTP is a separate project and that its construction is uncertain at this time. The on-Reservation wastewater treatment plant was identified in the DEIS as a separate but related project. As such, the future facility was evaluated in Section 4.11 Indirect Effects section of the DEIS. Additionally, Section 5.0 *Mitigation Measures* of the EIS identified the wastewater treatment facility as a separate but related facility that would need to be fully functioning prior to the facility's doors opening for business. The location and operation of the wastewater treatment plant was provided for full disclosure purposes at the time the DEIS was drafted. The ultimate location and construction/operation of the facility still needs to be fully planned and vetted by/through the Tribe and other outside agencies. As noted above, it may be that the on-Reservation construction of a wastewater plant for the casino project is not necessary.

Separate from the fee-to-trust NEPA process, the Tribe has been working with ACOE to determine if there is a federal interest in conducting a cost-sharing feasibility study to address economic and water related development needs of the Tribe. To date, the Tribe has approved undertaking the feasibility

study, which is expected to span a 40-month period. This work will include many tasks including the sitting/sizing of the wastewater treatment facility on the Reservation to serve the current and projected wastewater needs of the Tribe. Therefore, while information concerning the on-Reservation wastewater facility was presented in the DEIS for full disclosure purposes, BIA believe it to be premature to move forward with permitting the wastewater treatment plant at this time. It may be that the casino project does not use this on-Reservation wastewater plant even if one is constructed. Should a wastewater treatment facility be constructed on-Reservation in the future, the Tribe and BIA will ensure that all applicable federal regulations are complied with when that time comes.

Response #A37-526

The paragraph that discusses the State Phase II General Stormwater Construction Permit has been removed in response to EPA's comment. The following revisions have been made to Section 4.2.1:

Construction Effects

EPA alone has the authority to enforce water quality standards on Indian trust status lands, including the responsibility to enforce waste discharges under the National Pollutant Discharge Elimination System (NPDES).

Construction activities on the Development Site would be regulated under NPDES Construction General Permit (CGP) program. The CGP requires the developer/owner prepare a SWPPP for projects. The SWPPP is a document that addresses water quality controls during construction activities. To address this requirement, a SWPPP would be prepared for Proposed Action A to reduce the off-site discharge of pollutants.

3.1.38 Agency/Organization Comment Letter #A38

Response #A38-527

The commenter claims that the adjacent land owner was not notified of the proposed project and had to seek out information from others. The BIA issued a Notice of Intent for the preparation of the Draft EIS together with a notice for a public scoping meeting at the Hemet Public Library in 2008. A total of approximately 225 people attended the public scoping meeting in 2008. The BIA distributed a Notice of Availability together with the Draft EIS in June 2009 to Federal, State, and local agencies and other interested persons, which began a 75-day public review period. The Notice of Availability for the Draft EIS was filed by the BIA with the U.S. EPA in the Federal register, which also provided the time and location of the public hearing on the Draft EIS. During the Draft EIS public comment period, approximately 250 comment letters were received by the BIA. In addition, a number of public comments were recorded for the record at the August, 2009 public hearing on the Draft EIS. Following completion of the Final EIS, the BIA will file the document with the EPA and have it published in the Federal Register.

The commenter states that the FEIS suggests that there are two road closings and that re-routing would significantly affect "Calicinto Ranch," which is located to the east of the project site. Proposed Action A and Alternative 1 include the realignment of Lake Park Drive to a more southeasterly connection with Soboba Road. None of the existing roads would be closed. The commenter may be responding to the roadside landscaping depicted on the conceptual plan, which gives the impression that continued access to E. Main Street from Soboba Road would be closed. This is not the case. Other than the realigned Lake Park Drive, no road closings are proposed.

Response #A38-528

The commenter states that the property rights of Mr. Pierelli have been ignored and that a fence has been placed over his easement. As stated above, no road closing are proposed under the Proposed Action. The authors of the EIS are not aware of a fence that has been placed on the easement of Mr. Pierelli. A re-routing of Lake Park Drive is proposed in Proposed Action A and Alternative 1; however, other than the re-routing of traffic to the southeast, no road closings are proposed. In order for this re-routing to occur, the City of San Jacinto would need to process the re-alignment request from the Tribe through the City's discretionary process. All easements and rights-of-ways on record would be fully considered prior to the approval/denial of any re-routing requests.

Response #A38-529

The commenter states that the Proposed Action would destroy the Calicinto Ranch and provides several points below, which are responded to herein:

The commenter states that the intersection of Lake Park Drive and Soboba Road would be eliminated and re-routed. The roadway plan for Proposed Action A and Alternative 1 would re-route Lake Park Drive to the southeast. No roads would be closed. Travelers from the Calicinto Ranch would still have access to Soboba Road if either Proposed Action A or Alternative 1 were selected and implemented. Please note, that any realignment would be required to be processed through the City of San Jacinto for consideration and decision making.

The commenter states that the plans do not account for the existing and future drainage coming off of the San Jacinto Mountains. Figures 2-5, 2-8, 2-10, 2-12, and 2-14 all show proposed drainage facility improvements for the various alternatives, which would accommodate pre- and post-development flows coming into the site and generated by the increased impervious surfaces. Each development alternative provides for specific drainage infrastructure improvements in the area of Soboba Road and Lake Park Drive. Each development alternative discussion within the FEIS contains a discussion of the drainage improvements that would be included in the site design. Lastly, Appendix K includes a preliminary drainage study for the proposed project. The impact to site drainage was found to be less than significant with the implementation of the drainage improvement measures provided for in each development plan.

The commenter states that the events arena would generate noise that would "…travel uphill and impact everything that is done at Calicinto Ranch…" The fully enclosed, multiuse arena would be constructed with sound isolation and absorbing features incorporated within the facility, which will prevent the propagation of significant noise beyond the property line. There will be no outdoor concert events at the facility, only indoor events. A less than significant noise impact on the Calicinto Ranch would result from operation of the events center.

The commenter states that the FEIS does not address the parking lot, hotel, accumulation of people, noise and traffic on Calicinto Ranch. The environmental analysis is not required to undertake an environmental review for each and every property surrounding the project site. The analysis identified the sensitive areas, corridors, and receptors nearest the project site and conducted an environmental impact assessment on those resources (specifically the Soboba Springs Mobile Home Estates), which is closer to the proposed gaming facility than Calicinto Ranch. The level of impact on identified sensitive resources within the FEIS was found to be less than significant with the design features and mitigation measures. Calicinto Ranch would not be expected to experience significant impacts once all design and mitigation features are implemented.

The commenter states that the noise, crowds, and "gathering" of the proposed facilities would have a significant impact on Calicinto Ranch. The commenter also states that it is "…sad that this was simply ignored, with no attempt to give notice to Calicinto Ranch and the Pirellis, or to receive their input." Please see Response FFS-1 for background on the BIA's public noticing efforts throughout this process. With regards to the "Pirellis," our records indicate that they were present at the scoping meeting and Draft EIS public meeting and provided individual comments during that time (Please see Appendix B, page 9, F-7, G-2,3; Appendix E, Section 2 page 3, and 10).

The traffic and noise effects have been fully considered within the FEIS. The traffic study did include the operational effects along Soboba Road and specifically addressed traffic along Soboba Road, Lake Park drive, as well as the Soboba Road and Lake Park Drive intersection. Additionally, the noise analysis addressed various noise impacts on the closest sensitive receptors including Soboba Springs Mobile Home Estates, which is approximately 50 feet from the noise sources. Although the analysis did not specifically address Calicinto Ranch, the less than significant impact on a sensitive receptor that is closer to the site than Calicinto Ranch, coupled with the less than significant conclusion, allows for the conclusion of less than significant on Calicinto Ranch.

The commenter states that the traffic would have a devastating effect on Calicinto Ranch. The FEIS fully analyzes and discloses the traffic impacts that would occur along Soboba Road and Lake Park Drive.

The commenter states that the EIS does not address the effects on agricultural lands to the east. Neither the Proposed Action nor the development alternatives would result in development on agricultural lands east of the project site. For those lands within the project boundaries, the FEIS fully addressed the impacts to prime/local farmland. Therefore, a less than significant impact on agricultural lands east of the project site would occur.

The commenter states that the Tribe has a significant amount of land on the existing reservation that can be used for the project. The location of the Project Site would allow the Tribe to fully capitalize on the proposed hotel/casino complex's proximity to the Golf Course and Country Club in order to offer a destination resort, which is a primary reason for proposing the project at this location. In real terms, it is not feasible to relocate the Golf Course and Country Club to the existing gaming parcel. There is not enough developable land to create an 18-hole golf course near the existing casino, nor is it economically feasible to construct an additional golf course near the existing casino with the existing golf course remaining in operation. The purpose of the proposed hotel/casino complex is to diversify the economic enterprises of the Tribe and to allow for these enterprises to compliment by creating a business cluster, or economic synergy. An integrated complex offers customers many possible activities in one location. Thus, the proposed development would act as a destination center for tourists and businesses, while also catering to local interests. The intent of the Tribe is to differentiate its hotel, casino, golf course, and related facilities from those of nearby competing tribes.

The commenter states that drainage needs to be considered. Please see Response FFS-3(2) above.

The commenter states that the taking of easements needs to be considered, as well as noise and traffic effects. Please see Response FFS-1, FFS-2, and FFS-3(1) for a response related to the easement issue. Please see Response FFS-3(3)(4)(5) and (6) for a response related to noise and traffic.

3.2 DETAILED RESPONSES TO LETTERS SUBMITTED BY INDIVIDUALS

3.2.1 Individual Letter 1

Response 1-507

Letter #1 is one of many copies of a form letter received by the BIA during the public comment period. The form letter contains expressions of opinion, as well as concerns regarding land use, tax revenues, general environmental issues, the project's purpose and need, and project alternatives. Accordingly, please refer to the following discussions in **Section 1** of this public comment report:

- **Section 1.2.1 Expressions of Opinion**
- **Section 1.12.2 Land Use**
- **Section 1.11.1 Economic and Fiscal Resources**
- **Section 1.5 General Environmental Concerns**
- **Section 1.3 Purpose and Need**
- **Section 1.4 Alternatives**

3.2.2 Individual Letter 2

Response #2-508

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.3 Individual Letter 3

Response #3-509

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.4 Individual Letter 4

Response #4-510

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.5 Individual Letter 5

Response #5-511

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.6 Individual Letter 6

Response #6-512

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.7 Individual Letter 7

Response #7-513

Prior to development of the Proposed Action, the Project Site would be placed into trust, and would therefore lie within the Tribe's Reservation boundaries.

Refer to **Section 1.2.1 Expressions of Opinion**. Consultation with the City is described under **Section 1.1.4 Cooperating Agency**. Refer to **Section 1.13.5 Law Enforcement** for a discussion of the project's anticipated effect on crime. See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." Refer to **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities** for traffic concerns. Project effect on property values are discussed in **Section 1.11 Economic and Socioeconomic Conditions.** See **Section 1.5 General Environmental Concerns**.

3.2.8 Individual Letter 8

Response #8-514

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.9 Individual Letter 9

Response #9-515

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

In response to concerns raised by the public, a TMP (see Appendix AB of the EIS) was prepared. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured.

3.2.10 Individual Letter 10

Response #10-516

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.2.11 Individual Letter 11

Response #11-517

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use** for a discussion of jurisdiction issues and quality of life. Project effects to air quality and visual resources are discussed under **Section 1.8 Air Quality** and **1.14.3 Visual Resources**, respectively. In addition, see **Section 1.11 Economic and Socioeconomic Conditions** for a discussion of

effects to local tax revenue. Refer to **Section 1.13.5 Law Enforcement** for a discussion of the project's anticipated effect on crime.

3.2.12 Individual Letter 12

Response #12-518

See **Section 1.2.1 Expressions of Opinion**. Many of the points raised in this letter refer to the purpose and need for the project; accordingly, refer to **Section 1.3 Purpose and Need**.

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS).

3.2.13 Individual Letter 13

Response #13-519

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.14 Individual Letter 14

Response #14-520

See **Section 1.2.1 Expressions of Opinion**. Refer to **Section 1.3 Purpose and Need** for a discussion of the Tribe's stated need to require aboriginal territory. See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." **Section 1.11.1 Economic and Fiscal Resources** describes potential project effects on local tax revenue and property values Refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan** and **Section 1.12.2.3 Community Character and Quality of Life** for land use and quality of life concerns.

3.2.15 Individual Letter 15

Response #15-521

See **Section 1.2.1 Expressions of Opinion**. Refer to Section 3.8 of the EIS for a discussion of the existing level of crime on the Reservation. In addition, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report for a discussion of the project's anticipated effect on crime.

3.2.16 Individual Letter 16

Response #16-522

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2.3 Community Character and Quality of Life** for quality of life concerns. ." **Section 1.11.1 Economic and Fiscal Resources** describes potential project effects on local tax revenue.

3.2.17 Individual Letter 17

Response #17-523

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.18 Individual Letter 18

Response #18-524

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." In addition, refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan** and **Section 1.12.2.3 Community Character and Quality of Life** for land use and quality of life concerns. **Section 1.11.1 Economic and Fiscal Resources** describes potential project effects on local property values. See also **Section 1.3 Purpose and Need** and **Section 1.4 Alternative** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site.

3.2.19 Individual Letter 19

Response #19-525

See **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life** for quality of life concerns. See also **Section 1.3 Purpose and Need**: Response a, and **Section 1.4 Alternatives**: Responses a, c, and d for a discussion of project siting.

In response to concerns raised by the public, a TMP (see Appendix AB of the EIS) was prepared. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured.

3.2.20 Individual Letter 20

Response #20-526

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." See also **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

3.2.21 Individual Letter 21

Response #21-527

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.22 Individual Letter 22

Response #22-528

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages.

See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area. Concerns regarding noise and project effects to property values are discussed in **Sections 1.14.2 Noise** and **1.11.1 Economic and Fiscal Resources**. Refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan** for land use concerns. See also **Section 1.3 Purpose and Need**: Response a, and **Section 1.4 Alternatives** for a discussion of project siting.

3.2.23 Individual Letter 23

Response #23-529

See **Section 1.2.1 Expressions of Opinion**. Refer to Section 3.8 of the EIS for a discussion of the existing level of crime on the Reservation. In addition, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report for a discussion of the project's anticipated effect on crime.

3.2.24 Individual Letter 24

Response #24-530

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." **Section 1.11.1 Economic and Fiscal Resources** describes project effects on local property values. See also **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the Tribe's stated need for economic development.

See also **Section 1.2.2.3 Indian Gaming Regulatory Act (P.L. 100-497)**.

3.2.25 Individual Letter 25

Response #25-531

See **Section 1.2.1 Expressions of Opinion**. For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report. Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

For land use concerns, refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan.** See also **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

3.2.26 Individual Letter 26

Response #26-532

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Many of the points within this letter address the purpose and need for the project, as well as the selection of the proposed Development Site. Accordingly, see **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

3.2.27 Individual Letter 27

Response #27-533

Letter #27 is one of several copies of a form letter developed by Save Our Communities and received by the BIA during the public comment period. The form letter contains expressions of opinion, as well as concerns regarding land use, natural hazards, the enforceability of mitigation measures listed in the EIS, the effect of the project on local revenues and expenditures, the economic data used in the EIS, the purpose and need for the project, and environmental justice. Accordingly, please refer to the following discussions in **Section 1** of this public comment report:

- **Section 1.2.1 Expressions of Opinion**
- **Section 1.12.2 Land Use**
- **Section 1.6 Land Resources**
- **Section 1.18 Mitigation Measures**
- **Section 1.11.1 Economic and Fiscal Resources**
- **Section 1.3 Purpose and Need**: Response d.
- **Section 1.11.2 Environmental Justice**

Emergency response access to the Project Area and emergency evacuation are discussed within the TMP (Appendix AB of the EIS).

3.2.28 Individual Letter 28

Response #28-534

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.29 Individual Letter 29

Response #29-535

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.30 Individual Letter 30

Response #30-536

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.31 Individual Letter 31

Response #31-537

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.32 Individual Letter 32

Response #32-538

Individual Letter 32 is a copy of Individual Letter 12. Please see **Response #12-518**.

3.2.33 Individual Letter 33

Response #33-539

This letter is one of several copies of a form letter developed by Save Our Communities and received by the BIA during the public comment period. See the response provided to Individual Letter 27, **Response #27-533**.

3.2.34 Individual Letter 34

Response #34-540

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.35 Individual Letter 35

Response #35-541

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.36 Individual Letter 36

Response #36-542

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." **Section 1.12.2 Land Use** also discusses other land use concerns, such as quality of life (**1.12.2.3**) and consistency with the San Jacinto General Plan (**1.12.2.1**). For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report.

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages.

Section 1.11.1 Economic and Fiscal Resources describes project effects on local property values.

3.2.37 Individual Letter 37

Response #37-543

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**. The effects of the project on employment and local tax revenue are described in **Section 1.11.1 Economic and Fiscal Resources.**

3.2.38 Individual Letter 38

Response #38-544

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." **Section 1.12.2 Land Use** also discusses other land use concerns, such as quality of life (**1.12.2.3**) and consistency with the San Jacinto General Plan (**1.12.2.1**).

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages.

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting. **Section 1.4 Alternatives** responds to the request for an alternative access point to the Reservation from Esplanade Avenue.

Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities include under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

3.2.39 Individual Letter 39

Response #39-545

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.40 Individual Letter 40

Response #40-546

See **Section 1.2.1 Expressions of Opinion**. Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

3.2.41 Individual Letter 41

Response #41-547

This letter is one of several copies of a form letter developed by Save Our Communities and received by the BIA during the public comment period. See the response provided to Individual Letter 27, **Response #27-533**.

3.2.42 Individual Letter 42

Response #42-548

Individual Letter 42 is a copy of Individual Letter 14. Please see **Response #14-520**.

3.2.43 Individual Letter 43

Response #43-549

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands." See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare** for a discussion of the project's effect on lighting and glare in the Project Area. For general traffic concerns, refer to **Section 1.12.1 Transportation Networks.** For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report. Refer also to **Section 1.8 Air Quality**.

3.2.44 Individual Letter 44

Response #44-550

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**.

3.2.45 Individual Letter 45

Response #45-551

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

3.2.46 Individual Letter 46

Response #46-552

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**. **Section 1.11.1 Economic and Fiscal Resources** describes project effects on employment and local property values.

3.2.47 Individual Letter 47

Response #47-553

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns. **Section 1.11.1 Economic and Fiscal Resources** describes project effects on employment.

3.2.48 Individual Letter 48

Response #48-554

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting. Refer to **Section 1.3 Purpose and Need** for a response to concerns that the project would develop Tribal ancestral lands.

Section 1.1.1 General EIS Issues responds to comments regarding the overall quality of the EIS. As described in **Section 1.18 Mitigation Measures**, all relevant, reasonable mitigation measures that could improve the proposed project have been identified. Good faith efforts have been made throughout the environmental review process to design the project so as to minimize environmental effects and to propose mitigation measures that are intended to further minimize potential effects. **Section 1.11.2 Environmental Justice** responds to concerns that environmental justice effects to local communities were not accounted for in Section 3.6.3 of the EIS.

The effects of the project on land use and jurisdictional issues are described in **Section 1.12.2 Land Use**. **Section 1.11.1 Economic and Fiscal Resources** describes project effects on local tax revenue. The economic necessity for the project is described in Section 1.3.2 of the EIS. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.2.49 Individual Letter 49

Response #49-555

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Concerns that the local communities would become jurisdictional "islands" or that Tribe would have any influence over ingress and egress or public services are addressed within **Section 1.12.2 Land Use,**

1.12.2.2 Jurisdictional Issues. **Section 1.12.2 Land Use** also addresses project consistency with the San Jacinto General Plan (**1.12.2.1**) and quality of life issues (**1.12.2.3**).

Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting. General concerns regarding the effects of the project on traffic, local tax revenues, and crime addressed within **Section 1.12.1 Transportation Networks**, **Section 1.11.1 Economic and Fiscal Resources**, and **Section 1.13.5 Law Enforcement**.

3.2.50 Individual Letter 50

Response #50-556

See **Section 1.2.1 Expressions of Opinion**. Concerns that the local communities would become jurisdictional "islands" or that Tribe would have any influence over ingress and egress or public services are addressed within **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

3.2.51 Individual Letter 51

Response #51-557

See **Section 1.2.1 Expressions of Opinion**. Concerns that the local communities would become jurisdictional "islands" or that Tribe would have any influence over ingress and egress or public safety services are addressed within **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**. **Section 1.11.1 Economic and Fiscal Resources** describes project effects on local tax revenue and property values. For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report.

See also **Section 1.14.1 Hazardous Materials**.

Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting. **Section 1.4 Alternatives** responds to the request for an alternative access point to the Reservation from Esplanade Avenue. See also **Section 1.12.1 Transportation Networks**. All relevant, reasonable traffic mitigation measures that could improve the proposed project have been identified. Good faith efforts have been made throughout the environmental review process to design the project so as to minimize traffic effects and to propose mitigation measures that are intended to further minimize effects to transportation networks. Mitigation measures to reduce traffic effects are described in Section 5.7.1 and shown in Table 5-4 of the FEIS, while site-specific circulation and access recommendations for the Proposed Action and Alternatives are depicted on Figures 5-1a through Figure 5-5b of the document.

3.2.52 Individual Letter 52

Response #52-558

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**.

3.2.53 Individual Letter 53

Response #53-559

The commenter submitted a numbered list of comments. The responses are therefore correspondingly numbered below.

1. As described within the Executive Summary of the EIS: "Additionally, the Tribe proposes to develop approximately 55 acres of the Project Site (ten percent of total conveyance) into a destination hotel/casino complex." As discussed within Section 1.2 of the EIS, the existing golf course is 159 acres.

2. See **Section 1.3 Purpose and Need** for a discussion of the need to place the Project Site into trust under Alternatives 2 and 3.

3. The effects of the Alternative 3 on noise, lighting and glare, traffic, and solid waste are described within Sections 4.9.5, 4.7.5, and 4.85 of the EIS.

4. See **Section 1.6 Land Resources** of this public comment report.

5. See **Section 1.7 Water Resources**. Site grading will direct runoff to the proposed Best Management Practices (BMP) for collection and treatment.

Response #53-560

6. See **Section 1.7 Water Resources**. The underground storage tanks (UST) at the proposed gas station will conform with Federal regulations for UST installation in or adjacent to identified active fault zones (40 C.F.R. Part 280, Subpart B), as well as with State and Riverside County regulations (County of Riverside Ordinance No. 617). Section 2.1.1 and Section 5.1.3 of the EIS identify the criteria that will be used to locate and monitor the UST's associated with the project.

7. Comment regarding existing flood control is noted and made part of the administrative record.

Comment regarding soil stabilizers noted and made part of the administrative record. As described in Section 5.3 of the EIS, soil stabilizers would be utilized during the construction phase of the Project to control fugitive dust emissions.

8. See **Section 1.8 Air Quality** and **Section 1.12.1 Transportation Networks**.

9. See **Section 1.8.1 Air Quality – Construction Impacts, 1.8.1.2 Emissions Modeling and Regulatory Authority**: Response b.

As described in Section 4.4 of the EIS, while five jurisdictional waterways exist on portions of the Project Site, there are no waters of the United States present at the Development Site; therefore, no effects to waters of the United States would occur as a result of the Proposed Action and Alternatives. Water supply for the project is described within Sections 3.8 and 4.8 of the EIS.

10. See **Section 1.9 Biological Resources**.

Response #53-561

11. See **Section 1.9 Biological Resources**.

12. See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site.

13. As it relates to the 34 properties subject to transfer as part of the Proposed Action and Alternatives, at present, Riverside County receives $286,804 per year in property taxes on these parcels (see Section 3.6.1 of the EIS). This figure is not related to the existing casino. For fiscal year 2008-2009, Soboba Casino accounted for $1.47 million of the Special Distribution Fund (see **Section 1.11.1 Economic and Fiscal**

Resources). **Section 1.11.1 Economic and Fiscal Resources** and Section 3.6.1 of the EIS describe the methodology used to compute projected changes in tax revenues.

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting and the need to develop a commercial enterprise on the Project Site.

14. The traffic effect analysis proposed mitigation measures for all intersections and freeway segments which were projected to operate at unacceptable levels of service to bring those intersections and freeway segments to acceptable levels of service. All relevant, reasonable traffic mitigation measures that could improve the proposed project have been identified. Good faith efforts have been made throughout the environmental review process to design the project so as to minimize traffic effects and to propose mitigation measures that are intended to further minimize effects to transportation networks.

A TMP (see Appendix AB of the EIS) has been prepared and will be implemented to account for traffic during special events. This study includes information pertaining to event parking during special events and potential mitigation measures. The TMP does not call for the use of schools to manage event traffic. Language in Section 5.7.1 of the EIS pertaining to off-site parking at educational facilities has been removed.

For concerns related to crime, see Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report.

Response #53-562

15. See ***Response #53-561***, point 14 above. Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

Response #53-563

16. See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare**.

Response #53-564

17. See **Section 1.12.2 Land Use, 1.12.2.4 Lighting and Glare**. See also **Section 1.7.2 Impacts to Water Supply and Water Quality, 1.7.2.1 Water Supply**.

Response #53-565

18. See **Section 1.13.2 Wastewater Service**. Regarding concerns over noise, smell, lighting, and aesthetics effects from the WWTP, the best management practices (BMPs) which would be used for the Proposed Action and Alternatives are specified in Section 2.1.1 of the EIS under the heading "Wastewater Treatment and Disposal."

The amount of solid waste generated by each Action Alternative was determined using solid waste generation rates from the California Integrated Waste Management Board (CIWMB). Waste generation

rates are dependent upon the type of facility. Under Alternative 3, in place operating a hotel and the relocated casino, the Tribe would operate a retail shopping center and an RV-park. Therefore, while the solid waste that would have been produced from operation of the hotel and relocated casino under the Proposed Action is eliminated under this Alternative, solid waste would instead be generated by the operation of the shopping center and RV-park. It is expected that this Alternative would generate 1,836 more pounds per day of solid waste during the operational phase of the facilities than under the Proposed Action.

Response #53-566

19. See **Section 1.13.4 Electricity and Natural Gas**.

Response #53-567

20. See Section 4.8 of the EIS and **Section 1.13.5 Law Enforcement** of this public comment report.

In addition, in response to concerns raised by the public, a TMP (see Appendix AB) was prepared. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. The TMP includes an emergency evacuation plan. The emergency evacuation plan presents a strategy for residents in nearby communities and patrons of the proposed developments to retreat from the area in the event of an emergency situation. See Appendix AB of the EIS and **Section 1.12.1 Transportation Networks** for additional discussion on the TMP.

21. See **Section 1.13.6 Fire Protection and Emergency Medical Services**

Response #53-568

22. See **Section 1.14.1 Hazardous Materials**

Response #53-569

23. See **Section 1.14.2 Noise.**

Regarding the comment expressing concern that frequent refuse collection would be necessary, potential effects to traffic, air quality, and noise are already incorporated in those respective analyses in Section 4.0 of the EIS.

Response #53-570

24. See **Section 1.14.3 Visual Resources**. The fire stations, WWTP, gas station, commercial enterprises, and RV park building will not exceed two stories.

Response #53-571

25. Comments regarding cumulative effects to specific resources are addressed under the relevant headers within this public comment report (e.g. comments alleging that cumulative effects to air quality are not fully considered are addressed under Section 1.8 Air Quality). For concerns regarding soils and seismic hazards, see **Section 1.6 Land Resources**. See also the cumulative effects to land resources discussion in Section 4.10.3 of the EIS, which explains why it is not anticipated that the completion of Proposed Action and Alternatives would create any significant cumulative effects regarding land resources.

Response #53-572

26. See **Section 1.7 Water Resources**. See also **Section 1.8 Air Quality** and **Section 1.9 Biological Resources**. Refer also to Section 4.4 of the FEIS, which describes the effects of the Proposed Action, and Alternatives on biological resources by specifically presenting these effects on waters of the United States, Federally-listed plant and animal species, some additional species, and migratory birds.

Response #53-573

27. See **Section 1.9 Biological Resources** and Section 4.4 of the EIS.

Response #53-574

28. See **Section 1.10.1 Cultural Resources**. Land use and environmental justice concerns are addressed in Sections 4.6 and 4.7 of the EIS, respectively.

See **Section 1.12.1 Transportation Networks, 1.12.1.3 Mitigation Implementation**

For concerns regarding Indian Reservation Roads, see **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

The appropriate agencies have been contacted and have reviewed the traffic effect analysis, which contains a list of proposed improvements. Based on comments from these agencies, an updated traffic effect analysis has been prepared (see Appendix T of the EIS).

See also **Section 1.12.1 Transportation Networks, 1.12.1.3 Mitigation Implementation**

The size of the parking lots under the Proposed Action and Alternatives are disclosed in Section 2.1 of the EIS. Under Proposed Action A, a total of approximately 5,080 parking spaces would be provided. Two three-story parking garages would provide a total of approximately 4,300. These structures would be approximately 40-45 feet in elevation from existing grade and built upon pile driven foundations.

Response #53-575

29. See **Section 1.13.7 School Services**.

Response #53-576

30. Comment noted and made part of the administrative record. See **Section 1.14.1 Hazardous Materials**.

Response #53-577

31. See **Section 1.14.4 Recreational Resources** and **Section 2.12.2 Land Use** of this public comment report for a more detailed discussion on this topic.

Response #53-578

32. The effect of exhaust from vehicle traffic on air quality is accounted for in Section 4.3 of the EIS. Comment noted and made part of the administrative record. As described in Section 5.3 of the EIS, soil stabilizers would be utilized during the construction phase of the Project to control fugitive dust emissions.

Response #53-579

33. Realignment of Lake Park Drive hinges on which project alternative is chosen. This process is ongoing.

Response #53-580

See ***Responses #A30-369*** through ***#A30-373*** under Agency/Organization Comment Letter #A30. In addition, see **Section 1.18 Mitigation Measures** of this public comment report.

3.2.54 Individual Letter 54

Response #54-581

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.55 Individual Letter 55

Response #55-582

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. General concerns regarding noise, air quality, visual resources, quality of life, traffic, and crime are addressed in the following sections: **1.14.2 Noise**, **1.8 Air Quality**, **1.14.3 Visual Resources**, **1.12.2 Land Use (**see **1.12.2.3 Community Character and Quality of Life), 1.12.1 Transportation Networks**, and **1.13.5 Law Enforcement**.

3.2.56 Individual Letter 56

Response #56-583

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.57 Individual Letter 57

Response #57-584

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.58 Individual Letter 58

Response #58-585

See **Section 1.2.1 Expressions of Opinion** and **Section 1.5 General Environmental Concerns**. Refer to **Section 1.12.2 Land Use, Section 1.12.2.3 Community Character and Quality of Life** for quality of life concerns.

Response #58-586

Refer to **Section 1.1.3 Scoping**

Response #58-587

For concerns regarding crime, refer to **Section 1.13.5 Law Enforcement** of this public comment report, as well as to Sections 3.8 and 4.8 of the EIS.

Response #58-588

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

Response #58-589

Regarding concerns about the social effects of gambling on low income groups, minorities, senior citizens, and problem gamblers, the Proposed Action will not increase gaming facilities (i.e. slot machines) in the area (see the discussion within **Section 1.11.2 Environmental Justice**). The existing casino is located approximately one mile from the proposed casino, which implies that the communities that will have access to gaming facilities at the proposed casino currently have access to the same number of gaming facilities in the general area. Therefore, while the analysis acknowledges the negative effects of gambling in general, given that the Proposed Action will not add to the existing gaming facilities in the area, there is no evidence to conclude that additional effects of gambling on any groups would occur due to the Proposed Action compared to existing conditions.

Response #58-590

Refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan**.

Response #58-591

See **Section 1.14.2 Noise**.

Response #58-592

Refer to **Section 1.4 Alternatives**

Response #58-593

Refer to **Section 1.12.2 Land Use, 1.12.2.1 Consistency with the City of San Jacinto General Plan**.

Response #58-594

See **Section 1.14.1 Hazardous Materials**.

Response #58-595

The CEQ Regulations for implementing NEPA, 40 C.F.R. §1502.16(c), require analysis of the "[p]ossible conflicts between the proposed action and the objectives of Federal, regional, State, and local land use

plans, policies, and controls for the area concerned." The Riverside County LAFCO regulates boundary changes proposed by public agencies within the County. LAFCO is not involved with determining land use planning or policies, but instead governs jurisdictional boundaries at the city and county levels. The Tribe is not a signatory to LAFCO; therefore, if the lands are transferred into trust status LAFCO policies will no longer apply to the Project Site.

Section 3.6.1 of the EIS assesses the effect of the project on tax revenue in the context of the San Jacinto Redevelopment Zone.

Response #58-596

Section 1.11.1 Economic and Fiscal Resources and Section 3.6.1 of the EIS describe project effects on local tax revenue.

Response #58-597

Section 1.11.1 Economic and Fiscal Resources and Section 3.6.1 of the EIS describe project effects on local property values.

Response #58-598

Presently, there are no mature trees on the Development Site. Therefore, substantial tree removal is not envisioned as part of the Proposed Action or Alternatives. There presently exists a sound wall with gaps surrounding the Soboba Springs Mobile Estates, which currently results in an approximately 5 dBA decrease of noise levels. Construction of a higher sound wall, without gaps, between Lake Park Drive and the Soboba Springs Mobile Estates prior to commencing major construction is recommended as a mitigation measure in **Section 5.9.2** to lower received noise levels by about an additional 3 dBA overall.

Response #58-599

Speculation about alternative developments falls outside the scope of the NEPA process. See **Section 1.2** of this public comment report for additional information on non-NEPA topics.

Section 1.11.2 Environmental Justice responds to concerns that environmental justice effects to local communities were not accounted for in Section 3.6.3 of the EIS.

Response #58-600

Refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

Response #58-601

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP and will lessen the frequency of access blockages. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

Section 1.11.2 Environmental Justice addresses concerns regarding the social effects of gambling. See also **Section 1.13.5 Law Enforcement.**

Response #58-602

For concerns regarding crime, refer to **Section 1.13.5 Law Enforcement** of this public comment report, as well as to Sections 3.8 and 4.8 of the EIS.

Response #58-603

Refer to **Section 1.14.2 Noise** and to **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**.

Response #58-604

See **Section 1.2.1 Expressions of Opinion**.

Response #58-605

Comment noted and made part of the administrative record.

Response #58-606

This comment generally summarizes the content of the letter.

Responses to additional concerns raised are as follows:

Under the TMP (Appendix AB of the EIS), pedestrian crossings would be clearly marked and signed for both pedestrians and vehicular traffic. Clearly identified pedestrian walkways would be situated as to minimize any potential conflict with vehicular traffic. Traffic cones would be used to channelize traffic and guide drivers to the available parking areas. Proper signs would be utilized during peak periods. These include permanent and temporary signs. Each approach would have proper signs with directions marked clearly. The section entitled "Emergency/Fire/Medical Services" describes how adequate emergency access to local communities would be assured. Evacuation in the event of a large scale emergency is discussed under the same header.

The boundaries of the existing Reservation and the Project Site are shown in Figure 1-3 of the EIS.

3.2.59 Individual Letter 59

Response #59-607

The existing air quality in the Project Area and potential effects of the project on air quality are discussed in Sections 3.3 and 4.3 of the EIS. Refer to **Section 1.8 Air Quality** of this public comment report for air quality concerns.

3.2.60 Individual Letter 60

Response #60-608

Traffic concerns are addressed within **Section 1.12.1 Transportation Networks, 1.12.1.1 Effects to Nearby Residential Communities**. A TMP has been prepared and will be implemented to account for traffic during special events (Appendix AB of the EIS). Regarding residents' access to their properties during special events, a transportation demand management analysis was conducted as part of the TMP

and will lessen the frequency of access blockages. Refer to the remainder of **Section 1.12.1 Transportation Networks** for general traffic concerns.

Concerns that the local communities would become jurisdictional "islands" or that Tribe would have any influence over ingress and egress or public safety services are addressed within **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

The WWTP and associated percolation ponds would be located on the existing Reservation, with the WWTP site situated near the eastern terminus of Soboba Road, north of the road and the San Jacinto River. Figure 2-4 in the EIS depicts the location of the proposed wastewater facility, infrastructure, pump stations, and disposal fields. The site was selected partially due to its remote location from development and the potential effects on residents from its operation. The percolation ponds would be situated north of Soboba Road and west of Castille Canyon Road.

General concerns regarding crime are addressed within **Section 1.13.5 Law Enforcement**.

3.2.61 Individual Letter 61

Response #61-609

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.62 Individual Letter 62

Response #62-610

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.63 Individual Letter 63

Response #63-611

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.64 Individual Letter 64

Response #64-612

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.65 Individual Letter 65

Response #65-613

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.66 Individual Letter 66

Response #66-614

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.67 Individual Letter 67

Response #67-615

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.68 Individual Letter 68

Response #68-616

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.69 Individual Letter 69

Response #69-617

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.70 Individual Letter 70

Response #70-618

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.71 Individual Letter 71

Response #71-619

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.72 Individual Letter 72

Response #72-620

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.73 Individual Letter 73

Response #73-621

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.74 Individual Letter 74

Response #74-622

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.75 Individual Letter 75

Response #75-623

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.76 Individual Letter 76

Response #76-624

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.77 Individual Letter 77

Response #77-625

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.78 Individual Letter 78

Response #78-626

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.79 Individual Letter 79

Response #79-627

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.80 Individual Letter 80

Response #80-628

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.81 Individual Letter 81

Response #81-629

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.82 Individual Letter 82

Response #82-630

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.83 Individual Letter 83

Response #83-631

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.84 Individual Letter 84

Response #84-632

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.85 Individual Letter 85

Response #85-633

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.86 Individual Letter 86

Response #86-634

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.87 Individual Letter 87

Response #87-635

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.88 Individual Letter 88

Response #88-636

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.89 Individual Letter 89

Response #89-637

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.90 Individual Letter 90

Response #90-638

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.91 Individual Letter 91

Response #91-639

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.92 Individual Letter 92

Response #92-640

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.93 Individual Letter 93

Response #93-641

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.94 Individual Letter 94

Response #94-642

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.95 Individual Letter 95

Response #95-643

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.96 Individual Letter 96

Response #96-644

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.97 Individual Letter 97

Response #97-645

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.98 Individual Letter 98

Response #98-646

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.99 Individual Letter 99

Response #99-647

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.100 Individual Letter 100

Response #100-648

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.101 Individual Letter 101

Response #101-649

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.102 Individual Letter 102

Response #102-650

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.103 Individual Letter 103

Response #103-651

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.104 Individual Letter 104

Response #104-652

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.105 Individual Letter 105

Response #105-653

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.106 Individual Letter 106

Response #106-654

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.107 Individual Letter 107

Response #107-655

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.108 Individual Letter 108

Response #108-656

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.109 Individual Letter 109

Response #109-657

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.110 Individual Letter 110

Response #110-658

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.111 Individual Letter 111

Response #111-659

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.112 Individual Letter 112

Response #112-660

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.113 Individual Letter 113

Response #113-661

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.114 Individual Letter 114

Response #114-662

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.115 Individual Letter 115

Response #115-663

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.116 Individual Letter 116

Response #116-664

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.117 Individual Letter 117

Response #117-665

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.118 Individual Letter 118

Response #118-666

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.119 Individual Letter 119

Response #119-667

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.120 Individual Letter 120

Response #120-668

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.121 Individual Letter 121

Response #121-669

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.122 Individual Letter 122

Response #122-670

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.123 Individual Letter 123

Response #123-671

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.124 Individual Letter 124

Response #124-672

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.125 Individual Letter 125

Response #125-673

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.126 Individual Letter 126

Response #126-674

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.127 Individual Letter 127

Response #127-675 \

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.128 Individual Letter 128

Response #128-676

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.129 Individual Letter 129

Response #129-677

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.130 Individual Letter 130

Response #130-678

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.131 Individual Letter 131

Response #131-679

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.132 Individual Letter 132

Response #132-680

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.133 Individual Letter 133

Response #133-681

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.134 Individual Letter 134

Response #134-682

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.135 Individual Letter 135

Response #135-683

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.136 Individual Letter 136

Response #136-684

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.137 Individual Letter 137

Response #137-685

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.138 Individual Letter 138

Response #138-686

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.139 Individual Letter 139

Response #139-687

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.140 Individual Letter 140

Response #140-688

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.141 Individual Letter 141

Response #141-689

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.142 Individual Letter 142

Response #142-690

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.143 Individual Letter 143

Response #143-691

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.144 Individual Letter 144

Response #144-692

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.145 Individual Letter 145

Response #145-693

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.146 Individual Letter 146

Response #146-694

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.147 Individual Letter 147

Response #147-695

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.148 Individual Letter 148

Response #148-696

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.149 Individual Letter 149

Response #149-697

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.150 Individual Letter 150

Response #150-698

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.151 Individual Letter 151

Response #151-699

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.152 Individual Letter 152

Response #152-700

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.153 Individual Letter 153

Response #153-701

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.154 Individual Letter 154

Response #154-702

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.155 Individual Letter 155

Response #155-703

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.156 Individual Letter 156

Response #156-704

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.157 Individual Letter 157

Response #157-705

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.158 Individual Letter 158

Response #158-706

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.159 Individual Letter 159

Response #159-707

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.160 Individual Letter 160

Response #160-708

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.161 Individual Letter 161

Response #161-709

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.162 Individual Letter 162

Response #162-710

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.163 Individual Letter 163

Response #163-711

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.164 Individual Letter 164

Response #164-712

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.165 Individual Letter 165

Response #165-713

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.166 Individual Letter 166

Response #166-714

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.167 Individual Letter 167

Response #167-715

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.168 Individual Letter 168

Response #168-716

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.169 Individual Letter 169

Response #169-717

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.170 Individual Letter 170

Response #170-718

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.171 Individual Letter 171

Response #171-719

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.172 Individual Letter 172

Response #172-720

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.173 Individual Letter 173

Response #173-721

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.174 Individual Letter 174

Response #174-722

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.175 Individual Letter 175

Response #175-723

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.176 Individual Letter 176

Response #176-724

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.177 Individual Letter 177

Response #177-725

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.178 Individual Letter 178

Response #178-726

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.179 Individual Letter 179

Response #179-727

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.180 Individual Letter 180

Response #180-728

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.181 Individual Letter 181

Response #181-729

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.182 Individual Letter 182

Response #182-730

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.183 Individual Letter 183

Response #183-731

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.184 Individual Letter 184

Response #183-732

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.185 Individual Letter 185

Response #185-733

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.186 Individual Letter 186

Response #186-734

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.187 Individual Letter 187

Response #187-735

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.188 Individual Letter 188

Response #188-736

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.189 Individual Letter 189

Response #189-737

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.190 Individual Letter 190

Response #190-738

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.191 Individual Letter 191

Response #191-739

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.192 Individual Letter 192

Response #192-740

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.193 Individual Letter 193

Response #193-741

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.194 Individual Letter 194

Response #194-742

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.195 Individual Letter 195

Response #195-743

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.196 Individual Letter 196

Response #196-744

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.197 Individual Letter 197

Response #197-745

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.198 Individual Letter 198

Response #198-746

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.199 Individual Letter 199

Response #199-747

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.200 Individual Letter 200

Response #200-748

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.201 Individual Letter 201

Response #201-749

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.202 Individual Letter 202

Response #202-750

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.203 Individual Letter 203

Response #203-751

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.204 Individual Letter 204

Response #204-752

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.205 Individual Letter 205

Response #205-753

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.206 Individual Letter 206

Response #206-754

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.207 Individual Letter 207

Response #207-755

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.208 Individual Letter 208

Response #208-756

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.209 Individual Letter 209

Response #209-757

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.210 Individual Letter 210

Response #210-758

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.211 Individual Letter 211

Response #211-759

This letter is one of many copies of a form letter received by the BIA during the public comment period. See the response provided to Individual Letter 1, **Response #1-507**.

3.2.212 Individual Letter 212

Response 212-760

See **Section 1.2 Non-NEPA Issues, 1.2.1 Expressions of Opinion**.

The comment also lists several types of environmental effects attributable to the project. Commenters listing various categories of environmental effects can refer to the specific resource categories in **Section 1** for a summary of more specific comments and responses concerning each environmental resource. In particular, refer to the following:

- **Section 1.13.5 Law Enforcement**
- **Section 1.12.1 Transportation Networks**
- **Section 1.5 General Environmental Concerns**
- **Section 1.12.2 Land Use**

3.2.213 Individual Letter 213

Response 213-761

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**. In addition, see **Section 1.11 Economic and Socioeconomic Conditions** for a discussion of the tax revenue and employment implications of the project.

3.2.214 Individual Letter 214

Response 214-762

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**. In addition, see **Section 1.12.1 Transportation Networks; Section 1.11 Economic and Socioeconomic Conditions;** and **Section 1.8 Air Quality** for a discussion of the effects of the project on traffic, air quality, and the local economy.

3.2.215 Individual Letter 215

Response 215-763

See **Section 1.2.1 Expressions of Opinion**.

3.2.216 Individual Letter 216

Response 216-764

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**.

3.2.217 Individual Letter 217

Response 217-765

See **Section 1.4 Alternatives**: Response c. Regarding traffic concerns, refer to **Section 1.12.1 Transportation Networks, 1.12.1.5 Traffic Study Analysis**. For a response to safety concerns, see **Section 1.13.5 Law Enforcement**.

3.2.218 Individual Letter 218

Response 218-766

Refer to **Section 1.12.2 Land Use** for a discussion of zoning and quality of life issues. In addition, refer to **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives** for a discussion of project siting.

Response 218-767

Refer to **Section 1.3 Purpose and Need**: response e for a discussion of the Tribe's stated need to require aboriginal territory.

Response 218-768

Comment noted and made part of the administrative record. The proposed casino would operate 2,000 slot machines. The Tribe's gaming compact with the State does not permit operation of more than 2,000 slot machines.

Response 218-769

Comment noted and made part of the administrative record.

Response 218-770

Comment noted and made part of the administrative record.

3.2.219 Individual Letter 219

Response 219-771

Refer to **Section 1.2.1 Expressions of Opinion**. See also **Section 1.11 Economic and Socioeconomic Conditions** for a discussion of project effects on the local economy.

3.2.220 Individual Letter 220

Response 220-772

Letter 220 is a copy of Letter 213. Refer to **Response 213-761**.

3.2.221 Individual Letter 221

Refer to **Section 1.2.1 Expressions of Opinion**.

3.3 DETAILED RESPONSES TO COMMENTS SUBMITTED AT THE AUGUST 5, 2009 PUBLIC HEARING

3.3.1 TC-001

No response required.

3.3.2 TC-002

See **Section 1.1.4 Cooperating Agency**.

3.3.3 TC-003

See **Section 1.1.4 Cooperating Agency** and **Section 1.13.5 Law Enforcement**.

3.3.4 TC-004

See **Section 1.1.4 Cooperating Agency**.

3.3.5 TC-005

See **Section 1.12.2 Land Use**, **Section 1.13.5 Law Enforcement**, and **Section 1.13.6 Fire Protection and Emergency Medical Services**.

3.3.6 TC-006

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.3.7 TC-007

See **Section 1.3 Purpose and Need**, **Section 1.4 Alternatives**, and **Section 1.12.2 Land Use**.

3.3.8 TC-008

Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.3.9 TC-009

See **Section 1.13.5 Law Enforcement**.

3.3.10 TC-010

See **Section 1.13.5 Law Enforcement**.

3.3.11 TC-011

See **Sections 1.14.2 Noise**, **1.14.3 Visual Resources**, and **1.12.1 Transportation Networks**.

3.3.12 TC-012

See **Sections 1.8 Air Quality**, **1.11.1 Economic and Fiscal Resources**, **1.7 Water Resources**, **1.13.2 Wastewater Service**.

3.3.13 TC-013

See **Section 1.18 Mitigation Measures** and **Section 1.1.4 Cooperating Agency**.

3.3.14 TC-014

See **Section 1.1.4 Cooperating Agency** and **Section 1.2.1 Expressions of Opinion**.

3.3.15 TC-015

See **Section 1.1.2 Expressions of Opinion**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.3.16 TC-016

See **Section 1.12.2 Land Use**.

3.3.17 TC-017

See **Section 1.12.2 Land Use**.

3.3.18 TC-018

Comment noted and made part of the administrative record. The Soboba Tribe has been a Federally-recognized Indian tribe since 1883, possessing sovereign status and powers by virtue of such recognition (Federal Register, Vol. 70, No. 226, p. 71194, November 25, 2005). See also **Section 1.12.2 Land Use**.

3.3.19 TC-019

See **Section 1.2.1 Expression of Opinion**.

3.3.20 TC-020

Comment noted and made part of the administrative record.

3.3.21 TC-021

See **Section 1.2.1 Expression of Opinion** and **Section 1.10.1 Cultural Resources**.

3.3.22 TC-022

Speculation about alternative developments falls outside the scope of the NEPA process. See **Section 1.2.1 Expression of Opinion** and **Section 1.13.5 Law Enforcement**.

3.3.23 TC-023

Comment noted and made part of the administrative record.

3.3.24 TC-024

See **Section 1.2.1 Expression of Opinion** and **Section 1.4 Alternatives**. Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities, as

described under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

3.3.25 TC-025

See **Section 1.2.1 Expression of Opinion**, **Section 1.13.5 Law Enforcement**, and **Section 1.3 Purpose and Need**.

3.3.26 TC-026

See **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** and **Section 1.13.5 Law Enforcement**.

3.3.27 TC-027

See **Section 1.1.2 Expressions of Opinion**. Refer to **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues** for a response to comments concerned that the neighboring residential communities could become jurisdictional "islands."

3.3.28 TC-028

See **Section 1.1.3 Scoping**.

3.3.29 TC-029

See the response to **TC-029** above.

3.3.30 TC-030

See **Section 1.13.5 Law Enforcement**.

3.3.31 TC-031

See **Section 1.2.1 Expression of Opinion**, **Section 1.13.5 Law Enforcement**, **Section 1.3 Purpose and Need**, and **Section 1.4 Alternatives**.

3.3.32 TC-032

Comment noted and made part of the administrative record.

3.3.33 TC-033

Comment noted and made part of the administrative record. These comments are directed towards a separate project from the Proposed Action and Alternatives, and are therefore outside the scope of this NEPA analysis.

3.3.34 TC-034

See the response to **TC-033** above.

3.3.35 TC-035

See the response to **TC-033** above. Refer also to **Section 1.12.2 Land Use**.

3.3.36 TC-036

See **Section 1.14.2 Noise**.

3.3.37 TC-037

Comment noted and made part of the administrative record.

3.3.38 TC-038

See **Section 1.2.1 Expression of Opinion**.

3.3.39 TC-039

Comment noted and made part of the administrative record.

3.3.40 TC-040

Comment noted and made part of the administrative record. See **Section 1.13.5 Law Enforcement**.

3.3.41 TC-050

See **Section 1.12.1 Transportation Networks**, **Section 1.14.2 Noise**, and **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**.

3.3.42 TC-051

See **Section 1.12.1 Transportation Networks**.

3.3.43 TC-052

See **Section 1.2.1 Expression of Opinion**.

3.3.44 TC-053

Comment noted and made part of the administrative record. See **Section 1.2.1 Expression of Opinion**.

3.3.45 TC-054

See **Section 1.2.1 Expression of Opinion**, **Section 1.13.5 Law Enforcement**, and **Section 1.13.6 Fire Protection and Emergency Medical Services**.

3.3.46 TC-055

See **Section 1.4 Alternatives**. Refer also to **Section 1.13.5 Law Enforcement** and **Section 1.2.1 Expression of Opinion**.

3.3.47 TC-056

See **Section 1.13.5 Law Enforcement** and **Section 1.2.1 Expression of Opinion**.

3.3.48 TC-057

See **Section 1.13.5 Law Enforcement** and **Section 1.2.1 Expression of Opinion**.

3.3.49 TC-058

See **Section 1.12.1 Transportation Networks**.

3.3.50 TC-059

Comment noted and made part of the administrative record.

3.3.51 TC-060

See **Section 1.9 Biological Resources**.

3.3.52 TC-061

See **Section 1.6 Land Resources**, **Section 1.7 Water Resources**, **Section 1.1.1 General EIS Issues**, and **Section 1.3 Purpose and Need.**

3.3.53 TC-062

Comment noted and made part of the administrative record. See **Section 1.2.1 Expression of Opinion**.

3.3.54 TC-063

Comment noted and made part of the administrative record. See also **Section 1.1.4 Cooperating Agency**.

3.3.55 TC-064

Comment noted and made part of the administrative record. See **Section 1.2.1 Expression of Opinion** and **Section 1.5 General Environmental Concerns**.

3.3.56 TC-065

See **Section 1.18 Mitigation Measures**, **Section 1.12.1 Transportation Networks**, **Section 1.12.2 Land Use**, and **Section 1.13.5 Law Enforcement**.

3.3.57 TC-066

See **Section 1.1.4 Cooperating Agency** and **Section 1.18 Mitigation Measures**.

3.3.58 TC-067

See **Section 1.2.1 Expressions of Opinion**, **Section 1.12.2 Land Use**, **Section 1.3 Purpose and Need**.

3.3.59 TC-068

See **Section 1.12.1 Transportation Networks**.

3.3.60 TC-069

See **Section 1.12.1 Transportation Networks**.

3.3.61 TC-070

See **Section 1.12.1 Transportation Networks**.

3.3.62 TC-071

See **Section 1.1.2 Extension of the Comment Period**, **Section 1.1.1 General EIS Issues**, and **Section 1.5 General Environmental Concerns**.

3.3.63 TC-072

See **Section 1.14.2 Noise** and **Section 1.4 Alternatives**.

3.3.64 TC-073

See **Section 1.13.5 Law Enforcement** and **Section 1.12.1 Transportation Networks**.

3.3.65 TC-074

See **Section 1.2.1 Expressions of Opinion**. Refer also to **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life** and **11.12.2.2 Jurisdictional Issues.**

3.3.66 TC-075

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**.

3.3.67 TC-076

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**.

3.3.68 TC-077

Comment noted and made part of the administrative record. See **Section 1.12.2 Land Use**.

3.3.69 TC-078

See **Section 1.14.2 Noise, 1.14.2.2 Noise –Operational Impacts, 1.14.2.2.3 Parking and Traffic**.

3.3.70 TC-079

See **Section 1.12.2 Land Use** and **Section 1.11.2 Environmental Justice**.

3.3.71 TC-080

Comment noted and made part of the administrative record. See **Section 1.12.2 Land Use** and **Section 1.11.2 Environmental Justice**.

3.3.72 TC-081

See **Sections 1.2.1 Expressions of Opinion**, **1.5 General Environmental Concerns**, **1.12.2 Land Use**, and **1.3 Purpose and Need**.

3.3.73 TC-082

See **Sections 1.2.1 Expressions of Opinion** and **1.3 Purpose and Need**.

3.3.74 TC-083

See **Section 1.12.2.3 Community Character and Quality of Life** and **Section 1.5 General Environmental Concerns**. See also **Section 1.11.2 Environmental Justice**, **Section 1.12.1 Transportation Networks**, **Section 1.13.6 Fire Protection and Emergency Medical Services**, and **Section1.3 Purpose and Need**.

3.3.75 TC-084

Refer to **Section 1.10.1 Cultural Resources** and **Section 1.3 Purpose and Need**. See also **Section 1.1.1 General EIS Issues**.

3.3.76 TC-085

Refer to **Section 1.10.1 Cultural Resources**, **Section 1.3 Purpose and Need,** and **Section 1.12.2 Land Use, 1.12.2.2 Jurisdictional Issues**.

3.3.77 TC-086

See **Section 1.3 Purpose and Need**, **Section 1.4 Alternatives**, and **Section 1.11 Economic and Socioeconomic Conditions**.

3.3.78 TC-087

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**.

3.3.79 TC-088

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**. Refer also to **Section 1.12.1 Transportation Networks**.

3.3.80 TC-089

Refer to **Section 1.12.1 Transportation Networks**.

3.3.81 TC-090

See **Section 1.12.2 Land Use**.

3.3.82 TC-091

See **Section 1.12.2 Land Use**, **Section 1.14.3 Visual Resources**, and **Section 1.9 Biological Resources**.

3.3.83 TC-092

See **Section 1.7 Water Resources**.

3.3.84 TC-093

See **Section 1.7 Water Resources**.

3.3.85 TC-094

See **Section 1.13 Public Services** and **Section 1.2.1 Expressions of Opinion**. Refer also to Section 2.1.1 where the following text has been included:

> **Tribal Resolution No. CR07-HGFTT-51 (Appendix J of the EIS) acknowledges the existing easements for roadway, water lines and underground conduits and incidental purposes along the Project Site, which includes a roadway easement for Lake park Drive and Soboba Road.**

Therefore, all existing right-of-ways, including for utilities, would be preserved by the Tribe as a condition of DOI/BIA approving the trust action.

3.3.86 TC-095

See **Section 1.14.2 Noise**.

3.3.87 TC-096

See **Section 1.12.2 Land Use**, **Section 1.6 Land Resources**, and **Section 1.7.1 Impacts to Flooding and Runoff**.

3.3.88 TC-097

See **Section 1.12.2 Land Use**, **Section 1.6 Land Resources**, and **Section 1.7.1 Impacts to Flooding and Runoff**. Refer also to **Section 1.18 Mitigation Measures**.

3.3.89 TC-098

See **Section 1.5 General Environmental Concerns** and **Section 1.18 Mitigation Measures**.

3.3.90 TC-099

See **Section 1.18 Mitigation Measures** and **Section 1.11.1 Economic and Socioeconomic Conditions**.

3.3.91 TC-100

See **Section 1.3 Purpose and Need** and **Section 1.1.1 General EIS Issues**.

3.3.92 TC-101

See **Section 1.11.2 Environmental Justice** and **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**. Refer also to **Section 1.18 Mitigation Measures** and **Section 1.4 Alternatives**.

3.3.93 TC-102

See **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**. Refer also to **Section 1.14.2 Noise** and **Section 1.4 Alternatives**.

3.3.94 TC-103

See **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**.

3.3.95 TC-104

See **Section 1.11.1 Economic and Socioeconomic Conditions**, **Section 1.2.1 Expressions of Opinion**, and **Section 1.12.2 Land Use**.

3.3.96 TC-105

See **Section 1.3 Purpose and Need** and **Section 1.4 Alternatives**. Refer also to **Section 1.12.1 Transportation Networks**.

3.3.97 TC-106

See **Section 1.13.5 Law Enforcement** and **Section 1.2.1 Expressions of Opinion**.

3.3.98 TC-107

See **Sections 1.8 Air Quality**, **1.12.1 Transportation Networks**, **1.13.5 Law Enforcement**, and **1.13.6 Fire Protection and Emergency Medical Services**.

3.3.99 TC-108

See **Section 1.13.5 Law Enforcement.**

3.3.100 TC-109

See **Sections 1.8 Air Quality**, **Section 1.11.1 Economic and Socioeconomic Conditions**, and **Section 1.12.2 Land Use, 1.12.2.3 Community Character and Quality of Life**.

3.3.101 TC-110

See **Section 1.2.1 Expressions of Opinion**, **Section 1.11.1 Economic and Socioeconomic Conditions**, and **Section 1.3 Purpose and Need**.

3.3.102 TC-111

See **Section 1.12.1 Transportation Networks** and **Section 1.13.5 Law Enforcement.**

3.3.103 TC-112

See **Section 1.2.1 Expressions of Opinion**.

3.3.104 TC-113

Comment noted and made part of the administrative record.

3.3.105 TC-114

See **Section 1.11.2 Environmental Justice**, **Section 1.10 Cultural and Paleontological Resources**, and **Section 1.5 General Environmental Concerns**. The reference to "Alameda County Coroner" has been corrected to be Riverside County Coroner.

3.3.106 TC-115

See **Section 1.13.5Law Enforcement** and **Section 1.7 Water Resources**.

3.3.107 TC-116

See **Section 1.2.1 Expressions of Opinion** and **Section 1.3 Purpose and Need**.

3.3.108 TC-117

See **Section 1.2.1 Expressions of Opinion**. See also **Section 1.12.1 Transportation Networks**, **Section 1.11.1 Economic and Socioeconomic Conditions**, **Section 1.18 Mitigation Measures**, **Section 1.1.1 General EIS Issues**, and **Section 1.12.2 Land Use**.

3.3.109 TC-118

See **Section 1.12.2 Land Use**, **Section 1.14.3 Visual Resources**, and **Section 1.14.2 Noise**.

3.3.110 TC-119

See **Section 1.1.4 Cooperating Agency**.

3.3.111 TC-120

See **Section 1.6 Land Resources**. Where possible and where available data allowed, the EIS disclosed environmental effects that could affect residential communities outside the Project Site. The EIS considers the effects of the project on nearby residential communities include under Noise (Section 4.9), Visual Resources (Section 4.9), Transportation Networks (Section 4.7), and Land Use (including Lighting and Glare; Section 4.7).

3.3.112 TC-121

Comment noted and made part of the administrative record. See **Section 1.12.1 Transportation Networks**.

3.3.113 TC-122

Comment noted and made part of the administrative record. See **Section 1.2.1 Expressions of Opinion**, **Section 1.1.2 Extension of the Comment Period**, **Section 1.11 Economic and Socioeconomic Conditions**, and **Section 1.12.1 Transportation Networks**.

3.3.114 TC-123

Comment noted and made part of the administrative record.

Appendix F:

Cooperating Agency Letters of Participation

BEST BEST & KRIEGER LLP
ATTORNEYS AT LAW

Christopher H. Calfee
(925) 977-3308
Christopher.Calfee@bbklaw.com

2001 North Main Street, Suite 390
Walnut Creek, CA 94596
Phone: (925) 977-3300
Fax: (925) 977-1870
bbklaw.com

April 28, 2008

VIA FACSIMILE AND U.S. MAIL

John Rydzik
Bureau of Indian Affairs
2800 Cottage Way
Sacramento, CA 95825

Re: City of San Jacinto's Status as Cooperating Agency for Soboba Fee to Trust Application

Dear Mr. Rydzik:

Thank you for meeting with Tim Hults, Asher Hartel, Jeff Ballinger and me on April 17, 2008, to discuss the City of San Jacinto's (City) status as a cooperating agency in the Soboba Band of Luiseno Indians (Tribe) Horseshoe Grande Fee-to-Trust Transfer Project (Project). We are encouraged that the Bureau of Indian Affairs intends to work closely with the City in the environmental review process for the Project, and will facilitate communication with the Tribe regarding the City's concerns.

During that meeting, the Bureau committed to providing the City with a draft memorandum of understanding to memorialize the City's participation in the environmental review process. The Bureau also committed to establishing a schedule of regular conference calls with the City to provide updates and opportunities for input. Finally, the Bureau committed to providing the City with an administrative draft of the environmental impact statement as soon as possible, so that the City may provide meaningful input prior to releasing the document for public review and comment. We understand that the Bureau is to receive a preliminary draft later this week.

The purpose of this letter is to confirm the City's understanding of the outcome of our meeting with you. If we are mistaken in any respect, please let us know.

Thank you again for your assistance. We look forward to working with you.

Sincerely,

Christopher H. Calfee
for BEST BEST & KRIEGER LLP
Deputy City Attorney for the City of San Jacinto

CHC:mb

cc: Tim Hults, Assistant City Manager
Asher Hartel, Director of Planning
Jeff Ballinger, Best Best & Krieger LLP
Roderick Walston, Best Best & Krieger LLP
James J. Fletcher, Superindendent, Southern California Agency, Bureau of Indian Affairs
Valerie E. Thomas, Environmental Protection Specialist, Bureau of Indian Affairs

SACRAMENTO\CCALFEE\50448.1

SAN JACINTO

Dm On 5-7-08
T Amy Dutschke
DECRms
5-14-08
Ack. Ltr

April 28, 2008

Ms. Amy Dutschke
Pacific Regional Director of Bureau of Indian Affairs
Bureau of Indian Affairs
2800 Cottage Way
Sacramento, CA 92581

Re: Soboba Horseshoe Grande Fee-to-Trust & EIS Project

Dear Ms. Dutschke:

This letter acknowledges the City of San Jacinto's (hereinafter, the City) comprehension of the Tribe's proposal to convey 34 parcels, 534.91± acres of tribally owned property that is contiguous to the existing Soboba Reservation to federal trust status, and to develop a portion of that property (approximately 55± acres, or 10 percent of total conveyance) into a destination hotel/casino complex, gas station, and a tribal fire station (collectively, the Proposed Action).

The City accepted the Bureau of Indian Affair's (BIA) 12/12/2007 invitation to act as a Cooperating Agency in the NEPA process. The City has entered into the consultation process with the BIA. As of 4/25/2008, the City has met with Tribal Council members, tribal consultants, and Mr. John Rydzik (BIA Regional Director of Environmental, Cultural, Resource Management and Safety) to discuss the Proposed Action.

The City was consulted on 4/25/2008 by Tribal Council members and a tribal consultant (Mr. Ben Pogue, Entrix) to discuss the Proposed Action and establish the scope of issues to be evaluated in subcommittees with tribal consultants and BIA. The objective of these subcommittee discussions is a Memorandum of Understanding (MOU) for inclusion in the Final Environmental Impact Statement.

Sincerely,

Barry McClellan
San Jacinto City Manager

City Manager's Office
201 East Main Street | San Jacinto, CA 92583 | Ph (951) 487-7342 | Fax (951) 654-3728 | www.ci.san-jacinto.ca.us

Appendix G:

Draft Operations Plan for Soboba Fire Department

PLANNING FOR THE FUTURE

SOBOBA BAND OF LUISENO INDIANS
FIRE DEPARTMENT DEVELOPMENT PLAN
MAY 7, 2008

JAMES S. BARRON
Consultant

SOBOBA FIRE DEPARTMENT DEVELOPMENT PLAN

TABLE OF CONTENTS **PAGE**

Introduction 1

Work Scope 2

Response Time Goals 7

Facilities 7

Apparatus and Equipment 8

Staffing Levels 8

Emergency Response Plan 8

Mutual-Aid and Other Cooperative Agreements 9

Dispatch and Communications Services 9

Emergency Medical Services 9

Fire Prevention 10

Recruitment and Hiring 10

Training 10

Policies and Procedures 12

ATTACHMENTS

Land Use / Fire Suppression Goals . . . . . Attachment “A”

Picture Display – Proposed Fire Apparatus . . . . . Attachment “B”

Standard Response Plan . . . . . Attachment “C”

Soboba Band of Luiseno Indians
Fire Department Development Plan
May 7, 2008

Introduction:

On July 1, 2007, the Soboba Band of Luiseno Indians hired Jim Barron, a 35-year fire service veteran, as a consultant to guide them through the process of establishing a fire department to protect their Reservation.

Besides a desire for further self-reliance, the Soboba Tribal Council recognized the need to improve response times to fire and medical emergencies on the Reservation. Their plans to build a new casino and hotel on the Reservation have further brought the need to the forefront. Currently, outside City, County and State fire resources are relied upon to provide emergency services.

The Tribe's consultant (interim Fire Chief) prepared the following Work Scope for determining an appropriate level-of-service for fire protection and medical-aid services. By analyzing the needs of the Soboba Reservation, recommendations and decisions have been made for facilities, apparatus/equipment, staffing levels, communications, training and special programs for a dedicated tribal fire department as elaborated upon in this document – "Soboba Fire Department Development Plan."

SCOPE OF WORK:

Provide recommendations for the **appropriate level-of-service** for fire protection and medical-aid services by analyzing the needs of the Soboba Reservation. Once determined and agreed upon, a proposed budget and timeline for creating a fire department will be developed.

As outlined below, a suggested logical and systematic approach to accomplish this project would be to identify tasks/activities to be completed which could be categorized within three **(3) phases: Planning, Development and Operational Implementation.**

The concept of phasing can be summed up as follows:

- **Phase 1** – covers everything needed to be done, costs and timelines identified
- **Phase 2** – covers everything needed to begin emergency services on day one
- **Phase 3** – basic service begins, plus implementation of additional services identified in Phase 1

Phase One – Planning

- **Facilities**
  - evaluate fire history
  - determine/analyze emergency call-load
  - identify/analyze fire hazards
  - identify/assess the protection needs for all tribal assets, lands, cultural resources
  - identify/assess future tribal assets proposed
  - consider/analyze the effectiveness of current fire and EMS services provided
  - identify/evaluate existing and potential mutual-aid and/or automatic-aid resources
  - identify/recommend new agreements that could benefit/enhance reservation fire protection
  - determine/analyze potential response times from proposed facility site(s) on the reservation
  - consider/analyze the need for multiple fire stations
  - consider/recommend beginning service in temporary vs. permanent
  - recommend fire station site(s) and sizes
  - research/recommend fire station plans
  - determine facility costs
  - research/consider grant opportunities

- **Communications**
  - identify/recommend dispatching alternatives
  - assess adequacy of communications coverage throughout reservation
  - identify/recommend communications equipment needs – base, mobile and portable radios
  - determine dispatch services and communications costs
  - research/consider grant opportunities

- **Apparatus and Equipment**
  - consider/analyze the effectiveness of current fire and EMS services
  - consider/evaluate existing and potential mutual-aid and/or automatic-aid resources
  - identify/assess the fire protection needs for all tribal assets, lands, cultural resources
  - research/consider nationally recognized standards, ISO grading criteria, OSHA requirements
  - consider/recommend apparatus and equipment needs
  - determine apparatus and equipment costs
  - research/consider grant opportunities

- **Personnel**
  - consider/analyze the effectiveness of current fire and EMS services
  - consider/evaluate existing and potential mutual-aid and/or automatic-aid resources
  - identify/assess the fire protection needs for all tribal assets, lands, cultural resources
  - research/consider nationally recognized standards, ISO grading criteria, OSHA requirements
  - consider apparatus recommendations
  - consider/recommend staffing levels
  - consider/evaluate duty officer coverage needs
  - consider/recommend chief officer and other key positions
  - consider/recommend duty weeks
  - conduct/salary survey
  - consider/recommend employee compensation/benefits
  - research/consider grant opportunities

- **Programs**
  - evaluate the fire history
  - determine/analyze emergency call-load
  - determine/analyze fire hazards
  - identify/assess the fire protection needs for all tribal assets, lands, cultural resources
  - identify/assess future tribal assets proposed
  - consider/analyze the demographics for the reservation
  - recommend fire department program needs
  - research/consider grant opportunities

- **Budgeting**
  - seek tribal input/conceptual approval for level-of-service
  - prepare draft budget
    - identify one-time startup costs (i.e. fire station, apparatus, equipment)
    - seek tribal input/approval

- **Timeline**
  - prepare timeline for implementation
    - seek tribal input/approval

Phase Two – Development

- **Facility**
  - build fire station
    - select architect/fire station plans
    - advertise/award construction contract
    - monitor construction
  - order/purchase furnishings
  - create inventory
  - develop policies, procedures, forms
  - pursue identified grant opportunities

- **Communications**
  - establish dispatching contract
  - order/purchase all communications equipment
    - base, mobile and portable radios
    - create inventory
  - pursue identified grant opportunities
  - establish radio identifiers through County for stations(s), apparatus, support vehicle(s), and chief officer(s)
  - establish mutual-aid and/or automatic-aid agreements
  - establish working relationships with cooperators
  - develop policies, procedures, forms

- **Apparatus and Equipment**
  - order/purchase apparatus
  - order/purchase firefighting and rescue tools
    - create inventory
  - establish policies, procedures, forms
  - pursue identified grant opportunities

- **Personnel**
  - recruit/hire fire personnel
    - develop job descriptions
    - establish minimum qualifications
    - provide orientation
    - order/purchase personal protective equipment (PPE)
  - develop uniform standards/shoulder patch
  - establish policies, procedures, forms
  - pursue identified grant opportunities

- **Programs**
  - establish identified/approved programs:
    - training
      - certifications
      - standards
    - fire prevention
      - code enforcement
      - inspections
      - public education
  - establish policies, procedures, forms
  - pursue identified grant opportunities

Phase Three – Operational Implementation

- **Year 1:**
  - open satellite fire station w/ staffed fire engine
  - Fire Chief (consultant) transitions to full-time, permanent employee status
  - Assistant Chief position filled
  - other approved position(s) filled
  - dispatching services begin
  - emergency response begins
  - approved programs start
  - long range planning continues
  - on-going evaluation process
    - provide reports
    - identify problems/solutions

- **Year 2-5:**
  - construct/open headquarters fire station
  - purchase additional apparatus (i.e. brush engine, truck company)
  - recruit/hire additional staffing for second apparatus coverage
  - recruit/hire additional staff and/or chief officer positions for program mgmt
  - purchase support vehicles (i.e. command, staff, utility)
  - add firefighter-paramedic position to each front line unit
  - establish reserve firefighter program
  - WUI program begins funded through BIA grants
  - long range planning continues
  - on-going evaluation process
    - provide reports
    - identify problems/solutions

- **Year 5-10:**
  - establish explorer program
  - purchase relief fire engine
  - long range planning continues
  - on-going planning continues
    - provide reports
    - identify problems/solutions

Response Time Goals:

Emergency response times are critical to the success of saving lives and reducing property loss. Nationally recognized fire service standards hold to the importance of a 5-minute response time, both for fire and medical emergencies. Additionally, due to potential for a large and catastrophic fire event, standards also recommend that a 3-minute response goal is desirable for commercial responses.

The closest existing fire station (Station 25/San Jacinto City) is located 2.2 miles from Lake Park Drive and Soboba Road, with an estimated response time of 6-7 minutes. This calculation is based on travel time of 2 minutes per mile, plus 2-3 minutes for the emergency dispatch and crew getaway.

Also of critical importance, when dispatched to a structure fire, is the arrival of backup resources and personnel to support a firefighting operation. A typical, initial dispatch to a structure fire includes three fire apparatus – either 3 fire engines or 2 fire engines and 1 truck company. You will find attached a "Land Use/Fire Suppression Goals" worksheet (see Attachment "A"; source – CDF/Riverside County Fire Department) that displays suggested objectives when combating a structure fire depending on the land use category. The Tribe has adopted the fire suppression goals outlined for the "Heavy Urban" category. As indicated, the recommended goal calls out for the first arriving unit to be on scene within 5 minutes from time of dispatch and complete "setup" within an additional 3 minutes. This would allow for extinguishing agents to be applied within a goal of 8 minutes from the time of dispatch. The goal for the full assignment is to arrive at scene and be setup for operation within 10 minutes of dispatch on 90% of all fire incidents.

In addition to CDF Station 25 (2.20 miles), the nearest mutual-aid fire resources are CDF Station 72 (4.41 miles), CDF Station 26 (4.60 miles), CDF Station 78 (6.41 miles), and Hemet City Station 5 (3.93 miles). These mutual-aid units figure in prominently as backup to tribal fire equipment and personnel by rounding out the necessary depth of equipment on scene and operational within 10 minutes of dispatch (Heavy Urban/Fire Suppression Goals).

Facilities:

With the above-mentioned suppression goals in mind, the Tribe will construct two (2) fire stations to protect the Reservation. The initial fire station will be a satellite operation constructed near the vicinity of Soboba and Castille Canyon Roads. A semi-permanent design style has been selected.

The second fire station will be co-located and built in conjunction with the development of the new casino and hotel to be located at Soboba Road and Lake Park Drive. This facility will serve as the tribal fire department headquarters and will be significantly larger than the satellite fire station.

Fire Apparatus and Equipment:

Recommendations for fire apparatus were made after an evaluation of the types of emergency calls typically encountered, the call-load, the terrain, the existing and future assets-at-risk, the availability of mutual-aid resources and the potential for fire loss.

The following three apparatus have been identified to meet the Soboba Reservation's needs: (1) one Type-1 structural fire engine, (2) one Type-3 brush engine and (3) one aerial truck company (see Attachment "B" – a picture display of these proposed fire apparatus).

A new Smeal Type-1 fire engine has been delivered to the Reservation and is to be fully outfitted with state-of-the-art fire equipment. This Smeal model is referred to as an "interface" fire engine due to its excellent mobility in rural wildland areas, such as the Reservation.

The brush engine specifications call out for 4-wheel drive capability. In addition to being well suited for the Reservation's backcountry, it will no doubt be advantageous during times of inclement weather.

A Smeal 105-foot "quint" ladder truck is earmarked for future purchase when the new casino and hotel development takes place. The importance of building accessibility for firefighting equipment will be emphasized during the project's design review stage to assure public safety.

Staffing Levels:

Initial fire engine staffing will be 24/7 coverage with four (4) personnel. "Traditional" staffing of 1 fire captain, 1 engineer and 2 firefighters will be on-duty each day. Additionally, the Fire Chief and an Assistant Chief will share daily duty coverage.

Ultimately, two (2) staffed fire apparatus (7-8 firefighters) will be put into service to assure an effective number of on-duty personnel ready for response. The Type-1 and Type-3 engines will initially provide coverage from the satellite fire station. However, this staffing will be split up between the two facilities once the HQ fire station is complete.

At this point, the brush engine will be "cross-covered" by the fire crew at the satellite station and the aerial truck will be staffed at Headquarters. During times of high fire danger, off-duty personnel can staff the brush engine.

Standard Response Plan:

The CDF/Riverside County Fire Department's "Standard Response Plan" (see Attachment "C") will be followed for a preset apparatus and other resource response numbers to various types of emergency incidents. The numbers listed within the Plan assume the availability of tribal apparatus augmented by outside mutual-aid resources.

Mutual-Aid and Other Cooperative Agreements:

Reservation participation in any mutual-aid or automatic-aids is subject to negotiation between the Reservation and those agencies. Discussions have taken place with the CDF/County Fire Department to enter into a mutual-aid agreement for the sharing of resources. This would also include the City of San Jacinto due to its contractual relationship with CDF/County Fire to provide fire protection services. An additional mutual-aid agreement will be pursued with the City of Hemet.

The objective of the Soboba Fire Department will be to maintain one fire response unit at all times when mutual-aid requires responses off Reservation. This necessitates the need for a minimum of two (2) staffed fire units for the protection of the Reservation and will assure the ability to reciprocate with other neighboring fire departments.

The Bureau of Indian Affairs (BIA) has entered into an agreement with the California Department of Forestry and Fire Protection (CDF) to suppress wildland fires on tribal lands. Therefore, the primary jurisdiction for wildland incidents on the Soboba Reservation will remain with CDF even after the Soboba Fire Department becomes operational.

Dispatch and Communications Services:

CDF/Riverside County Fire Department will provide the dispatching services for the Reservation. The CDF Perris Emergency Command Center (ECC) provides comprehensive dispatching services with state-of-the-art equipment. The CDF/County Fire Chief had indicated his department is in a position to provide a dispatching contract. This contract has been discussed and is in the draft stages at this time.

The Perris ECC dispatches the current emergency resources that provide service to the Reservation. This includes American Medical Response (AMR), the private ambulance service providing Advanced Life Support (ALS) transport on the Reservation. Reservation fire units will need to rely on backup of these same resources for fires and other major incidents; therefore, there is an obvious advantage to being dispatched by the same dispatch center and have the ability to communicate over the same radio frequencies. The Pechanga and Morongo Tribal Fire Departments also contract with CDF/County Fire for dispatch services.

Emergency Medical Services:

All Soboba Fire Department personnel will be required to maintain Emergency Medical Technician (EMT) and CPR certificates. ALS transport will continue to be provided by AMR, which provides paramedic services under a Riverside County contract for the majority of the county and its cities. The current County contract with AMR requires a maximum response time of 13:59 for the Soboba Reservation.

Many jurisdictions within the County have opted to enhance paramedic service by adding a paramedic firefighter to their fire engines to assure earlier ALS intervention. Once the patient is stabilized, then there is an orderly transfer of the patient to AMR for transport.

The Tribe has conceptually agreed to eventually follow this same practice of one paramedic assigned to each fire unit. The Soboba Fire Department's ALS program is projected to begin sometime in the next two years.

Fire Prevention:

The Soboba Fire Department will ensure that all personnel are trained to provide basic investigation and inspection services. Currently on the Reservation, fire marshal services are contracted from the outside. The Soboba Fire Department will eventually have a fire marshal position on staff to fulfill these duties – including, but not limited to: code enforcement, inspections, plan-checking, investigations and public education.

It will be the policy of Soboba Fire Department to investigate all fires on the Reservation. In the case of vegetation fires, Soboba Fire Department personnel will coordinate with CDF when conducting investigations.

In the future, the Soboba Fire Department will pursue BIA grant monies to fund a Wildland Urban Interface (WUI) Program. The program will concentrate on assisting the tribal members with clearance of wildland fuels around their residences to provide for defensible space.

Recruitment and Hiring:

The following describes the recruitment, hiring and training process for the Soboba Fire Department.

Approximately 4 months prior to establishing the Soboba Fire Department, recruitment will be initiated for experienced fire captains, fire engineers, and entry-level firefighters. Additionally, the Tribe will recruit and hire an Assistant Chief or Station Captain who will assist in the recruitment and hiring process. Soboba Human Resources will work with the Fire Chief to develop the recruitment materials, process, and implementation plan for review and approval of the Tribal Council.

Training:

The following describes the Soboba Fire Department Training Program that will be overseen by the Assistant Fire Chief or a designee. The Fire Chief and his/her staff will accountable for the development of a comprehensive general training program for newly hired firefighters and veterans alike.

Beginning from the time a new employee is hire, they will be placed into a structured regimen designed to develop the knowledge base and skills necessary for employees in today's fire service. Throughout their entire probationary period, Soboba fire personnel will be required to demonstrate, through a battery of both practical and written examinations, a high level of proficiency.

Each firefighter will be tested after six months from their hire date on important skills such as: breathing apparatus, basic hose evolutions, ladders, and emergency medical technician skills. For the next two years, the newly hired firefighter will add to his/her knowledge base and be tested accordingly on such subjects as:

- Salvage and Overhaul
- Ventilation
- Rescue Techniques
- Hose Stream Practices
- Forcible Entry
- Low and High Angle Rescue
- Swift Water Rescue
- EMT and CPR
- Defibrillator/Combi-Tube Adjuncts to EMT Skills

With the exception of the Combi-Tube and Defibrillator skills, all information presented to the Soboba employee will be via classroom drill by a Training Officer, qualified company captain or qualified crewmember, or by self-study from the station library. Contract agencies are used to provide training in the medical field due to strict regulations regarding continuity of subject matter.

A comprehensive training program will also be developed and provided fire personnel that meets or exceeds both State and Federal mandates for training in the following areas:

- Hazmat Awareness and Operations (Sara Title III, CFR: 1910.120)
- Permit Required Confined Space (CFR: 1910.146)
- Affirmative Action Training (Title VII, 164 Civil Rights)
- Injury and Illness Prevention (CCR: 3203)
- Personal Protective Equipment [CCR: 3401(b)(6)]
- SCBA [CCR: 3409, ANSI: Z88.5: 8.3, CCR: 5144]
- SCBA Ability Training (ANSI: Z88.5:8.3)
- Wildland Fire Shelters [CCR: 3410(g), NFPA 295 3-2]
- Multi-Casualty Incident Training (H&S: 1797.151)
- Triage (H&S: 1798.170)
- Vehicle Extrication (CCR: 100075)
- CPR (CCR: 100025, H&S: 1797.182, PC: 13518)
- Sudden Infant Death Syndrome (Senate Bill 1067)
- Bloodborne Pathogens [CCR: 5193(e)(5)]
- Incident Command System (Senate Bill 1841-1993, Firescope Act)

- NIMS 700
- Standardized Emergency System (SEMS) (GC: 8707)
- Class B Driving Program (California DMV DL170)

Examples of non-mandated classes to be developed for fire personnel to enhance emergency scene effectiveness and safety include:

- Electric Vehicle Response
- Swift Water Emergencies
- Incident Command System
- High-Rise Response and ICS
- Emergency Vehicle Operation Course

All fire suppression personnel will be required to fulfill a minimum of 20 hours of training per month. Training at the company level is varied and ongoing. This requirement can be met in the form of classroom drill or manipulative drill. The fire captains are responsible for ensuring that the appropriate hours on specific topics are met each month and that all necessary areas for training are covered.

Policies and Procedures:

The Fire Chief and his/her staff will be responsible for the development of policies and procedures specific to the fire department. These policies and procedures are not intended to contradict any sections of the Soboba Employees Handbook or any other tribal rules, procedures or policies in existence, but rather provide clarification where may be needed. For example, the majority of the fire department employees will work 24-hour shifts, a 56-hour duty week, holidays, emergency overtime and other issues unique to other tribal departments, which will need to be addressed.

ATTACHMENT "A"

LAND USE / FIRE SUPPRESSION GOALS

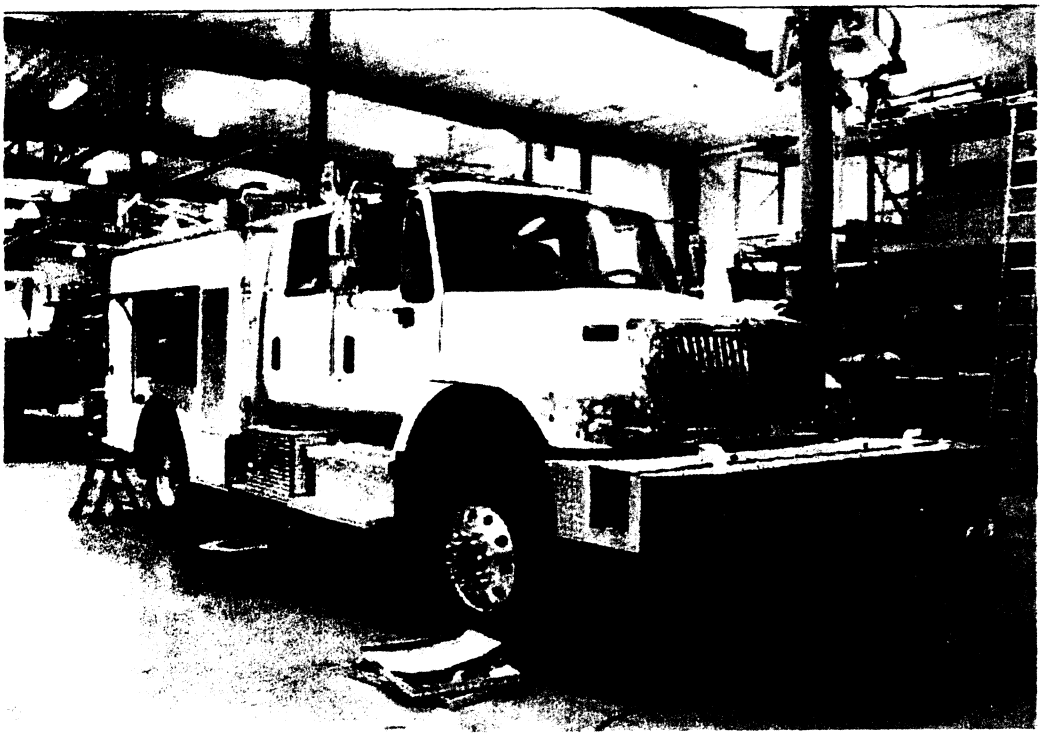
OBJECTIVES	OUTLYING	RURAL	URBAN	HEAVY URBAN
Extinguishing agent applied to fires w/in listed minutes from dispatch.	17 response +3 setup 20 minutes	11 response +3 setup 14 minutes	7 response +3 setup 10 minutes	5 response +3 setup 8 minutes
Full assignment in operation within listed minutes from dispatch.	26 response +4 setup 30 minutes	16 response +4 setup 20 minutes	11 response +4 setup 15 minutes	6 response +4 setup 10 minutes
Suppression initiated within listed minutes of dispatch for 90% of all fires.	15 minutes	10 minutes	8 minutes	Prior to flashover
Fire station located within listed miles.	8 miles	5 miles	3 miles	1.5 miles

ATTACHMENT "B"

Proposed Fire Apparatus for Soboba Fire Department

Smeal Fire Apparatus
Type I Pumper
500 gal water tank

Smeal Fire Apparatus
105 ft Ladder Truck
300 gal water tank



Danko Fire Apparatus
Type III Brush Engine
500 gal water tank

ATTACHMENT "C"

STANDARD RESPONSE PLAN

TABLE – 1

INCIDENT TYPE	BC	E	S	BS	MED	AMB	T	HM	USAR	LAW	AA	AT	COP	DOZ	CREW	OES	FA
STRUCTURE	1	3	1		1#		1#										
COMMERCIAL/HIGH/WIDE RISE MULTI FAMILY DWELLING	1	4	1		1#		1#										
FIRE TYPE UNKNOWN		2	1														
RINGING ALARM		2					1*										
VEHICLE		2	1														
TRAIN/AIRCRAFT	1	3	1		1#	1	1#										X
REFUSE/IMPROVEMENT		1	1														
BOMB THREATS	USE FIRE INCIDENT TYPE AS DETERMINED BY THE LOCATION OF DEVICE; CODE 2 RESPONSE																
STATE VEGETATION																	
LOW		2	1														
MED	1	3	1										1	1	1		
HIGH	1	5	1								1	2	1	2	2		
LOCAL VEGETATION																	
LOW		2	1														
MED		3	1														
HIGH	1	3	1														
MEDICAL AID / TC		1	1		1#	1				X							
TC CUT & RESCUE TC OVER THE SIDE	1	2	1 w/jaws		1#	1	1#			X							
TECHNICAL RESCUE, CONFINED SPACE, TRENCH RESCUE	1	3	1	1	1#	1	1	1	1								
MASS CASUALTY	1	3	1		2#	2	1#			X							
&SWIFT WATER	1	3			1#	1	1		1								
HAZ MAT	1	1	1					1									
FMS		1	1														
PSA		1	1														

~ Where assigned within contractor's jurisdiction **revised 1/2008**

* ~ if truck is second in the line-up, respond in place of engine

& ~ if Swift Water Team Activated, ADD 1 BC (Team Leader) and SWR Unit(s)

Appendix H:

Tribal-State Compact and Ordinances

COPY

TRIBAL-STATE COMPACT

BETWEEN

THE STATE OF CALIFORNIA

AND THE

SOBOBA BAND OF MISSION INDIANS

TABLE OF CONTENTS

PREAMBLE 1

SECTION 1.0
PURPOSES AND OBJECTIVES 2

SECTION 2.0
DEFINITIONS 3

SECTION 3.0
CLASS III GAMING AUTHORIZED AND PERMITTED 5

SECTION 4.0
SCOPE OF CLASS III GAMING 6

SECTION 5.0
REVENUE DISTRIBUTION 9

SECTION 6.0
LICENSING 11

SECTION 7.0
COMPLIANCE ENFORCEMENT 21

SECTION 8.0
RULES AND REGULATIONS FOR THE OPERATION AND MANAGEMENT OF THE TRIBAL GAMING OPERATION 24

SECTION 9.0
DISPUTE RESOLUTION PROVISIONS 28

SECTION 10.0
PUBLIC AND WORKPLACE HEALTH, SAEFTEY AND LIABILITY 30

SECTION 11.0
EFFECTIVE DATE AND TERM OF COMPACT 35

SECTION 12.0
AMENDMENTS; RENEGOTIATIONS 36

SECTION 13.0
NOTICES 37

SECTION 14.0
CHANGES IN IGRA 37

SECTION 15.0
MISCELLANEOUS 37

ATTACHMENTS:
ADDENDUM A
ADDENDUM B
NOTICE OF ADOPTION OF MODEL TRIBAL LABOR RELATIONS ORDINANCE
MODEL TRIBAL LABOR RELATIONS ORDINANCE

TRIBAL-STATE GAMING COMPACT

Between the SOBOBA BAND OF MISSION INDIANS, a federally recognized Indian Tribe,

and the

STATE OF CALIFORNIA

This Tribal-State Gaming Compact is entered into on a government-to-government basis by and between the Soboba Band of Mission Indians, a federally-recognized sovereign Indian tribe (hereafter "Tribe"), and the State of California, a sovereign State of the United States (hereafter "State"), pursuant to the Indian Gaming Regulatory Act of 1988 (P.L. 100-497, codified at 18 U.S.C. Sec. 1166 et seq. and 25 U.S.C. Sec. 2701 et seq.) (hereafter "IGRA"), and any successor statute or amendments.

PREAMBLE

A. In 1988, Congress enacted IGRA as the federal statute governing Indian gaming in the United States. The purposes of IGRA are to provide a statutory basis for the operation of gaming by Indian tribes as a means of promoting tribal economic development, self-sufficiency, and strong tribal governments; to provide a statutory basis for regulation of Indian gaming adequate to shield it from organized crime and other corrupting influences; to ensure that the Indian tribe is the primary beneficiary of the gaming operation; to ensure that gaming is conducted fairly and honestly by both the operator and players; and to declare that the establishment of an independent federal regulatory authority for gaming on Indian lands, federal standards for gaming on Indian lands, and a National Indian Gaming Commission are necessary to meet congressional concerns.

B. The system of regulation of Indian gaming fashioned by Congress in IGRA rests on an allocation of regulatory jurisdiction among the three sovereigns involved: the federal government, the state in which a tribe has land, and the tribe itself. IGRA makes Class III gaming activities lawful on the lands of federally-recognized Indian tribes only if such activities are: (1) authorized by a tribal ordinance, (2) located in a state that permits such gaming for any purpose by any person, organization or entity, and (3) conducted in conformity with a gaming compact entered into between the Indian tribe and the state and approved by the Secretary of the Interior.

C. The Tribe is currently operating a tribal gaming casino offering Class III gaming activities on its land. On September 1, 1999, the largest number of Gaming Devices operated by the Tribe was 991.

D. The State enters into this Compact out of respect for the sovereignty of the Tribe; in recognition of the historical fact that Indian gaming has become the single largest revenue-producing activity for Indian tribes in the United States; out of a desire to terminate pending "bad faith" litigation between the Tribe and the State; to initiate a new era of tribal-state cooperation in areas of mutual concern; out of a respect for the sentiment of the voters of California who, in approving Proposition 5, expressed their belief that the forms of gaming authorized herein should be allowed; and in anticipation of voter approval of SCA 11 as passed by the California legislature.

E. The exclusive rights that Indian tribes in California, including the Tribe, will enjoy under this Compact create a unique opportunity for the Tribe to operate its Gaming Facility in an economic environment free of competition from the Class III gaming referred to in Section 4.0 of this Compact on non-Indian lands in California. The parties are mindful that this unique environment is of great economic value to the Tribe and the fact that income from Gaming Devices represents a substantial portion of the tribes' gaming revenues. In consideration for the exclusive rights enjoyed by the tribes, and in further consideration for the State's willingness to enter into this Compact, the tribes have agreed to provide to the State, on a sovereign-to-sovereign basis, a portion of its revenue from Gaming Devices.

F. The State has a legitimate interest in promoting the purposes of IGRA for all federally-recognized Indian tribes in California, whether gaming or non-gaming. The State contends that it has an equally legitimate sovereign interest in regulating the growth of Class III gaming activities in California. The Tribe and the State share a joint sovereign interest in ensuring that tribal gaming activities are free from criminal and other undesirable elements.

Section 1.0. PURPOSES AND OBJECTIVES.

The terms of this Gaming Compact are designed and intended to:

(a) Evidence the goodwill and cooperation of the Tribe and State in fostering a mutually respectful government-to-government relationship that will serve the mutual interests of the parties.

(a) Evidence the goodwill and cooperation of the Tribe and State in fostering a mutually respectful government-to-government relationship that will serve the mutual interests of the parties.

(b) Develop and implement a means of regulating Class III gaming, and only Class III gaming, on the Tribe's Indian lands to ensure its fair and honest operation in accordance with IGRA, and through that regulated Class III gaming, enable the Tribe to develop self-sufficiency, promote tribal economic development, and generate jobs and revenues to support the Tribe's government and governmental services and programs.

(c) Promote ethical practices in conjunction with that gaming, through the licensing and control of persons and entities employed in, or providing goods and services to, the Tribe's Gaming Operation and protecting against the presence or participation of persons whose criminal backgrounds, reputations, character, or associations make them unsuitable for participation in gaming, thereby maintaining a high level of integrity in tribal government gaming.

Sec. 2.0. DEFINITIONS.

Sec. 2.1. "Applicant" means an individual or entity that applies for a Tribal license or State certification.

Sec. 2.2. "Association" means an association of California tribal and state gaming regulators, the membership of which comprises up to two representatives from each tribal gaming agency of those tribes with whom the State has a gaming compact under IGRA, and up to two delegates each from the state Division of Gambling Control and the state Gambling Control Commission.

Sec. 2.3. "Class III gaming" means the forms of Class III gaming defined as such in 25 U.S.C. Sec. 2703(8) and by regulations of the National Indian Gaming Commission.

Sec. 2.4. "Gaming Activities" means the Class III gaming activities authorized under this Gaming Compact.

Sec. 2.5. "Gaming Compact" or "Compact" means this compact.

Sec. 2.6. "Gaming Device" means a slot machine, including an electronic, electromechanical, electrical, or video device that, for consideration, permits: individual play with or against that device or the participation in any electronic, electromechanical, electrical, or video system to which that device is connected; the playing of games thereon or therewith, including, but not limited to, the playing of facsimiles of games of chance or skill; the possible delivery of, or entitlement by the player to, a prize or something of value as a result of the application of an element of

chance; and a method for viewing the outcome, prize won, and other information regarding the playing of games thereon or therewith.

Sec. 2.7. "Gaming Employee" means any person who (a) operates, maintains, repairs, assists in any Class III gaming activity, or is in any way responsible for supervising such gaming activities or persons who conduct, operate, account for, or supervise any such gaming activity, (b) is in a category under federal or tribal gaming law requiring licensing, (c) is an employee of the Tribal Gaming Agency with access to confidential information, or (d) is a person whose employment duties require or authorize access to areas of the Gaming Facility that are not open to the public.

Sec. 2.8. "Gaming Facility" or "Facility" means any building in which Class III gaming activities or gaming operations occur, or in which the business records, receipts, or other funds of the gaming operation are maintained (but excluding offsite facilities primarily dedicated to storage of those records, and financial institutions), and all rooms, buildings, and areas, including parking lots and walkways, a principal purpose of which is to serve the activities of the Gaming Operation, provided that nothing herein prevents the conduct of Class II gaming (as defined under IGRA) therein.

Sec. 2.9. "Gaming Operation" means the business enterprise that offers and operates Class III Gaming Activities, whether exclusively or otherwise.

Sec. 2.10. "Gaming Ordinance" means a tribal ordinance or resolution duly authorizing the conduct of Class III Gaming Activities on the Tribe's Indian lands and approved under IGRA.

Sec. 2.11. "Gaming Resources" means any goods or services provided or used in connection with Class III Gaming Activities, whether exclusively or otherwise, including, but not limited to, equipment, furniture, gambling devices and ancillary equipment, implements of gaming activities such as playing cards and dice, furniture designed primarily for Class III gaming activities, maintenance or security equipment and services, and Class III gaming consulting services. "Gaming Resources" does not include professional accounting and legal services.

Sec. 2.12. "Gaming Resource Supplier" means any person or entity who, directly or indirectly, manufactures, distributes, supplies, vends, leases, or otherwise purveys Gaming Resources to the Gaming Operation or Gaming Facility, provided that the Tribal Gaming Agency may exclude a purveyor of equipment or furniture that is not specifically designed for, and is distributed generally for use other than in connection with, Gaming Activities, if the purveyor is not otherwise a Gaming Resource Supplier as described by of Section 6.4.5, the compensation received by the

purveyor is not grossly disproportionate to the value of the goods or services provided, and the purveyor is not otherwise a person who exercises a significant influence over the Gambling Operation.

Sec. 2.13. "IGRA" means the Indian Gaming Regulatory Act of 1988 (P.L. 100-497, 18 U.S.C. Sec. 1166 et seq. and 25 U.S.C. Sec. 2701 et seq.) any amendments thereto, and all regulations promulgated thereunder.

Sec. 2.14. "Management Contractor" means any Gaming Resource Supplier with whom the Tribe has contracted for the management of any Gaming Activity or Gaming Facility, including, but not limited to, any person who would be regarded as a management contractor under IGRA.

Sec. 2.15. "Net Win" means "net win" as defined by American Institute of Certified Public Accountants.

Sec. 2.16. "NIGC" means the National Indian Gaming Commission.

Sec. 2.17. "State" means the State of California or an authorized official or agency thereof.

Sec. 2.18. "State Gaming Agency" means the entities authorized to investigate, approve, and regulate gaming licenses pursuant to the Gambling Control Act (Chapter 5 (commencing with Section 19800) of Division 8 of the Business and Professions Code).

Sec. 2.19. "Tribal Chairperson" means the person duly elected or selected under the Tribe's organic documents, customs, or traditions to serve as the primary spokesperson for the Tribe.

Sec. 2.20. "Tribal Gaming Agency" means the person, agency, board, committee, commission, or council designated under tribal law, including, but not limited to, an intertribal gaming regulatory agency approved to fulfill those functions by the National Indian Gaming Commission, as primarily responsible for carrying out the Tribe's regulatory responsibilities under IGRA and the Tribal Gaming Ordinance. No person employed in, or in connection with, the management, supervision, or conduct of any gaming activity may be a member or employee of the Tribal Gaming Agency.

Sec. 2.21. "Tribe" means the Soboba Band of Mission Indians, a federally-recognized Indian tribe, or an authorized official or agency thereof.

Sec. 3.0 CLASS III GAMING AUTHORIZED AND PERMITTED. The Tribe is hereby authorized and permitted to engage in only the Class III Gaming Activities expressly referred to in Section 4.0 and shall not engage in Class III gaming that is not expressly authorized in that Section.

Sec. 4.0. SCOPE OF CLASS III GAMING.

Sec. 4.1. Authorized and Permitted Class III gaming. The Tribe is hereby authorized and permitted to operate the following Gaming Activities under the terms and conditions set forth in this Gaming Compact:

(a) The operation of Gaming Devices.

(b) Any banking or percentage card game.

(c) The operation of any devices or games that are authorized under state law to the California State Lottery, provided that the Tribe will not offer such games through use of the Internet unless others in the state are permitted to do so under state and federal law.

(e) Nothing herein shall be construed to preclude negotiation of a separate compact governing the conduct of off-track wagering at the Tribe's Gaming Facility.

Sec. 4.2. Authorized Gaming Facilities. The Tribe may establish and operate not more than two Gaming Facilities, and only on those Indian lands on which gaming may lawfully be conducted under the Indian Gaming Regulatory Act. The Tribe may combine and operate in each Gaming Facility any forms and kinds of gaming permitted under law, except to the extent limited under IGRA, this Compact, or the Tribe's Gaming Ordinance.

Sec. 4.3. Sec. 4.3. Authorized number of Gaming Devices

Sec. 4.3.1 The Tribe may operate no more Gaming Devices than the larger of the following:

(a) A number of terminals equal to the number of Gaming Devices operated by the Tribe on September 1, 1999; or

(b) Three hundred fifty (350) Gaming Devices.

Sec. 4.3.2. Revenue Sharing with Non-Gaming Tribes.

(a) For the purposes of this Section 4.3.2 and Section 5.0, the following definitions apply:

(i) A "Compact Tribe" is a tribe having a compact with the State that authorizes the Gaming Activities authorized by this Compact. Federally-recognized tribes that are operating fewer than 350 Gaming Devices are "Non-Compact Tribes." Non-Compact Tribes shall be deemed third party beneficiaries of this and other compacts identical in all material respects. A Compact Tribe that becomes a Non-Compact Tribe may not thereafter return to the status of a Compact Tribe for a period of two years becoming a Non-Compact Tribe.

(ii) The Revenue Sharing Trust Fund is a fund created by the Legislature and administered by the California Gambling Control Commission, as Trustee, for the receipt, deposit, and distribution of monies paid pursuant to this Section 4.3.2.

(iii) The Special Distribution Fund is a fund created by the Legislature for the receipt, deposit, and distribution of monies paid pursuant to Section 5.0.

Sec. 4.3.2.1. Revenue Sharing Trust Fund.

(a) The Tribe agrees with all other Compact Tribes that are parties to compacts having this Section 4.3.2, that each Non-Compact Tribe in the State shall receive the sum of $1.1 million per year. In the event there are insufficient monies in the Revenue Sharing Trust Fund to pay $1.1 million per year to each Non-Compact Tribe, any available monies in that Fund shall be distributed to Non-Compact Tribes in equal shares. Monies in excess of the amount necessary to $1.1 million to each Non-Compact Tribe shall remain in the Revenue Sharing Trust Fund available for disbursement in future years.

(b) Payments made to Non-Compact Tribes shall be made quarterly and in equal shares out of the Revenue Sharing Trust Fund. The Commission shall serve as the trustee of the fund. The Commission shall have no discretion with respect to the use or disbursement of the trust funds. Its sole authority shall be to serve as a depository of the trust funds and to disburse them on a quarterly basis to Non-Compact Tribes. In no event shall the State's General Fund be obligated to make up any shortfall or pay any unpaid claims.

Sec. 4.3.2.2. Allocation of Licenses.

(a) The Tribe, along with all other Compact Tribes, may acquire licenses to use Gaming Devices in excess of the number they are authorized to use under Sec. 4.3.1, but in no event may the Tribe operate more than 2,000 Gaming Devices, on the following terms, conditions, and priorities:

(1). The maximum number of machines that all Compact Tribes in the aggregate may license pursuant to this Section shall be a sum equal to 350 multiplied by the number of Non-Compact tribes as of September 1, 1999, plus the difference between 350 and the lesser number authorized under Section 4.3.1.

(2) The Tribe may acquire and maintain a license to operate a Gaming Device by paying into the Revenue Sharing Trust Fund, on a quarterly basis, in the following amounts:

Number of Licensed Devices	Fee Per Device Per Annum
1-350	$0
351-750	$900
751-1250	$1950
1251-2000	$4350

(3) Licenses to use Gaming Devices shall be awarded as follows:

(i) First, Compact Tribes with no Existing Devices (i.e., the number of Gaming Devices operated by a Compact Tribe as of September 1, 1999) may draw up to 150 licenses for a total of 500 Gaming Devices;

(ii) Next, Compact Tribes authorized under Section 4.3.1 to operate up to and including 500 Gaming Devices as of September 1, 1999 (including tribes, if any, that have acquired licenses through subparagraph (i)), may draw up to an additional 500 licenses, to a total of 1000 Gaming Devices;

(iii) Next, Compact Tribes operating between 501 and 1000 Gaming Devices as of September 1, 1999 (including tribes, if any, that have acquired licenses through subparagraph (ii)), shall be entitled to draw up to an additional 750 Gaming Devices;

(iv) Next, Compact Tribes authorized to operate up to and including 1500 gaming devices (including tribes, if any, that have acquired licenses through subparagraph (iii)), shall be entitled to draw up to an additional 500 licenses, for a total authorization to operate up to 2000 gaming devices.

(v) Next, Compact Tribes authorized to operate more than 1500 gaming devices (including tribes, if any, that have acquired licenses through subparagraph (iv)), shall be entitled to draw additional licenses up to a total authorization to operate up to 2000 gaming devices.

(vi). After the first round of draws, a second and subsequent round(s) shall be conducted utilizing the same order of priority as set forth above. Rounds shall continue until tribes cease making draws, at which time draws will be discontinued for one month or until the Trustee is notified that a tribe desires to acquire a license, whichever last occurs.

(e) As a condition of acquiring licenses to operate Gaming Devices, a non-refundable one-time pre-payment fee shall be required in the amount of $1,250 per Gaming Device being licensed, which fees shall be deposited in the Revenue Sharing Trust Fund. The license for any Gaming Device shall be canceled if the Gaming Device authorized by the license is not in commercial operation within twelve months of issuance of the license.

Sec. 4.3.2.3. The Tribe shall not conduct any Gaming Activity authorized by this Compact if the Tribe is more than two quarterly contributions in arrears in its license fee payments to the Revenue Sharing Trust Fund.

Sec. 4.3.3. If requested to do so by either party after March 7, 2003, but not later than March 31, 2003, the parties will promptly commence negotiations in good faith with the Tribe concerning any matters encompassed by Sections 4.3.1 and Section 4.3.2, and their subsections.

SEC. 5.0 REVENUE DISTRIBUTION

Sec. 5.1. (a) The Tribe shall make contributions to the Special Distribution Fund created by the Legislature, in accordance with the following schedule, but only with respect to the number of Gaming Devices operated by the Tribe on September 1, 1999:

Number of Terminals in Quarterly Device Base	Percent of Average Gaming Device Net Win
1 - 200	0%
201 – 500	7%
501 – 1000	7% applied to the excess over 200 terminals, up to 500 terminals, plus 10% applied to terminals over 500 terminals, up to 1000 terminals.
1000+	7% applied to excess over 200, up to 500 terminals, plus 10% applied to terminals over 500, up to 1000 terminals, plus 13% applied to the excess above 1000 terminals.

(b) The first transfer to the Special Distribution Fund of its share of the gaming revenue shall made at the conclusion of the first calendar quarter following the second anniversary date of the effective date of this Compact.

Sec. 5.2. Use of funds. The State's share of the Gaming Device revenue shall be placed in the Special Distribution Fund, available for appropriation by the Legislature for the following purposes: (a) grants, including any administrative costs, for programs designed to address gambling addiction; (b) grants, including any administrative costs, for the support of state and local government agencies impacted by tribal government gaming; (c) compensation for regulatory costs incurred by the State Gaming Agency and the state Department of Justice in connection with the implementation and administration of the Compact; (d) payment of shortfalls that may occur in the Revenue Sharing Trust Fund; and (e) any other purposes specified by the Legislature. It is the intent of the parties that Compact Tribes will be consulted in the process of identifying purposes for grants made to local governments.

Sec. 5.3. (a) The quarterly contributions due under Section 5.1 shall be determined and made not later than the thirtieth (30th) day following the end of each calendar quarter by first determining the total number of all Gaming Devices operated by a Tribe during a given quarter ("Quarterly Device Base"). The "Average Device Net Win" is calculated by dividing the total Net Win from all terminals during the quarter by the Quarterly Terminal Base.

(b) Any quarterly contribution not paid on or before the date on which such amount is due shall be deemed overdue. If any quarterly contribution under Section 5.1 is overdue to the Special Distribution Fund, the Tribe shall pay to the Special Distribution Fund, in addition to the overdue quarterly contribution, interest on such amount from the date the quarterly contribution was due until the date such quarterly contribution (together with interest thereon) was actually paid at the rate of 1.0% per month or the maximum rate permitted by state law, whichever is less. Entitlement to such interest shall be in addition to any other remedies the State may have.

(c) At the time each quarterly contribution is made, the Tribe shall submit to the State a report (the "Quarterly Contribution Report") certified by an authorized representative of the Tribe reflecting the Quarterly Device Base, the Net Win from all terminals in the Quarterly Device Base (broken down by Gaming Device), and the Average Device Net Win.

(d) If the State causes an audit to be made pursuant to subdivision (c), and the Average Device Net Win for any quarter as reflected on such quarter's Quarterly

Contribution Reports is found to be understated, the State will promptly notify the Tribe, and the Tribe will either accept the difference or provide a reconciliation satisfactory to the State. If the Tribe accepts the difference or does not provide a reconciliation satisfactory to the State, the Tribe must immediately pay the amount of the resulting deficiencies in the quarterly contribution plus interest on such amounts from the date they were due at the rate of 1.0% per month or the maximum rate permitted by applicable law, whichever is less.

(e) The Tribe shall not conduct Class III gaming if more than two quarterly contributions to the Special Distribution Fund are overdue.

Sec. 6.0. LICENSING.

Sec. 6.1. Gaming Ordinance and Regulations. All Gaming Activities conducted under this Gaming Compact shall, at a minimum, comply with a Gaming Ordinance duly adopted by the Tribe and approved in accordance with IGRA, and with all rules, regulations, procedures, specifications, and standards duly adopted by the Tribal Gaming Agency.

Sec. 6.2. Tribal Ownership, Management, and Control of Gaming Operation.The Gaming Operations authorized under this Gaming Compact shall be owned solely by the Tribe.

Sec. 6.3. Prohibition Regarding Minors. (a) Except as provided in subdivision (b), the Tribe shall not permit persons under the age of 18 years to be present in any room in which Class III Gaming Activities are being conducted unless the person is en-route to a non-gaming area of the Gaming Facility.

(b) If the Tribe permits the consumption of alcoholic beverages in the Gaming Facility, the Tribe shall prohibit persons under the age of 21 years from being present in any area in which Class III gaming activities are being conducted and in which alcoholic beverages may be consumed, to the extent required by the state Department of Alcoholic Beverage Control.

Sec. 6.4. Licensing Requirements and Procedures.

Sec. 6.4.1. Summary of Licensing Principles. All persons in any way connected with the Gaming Operation or Facility who are required to be licensed or to submit to a background investigation under IGRA, and any others required to be licensed under this Gaming Compact, including, but not limited to, all Gaming Employees and Gaming Resource Suppliers, and any other person having a significant influence over the Gaming Operation must be licensed by the Tribal Gaming Agency. The parties intend that the licensing process provided for in this Gaming Compact shall involve

joint cooperation between the Tribal Gaming Agency and the State Gaming Agency, as more particularly described herein.

Sec. 6.4.2. Gaming Facility. (a) The Gaming Facility authorized by this Gaming Compact shall be licensed by the Tribal Gaming Agency in conformity with the requirements of this Gaming Compact, the Tribal Gaming Ordinance, and IGRA. The license shall be reviewed and renewed, if appropriate, every two years thereafter. Verification that this requirement has been met shall be provided by the Tribe to the State Gaming Agency every two years. The Tribal Gaming Agency's certification to that effect shall be posted in a conspicuous and public place in the Gaming Facility at all times.

(b) In order to protect the health and safety of all Gaming Facility patrons, guests, and employees, all Gaming Facilities of the Tribe constructed after the effective date of this Gaming Compact, and all expansions or modifications to a Gaming Facility in operation as of the effective date of this Compact, shall meet the building and safety codes of the Tribe, which, as a condition for engaging in that construction, expansion, modification, or renovation, shall amend its existing building and safety codes if necessary, or enact such codes if there are none, so that they meet the standards of either the building and safety codes of any county within the boundaries of which the site of the Facility is located, or the Uniform Building Codes, including all uniform fire, plumbing, electrical, mechanical, and related codes then in effect provided that nothing herein shall be deemed to confer jurisdiction upon any county or the State with respect to any reference to such building and safety codes. Any such construction, expansion or modification will also comply with the federal Americans with Disabilities Act, P.L. 101-336, as amended, 42 U.S.C. § 12101 et seq.

(c) Any Gaming Facility in which gaming authorized by this Gaming Compact is conducted shall be issued a certificate of occupancy by the Tribal Gaming Agency prior to occupancy if it was not used for any Gaming Activities under IGRA prior to the effective date of this Gaming Compact, or, if it was so used, within one year thereafter. The issuance of this certificate shall be reviewed for continuing compliance every two years thereafter. Inspections by qualified building and safety experts shall be conducted under the direction of the Tribal Gaming Agency as the basis for issuing any certificate hereunder. The Tribal Gaming Agency shall determine and certify that, as to new construction or new use for gaming, the Facility meets the Tribe's building and safety code, or, as to facilities or portions of facilities that were used for the Tribe's Gaming Activities prior to this Gaming Compact, that the facility or portions thereof do not endanger the health or safety of occupants or the integrity of the

Gaming Operation. The Tribe will not offer Class III gaming in a Facility that is constructed or maintained in a manner that endangers the health or safety of occupants or the integrity of the gaming operation.

(d) The State shall designate an agent or agents to be given reasonable notice of each inspection by the Tribal Gaming Agency's experts, which state agents may accompany any such inspection. The Tribe agrees to correct any Gaming Facility condition noted in an inspection that does not meet the standards set forth in subdivisions (b) and (c). The Tribal Gaming Agency and the State's designated agent or agents shall exchange any reports of an inspection within 10 daysafter completion of the report, which reports shall also be separately and simultaneously forwarded by both agencies to the Tribal Chairperson. Upon certification by the Tribal Gaming Agency's experts that a Gaming Facility meets applicable standards, the Tribal Gaming Agency shall forward the experts' certification to the State within 10 days of issuance. If the State's agent objects to that certification, the Tribe shall make a good faith effort to address the State's concerns, but if the State does not withdraw its objection, the matter will be resolved in accordance with the dispute resolution provisions of Section 9.0.

Sec. 6.4.3. Suitability Standard Regarding Gaming Licenses.(a) In reviewing an application for a gaming license, and in addition to any standards set forth in the Tribal Gaming Ordinance, the Tribal Gaming Agency shall consider whether issuance of the license is inimical to public health, safety, or welfare, and whether issuance of the license will undermine public trust that the Tribe's Gaming Operations, or tribal government gaming generally, are free from criminal and dishonest elements and would be conducted honestly. A license may not be issued unless, based on all information and documents submitted, the Tribal Gaming Agency is satisfied that the applicant is all of the following, in addition to any other criteria in IGRA or the Tribal Gaming Ordinance:

(a) A person of good character, honesty, and integrity.

(b) A person whose prior activities, criminal record (if any), reputation, habits, and associations do not pose a threat to the public interest or to the effective regulation and control of gambling, or create or enhance the dangers of unsuitable, unfair, or illegal practices, methods, or activities in the conduct of gambling, or in the carrying on of the business and financial arrangements incidental thereto.

(c) A person who is in all other respects qualified to be licensed as provided in this Gaming Compact, IGRA, the Tribal Gaming Ordinance, and any other criteria adopted by the Tribal Gaming Agency or the Tribe. An applicant shall not be found to be

unsuitable solely on the ground that the applicant was an employee of a tribal gaming operation in California that was conducted prior to the effective date of this Compact.

Sec. 6.4.4. Gaming Employees. (a) Every Gaming Employee shall obtain, and thereafter maintain current, a valid tribal gaming license, which shall be subject to biennial renewal; provided that in accordance with Section 6.4.9, those persons may be employed on a temporary or conditional basis pending completion of the licensing process.

(b) Except as provided in subdivisions (c) and (d), the Tribe will not employ or continue to employ, any person whose application to the State Gaming Agency for a determination of suitability, or for a renewal of such a determination, has been denied or has expired without renewal.

(c) Notwithstanding subdivision (a), the Tribe may retain in its employ a person whose application for a determination of suitability, or for a renewal of such a determination, has been denied by the State Gaming Agency, if: (i) the person holds a valid and current license issued by the Tribal Gaming Agency that must be renewed at least biennially; (ii) the denial of the application by the State Gaming Agency is based solely on activities, conduct, or associations that antedate the filing of the person's initial application to the State Gaming Agency for a determination of suitability; (iii) the person is not an employee or agent of any other gaming operation; and (iv) the person has been in the continuous employ of the Tribe for at least three years prior to the effective date of this Compact.

(d) Notwithstanding subdivision (a), the Tribe may employ or retain in its employ a person whose application for a determination of suitability, or for a renewal of such a determination, has been denied by the State Gaming Agency, if the person is an enrolled member of the Tribe, as defined in this subdivision, and if (i) the person holds a valid and current license issued by the Tribal Gaming Agency that must be renewed at least biennially; (ii) the denial of the application by the State Gaming Agency is based solely on activities, conduct, or associations that antedate the filing of the person's initial application to the State Gaming Agency for a determination of suitability; and (iii) the person is not an employee or agent of any other gaming operation. For purposes of this subdivision, "enrolled member" means a person who is either (a) certified by the Tribe as having been a member of the Tribe for at least five (5) years, or (b) a holder of confirmation of membership issued by the Bureau of Indian Affairs.

(e) Nothing herein shall be construed to relieve any person of the obligation to apply for a renewal of a determination of suitability as required by Section 6.5.6.

Sec. 6.4.5. Gaming Resource Supplier. Any Gaming Resource Supplier who, directly or indirectly, provides, has provided, or is deemed likely to provide at least twenty-five thousand dollars ($25,000) in Gaming Resources in any 12month period, or who has received at least twenty-five thousand dollars ($25,000) in any consecutive 12-month period within the 24-month period immediately preceding application, shall be licensed by the Tribal Gaming Agency prior to the sale, lease, or distribution, or further sale, lease, or distribution, of any such Gaming Resources to or in connection with the Tribe's Operation or Facility. These licenses shall be reviewed at least every two years for continuing compliance. In connection with such a review, the Tribal Gaming Agency shall require the Supplier to update all information provided in the previous application. For purposes of Section 6.5.2, such a review shall be deemed to constitute an application for renewal. The Tribe shall not enter into, or continue to make payments pursuant to, any contract or agreement for the provision of Gaming Resources with any person whose application to the State Gaming Agency for a determination of suitability has been denied or has expired without renewal. Any agreement between the Tribe and a Gaming Resource Supplier shall be deemed to include a provision for its termination without further liability on the part of the Tribe, except for the bona fide repayment of all outstanding sums (exclusive of interest) owed as of, or payment for services or materials received up to, the date of termination, upon revocation or non-renewal of the Supplier's license by the Tribal Gaming Agency based on a determination of unsuitability by the State Gaming Agency.

Sec. 6.4.6. Financial Sources. Any person extending financing, directly or indirectly, to the Tribe's Gaming Facility or Gaming Operation shall be licensed by the Tribal Gaming Agency prior to extending that financing, provided that any person who is extending financing at the time of the execution of this Compact shall be licensed by the Tribal Gaming Agency within ninety (90) days of such execution. These licenses shall be reviewed at least every two years for continuing compliance. In connection with such a review, the Tribal Gaming Agency shall require the Financial Source to update all information provided in the previous application. For purposes of Section 6.5.2, such a review shall be deemed to constitute an application for renewal. Any agreement between the Tribe and a Financial Source shall be deemed to include a provision for its termination without further liability on the part of the Tribe, except for the bona fide repayment of all outstanding sums (exclusive of interest) owed as of the date of termination, upon revocation or non-renewal of the Financial Source's license by the Tribal Gaming Agency based on a determination of

unsuitability by the State Gaming Agency. The Tribe shall not enter into, or continue to make payments pursuant to, any contract or agreement for the provision of financing with any person whose application to the State Gaming Agency for a determination of suitability has been denied or has expired without renewal. A Gaming Resource Supplier who provides financing exclusively in connection with the sale or lease of Gaming Resources obtained from that Supplier may be licensed solely in accordance with licensing procedures applicable, if at all, to Gaming Resource Suppliers. The Tribal Gaming Agency may, at its discretion, exclude from the licensing requirements of this section, financing provided by a federally regulated or state-regulated bank, savings and loan, or other federally- or state-regulated lending institution; or any agency of the federal, state, or local government; or any investor who, alone or in conjunction with others, holds less than 10% of any outstanding indebtedness evidenced by bonds issued by the Tribe.

Sec. 6.4.7. Processing Tribal Gaming License Applications. Each applicant for a tribal gaming license shall submit the completed application along with the required information and an application fee, if required, to the Tribal Gaming Agency in accordance with the rules and regulations of that agency. At a minimum, the Tribal Gaming Agency shall require submission and consideration of all information required under IGRA, including Section 556.4 of Title 25 of the Code of Federal Regulations, for licensing primary management officials and key employees.For applicants who are business entities, these licensing provisions shall apply to the entity as well as: (i each of its officers and directors; (ii) each of its principal management employees, including any chief executive officer, chief financial officer, chief operating officer, and general manager; (iii) each of its owners or partners, if an unincorporated business; (iv) each of its shareholders who owns more than 10 percent of the shares of the corporation, if a corporation; and (v) each person or entity (other than a financial institution that the Tribal Gaming Agency has determined does not require a license under the preceding section) that, alone or in combination with others, has provided financing in connection with any gaming authorized under this Gaming Compact, if that person or entity provided more than 10 percent of (a) the start-up capital, (b) the operating capital over a 12-month period, or (c) a combination thereof. For purposes of this Section, where there is any commonality of the characteristics identified in clauses (i) to (v), inclusive, between any two or more entities, those entities may be deemed to be a single entity. Nothing herein precludes the Tribe or Tribal Gaming Agency from requiring more stringent licensing requirements.

Sec. 6.4.8. Background Investigations of Applicants. The Tribal Gaming Agency shall conduct or cause to be conducted all necessary background investigations reasonably required to determine that the applicant is qualified for a gaming license under the standards set forth in Section 6.4.3, and to fulfill all requirements for licensing under IGRA, the Tribal Gaming Ordinance, and this Gaming Compact. The Tribal Gaming Agency shall not issue other than a temporary license until a determination is made that those qualifications have been met. In lieu of completing its own background investigation, and to the extent that doing so does not conflict with or violate IGRA or the Tribal Gaming Ordinance, the Tribal Gaming Agency may contract with the State Gaming Agency for the conduct of background investigations, may rely on a state certification of non-objection previously issued under a gaming compact involving another tribe, or may rely on a State gaming license previously issued to the applicant, to fulfill some or all of the Tribal Gaming Agency's background investigation obligation. An applicant for a tribal gaming license shall be required to provide releases to the State Gaming Agency to make available to the Tribal Gaming Agency background information regarding the applicant.The State Gaming Agency shall cooperate in furnishing to the Tribal Gaming Agency that information, unless doing so would violate any agreement the State Gaming Agency has with a source of the information other than the applicant, or would impair or impede a criminal investigation, or unless the Tribal Gaming Agency cannot provide sufficient safeguards to assure the State Gaming Agency that the information will remain confidential or that provision of the information would violate state or federal law. If the Tribe adopts an ordinance confirming that Article 6 (commencing with section 11140) of Chapter 1 of Title 1 of Part 4 of the California Penal Code is applicable to members, investigators, and staff of the Tribal Gaming Agency, and those members, investigators, and staff thereafter comply with that ordinance, then, for purposes of carrying out its obligations under this Section, the Tribal Gaming Agency shall be considered to be an entity entitled to receive state summary criminal history information within the meaning of subdivision (b)(12) of section 11105 of the California Penal Code. The California Department of Justice shall provide services to the Tribal Gaming Agency through the California Law Enforcement Telecommunications System (CLETS), subject to a determination by the CLETS advisory committee that the Tribal Gaming Agency is qualified for receipt of such services, and on such terms and conditions as are deemed reasonable by that advisory committee.

Sec. 6.4.9. Temporary Licensing of Gaming Employees. Notwithstanding anything herein to the contrary, if the applicant has completed a license application in a manner satisfactory to the Tribal Gaming Agency, and that agency has conducted a preliminary background investigation, and the investigation or other information held by that agency does not indicate that the applicant has a criminal history or other information in his or her background that would either automatically disqualify the applicant from obtaining a license or cause a reasonable person to investigate further before issuing a license, or is otherwise unsuitable for licensing, the Tribal Gaming Agency may issue a temporary license and may impose such specific conditions thereon pending completion of the applicant's background investigation, as the Tribal Gaming Agency in its sole discretion shall determine. Special fees may be required by the Tribal Gaming Agency to issue or maintain a temporary license. A temporary license shall remain in effect until suspended or revoked, or a final determination is made on the application. At any time after issuance of a temporary license, the Tribal Gaming Agency may suspend or revoke it in accordance with Sections 6.5.1 or 6.5.5, and the State Gaming Agency may request suspension or revocation in accordance with subdivision (d) of Section 6.5.6. Nothing herein shall be construed to relieve the Tribe of any obligation under Part 558 of Title 25 of the Code of Federal Regulations.

Sec. 6.5. Gaming License Issuance. Upon completion of the necessary background investigation, the Tribal Gaming Agency may issue a license on a conditional or unconditional basis. Nothing herein shall create a property or other right of an applicant in an opportunity to be licensed, or in a license itself, both of which shall be considered to be privileges granted to the applicant in the sole discretion of the Tribal Gaming Agency.

Sec. 6.5.1. Denial, Suspension, or Revocation of Licenses. (a) Any application for a gaming license may be denied, and any license issued may be revoked, if the Tribal Gaming Agency determines that the application is incomplete or deficient, or if the applicant is determined to be unsuitable or otherwise unqualified for a gaming license. Pending consideration of revocation, the Tribal Gaming Agency may suspend a license in accordance with Section 6.5.5. All rights to notice and hearing shall be governed by tribal law, as to which the applicant will be notified in writing along with notice of an intent to suspend or revoke the license.

(b) (i) Except as provided in paragraph (ii) below, upon receipt of notice that the State Gaming Agency has determined that a person would be unsuitable for licensure in a gambling establishment subject to the jurisdiction of the State Gaming Agency, the Tribal Gaming Agency shall promptly revoke any license that has theretofore been

issued to the person; provided that the Tribal Gaming Agency may, in its discretion, re-issue a license to the person following entry of a final judgment reversing the determination of the State Gaming Agency in a proceeding in state court conducted pursuant to section 1085 of the California Civil Code.

(ii) Notwithstanding a determination of unsuitability by the State Gaming Agency, the Tribal Gaming Agency may, in its discretion, decline to revoke a tribal license issued to a person employed by the Tribe pursuant to Section 6.4.4(c) or Section 6.4.4(d).

Sec. 6.5.2. Renewal of Licenses; Extensions; Further Investigation. The term of a tribal gaming license shall not exceed two years, and application for renewal of a license must be made prior to its expiration. Applicants for renewal of a license shall provide updated material as requested, on the appropriate renewal forms, but, at the discretion of the Tribal Gaming Agency, may not be required to resubmit historical data previously submitted or that is otherwise available to the Tribal Gaming Agency. At the discretion of the Tribal Gaming Agency, an additional background investigation may be required at any time if the Tribal Gaming Agency determines the need for further information concerning the applicant's continuing suitability or eligibility for a license. Prior to renewing a license, the Tribal Gaming Agency shall deliver to the State Gaming Agency copies of all information and documents received in connection with the application for renewal.

Sec. 6.5.3. Identification Cards. The Tribal Gaming Agency shall require that all persons who are required to be licensed wear, in plain view at all times while in the Gaming Facility, identification badges issued by the Tribal Gaming Agency. Identification badges must display information including, but not limited to, a photograph and an identification number that is adequate to enable agents of the Tribal Gaming Agency to readily identify the person and determine the validity and date of expiration of his or her license.

Sec. 6.5.4. Fees for Tribal License. The fees for all tribal licenses shall be set by the Tribal Gaming Agency.

Sec. 6.5.5. Suspension of Tribal License. The Tribal Gaming Agency may summarily suspend the license of any employee if the Tribal Gaming Agency determines that the continued licensing of the person or entity could constitute a threat to the public health or safety or may violate the Tribal Gaming Agency's licensing or other standards. Any right to notice or hearing in regard thereto shall be governed by Tribal law.

Sec. 6.5.6. State Certification Process. (a) Upon receipt of a completed license application and a determination by the Tribal Gaming Agency that it intends to issue the earlier of a temporary or permanent license, the Tribal Gaming Agency shall transmit to the State Gaming Agency a notice of intent to license the applicant, together with all of the following: (i) a copy of all tribal license application materials and information received by the Tribal Gaming Agency from the applicant; (ii) an original set of fingerprint cards; (iii) a current photograph; and (iv) except to the extent waived by the State Gaming Agency, such releases of information, waivers, and other completed and executed forms as have been obtained by the Tribal Gaming Agency. Except for an applicant for licensing as a non-key Gaming Employee, as defined by agreement between the Tribal Gaming Agency and the State Gaming Agency, the Tribal Gaming Agency shall require the applicant also to file an application with the State Gaming Agency, prior to issuance of a temporary or permanent tribal gaming license, for a determination of suitability for licensure under the California Gambling Control Act. Investigation and disposition of that application shall be governed entirely by state law, and the State Gaming Agency shall determine whether the applicant would be found suitable for licensure in a gambling establishment subject to that Agency's jurisdiction. Additional information may be required by the State Gaming Agency to assist it in its background investigation, provided that such State Gaming Agency requirement shall be no greater than that which may be required of applicants for a State gaming license in connection withnontribal gaming activities and at a similar level of participation or employment. A determination of suitability is valid for the term of the tribal license held by the applicant, and the Tribal Gaming Agency shall require a licensee to apply for renewal of a determination of suitability at such time as the licensee applies for renewal of a tribal gaming license.The State Gaming Agency and the Tribal Gaming Agency (together with tribal gaming agencies under other gaming compacts) shall cooperate in developing standard licensing forms for tribal gaming license applicants, on a statewide basis, that reduce or eliminate duplicative or excessive paperwork, which forms and procedures shall take into account the Tribe's requirements under IGRA and the expense thereof.

(b) Background Investigations of Applicants.Upon receipt of completed license application information from the Tribal Gaming Agency, the State Gaming Agency may conduct a background investigation pursuant to state law to determine whether the applicant would be suitable to be licensed for association with a gambling establishment subject to the jurisdiction of the State Gaming Agency. If further investigation is required to supplement the investigation conducted by the Tribal

Gaming Agency, the applicant will be required to pay the statutory application fee charged by the State Gaming Agency pursuant to California Business and Professions Code section 19941(a), but any deposit requested by the State Gaming Agency pursuant to section 19855 of that Code shall take into account reports of the background investigation already conducted by the Tribal Gaming Agency and the NIGC, if any. Failure to pay the application fee or deposit may be grounds for denial of the application by the State Gaming Agency. The State Gaming Agency and Tribal Gaming Agency shall cooperate in sharing as much background information as possible, both to maximize investigative efficiency and thoroughness, and to minimize investigative costs. Upon completion of the necessary background investigation or other verification of suitability, the State Gaming Agency shall issue a notice to the Tribal Gaming Agency certifying that the State has determined that the applicant would be suitable, or that the applicant would be unsuitable, for licensure in a gambling establishment subject to the jurisdiction of the State Gaming Agency and, if unsuitable, stating the reasons therefor.

(c) The Tribe shall monthly provide the State Gaming Agency with the name, badge identification number, and job descriptions of all non-key Gaming Employees.

(d) Prior to denying an application for a determination of suitability, the State Gaming Agency shall notify the Tribal Gaming Agency and afford the Tribe an opportunity to be heard. If the State Gaming Agency denies an application for a determination of suitability, that Agency shall provide the applicant with written notice of all appeal rights available under state law.

Sec. 7.0. COMPLIANCE ENFORCEMENT.

Sec. 7.1. On-Site Regulation. It is the responsibility of the Tribal Gaming Agency to conduct on-site gaming regulation and control in order to enforce the terms of this Gaming Compact, IGRA, and the Tribal Gaming Ordinance with respect to Gaming Operation and Facility compliance, and to protect the integrity of the Gaming Activities, the reputation of the Tribe and the Gaming Operation for honesty and fairness, and the confidence of patrons that tribal government gaming in California meets the highest standards of regulation and internal controls. To meet those responsibilities, the Tribal Gaming Agency shall adopt and enforce regulations, procedures, and practices as set forth herein.

Sec. 7.2. Investigation and Sanctions. The Tribal Gaming Agency shall investigate any reported violation of this Gaming Compact and shall require the Gaming Operation to correct the violation upon such terms and conditions as the Tribal Gaming Agency determines are necessary. The Tribal Gaming Agency shall be

empowered by the Tribal Gaming Ordinance to impose fines or other sanctions within the jurisdiction of the Tribe against gaming licensees or other persons who interfere with or violate the Tribe's gaming regulatory requirements and obligations under IGRA, the Tribal Gaming Ordinance, or this Gaming Compact. The Tribal Gaming Agency shall report significant or continued violations of this Compact or failures to comply with its orders to the State Gaming Agency.

Sec. 7.3. Assistance by State Gaming Agency. The Tribe may request the assistance of the State Gaming Agency whenever it reasonably appears that such assistance may be necessary to carry out the purposes described in Section 7.1, or otherwise to protect public health, safety, or welfare. If requested by the Tribe or Tribal Gaming Agency, the State Gaming Agency shall provide requested services to ensure proper compliance with this Gaming Compact. The State shall be reimbursed for its actual and reasonable costs of that assistance, if the assistance required expenditure of extraordinary costs.

Sec. 7.4. Access to Premises by State Gaming Agency; Notification; Inspections. Notwithstanding that the Tribe has the primary responsibility to administer and enforce the regulatory requirements of this Compact, the State Gaming Agency shall have the right to inspect the Tribe's Gaming Facility with respect to Class III Gaming Activities only, and all Gaming Operation or Facility records relating thereto, subject to the following conditions:

Sec. 7.4.1. Inspection of public areas of a Gaming Facility may be made at any time without prior notice during normal Gaming Facility business hours.

Sec. 7.4.2. Inspection of areas of a Gaming Facility not normally accessible to the public may be made at any time during normal Gaming Facility business hours, immediately after the State Gaming Agency's authorized inspector notifies the Tribal Gaming Agency of his or her presence on the premises, presents proper identification, and requests access to the non-public areas of the Gaming Facility. The Tribal Gaming Agency, in its sole discretion, may require a member of the Tribal Gaming Agency to accompany the State Gaming Agency inspector at all times that the State Gaming Agency inspector is in a non-public area of the Gaming Facility. If the Tribal Gaming Agency imposes such a requirement, it shall require such member to be available at all times for those purposes and shall ensure that the member has the ability to gain immediate access to all non-public areas of the Gaming Facility. Nothing in this Compact shall be construed to limit the State Gaming Agency to one inspector during inspections.

Sec. 7.4.3. (a) Inspection and copying of Gaming Operation papers, books, and records may occur at any time, immediately after notice to the Tribal Gaming Agency, during the normal hours of the Gaming Facility's business office, provided that the inspection and copying of those papers, books or records shall not interfere with the normal functioning of the Gaming Operation or Facility.Notwithstanding any other provision of California law, all information and records that the State Gaming Agency obtains, inspects, or copies pursuant to this Gaming Compact shall be, and remain, the property solely of the Tribe; provided that such records and copies may be retained by the State Gaming Agency as reasonably necessary for completion of any investigation of the Tribe's compliance with this Compact.

(b)(i) The State Gaming Agency will exercise utmost care in the preservation of the confidentiality of any and all information and documents received from the Tribe, and will apply the highest standards of confidentiality expected under state law to preserve such information and documents from disclosure. The Tribe mayavail itself of any and all remedies under state law for improper disclosure of information or documents. To the extent reasonably feasible, the State Gaming Agency will consult with representatives of the Tribe prior to disclosure of any documents received from the Tribe, or any documents compiled from such documents or from information received from the Tribe, including any disclosure compelled by judicial process, and, in the case of any disclosure compelled by judicial process, will endeavor to give the Tribe immediate notice of the order compelling disclosure and a reasonable opportunity to interpose an objection thereto with the court.

(ii) The Tribal Gaming Agency and the State Gaming Agency shall confer and agree upon protocols for release to other law enforcement agencies of information obtained during the course of background investigations.

(c) Records received by the State Gaming Agency from the Tribe in compliance with this Compact, or information compiled by the State Gaming Agency from those records, shall be exempt from disclosure under the California Public Records Act.

Sec. 7.4.4. Notwithstanding any other provision of this Compact, the State Gaming Agency shall not be denied access to papers, books, records, equipment, or places where such access is reasonably necessary to ensure compliance with this Compact.

Sec. 7.4.5. (a) Subject to the provisions of subdivision (b), the Tribal Gaming Agency shall not permit any Gaming Device to be transported to or from the Tribe's land except in accordance with procedures established by agreement between the State Gaming Agency and the Tribal Gaming Agency and upon at least 10 days' notice to the Sheriff's Department for the county in which the land is located.

(b) Transportation of a Gaming Device from the Gaming Facility within California is permissible only if: (i) The final destination of the device is a gaming facility of any tribe in California that has a compact with the State; (ii) The final destination of the device is any other state in which possession of the device or devices is made lawful by state law or by tribal-state compact; (iii) The final destination of the device is another country, or any state or province of another country, wherein possession of the device is lawful; or (iv) The final destination is a location within California for testing, repair, maintenance, or storage by a person or entity that has been licensed by the Tribal Gaming Agency and has been found suitable for licensure by the State Gaming Agency.

(c) Gaming Devices transported off the Tribe's land in violation of this Section 7.4.5 or in violation of any permit issued pursuant thereto is subject to summary seizure by California peace officers.

Sec. 8.0. RULES AND REGULATIONS FOR THE OPERATION AND MANAGEMENT OF THE TRIBAL GAMING OPERATION.

Sec. 8.1. Adoption of Regulations for Operation and Management; Minimum Standards. In order to meet the goals set forth in this Gaming Compact and required of the Tribe by law, the Tribal Gaming Agency shall be vested with the authority to promulgate, and shall promulgate, at a minimum, rules and regulations or specifications governing the following subjects, and to ensure their enforcement in an effective manner:

Sec. 8.1.1. The enforcement of all relevant laws and rules with respect to the Gaming Operation and Facility, and the power to conduct investigations and hearings with respect thereto, and to any other subject within its jurisdiction.

Sec. 8.1.2. Ensuring the physical safety of Gaming Operation patrons and employees, and any other person while in the Gaming Facility. Nothing herein shall be construed to make applicable to the Tribe any state laws, regulations, or standards governing the use of tobacco.

Sec. 8.1.3. The physical safeguarding of assets transported to, within, and from the Gaming Facility.

Sec. 8.1.4. The prevention of illegal activity from occurring within the Gaming Facility or with regard to the Gaming Operation, including, but not limited to, the maintenance of employee procedures and a surveillance system as provided below.

Sec. 8.1.5. The recording of any and all occurrences within the Gaming Facility that deviate from normal operating policies and procedures (hereafter "incidents"). The procedure for recording incidents shall: (1) specify that security personnel record

all incidents, regardless of an employee's determination that the incident may be immaterial (all incidents shall be identified in writing); (2) require the assignment of a sequential number to each report; (3) provide for permanent reporting in indelible ink in a bound notebook from which pages cannot be removed and in which entries are made on each side of each page; and (4) require that each report include, at a minimum, all of the following:

(a) The record number.

(b) The date.

(c) The time.

(d) The location of the incident.

(e) A detailed description of the incident.

(f) The persons involved in the incident.

(g) The security department employee assigned to the incident.

Sec. 8.1.6. The establishment of employee procedures designed to permit detection of any irregularities, theft, cheating, fraud, or the like, consistent with industry practice.

Sec. 8.1.7. Maintenance of a list of persons barred from the Gaming Facility who, because of their past behavior, criminal history, or association with persons or organizations, pose a threat to the integrity of the Gaming Activities of the Tribe or to the integrity of regulated gaming within the State.

Sec. 8.1.8. The conduct of an audit of the Gaming Operation, not less than annually, by an independent certified public accountant, in accordance with the auditing and accounting standards for audits of casinos of the American Institute of Certified Public Accountants.

Sec. 8.1.9. Submission to, and prior approval, from the Tribal Gaming Agency of the rules and regulations of each Class III game to be operated by the Tribe, and of any changes in those rules and regulations. No Class III game may be played that has not received Tribal Gaming Agency approval.

Sec. 8.1.10. Addressing all of the following:

(a) Maintenance of a copy of the rules, regulations, and procedures for each game as played, including, but not limited to, the method of play and the odds and method of determining amounts paid to winners;

(b) Specifications and standards to ensure that information regarding the method of play, odds, and payoff determinations shall be visibly displayed or available to patrons in written form in the Gaming Facility;

(c) Specifications ensuring that betting limits applicable to any gaming station shall be displayed at that gaming station;

(d) Procedures ensuring that in the event of a patron dispute over the application of any gaming rule or regulation, the matter shall be handled in accordance with, industry practice and principles of fairness, pursuant to the Tribal Gaming Ordinance and any rules and regulations promulgated by the Tribal Gaming Agency.

Sec. 8.1.11. Maintenance of a closed-circuit television surveillance system consistent with industry standards for gaming facilities of the type and scale operated by the Tribe, which system shall be approved by, and may not be modified without the approval of, the Tribal Gaming Agency. The Tribal Gaming Agency shall have current copies of the Gaming Facility floor plan and closed-circuit television system at all times, and any modifications thereof first shall be approved by the Tribal Gaming Agency.

Sec. 8.1.12. Maintenance of a cashier's cage in accordance with industry standards for such facilities.

Sec. 8.1.13. Specification of minimum staff and supervisory requirements for each Gaming Activity to be conducted.

Sec. 8.1.14. Technical standards and specifications for the operation of Gaming Devices and other games authorized herein to be conducted by the Tribe, which technical specifications may be no less stringent than those approved by a recognized gaming testing laboratory in the gaming industry.

Sec. 8.2. State Civil and Criminal Jurisdiction. Nothing in this Gaming Compact affects the civil or criminal jurisdiction of the State under Public Law 280 (18 U.S.C. Sec. 1162; 28 U.S.C. Sec. 1360) or IGRA, to the extent applicable. In addition, criminal jurisdiction to enforce state gambling laws is transferred to the State pursuant to 18 U.S.C. § 1166(d), provided that no Gaming Activity conducted by the Tribe pursuant to this Gaming Compact may be deemed to be a civil or criminal violation of any law of the State.

Sec. 8.3. (a) The Tribe shall take all reasonable steps to ensure that members of the Tribal Gaming Agency are free from corruption, undue influence, compromise, and conflicting interests in the conduct of their duties under this Compact; shall adopt a conflict-of-interest code to that end; and shall ensure the prompt removal of any member of the Tribal Gaming Agency who is found to have acted in a corrupt or compromised manner.

(b) The Tribe shall conduct a background investigation on a prospective member of the Tribal Gaming Agency, who shall meet the background requirements of a

management contractor under IGRA; provided that, if such official is elected through a tribal election process, that official may not participate in any Tribal Gaming Agency matters under this Compact unless a background investigation has been concluded and the official has been found to be suitable. If requested by the tribal government or the Tribal Gaming Agency, the State Gaming Agency may assist in the conduct of such a background investigation and may assist in the investigation of any possible corruption or compromise of a member of the agency.

Sec. 8.4. In order to foster statewide uniformity of regulation of Class III gaming operations throughout the state, rules, regulations, standards, specifications, and procedures of the Tribal Gaming Agency in respect to any matter encompassed by Sections 6.0, 7.0, or 8.0 shall be consistent with regulations adopted by the State Gaming Agency in accordance with Section 8.4.1. Chapter 3.5 (commencing with section 11340) of Part 1 of Division 3 of Title 2 of the California Government Code does not apply to regulations adopted by the State Gaming Agency in respect to tribal gaming operations under this Section.

Sec. 8.4.1. (a) Except as provided in subdivision (d), no State Gaming Agency regulation shall be effective with respect to the Tribe's Gaming Operation unless it has first been approved by the Association and the Tribe has had an opportunity to review and comment on the proposed regulation.

(b) Every State Gaming Agency regulation that is intended to apply to the Tribe (other than a regulation proposed or previously approved by the Association) shall be submitted to the Association for consideration prior to submission of the regulation to the Tribe for comment as provided in subdivision (c). A regulation that is disapproved by the Association shall not be submitted to the Tribe for comment unless it is re-adopted by the State Gaming Agency as a proposed regulation, in its original or amended form, with a detailed, written response to the Association's objections.

(c) Except as provided in subdivision (d), no regulation of the State Gaming Agency shall be adopted as a final regulation in respect to the Tribe's Gaming Operation before the expiration of 30 days after submission of the proposed regulation to the Tribe for comment as a proposed regulation, and after consideration of the Tribe's comments, if any.

(d) In exigent circumstances (e.g., imminent threat to public health and safety), the State Gaming Agency may adopt a regulation that becomes effective immediately. Any such regulation shall be accompanied by a detailed, written description of the exigent circumstances, and shall be submitted immediately to the Association for consideration. If the regulation is disapproved by the Association, it shall cease to be

effective, but may be re-adopted by the State Gaming Agency as a proposed regulation, in its original or amended form, with a detailed, written response to the Association's objections, and thereafter submitted to the Tribe for comment as provided in subdivision (c).

(e) The Tribe may object to a State Gaming Agency regulation on the ground that it is unnecessary, unduly burdensome, or unfairly discriminatory, and may seek repeal or amendment of the regulation through the dispute resolution process of Section 9.0.

Sec. 9.0. DISPUTE RESOLUTION PROVISIONS.

Sec. 9.1. Voluntary Resolution; Reference to Other Means of Resolution. In recognition of the government-to-government relationship of the Tribe and the State, the parties shall make their best efforts to resolve disputes that occur under this Gaming Compact by good faith negotiations whenever possible.Therefore, without prejudice to the right of either party to seek injunctive relief against the other when circumstances are deemed to require immediate relief, the parties hereby establish a threshold requirement that disputes between the Tribe and the State first be subjected to a process of meeting and conferring in good faith in order to foster a spirit of cooperation and efficiency in the administration and monitoring of performance and compliance by each other with the terms, provisions, and conditions of this Gaming Compact, as follows:

(a) Either party shall give the other, as soon as possible after the event giving rise to the concern, a written notice setting forth, with specificity, the issues to be resolved.

(b) The parties shall meet and confer in a good faith attempt to resolve the dispute through negotiation not later than 10 days after receipt of the notice, unless both parties agree in writing to an extension of time.

(c) If the dispute is not resolved to the satisfaction of the parties within 30 calendar days after the first meeting, then either party may seek to have the dispute resolved by an arbitrator in accordance with this section, but neither party shall be required to agree to submit to arbitration.

(d) Disagreements that are not otherwise resolved by arbitration or other mutually acceptable means as provided in Section 9.3 may be resolved in theUnited States District Court where the Tribe's Gaming Facility is located, or is to be located, and the Ninth Circuit Court of Appeals (or, if those federal courts lack jurisdiction, in any state court of competent jurisdiction and its related courts of appeal). The disputes to be submitted to court action include, but are not limited to, claims of breach or violation of this Compact, or failure to negotiate in good faith as required by the terms of this Compact. In no event may the Tribe be precluded from pursuing any arbitration or

judicial remedy against the State on the grounds that the Tribe has failed to exhaust its state administrative remedies. The parties agree that, except in the case of imminent threat to the public health or safety, reasonable efforts will be made to explore alternative dispute resolution avenues prior to resort to judicial process.

Sec. 9.2. Arbitration Rules. Arbitration shall be conducted in accordance with the policies and procedures of the Commercial Arbitration Rules of the American Arbitration Association, and shall be held on the Tribe's land or, if unreasonably inconvenient under the circumstances, at such other location as the parties may agree. Each side shall bear its own costs, attorneys' fees, and one-half the costs and expenses of the American Arbitration Association and the arbitrator, unless the arbitrator rules otherwise. Only one neutral arbitrator may be named, unless the Tribe or the State objects, in which case a panel of three arbitrators (one ofwhom is selected by each party) will be named. The provisions of Section 1283.05 of the California Code of Civil Procedure shall apply; provided that no discovery authorized by that section may be conducted without leave of the arbitrator. The decision of the arbitrator shall be in writing, give reasons for the decision, and shall be binding. Judgment on the award may be entered in any federal or state court having jurisdiction thereof.

Sec. 9.3. No Waiver or Preclusion of Other Means of Dispute Resolution. This Section 9.0 may not be construed to waive, limit, or restrict any remedy that is otherwise available to either party, nor may this Section be construed to preclude, limit, or restrict the ability of the parties to pursue, by mutual agreement, any other method of dispute resolution, including, but not limited to, mediation or utilization of a technical advisor to the Tribal and State Gaming Agencies; provided that neither party is under any obligation to agree to such alternative method of dispute resolution.

Sec. 9.4. Limited Waiver of Sovereign Immunity. (a) In the event that a dispute is to be resolved in federal court or a state court of competent jurisdiction as provided in this Section 9.0, the State and the Tribe expressly consent to be sued therein and waive any immunity therefrom that they may have provided that:

(1) The dispute is limited solely to issues arising under this Gaming Compact;

(2) Neither side makes any claim for monetary damages (that is, only injunctive, specific performance, including enforcement of a provision of this Compact requiring payment of money to one or another of the parties, or declaratory relief is sought); and

(3) No person or entity other than the Tribe and the State is party to the action, unless failure to join a third party would deprive the court of jurisdiction; provided that nothing herein shall be construed to constitute a waiver of the sovereign immunity of either the Tribe or the State in respect to any such third party.

(b) In the event of intervention by any additional party into any such action without the consent of the Tribe and the State, the waivers of either the Tribe or the State provided for herein may be revoked, unlessjoinder is required to preserve the court's jurisdiction; provided that nothing herein shall be construed to constitute a waiver of the sovereign immunity of either the Tribe or the State in respect to any such third party.

(c) The waivers and consents provided for under this Section 9.0 shall extend to civil actions authorized by this Compact, including, but not limited to, actions to compel arbitration, any arbitration proceeding herein, any action to confirm or enforce any judgment or arbitration award as provided herein, and any appellate proceedings emanating from a matter in which an immunity waiver has been granted. Except as stated herein or elsewhere in this Compact, no other waivers or consents to be sued, either express or implied, are granted by either party.

Sec. 10.0. PUBLIC AND WORKPLACE HEALTH, SAFETY, AND LIABILITY.

Sec. 10.1. The Tribe will not conduct Class III gaming in a manner that endangers the public health, safety, or welfare; provided that nothing herein shall be construed to make applicable to the Tribe any state laws or regulations governing the use of tobacco.

Sec. 10.2. Compliance. For the purposes of this Gaming Compact, the Tribal Gaming Operation shall:

(a) Adopt and comply with standards no less stringent than state public health standards for food and beverage handling. The Gaming Operation will allow inspection of food and beverage services by state or county health inspectors, during normal hours of operation, to assess compliance with these standards, unless inspections are routinely made by an agency of the United States government to ensure compliance with equivalent standards of the United States Public Health Service. Nothing herein shall be construed as submission of the Tribe to the jurisdiction of those state or county health inspectors, but any alleged violations of the standards shall be treated as alleged violations of this Compact.

(b) Adopt and comply with standards no less stringent than federal water quality and safe drinking water standards applicable in California; the Gaming Operation will allow for inspection and testing of water quality by state or county health inspectors, as applicable, during normal hours of operation, to assess compliance with these standards, unless inspections and testing are made by an agency of the United States pursuant to, or by the Tribe under express authorization of, federal law, to ensure compliance with federal water quality and safe drinking water standards. Nothing

herein shall be construed as submission of the Tribe to the jurisdiction of those state or county health inspectors, but any alleged violations of the standards shall be treated as alleged violations of this Compact.

(c) Comply with the building and safety standards set forth in Section 6.4.

(d) Carry no less than five million dollars ($5,000,000) in public liability insurance for patron claims, and that the Tribe provide reasonable assurance that those claims will be promptly and fairly adjudicated, and that legitimate claims will be paid; provided that nothing herein requires the Tribe to agree to liability for punitive damages or attorneys' fees. On or before the effective date of this Compact or not less than 30 days prior to the commencement of Gaming Activities under this Compact, whichever is later, the Tribe shall adopt and make available to patrons a tort liability ordinance setting forth the terms and conditions, if any, under which the Tribe waives immunity to suit for money damages resulting from intentional or negligent injuries to person or property at the Gaming Facility or in connection with the Tribe's Gaming Operation, including procedures for processing any claims for such money damages; provided that nothing in this Section shall require the Tribe to waive its immunity to suit except to the extent of the policy limits set out above.

(e) Adopt and comply with standards no less stringent than federal workplace and occupational health and safety standards; the Gaming Operation will allow for inspection of Gaming Facility workplaces by state inspectors, during normal hours of operation, to assess compliance with these standards, unless inspections are regularly made by an agency of the United States government to ensure compliance with federal workplace and occupational health and safety standards. Nothing herein shall be construed as submission of the Tribe to the jurisdiction of those state inspectors, but any alleged violations of the standards shall be treated as alleged violations of this Compact.

(f) Comply with tribal codes and other applicable federal law regarding public health and safety.

(g) Adopt and comply with standards no less stringent than federal laws and state laws forbidding employers generally from discriminating in the employment of persons to work for the Gaming Operation or in the Gaming Facility on the basis of race, color, religion, national origin, gender, sexual orientation, age, or disability; provided that nothing herein shall preclude the tribe from giving a preference in employment to Indians, pursuant to a duly adopted tribal ordinance.

(h) Adopt and comply with standards that are no less stringent than state laws prohibiting a gaming enterprise from cashing any check drawn against a federal, state,

county, or city fund, including but not limited to, Social Security, unemployment insurance, disability payments, or public assistance payments.

(i) Adopt and comply with standards that are no less stringent than state laws, if any, prohibiting a gaming enterprise from providing, allowing, contracting to provide, or arranging to provide alcoholic beverages, or food or lodging for no charge or at reduced prices at a gambling establishment or lodging facility as an incentive or enticement.

(j) Adopt and comply with standards that are no less stringent than state laws, if any, prohibiting extensions of credit.

(k) Provisions of the Bank Secrecy Act, P.L. 91-508, October 26, 1970, 31 U.S.C. Sec. 5311-5314, as amended, and all reporting requirements of the Internal Revenue Service, insofar as such provisions and reporting requirements are applicable to casinos.

Sec. 10.2.1. The Tribe shall adopt and, not later than 30 days after the effective date of this Compact, shall make available on request the standards described in subdivisions (a)-(c) and (e)-(k) of Section 10.2 to which the Gaming Operation is held. In the absence of a promulgated tribal standard in respect to a matter identified in those subdivisions, or the express adoption of an applicable federal statute or regulation in lieu of a tribal standard in respect to any such matter, the applicable state statute or regulation shall be deemed to have been adopted by the Tribe as the applicable standard.

Sec. 10.3 Participation in state statutory programs related to employment. (a) In lieu of permitting the Gaming Operation to participate in the state statutory workers' compensation system, the Tribe may create and maintain a system that provides redress for employee work-related injuries through requiring insurance or self-insurance, which system must include a scope of coverage, availability of an independent medical examination, right to notice, hearings before an independent tribunal, a means of enforcement against the employer, and benefits comparable to those mandated for comparable employees under state law. Not later than the effective date of this Compact, or 60 days prior to the commencement of Gaming Activities under this Compact, the Tribe will advise the State of its election to participate in the statutory workers' compensation system or, alternatively, will forward to the State all relevant ordinances that have been adopted and all other documents establishing the system and demonstrating that the system is fully operational and compliant with the comparability standard set forth above. The parties

agree that independent contractors doing business with the Tribe must comply with all state workers' compensation laws and obligations.

(b) The Tribe agrees that its Gaming Operation will participate in the State's program for providing unemployment compensation benefits and unemployment compensation disability benefits with respect to employees employed at the Gaming Facility, including compliance with the provisions of the California Unemployment Insurance Code, and the Tribe consents to the jurisdiction of the state agencies charged with the enforcement of that Code and of the courts of the State of California for purposes of enforcement.

(c) As a matter of comity, with respect to persons employed at the Gaming Facility, other than members of the Tribe, the Tribal Gaming Operation shall withhold all taxes due to the State as provided in the California Unemployment Insurance Code and the Revenue and Taxation Code, and shall forward such amounts as provided in said Codes to the State.

Sec. 10.4. Emergency Service Accessibility. The Tribe shall make reasonable provisions for adequate emergency fire, medical, and related relief and disaster services for patrons and employees of the Gaming Facility.

Sec. 10.5. Alcoholic Beverage Service. Standards for alcohol service shall be subject to applicable law.

Sec. 10.6. Possession of firearms shall be prohibited at all times in the Gaming Facility except for state, local, or tribal security or law enforcement personnel authorized by tribal law and by federal or state law to possess fire arms at the Facility.

Sec. 10.7. Labor Relations.

Notwithstanding any other provision of this Compact, this Compact shall be null and void if, on or before October 13, 1999, the Tribe has not provided an agreement or other procedure acceptable to the State for addressing organizational and representational rights of Class III Gaming Employees and other employees associated with the Tribe's Class III gaming enterprise, such as food and beverage, housekeeping, cleaning, bell and door services, and laundry employees at the Gaming Facility or any related facility, the only significant purpose of which is to facilitate patronage at the Gaming Facility.

Sec. 10.8. Off-Reservation Environmental Impacts.

Sec. 10.8.1. On or before the effective date of this Compact, or not less than 90 days prior to the commencement of a Project, as defined herein, the Tribe shall adopt an ordinance providing for the preparation, circulation, and consideration by the Tribe of environmental impact reports concerning potential off-Reservation environmental

impacts of any and all Projects to be commenced on or after the effective date of this Compact. In fashioning the environmental protection ordinance, the Tribe will make a good faith effort to incorporate the policies and purposes of the National Environmental Policy Act and the California Environmental Quality Act consistent with the Tribe's governmental interests.

Sec. 10.8.2. (a) Prior to commencement of a Project, the Tribe will:

(1) Inform the public of the planned Project;

(2) Take appropriate actions to determine whether the project will have any significant adverse impacts on the off-Reservation environment;

(3) For the purpose of receiving and responding to comments, submit all environmental impact reports concerning the proposed Project to the State Clearinghouse in the Office of Planning and Research and the county board of supervisors, for distribution to the public.

(4) Consult with the board of supervisors of the county or counties within which the Tribe's Gaming Facility is located, or is to be located, and, if the Gaming Facility is within a city, with the city council, and if requested by the board or council, as the case may be, meet with them to discuss mitigation of significant adverse off-Reservation environmental impacts;

(5) Meet with and provide an opportunity for comment by those members of the public residing off-Reservation within the vicinity of the Gaming Facility such as might be adversely affected by proposed Project.

(b) During the conduct of a Project, the Tribe shall:

(1) Keep the board or council, as the case may be, and potentially affected members of the public apprized of the project's progress; and

(2) Make good faith efforts to mitigate any and all such significant adverse off-Reservation environmental impacts.

(c) As used in Section 10.8.1 and this Section 10.8.2, the term "Project" means any expansion or any significant renovation or modification of an existing Gaming Facility, or any significant excavation, construction, or development associated with the Tribe's Gaming Facility or proposed Gaming Facility and the term "environmental impact reports" means any environmental assessment, environmental impact report, or environmental impact statement, as the case may be.

Sec. 10.8.3. (a) The Tribe and the State shall, from time to time, meet to review the adequacy of this Section 10.8, the Tribe's ordinance adopted pursuant thereto, and the Tribe's compliance with its obligations under Section 10.8.2, to ensure that

significant adverse impacts to the off-Reservation environment resulting from projects undertaken by the Tribe may be avoided or mitigated.

(b) At any time after January 1, 2003, but not later than March 1, 2003, the State may request negotiations for an amendment to this Section 10.8 on the ground that, as it presently reads, the Section has proven to be inadequate to protect the off-Reservation environment from significant adverse impacts resulting from Projects undertaken by the Tribe or to ensure adequate mitigation by the Tribe of significant adverse off-Reservation environmental impacts and, upon such a request, the Tribe will enter into such negotiations in good faith.

(c) On or after January 1, 2004, the Tribe may bring an action in federal court under 25 U.S.C. Sec. 2710(d)(7)(A)(i) on the ground that the State has failed to negotiate in good faith, provided that the Tribe's good faith in the negotiations shall also be in issue. In any such action, the court may consider whether the State's invocation of its rights under subdivision (b) of this Section 10.8.3 was in good faith. If the State has requested negotiations pursuant to subdivision (b) but, as of January 1, 2005, there is neither an agreement nor an order against the State under 25 U.S.C. Sec. 2710(d)(7)(B)(iii), then, on that date, the Tribe shall immediately cease construction and other activities on all projects then in progress that have the potential to cause adverse off-Reservation impacts, unless and until an agreement to amend this Section 10.8 has been concluded between the Tribe and the State.

Sec. 11.0. EFFECTIVE DATE AND TERM OF COMPACT.

Sec. 11.1. Effective Date. This Gaming Compact shall not be effective unless and until all of the following have occurred:

(a) The Compact is ratified by statute in accordance with state law;

(b) Notice of approval or constructive approval is published in the Federal Register as provided in 25 U.S.C. 2710(d)(3)(B); and

(c) SCA 11 is approved by the California voters in the March 2000 general election.

Sec. 11.2. Term of Compact; Termination.

Sec. 11.2.1. Effective. (a) Once effective this Compact shall be in full force and effect for state law purposes until December 31, 2020.

(b) Once ratified, this Compact shall constitute a binding and determinative agreement between the Tribe and the State, without regard to voter approval of any constitutional amendment, other than SCA 11, that authorizes a gaming compact.

(c) Either party may bring an action in federal court, after providing a sixty (60) day written notice of an opportunity to cure any alleged breach of this Compact, for

a declaration that the other party has materially breached this Compact. Upon issuance of such a declaration, the complaining party may unilaterally terminate this Compact upon service of written notice on the other party. In the event a federal court determines that it lacks jurisdiction over such an action, the action may be brought in the superior court for the county in which the Tribe's Gaming Facility is located. The parties expressly waive their immunity to suit for purposes of an action under this subdivision, subject to the qualifications stated in Section 9.4(a).

Sec. 12.0. AMENDMENTS; RENEGOTIATIONS.

Sec. 12.1. The terms and conditions of this Gaming Compact may be amended at any time by the mutual and written agreement of both parties.

Sec. 12.2. This Gaming Compact is subject to renegotiation in the event the Tribe wishes to engage in forms of Class III gaming other than those games authorized herein and requests renegotiation for that purpose, provided that no suchrenegotiation may be sought for 12 months following the effective date of this Gaming Compact.

Sec. 12.3. Process and Negotiation Standards. All requests to amend or renegotiate this Gaming Compact shall be in writing, addressed to the Tribal Chairperson or the Governor, as the case may be, and shall include the activities or circumstances to be negotiated, together with a statement of the basis supporting the request. If the request meets the requirements of this Section, the parties shall confer promptly and determine a schedule for commencing negotiations within 30 days of the request. Unless expressly provided otherwise herein, all matters involving negotiations or other amendatory processes under Section 4.3.3(b) and this Section 12.0 shall be governed, controlled, and conducted in conformity with the provisions and requirements of IGRA, including those provisions regarding the obligation of the State to negotiate in good faith and the enforcement of that obligation in federal court. The Chairperson of the Tribe and the Governor of the State are hereby authorized to designate the person or agency responsible for conducting the negotiations, and shall execute any documents necessary to do so.

Sec. 12.4. The Tribe shall have the right to terminate this Compact in the event the exclusive right of Indian tribes to operate Gaming Devices in California is abrogated by the enactment, amendment, or repeal of a state statute or constitutional provision, or the conclusive and dispositive judicial construction of a statute or the state Constitution by a California appellate court after the effective date of this Compact, that Gaming Devices may lawfully be operated by another person, organization, or entity (other than an Indian tribe pursuant to a compact) within California.

Sec. 13.0 NOTICES.

Unless otherwise indicated by this Gaming Compact, all notices required or authorized to be served shall be served by first-class mail at the following addresses:

Governor
State Capitol
Sacramento, California 95814

Tribal Chairperson
Soboba Band of Mission Indians
P.O. Box 487
San Jacinto, California 92583

Sec. 14.0. CHANGES IN IGRA. This Gaming Compact is intended to meet the requirements of IGRA as it reads on the effective date of this Gaming Compact, and when reference is made to the Indian Gaming Regulatory Act or to an implementing regulation thereof, the referenced provision is deemed to have been incorporated into this Compact as if set out in full. Subsequent changes to IGRA that diminish the rights of the State or the Tribe may not be applied retroactively to alter the terms of this Gaming Compact, except to the extent that federal law validly mandates that retroactive application without the State's or the Tribe's respective consent

Sec. 15.0. MISCELLANEOUS.

Sec. 15.1. Third Party Beneficiaries. Except to the extent expressly provided under this Gaming Compact, this Gaming Compact is not intended to, and shall not be construed to, create any right on the part of a third party to bring an action to enforce any of its terms.

Sec. 15.2. Complete agreement; revocation of prior requests to negotiate. This Gaming Compact, together with all addenda and approved amendments, sets forth the full and complete agreement of the parties and supersedes any prior agreements or understandings with respect to the subject matter hereof.

Sec. 15.3. Construction. Neither the presence in another tribal-state compact of language that is not included in this Compact, nor the absence in this Compact of language that is present in another tribal-state compact shall be a factor in construing the terms of this Compact.

Sec. 15.4. Most Favored Tribe. If, after the effective date of this Compact, the State enters into a Compact with any other tribe that contains more favorable provisions with respect to any provisions of this Compact, the State shall, at the Tribe's request, enter into the preferred compact with the Tribe as a superseding substitute for this Compact; provided that the duration of the substitute compact shall not exceed the duration of this Compact.

Sec. 15.6. Representations.

By entering into this Compact, the Tribe expressly represents that, as of the date of the Tribe's execution of this Compact: (a) the undersigned has the authority to execute this Compact on behalf of his or her tribe and will provide written proof of such authority and ratification of this Compact by the tribal governing body no later than October 9, 1999; (b) the Tribe is (i) recognized as eligible by the Secretary of the Interior for special programs and services provided by the United States to Indians because of their status as Indians, and (ii) recognized by the Secretary of the Interior as possessing powers of self-government. In entering into this Compact, the State expressly relies upon the foregoing representations by the Tribe, and the State's entry into the Compact is expressly made contingent upon the truth of those representations as of the date of the Tribe's execution of this Compact. Failure to provide written proof of authority to execute this Compact or failure to provide written proof of ratification by the Tribe's governing body will give the State the opportunity to declare this Compact null and void.

IN WITNESS WHEREOF, the undersigned sign this Compact on behalf of the State of California and the Soboba Band of Mission Indians.

Done at Sacramento, California, this 10th day of September 1999.

STATE OF CALIFORNIA

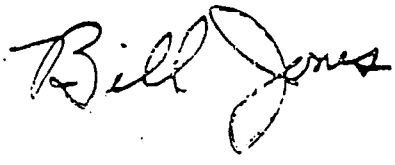
Gray Davis

By Gray Davis
Governor of the State of California

SOBOBA BAND OF MISSION INDIANS

Robert Salgado

By Robert Salgado
Chairperson of the Soboba Band of Mission Indians

ATTEST: 

By Bill Jones
Secretary of State, State of California

///

///

///

///

///

///

///

///

///

///

///

///

///

///

Consistent with 25 U.S.C.A. Sec. 2710 (d)(8), the Compact between the Sovereign Nation of the Soboba Band of Luiseno Mission Indians of the Soboba Reservation and the Sovereign State of California dated September 10, 1999, is hereby approved on this 5th day of May, 2000, by the Assistant Secretary - Indian Affairs, United States Department of the Interior.

UNITED STATES DEPARTMENT OF THE INTERIOR

Kevin Gover
Assistant Secretary - Indian Affairs

ADDENDUM "A" TO TRIBAL-STATE GAMING COMPACT BETWEEN THE SOBOBA BAND OF MISSION INDIANS AND THE STATE OF CALIFORNIA

Modification No. 1

Section 6.4.4(d) is modified to read as follows:

Section 6.4.4(d) is modified to read as follows:

(d) (1) Notwithstanding subdivision (a), the Tribe may employ or retain in its employ a person whose application for a determination of suitability, or for a renewal of such a determination, has been denied by the State Gaming Agency, if the person is an enrolled member of the Tribe, as defined in this subdivision, and if ~~(i)~~ (A) the person holds a valid and current license issued by the Tribal Gaming Agency that must be renewed at least biennially; ~~(ii)~~ (B) the denial of the application by the State Gaming Agency is based solely on activities, conduct, or associations that antedate the filing of the person's initial application to the State Gaming Agency for a determination of suitability; and ~~(iii)~~ (C) the person is not an employee or agent of any other gaming operation.

(2) For purposes of this subdivision, "enrolled member" means a person who is either: ~~(a)~~ (A) a person certified by the Tribe as having been a member of the Tribe for at least five (5) years; ~~or (b)~~ (B) a holder of confirmation of membership issued by the Bureau of Indian Affairs; or (C), if the Tribe has 100 or more enrolled members as of the date of execution of this Compact, a person certified by the Tribe as being a member pursuant to criteria and standards specified in a tribal Constitution that has been approved by the Secretary of the Interior.

Modification No. 2

Section 8.4.1(e) is modified to read as follows:

(e) The Tribe may object to a State Gaming Agency regulation on the ground that it is unnecessary, unduly burdensome, conflicts with a published final regulation of the NIGC, or is unfairly discriminatory, and may seek repeal or amendment of the regulation through the dispute resolution process of Section 9.0; provided that, if the regulation of the State Gaming Agency conflicts with a final published regulation of the NIGC, the NIGC regulation shall govern pending conclusion of the dispute resolution process.

Modification No. 3

Section 12.2 is modified to read as follows:

Sec. 12.2. (a) This Gaming Compact is subject to renegotiation in the event the Tribe wishes to engage in forms of Class III gaming other than those games authorized herein and requests renegotiation for that purpose, provided that no such renegotiation may be sought for 12 months following the effective date of this Gaming Compact.

(b) Nothing herein shall be construed to constitute a waiver of any rights under IGRA in the event of an expansion of the scope of permissible gaming resulting from a change in state law.

Modification No. 4

Section 11.2.1(a) is modified to read:

Sec. 11.2.1. Effective. (a) Once effective this Compact shall be in full force and effect for state law purposes until December 31, 2020. No sooner than eighteen (18) months prior to the aforementioned termination date, either party may request the other party to enter into negotiations to extend this Compact or to enter into a new compact. If the parties have not agreed to extend the date of this Compact or entered into a new compact by the termination date, this Compact will automatically be extended to June 30, 2022, unless the parties have agreed to an earlier termination date.

Modification No. 5

Section 12.4 is modified to read as follows:

Sec. 12.4. ~~The Tribe shall have the right to terminate this Compact~~ In the event the exclusive right of Indian tribes to operate Gaming Devices in California is abrogated by the enactment, amendment, or repeal of a state statute or constitutional provision, or the conclusive and dispositive judicial construction of a statute or the state Constitution by a California appellate court after the effective date of this Compact, that Gaming Devices may lawfully be operated by another person, organization, or entity (other than an Indian tribe pursuant to a compact) within California, the Tribe shall have the right to: (i) termination of this Compact, in which case the Tribe will lose the right to operate Gaming Devices and other Class III gaming, or (ii) continue under the Compact with an entitlement to a reduction of

the rates specified in Section 5.1(a) following conclusion of negotiations, to provide for (a) compensation to the State for actual and reasonable costs of regulation, as determined by the state Department of Finance; (b) reasonable payments to local governments impacted by tribal government gaming; (c) grants for programs designed to address gambling addiction; (d) and such assessments as may be permissible at such time under federal law.

Modification No. 6

Section 10.2(d) is modified to read as follows:

(d) Carry no less than five million dollars ($5,000,000) in public liability insurance for patron claims, and ~~that~~ the Tribe shall request its insurer to ~~provide reasonable assurance that those claims will be~~ promptly and fairly ~~adjudicated, and that legitimate claims will be paid~~ settle all valid claims; provided that nothing herein requires the Tribe to agree to liability for punitive damages, any intentional acts not covered by the insurance policy, or attorneys' fees. On or before the effective date of this Compact or not less than 30 days prior to the commencement of Gaming Activities under this Compact, whichever is later, the Tribe shall adopt and make available to patrons a tort liability ordinance setting forth the terms and conditions, if any, under which the Tribe waives immunity to suit for money damages resulting from intentional or negligent injuries to person or property at the Gaming Facility or in connection with the Tribe's Gaming Operation, including procedures for processing any claims for such money damages; provided that nothing in this Section shall require the Tribe to waive its immunity to suit except to the extent of the policy limits and insurance coverage set out above.

Modification No. 7

Section 10.2(k) is modified to read as follows:

(k) Comply with provisions of the Bank Secrecy Act, P.L. 91-508, October 26, 1970, 31 U.S.C. Sec. 5311-5314, as amended, and all reporting requirements of the Internal Revenue Service, insofar as such provisions and reporting requirements are applicable to casinos.

IN WITNESS WHEREOF, the undersigned sign this Addendum on behalf of the State of California and the Soboba Band of Mission Indians.

STATE OF CALIFORNIA

Gray Davis

By Gray Davis
Governor of the State of California

Executed this 8th day of October, 1999, at Sacramento, California.

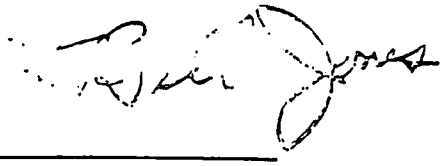
SOBOBA BAND OF MISSION INDIANS

Robert Salgado Sr

By Robert Salgado, Sr.
Chairperson of the Soboba Band of Mission Indians

Executed this 2nd day of October, 1999, at San Jacinto, California.

ATTEST:



By Bill Jones
Secretary of State, State of California

///

///

///

///

///

///

///

///

///

///

///

///

///

///

ADDENDUM "B" TO TRIBAL-STATE GAMING COMPACT BETWEEN THE SOBOBA BAND OF MISSION INDIANS AND THE STATE OF CALIFORNIA

In compliance with Section 10.7 of the Compact, the Tribe agrees to adopt an ordinance identical to the Model Tribal Labor Relations Ordinance attached hereto, and to notify the State of that adoption no later than October 12, 1999. If such notice has not been received by the State by October 13, 1999, this Compact shall be null and void. Failure of the Tribe to maintain the Ordinance in effect during the term of this Compact shall constitute a material breach entitling the State to terminate this Compact. No amendment of the Ordinance shall be effective unless approved by the State.

Attachment: Model Tribal Labor Relations Ordinance.

IN WITNESS WHEREOF, the undersigned sign this Addendum on behalf of the State of California and the Soboba Band of Mission Indians.

STATE OF CALIFORNIA

Gray Davis

By Gray Davis
Governor of the State of California

Executed this 8th day of October, 1999, at Sacramento, California.

SOBOBA BAND OF MISSION INDIANS

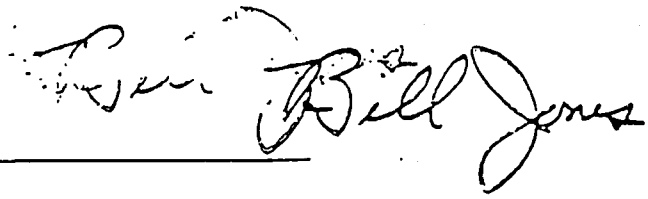
Robert Salgado Sr

By Robert Salgado, Sr.
Chairperson of the Soboba Band of Mission Indians

Executed this 2nd day of October, 1999, at San Jacinto, California.

####

ATTEST:



By Bill Jones
Secretary of State, State of California

Soboba Band of Mission Indians
P.O. BOX 487 • SAN JACINTO, CA 92581 • TELEPHONE (909) 654-2765

Governor Gray Davis
State Capitol
Sacramento, CA 95814

Re: Notice of Adoption:

This will certify that on October 2, 1999, the Soboba Band of Mission Indians adopted resolution No. CR99-TLRO-41, adopting the Tribal Labor Relations Ordinance sent to the Tribe by the State on September 17, 1999, said Ordinance to become effective upon the effective date of the Compact between the State of California and the Soboba Band of Mission Indians, in accordance with the terms of said Ordinance.

Unless we hear from your office immediately, we will assume that this is in full compliance with §10.7 of the Compact.

Dated: October 2, 1999

Robert J. Salgado, Sr.,
Tribal Chairman

ATTACHMENT TO ADDENDUM B

TRIBAL LABOR RELATIONS ORDINANCE
September 14, 1999

Section 1: Threshold of applicability

(a) Any tribe with 250 or more persons employed in a tribal casino and related facility shall adopt this Tribal Labor Relations Ordinance (TLRO or Ordinance). For purposes of this ordinance, a "tribal casino" is one in which class III gaming is conducted pursuant to a tribal-state compact. A "related facility" is one for which the only significant purpose is to facilitate patronage of the class III gaming operations.

(b) Any tribe which does not operate such a tribal casino as of September 10, 1999, but which subsequently opens a tribal casino, may delay adoption of this ordinance until one year from the date the number of employees in the tribal casino or related facility as defined in 1(a) above exceeds 250.

(c) Upon the request of a labor union, the Tribal Gaming Commission shall certify the number of employees in a tribal casino or other related facility as defined in 1(a) above. Either party may dispute the certification of the Tribal Gaming Commission to the Tribal Labor Panel.

Section 2: Definition of Eligible Employees

(a) The provisions of this ordinance shall apply to any person (hereinafter "Eligible Employee") who is employed within a tribal casino in which Class III gaming is conducted pursuant to a tribal-state compact or other related facility, the only significant purpose of which is to facilitate patronage of the Class III gaming operations, except for any of the following:

(1) any employee who is a supervisor, defined as any individual having authority, in the interest of the tribe and/or employer, to hire, transfer, suspend, lay off, recall, promote, discharge, assign, reward, or discipline other employees, or responsibility to direct them or to adjust their grievances, or effectively to recommend such action, if in connection with the foregoing the exercise of such authority is not of a merely routine or clerical nature, but requires the use of independent judgment;

(2) any employee of the Tribal Gaming Commission;

(3) any employee of the security or surveillance department, other than those who are responsible for the technical repair and maintenance of equipment;

(4) any cash operations employee who is a "cage" employee or money counter; or

(5) any dealer.

Section 3: Non-interference with regulatory or security activities

Operation of this Ordinance shall not interfere in any way with the duty of the Tribal Gaming Commission to regulate the gaming operation in accordance with the Tribe's National Indian Gaming Commission-approved gaming ordinance. Furthermore, the exercise of rights hereunder shall in no way interfere with the tribal casino's surveillance/security systems, or any other internal controls system designed to protect the integrity of the tribe's gaming operations. The Tribal Gaming Commission is specifically excluded from the definition of tribe and its agents.

Section 4: Eligible Employees free to engage in or refrain from concerted activity

Eligible Employees shall have the right to self-organization, to form, to join, or assist employee organizations, to bargain collectively through representatives of their own choosing, to engage in other concerted activities for the purpose of collective bargaining or other mutual aid or protection, and shall also have the right to refrain from any or all such activities.

Section 5: Unfair Labor Practices for the tribe

It shall be an unfair labor practice for the tribe and/or employer or their agents:

(1) to interfere with, restrain or coerce Eligible Employees in the exercise of the rights guaranteed herein;

(2) to dominate or interfere with the formation or administration of any labor organization or contribute financial or other support to it, but this does not restrict the tribe and/or employer and a certified union from agreeing to union security or dues checkoff;

(3) to discharge or otherwise discriminate against an Eligible Employee because s/he has filed charges or given testimony under this Ordinance;

pertaining to Eligible Employees. Actual posting of such posters, notices, and other materials, shall be by employees desiring to post such materials.

Section 9: Indian preference explicitly permitted

Nothing herein shall preclude the tribe from giving Indian preference in employment, promotion, seniority, lay-offs or retention to members of any federally recognized Indian tribe or shall in any way affect the tribe's right to follow tribal law, ordinances, personnel policies or the tribe's customs or traditions regarding Indian preference in employment, promotion, seniority, lay-offs or retention. Moreover, in the event of a conflict between tribal law, tribal ordinance or the tribe's customs and traditions regarding Indian preference and this Ordinance, the tribal law, tribal ordinance or the tribe's customs and traditions shall govern.

Section 10: Secret ballot elections required

(a) Dated and signed authorized cards from thirty percent (30%) or more of the Eligible Employees within the bargaining unit verified by the elections officer will result in a secret ballot election to be held within 30 days from presentation to the elections officer.

(b) The election shall be conducted by the election officer. The election officer shall be a member of the Tribal Labor Panel chosen pursuant to the dispute resolution provisions herein. All questions concerning representation of the tribe and/or Employer's Eligible Employees by a labor organization shall be resolved by the election officer. The election officer shall be chosen upon notification by the labor organization to the tribe of its intention to present authorization cards, and the same election officer shall preside thereafter for all proceedings under the request for recognition; provided however that if the election officer resigns, dies or is incapacitated for any other reason from performing the functions of this office, a substitute election officer shall be selected in accordance with the dispute resolution provisions herein.

(c) The election officer shall certify the labor organization as the exclusive collective bargaining representative of a unit of employees if the labor organization has received the majority of votes by employees voting in a secret ballot election that the election officer determines to have been conducted fairly. If the election officer determines that the election was

conducted unfairly due to misconduct by the tribe and/or employer or union, the election officer may order a re-run election. If the election officer determines that there was the commission of serious Unfair Labor Practices by the tribe that interfere with the election process and preclude the holding of a fair election, and the labor organization is able to demonstrate that it had the support of a majority of the employees in the unit at any point before or during the course of the tribe's misconduct, the election officer shall certify the labor organization.

(d) The tribe or the union may appeal any decision rendered after the date of the election by the election officer to a three (3) member panel of the Tribal Labor Panel mutually chosen by both parties.

(e) A union which loses an election and has exhausted all dispute remedies related to the election may not invoke any provisions of this labor ordinance at that particular casino or related facility until one year after the election was lost.

Section 11: Collective bargaining impasse

Upon recognition, the tribe and the union will negotiate in good faith for a collective bargaining agreement covering bargaining unit employees represented by the union. If collective bargaining negotiations result in impasse, and the matter has not been resolved by the tribal forum procedures sets forth in Section 13 (b) governing resolution of impasse within sixty (60) working days or such other time as mutually agreed to by the parties, the union shall have the right to strike. Strike-related picketing shall not be conducted on Indian lands as defined in 25 U.S.C. Sec. 2703 (4).

Section 12: Decertification of bargaining agent

(a) The filing of a petition signed by thirty percent (30%) or more of the Eligible Employees in a bargaining unit seeking the decertification of a certified union, will result in a secret ballot election to be held 30 days from the presentation of the petition.

(b) The election shall be conducted by an election officer. The election officer shall be a member of the Tribal Labor Panel chosen pursuant to the dispute resolution provisions herein. All questions concerning the decertification of the labor organization shall be resolved by an election

officer. The election officer shall be chosen upon notification to the tribe and the union of the intent of the employees to present a decertification petition, and the same election officer shall preside thereafter for all proceedings under the request for decertification; provided however that if the election officer resigns, dies or is incapacitated for any other reason from performing the functions of this office, a substitute election officer shall be selected in accordance with the dispute resolution provisions herein.

(c) The election officer shall order the labor organization decertified as the exclusive collective bargaining representative if a majority of the employees voting in a secret ballot election that the election officer determines to have been conducted fairly vote to decertify the labor organization. If the election officer determines that the election was conducted unfairly due to misconduct by the tribe and/or employer or the union the election officer may order a re-run election or dismiss the decertification petition.

(d) A decertification proceeding may not begin until one (1) year after the certification of a labor union if there is no collective bargaining agreement. Where there is a collective bargaining agreement, a decertification petition may only be filed no more than 90 days and no less than 60 days prior to the expiration of a collective bargaining agreement. A decertification petition may be filed anytime after the expiration of a collective bargaining agreement.

(e) The tribe or the union may appeal any decision rendered after the date of the election by the election officer to a three (3) member panel of the Tribal Labor Panel mutually chosen by both parties.

Section 13: Binding dispute resolution mechanism

(a) All issues shall be resolved exclusively through the binding dispute resolution mechanisms herein, with the exception of a collective bargaining negotiation impasse, which shall only go through the first level of binding dispute resolution.

(b) The first level of binding dispute resolution for all matters related to organizing, election procedures, alleged unfair labor practices, and discharge of Eligible Employees shall be an appeal to a designated tribal forum such as a Tribal Council, Business Committee, or Grievance Board.

The parties agree to pursue in good faith the expeditious resolution of these matters within strict time limits. The time limits may not be extended without the agreement of both parties. In the absence of a mutually satisfactory resolution, either party may proceed to the independent binding dispute resolution set forth below. The agreed upon time limits are set forth as follows:

(1) All matters related to organizing, election procedures and alleged unfair labor practices prior to the union becoming certified as the collective bargaining representative of bargaining unit employees, shall be resolved by the designated tribal forum within thirty (30) working days.

(2) All matters after the union has become certified as the collective bargaining representative and relate specifically to impasse during negotiations, shall be resolved by the designated tribal forum within sixty (60) working days;

(c) The second level of binding dispute resolution shall be a resolution by the Tribal Labor Panel, consisting of ten (10) arbitrators appointed by mutual selection of the parties which panel shall serve all tribes that have adopted this ordinance. The Tribal Labor Panel shall have authority to hire staff and take other actions necessary to conduct elections, determine units, determine scope of negotiations, hold hearings, subpoena witnesses, take testimony, and conduct all other activities needed to fulfill its obligations under this Tribal Labor Relations Ordinance.

(1) Each member of the Tribal Labor Panel shall have relevant experience in federal labor law and/or federal Indian law with preference given to those with experience in both. Names of individuals may be provided by such sources as, but not limited to, Indian Dispute Services, Federal Mediation and Conciliation Service, and the American Academy of Arbitrators.

(2) Unless either party objects, one arbitrator from the Tribal Labor Panel will render a binding decision on the dispute under the Ordinance. If either party objects, the dispute will be decided by a three-member panel of the Tribal Labor Panel, which will render a binding decision. In the event there is one arbitrator, five (5) Tribal Labor Panel names shall be submitted to the parties and each party may strike no more that two (2) names. In the event there is a three (3) member panel, seven (7) TLP names shall be submitted to the parties and each party may strike no more than two (2) names. A coin toss shall determine which party may

strike the first name. The arbitrator will generally follow the American Arbitration Association's procedural rules relating to labor dispute resolution. The arbitrator or panel must render a written, binding decision that complies in all respects with the provisions of this Ordinance.

(d) Under the third level of binding dispute resolution, either party may seek a motion to compel arbitration or a motion to confirm an arbitration award in Tribal Court, which may be appealed to federal court. If the Tribal Court does not render its decision within 90 days, or in the event there is no Tribal Court, the matter may proceed directly to federal court. In the event the federal court declines jurisdiction, the tribe agrees to a limited waiver of its sovereign immunity for the sole purpose of compelling arbitration or confirming an arbitration award issued pursuant to the Ordinance in the appropriate state superior court. The parties are free to put at issue whether or not the arbitration award exceeds the authority of the Tribal Labor Panel.

Soboba Band of Luiseño Mission Indians
P.O. Box 487 * SAN JACINTO, CA 92581 * TELEPHONE (909) 654-2765

ENVIRONMENTAL PROTECTION ORDINANCE

ORDINANCE NO. GC00-8

1. FINDINGS.

The Soboba Band of Luiseño Mission Indians of the Soboba Reservation, California, ("Tribe"), a federally-recognized Indian tribe exercising inherent sovereignty and jurisdiction over the Soboba Indian Reservation, finds the Tribal-State Class III Gaming Compact ("Compact") between the Tribe and the State of California requires that the Tribe enact an ordinance providing for the preparation, circulation and consideration by the Tribe of environmental impact reports concerning potential off-Reservation environmental impacts of any and all projects for the expansion or significant renovation or modification of an existing Gaming Facility, or any significant excavation, construction or development associated with the Tribe's Gaming Facility or proposed Gaming Facility to be commenced on or after the effective date of the Compact. The Tribe finds that it is necessary to adopt standards and procedures to identify, assess and, if reasonably feasible, mitigate such off-Reservation impacts in compliance with the requirements of the Compact.

2. PURPOSES.

The Tribe, as beneficial owner of the Soboba Indian Reservation and acting pursuant to its Constitution, hereby exercises its sovereignty to carry out the following purposes: (1) declare a tribal policy to encourage productive and enjoyable harmony between gaming-related activities on the Soboba Indian Reservation and the surrounding non-Indian community; (2) promote efforts to prevent, eliminate or mitigate damage to the environment from gaming-related activities on the Soboba Indian Reservation; (3) protect the health and safety of tribal members and all other persons within and without the exterior boundaries of the Soboba Indian Reservation; (4) protect the stability and integrity of lands within the Reservation; (5) protect the air, water, and land from pollution and degradation, including contamination of groundwater, surface waters, and drinking water supplies; (6) protect the historic and cultural values and traditions of the Tribe and the Reservation as a permanent tribal homeland; (7) prevent the deterioration of the standard of living, quality of life and well-being of the tribal members and other persons within and without the Reservation; and (8) promote tribal environmental regulation under the principles of tribal sovereignty.

3. DEFINITIONS.

1. "Tribe" means the Soboba Band of Luiseño Mission Indians of the Soboba Reservation, California.

2. "Tribal Council" means the elected governing body of the Soboba Indian Reservation as established and defined by the Constitution of the Tribe.
3. "Department" means the Tribal Environmental Programs Office.
4. "Reservation" means all the lands within the exterior boundaries of the Soboba Indian Reservation as presently defined or modified in the future.
5. "Tribal Court" means the Tribe Council sitting in its capacity as the judicial body of the tribe, or any other Tribal Court subsequently established by the Tribe.
6. "Water" means any groundwater, surface water, aquifers and water used for irrigation, industrial, commercial or domestic consumption.
7. "Public Water System" means a system for the provision of piped water for other than agricultural use.
8. "Wetlands" means swamps, marshes, bogs, and similar areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.
9. "Soboba Casino" means the Tribe's gaming facility located on the Reservation.

IV. ASSESSMENT OF OFF-RESERVATION ENVIRONMENTAL IMPACTS OF NEW GAMING FACILITIES.

A. This section applies only to gaming projects on the Soboba Indian Reservation. "Gaming projects" is defined to include the expansion, significant renovation or modification of Soboba Casino, and any significant excavation, construction or development associated with Soboba Casino or any new gaming facility proposed to be constructed on the Reservation.

B. Consistent with the purposes of the National Environment Policy Act, the California Environmental Quality Act and the Tribe's essential governmental interests, the Tribe intends that any significant adverse impacts to the off-Reservation environment resulting from new gaming projects undertaken by the Tribe should be avoided or mitigated to the extent feasible and practicable.

C. Before undertaking any gaming project under this section which has the potential to affect the off-Reservation environment, the Department shall prepare a Tribal Environmental Impact Statement (TEIS) to determine whether the project will have any significant adverse impacts on the off-Reservation environment. The TEIS shall contain in detail the following information and analysis:

1. the off-Reservation environmental impact of the proposed action;
2. any adverse off-Reservation environmental effects which cannot be avoided should the proposed project be implemented;
3. an analysis of the relationship between the local short-term uses of the environment and the maintenance and enhancement of long-term productivity;
4. any irreversible and irretrievable commitments of off-Reservation resources which would be involved in the proposed project should it be implemented.

D. In preparing the TEIS, the Department shall consult with and seek the views of the Tribal Council. The TEIS shall not be final until approved by the Tribal Council. The final TEIS shall be made available to tribal members and the general public. No gaming project shall be undertaken until the Tribal Council has approved the TEIS.

E. The Tribal Council shall submit the approved TEIS to the State of California Clearinghouse in the Office of Planning and Research and the Riverside County Board of Supervisors for distribution to the general public.

F. Before approving any project under this section, the Tribal Council or the Department shall inform the public of the planned project and shall consult with the Board of Supervisors of Riverside County, and if requested by the board, meet with them to discuss mitigation of significant adverse off-Reservation environmental impacts.

G. Before approving any project under this section, the Tribal Council or the Department shall meet with and provide an opportunity for comment by those members of the public residing off-Reservation within the vicinity of the project that might be adversely affected by the proposed project.

H. During the conduct of a project under this section, the Tribal Council or the Department shall keep the Riverside County Board of Supervisors, and potentially affected members of the public, informed of the progress of the project. The Tribal Council or the Department shall make good faith efforts to mitigate any significant adverse off-Reservation environmental impacts identified in the TEIS or by the off-Reservation community and local governments.

2. AMENDMENTS.

This Ordinance may be amended from time to time as the Tribal Council deems appropriate to protect what the Tribal Council determines to be the best interests of the Soboba Band of Luiseño Mission Indians of the Soboba Reservation, California.

3. SEVERABILITY.

The provisions of this Ordinance are severable. If any part or provision hereof is ruled to be void by any court of competent jurisdiction or any federal agency, the decisions of the court or agency so ruling shall not affect or impair any remaining provisions of the Ordinance.

4. REPEAL.

To the extent that any other previously enacted ordinances or resolutions, or portions thereof, may be inconsistent with this Ordinance, to that extent such prior ordinances or resolutions hereby are superseded and repealed.

5. EFFECTIVE DATE.

This Ordinance shall become effective on the effective date of the compact with the State of California authorizing Class III gaming on the Soboba Indian Reservation.

CERTIFICATION

We the elected members of the Tribal Council of the Soboba Band of Luiseño Indians do hereby certify that the foregoing Ordinance was adopted by the Soboba General Council at a duly held meeting convened on the Soboba Indian Reservation on September 9, 2000, by a vote of 24 "FOR", 9 "AGAINST", and 3 "ABSTAINED" and such Ordinance has not been rescinded or amended in any way.

Robert J. Salgado Sr., Chairman

Isaiah Vivanco, Vice-Chairman

Rosemary Salgado, Secretary

Michael Castello, Treasurer

Freda Miranda, Member

Soboba Band of Luiseño Mission Indians
P.O. Box 487 * SAN JACINTO, CA 92581 * TELEPHONE (909) 654-2765

GAMING FACILITY STANDARDS ORDINANCE

ORDINANCE NO. GC00-4, PROVIDING FOR THE ADOPTION, IMPLEMENTATION AND ENFORCEMENT OF BUILDING SAFETY, WATER QUALITY, DRINKING WATER, FOOD AND BEVERAGE HANDLING, WORKPLACE AND OCCUPATIONAL SAFETY AND HEALTH STANDARDS FOR GAMING FACILITIES OPERATED UNDER THE TRIBAL-STATE CLASS III GAMING COMPACT BETWEEN THE SOBOBA BAND OF LUISENO MISSION INDIANS OF THE SOBOBA INDIAN RESERVATION, CALIFORNIA, AND THE STATE OF CALIFORNIA; ADOPTING RELEVANT FEDERAL STANDARDS WHERE THE SOBOBA BAND HAS NOT EXPRESSLY ADOPTED A TRIBAL STANDARD; AUTHORIZING TRIBAL PUBLIC SAFETY AND SECURITY PERSONNEL TO POSSESS FIREARMS IN TRIBAL GAMING FACILITIES; MANDATING INDIAN PREFERENCE IN RECRUITMENT, HIRING, PROMOTION AND RETENTION OF GAMING OPERATION EMPLOYEES; AND CONFIRMING THE TRIBAL COUNCIL'S PREVIOUS ESTABLISHMENT OF A SYSTEM FOR REDRESS FOR EMPLOYEE WORK-RELATED INJURIES THROUGH A PROGRAM OF SELF-INSURANCE AND INSURANCE THAT PROVIDES BENEFITS AND PROCEDURES COMPARABLE TO THOSE MANDATED FOR COMPARABLE EMPLOYEES UNDER STATE LAW.

WHEREAS, the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, has entered into a Tribal-State Class III gaming compact with the State of California ("the Compact");

WHEREAS, the Compact requires that the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, adopt, implement and enforce ordinances, policies and/or procedures setting minimum standards for building safety, water quality, drinking water, food and beverage handling, workplace and occupational safety and health for, in and on the premises of gaming facilities authorized and operated pursuant to the Compact;

WHEREAS, the Compact provides that if the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, does not adopt its own or an applicable federal statute or regulation in lieu of a tribal standard, the state's statute or regulation will become the applicable standard by default;

WHEREAS, the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, desires and intends to fulfill its obligations under the Compact by adopting its own ordinances and standards for its gaming facilities, rather than allowing State standards to apply to those facilities by default;

WHEREAS, the Compact recognizes the right of the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, to give preference in hiring, promotion and retention to Indians, and the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, has a policy of extending such preference;

WHEREAS, the Compact recognizes the right of the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, to authorize its public safety and security personnel to carry firearms in Tribal gaming facilities; and

WHEREAS, the Compact allows the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, to choose whether to participate in the State of California's statutory workers' compensation system or to create and maintain its own system providing benefits and procedures comparable to those mandated for comparable employees under State law, and the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, already has established such a system for its gaming employees and desires to retain that system.

NOW, THEREFORE, BE IT RESOLVED and ordained as follows:

1. The Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, hereby adopts, incorporates by this reference and makes applicable to all gaming facilities operated under any Class III Gaming Compact(s) between the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, and the State of California the Uniform Building Code, the Uniform Mechanical Code, the National Electrical Code, the Uniform Fire Code and the Uniform Plumbing Code, as those codes now exist and as they may be amended from time to time by the International Conference of Building Officials, and delegates to the Soboba Tribal Gaming Agency all necessary authority to adopt appropriate regulations and enforce said codes in connection with the construction, operation and maintenance of gaming facilities operated under said Compact(s);

2. The Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, hereby adopts, incorporates by this reference and makes applicable to all gaming facilities operated under any Class III Gaming Compact(s) between the Soboba Band of Luiseno Mission Indians of the Soboba Indian Reservation, California, and the State of California standards no less stringent than the public health standards of the State of California for food and beverage handling, and delegates to the Soboba Tribal Gaming Agency all necessary authority to adopt appropriate regulations and enforce said standards codes in connection with the operation and maintenance of gaming facilities operated under said Compact(s);

3. The Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, hereby adopts, incorporates by this reference and makes applicable to all gaming facilities operated under any Class III Gaming Compact(s) between the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, and the State of California federal

water quality and safe drinking water standards applicable in California, and delegates to the Soboba Tribal Environmental Programs Office all necessary authority to adopt appropriate regulations and enforce those standards;

4. The Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, hereby adopts, incorporates by this reference and makes applicable to all gaming facilities operated under any Class III Gaming Compact(s) between the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, and the State of California workplace and occupational health and safety standards no less stringent than those established under federal law, and delegates to the Soboba Tribal Gaming Agency and the Soboba Tribal Environmental Programs Office, as appropriate, all necessary authority to adopt appropriate regulations and enforce those standards;

5. The Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, hereby adopts as Tribal standards all relevant federal health and safety standards for which there is no express Tribal standard and for which there is a comparable State standard that would apply to the Soboba Band's gaming facilities by default in the absence of a Tribal standard;

6. The Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, hereby officially declares its policy of extending preference in hiring, promotion and retention to members of federally-recognized Indian tribes, with first preference being given to members of the Soboba Band of Luiseno Mission Indians of the Soboba Indian Reservation, California, and Indian members of their immediate families, all subject to meeting or being capable of meeting job qualifications;

7. The Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, hereby officially declares its policy of permitting Tribal public safety and security personnel to carry firearms on the premises of Tribal gaming facilities; and

8. The Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, hereby ratifies the Tribal Council's previous establishment of a system for redress for employee work-related injuries through a program of self-insurance and insurance that provides benefits and procedures comparable to those mandated for comparable employees under state law, and appellate remedies under the Soboba Band's Tort Claims Ordinance.

This Ordinance shall take effect upon publication in the Federal Register of a notice that the Secretary of the Interior has approved or is considered to have approved the Tribal-State Class III Gaming Compact between the Soboba Band of Luiseño Mission Indians of the Soboba Indian Reservation, California, and the State of California.

CERTIFICATION

We the elected members of the Tribal Council of the Soboba Band of Luise9o Indians do hereby certify that the foregoing Ordinance was adopted by the Soboba General Council at a duly held meeting convened on the Soboba Indian Reservation on September 9, 2000, by a vote of 24 "FOR", 9 "AGAINST" and 3 "ABSTAINING" and such Ordinance has not been rescinded or amended in any way.

Robert J. Salgado Sr., Tribal Chairman

Isaiah Vivanco, Vice-Chairman

Rosemary Salgado, Secretary

Michael Castello, Treasurer

Freda Miranda, Member

Appendix I:

Tribal Resolution of Acceptance of Title Exception and Waste Water Treatment Plant

SOBOBA BAND OF LUISEÑO INDIANS

P.O. BOX 487*SAN JANCINTO, CA 92581*(951) 654-2765

RESOLUTION

RES. NO. CR07-HGFTT-51

RE: Acceptance of Title Exceptions of the Horseshoe Grande Property Fee-to-Trust Application to the United States Department of the Interior, Bureau of Indian Affairs

WHEREAS, the Soboba Band of Luiseño Indians is organized under the Tribal Constitution enacted October 2, 1993; and

WHEREAS, the final title commitments for the 534.91 acre property prepared by Orange Coast Title Company list the following exceptions to title:

- General and Special taxes for the fiscal year 2007-2008, including any assessments collected with taxes. A lien not yet payable; and
- The lien of supplemental taxes, if any, assessed pursuant to the provisions of section 75, *et seq.* of the revenue and taxation code of the State of California; and
- An easement for roadway, water lines and underground conduits and incidental purposes as reserved by John G. Althouse and Tillie M. Althouse in the deed recorded May 1, 1946 in book 737 page 586 and September 30, 1946, in book 769, page 430, both of Official Records, along said land; and
- An easement for purposes herein stated, and rights incidental thereto as provided in instrument:
  Recorded: January 20, 1947 in book 807 page 573, Official Records
  For: Public utilities and incidental purposes
  In favor of: California Electric Power Company, a Corporation
  Affects: Along a center line described as beginning on the center line of McDermott Road 1830 feet Southwest from the East line of Lot 3 on file in book 6, page 304, of maps, Records of San Diego County, California, thence North 42° 30' West, 1165 feet; Thence north 17° 21' East, 300 feet to the Northwesterly line of Lot 3; and
- A Permanent Flowage Easement consisting of the perpetual right, power, privilege, and easement to occasionally overflow, flood, and submerge the land herein described, including all structure and improvements located thereon, and the right to prohibit the construction or maintenance of the land structures for human habitation or structures of other types, expect as expressly approved in writing by Riverside County Flood Control and Water Conservation District, but reserving to the present owners, their successors and assigns, all right, title, interest and privilege that may be used and enjoyed without interfering with or abridging the rights herein described in

those certain lands in the County of Riverside, California, described as follows:

Parcel 4020-119B, 4020-112-C, 4020-115, as shown on Record of Survey filed March 8, 1961 in Records of Survey on file in book 33 pages 48-62, inclusive, Records of Survey, Records of Riverside County, California, as condemned in that certain Decree of Condemnation recorded January 18, 1965 as instrument no. 6064, of Official Records of Riverside County, California.

- An easement for purposes herein stated, and rights incidental thereto as provided in an instrument:
  Recorded: July 17, 1968 as instrument no. 68078, Official Records
  For: To extend and maintain excavation slopes and embankment slopes for drainage purposes where required for the construction and maintenance of Soboba Road and incidental purposes
  In favor of: County of Riverside
  Affects: Said land
- An easement for purposes herein stated, and rights incidental thereto as provided in instrument:
  Recorded: October 27, 1970 as instrument no. 108007, Official Records
  For: Sewage transmission and collection facilities and incidental purposes
  In favor or: Eastern Municipal Water District
  Affects: Said land
- An instrument, upon the terms and conditions contained therein:
  Entitled: Easement Agreement
  Dated: September 23, 1982
  Executed by and between: Diet Center Incorporated and Daon Corporation
  Recorded: September 24, 1982 as Instrument No. 165704, Official Records
- Rights of the public in and to any portion of the subject property lying within any lawfully established streets, roads, or highways; and
- The effect of documents, proceedings, liens, decrees or other matters which do not specifically describe said land, but which, if any do exist, may affect the title or impose liens or encumbrances thereon.

WHEREAS, the Tribal Council has reviewed the exceptions to title summarized above and listed in the final title commitments to determine whether any of the exceptions will interfere with the Tribe's proposed use of the 534.91 acre property.

NOW, THEREFORE BE IT RESOLVED, the Tribal Council of the Soboba Band of Luiseño Indians finds that the exceptions to title listed in the final title commitments for the 534.91 acre property will not interfere with the Tribe's proposed use of the property.

BE IT FUTHER RESOLVED THAT the Tribal Council of the Soboba Band of Luiseño Indians requests that the Secretary of the Interior accept the above-referenced exceptions and take title to the 534.91 acre property in trust for the benefit of the Soboba Band of Luiseño Indians.

CERTIFICATION

We the elected members of the Tribal Council of the Soboba Band of Luiseño Indians do hereby certify that the foregoing Resolution was adopted by the Soboba Tribal Council at a duly held meeting convened on the Soboba Indian Reservation on December 4, 2007 by a vote 3 "FOR", 0 "AGAINST", and 0 "ABSTAINING", and such Resolution has not been rescinded or amended in any way.

(Vacant) Chairman

Rosemary Morillo, Acting Chair

Rose Salgado, Secretary

Geneva Mojado, Treasurer

Julie Parcero, Council Member

SOBOBA BAND OF LUISEÑO INDIANS

P.O. BOX 487 * SAN JACINTO, CA 92581 * (951) 654-2765

RESOLUTION

RES. NO. GR08-WWTF-21

RE: Approval of the development of a Waste Water Treatment Facility to be located on the Soboba Indian Reservation.

Whereas, the Soboba Band of Luiseño Indians (Soboba Tribe) is a federally-recognized Indian Tribal Government; and

Whereas, the Soboba Band of Luiseño Indians' held a General Membership Meeting on Saturday, April 19, 2008; and

Whereas, the Soboba Tribe proposes the development of a tertiary sequencing batch reactor wastewater treatment facility will have a maximum daily capacity of 1.2 million gallons per day and be constructed in three phases; and

Whereas, the Waste Water Treatment Facility that will service all Reservation territory and the Horseshoe Grande property; and

Whereas, the plant would meet California Title 22 requirements for resuse of treated effluent for activities such as agricultural irrigation, landscape irrigation, and fire control.

Now Therefore Be It Resolved, that the General Membership approved for the Soboba Tribal Council to pursue the development of the Waste Water Treatment Facility to be located on the Soboba Indian Reservation.

CERTIFICATION

We, the elected members of the Soboba Tribal Council of the Soboba Band of Luiseño Indians do hereby certify that the foregoing Resolution was adopted by the Soboba General Membership at a duly held meeting convened on the Soboba Indian Reservation on April 19, 2008 by a vote of **50 FOR, 0 AGAINST, 0 ABSTAINING,** and such Resolution has not been rescinded or amended in any way.

Robert J. Salgado Sr., Chairman

Rosemary Morillo, Vice-Chair

Rose Salgado, Secretary

Geneva Mojado, Treasurer

Julie Parcero, Member

Appendix J:

Horseshoe Grande Drainage Study

APPENDIX J

SOBOBA HORSESHOE GRANDE PRELIMINARY DRAINAGE STUDY

ENGINEERING RESOURCES
OF SOUTHERN CALIFORNIA, INC.

SOBOBA PROPERTY
SAN JACINTO CA

PRELIMINARY DRAINAGE STUDY

Prepared for:
ENTRIX, Inc.

By:
Engineering Resources of Southern California, Inc.
3550 East Florida Avenue, Suite B
Hemet CA 92544

May 21, 2008

Job No. 08001001

TABLE OF CONTENTS

1.0 Introduction 1

1.1 Purpose of Study 1

1.2 Scope 1

2.0 Study Area 1

2.1 Area Characteristics 1

2.2 Soil Groups 3

2.3 Land Uses 3

3.0 Hydrology and Hydraulics 3

3.1 Methodology – Unit Hydrograph Method 3

3.2 Design Storm 4

3.3 Hydrologic Results 4

4.0 Summary 11

EXHIBITS

EXHIBIT 1 - EXISTING DRAINAGE FACILITIES

EXHIBIT 2 - PROPOSED DRAINAGE FACILITIES

EXHIBIT 3 – DRAINAGE MAP

APPENDIX

OFFSITE HYDROLOGY ANALYSIS
CIVILDESIGN Unit Hydrograph Method Calculations

ONSITE HYDROLOGY ANALYSIS
CIVILDESIGN Unit Hydrograph Method Calculations

HYDRAULIC CALCULATIONS

1.0 INTRODUCTION

1.1 Purpose of Study

The Soboba Band of Luiseno Indians has proposed to transfer 34 parcels totaling approximately 534.9 acres currently held in fee-title to trust status. This real estate is collectively known as the "Horseshoe Grande" property. The Tribe intends to relocate its existing casino, which presently resides on trust lands, to the Horseshoe Grande property.

This hydrology study is performed to address the drainage issues related to the project as part of the Environmental Impact Statement (EIS),

This Preliminary Drainage Study provides an analysis of the offsite drainage patterns and potential onsite drainage concerns. Design flows were determined for the offsite contributory areas and onsite areas based on the Riverside County Flood Control and Water Conservation District's (RCFC&WCD) Hydrology Manual, dated April 1978.

This study will evaluate the capacities of the existing storm drain facilities. It will also determine the improvements required to mitigate the deficiencies to convey the tributary flows under developed conditions.

1.2 Scope

Preliminary calculations were completed to identify and quantify of the runoff coming onto the site from offsite areas and to quantify the increase in runoff due to the property's development. Hydrologic calculations were performed using the Unit Hydrograph Method listed in the above-referenced RCFC&WCD's Manual, dated April 1978.

2.0 STUDY AREA

2.1 Area Characteristics

This project covers approximately 54.5 acres of developments in Riverside County, east of Hemet within the Soboba Indian Reservation. Soboba Road bounds the site on the east and the San Jacinto River bounds the site on the west. The site surrounds an existing mobile home park and is protected on the south and west by a levee. A large wetland/pond area exists on the site, a few hundred feet south of Lake Park Drive. Standing water was visible during a site visit. Two interconnected golf course lakes are located north of Lake Park Drive in the southern and central parts of the golf course.

Under existing conditions, storm runoff is conveyed overland to the site from the northeast and then surface runoff from the site is conveyed to the west or northwest. The levee to the south directs runoff from Juaro Canyon away from the site and to the river. On the west, the levee protects the site from flooding by the San Jacinto River. Surface runoff from areas directly east of Soboba Road

and south of the Lake Park Drive intersection runs through several ravines that discharge stormwater perpendicular to Soboba Road. During small storm events, runoff from areas near Lake Park Drive run along the east side of Soboba Road to a low point approximately 900 feet south of Lake Park Drive where it overtops the road and travels down the steep embankment to the site. There is an existing 24-inch culvert carrying low flows across the road. (See Exhibit 1) Large flows likely overtop the road perpendicular to the centerline and may cause structural damage to the roadway. Deep erosion areas are present along the west side of the road in the embankment to the subject property. Runoff from areas south of Lake Park Drive makes its way across Soboba Road and runs along the west side of the road north to the existing pond area.

The runoff generated from the existing mobile home trailer park flows northerly toward Lake Park Drive. The runoff is conveyed westerly through a shallow concrete box culvert under the entrance of the park to continue in a concrete lined channel toward the existing three 45-inch culverts located at the northwest corner of the property. The storm flows from the area between the mobile home park and the east levee of San Jacinto River will also drain north toward the above-mentioned culverts. The runoff will be carried north under Lake Park Drive and conveyed westerly through an earthen ditch toward an existing collection basin in the southwest corner of the golf course.

There are several culverts along Soboba Road north of Lake Park Drive (See Exhibit 1 for the existing drainage facilities).

Three 48-inch Corrugated Metal Pipes (CMP) presently convey flows from the ravine just north of the intersection of Lake Park Drive and Soboba Road.

There is also a 10-foot-wide by 7-foot-high Reinforced Concrete Box (RCB) that conveys the runoff from a larger ravine to a detention basin on the west side of Soboba Road and along the south side of the existing residential development. The flows are intercepted by an existing 60-inch pipe and carried westerly toward an existing pond within the golf course. When the existing ponds are over topped, the runoff will continue down stream toward the San Jacinto River north of the golf course.

An existing 84-inch RCP presently conveys flows from the watershed north of Chabela Street to a concrete-lined trapezoidal channel along the west side of Soboba Road and within the Golf Course Country Club property. These flows ultimately discharge into the San Jacinto River.

According to FEMA Flood Insurance Rate Map (FIRM) Panel Number 0650560005D, the site lies within Zone X. Zone X is defined by Areas of 500-year flood; areas of 100-year flood with average depths of less than 1-foot or with drainage areas less than 1 square-mile; and areas protected by levees from the 100-year flood.

Riverside County Flood Control and Water Conservation District generally requires the site to detain the incremental flows due to development.

This study provides hydrology analysis for the existing and developed conditions of the site during the 10- and 100-year storm events. Additional hydrology analysis was performed to determine the volume of the basin required to meet the Water Quality Management Plans (WQMP) requirements. The peak volume under developed conditions during a two-year storm event is used for sizing the WQMP basin. The storm drain infrastructures are considered to pass flows for the 100-year storm.

The offsite contributory area is divided into eight (8) distinct Sub-areas. (See Exhibit 3 for Drainage Map)

2.2 Soil Groups

Soil Group C was used for all areas in this study. While other soil types are present, Soil Group C is conservative and therefore appropriate for this site. Antecedent Moisture Condition (AMC) II was used for this analysis.

2.3 Land Uses

The upstream watershed is comprised principally of the undeveloped foothill areas of the San Jacinto Mountains.

There are four site alternatives proposed for the onsite developments. The hydrology analysis is performed for each alternative. (See Exhibits for Alternatives)

Alternative 1 includes approximately 54.5 acres of developments including construction of a casino, hotel, convention center, event arena, restaurant, administration buildings, retail shops and parking structures. Alternative 2 considers approximately 51.7 acres in development with 20 percent reduction in development areas as compared to Alternative 1. Alternative 3 includes 22.45 acres of development while Alternative 4 is considered as the preferred alternative with approximately 54.5 of improvements in two phases.

3.0 HYDROLOGY AND HYDRAULICS

3.1 Methodology-Unit Hydrograph Method

The offsite contributory area is estimated to be approximately 1,196 acres. The Unit Hydrograph Method (UHM) was selected for the hydrologic calculations of the offsite flows based on the RCFC&WCD's Manual, dated April 1978.

The UHM was performed for the 1-, 3-, 6- and 24-hour duration and 10-year and 100-year storm events. The 1-hour storm event was considered for the tributary areas smaller than 300 acres.

The 100-year storm peak flow from the above analysis was considered in the evaluation and design of the storm drain facilities.

Construction activities in the project area are regulated by the Riverside County NPDES Storm Water Program and require coverage under the State Phase II General Permit for Storm Water Discharges from Construction Activities. In compliance with the above requirements, a WQMP basin will be provided onsite to minimize the potential for discharge of pollutants into urban runoff from development projects. The 24-hour, 2-year storm runoff was considered for sizing the WQMP basin for each alternative.

This computational method is well documented in the manual. In general, a unit hydrograph is defined as the runoff hydrograph resulting from unit depth of excess rainfall produced by a storm of uniform intensity and a desired duration. The unit depth of rainfall is typically taken to be 1-inch over the entire study area. The Riverside County Flood Control and Water Conservation District has derived these methods from stream flow data and basin physiographic data. To calculate the desired flood hydrograph, the unit hydrograph is applied to the hyetograph of rainfall excess to estimate the hydrograph of surface runoff and to produce the flood hydrograph. No base flow was added in the calculations performed for this project.

CIVILCADD/CIVILDESIGN's Unit Hydrograph Analysis Program for Riverside County was used for the analysis. This program utilizes the procedures, data and methods found in the RCFC&WCD Manual.

3.2 Design Storm

The 100-year peak storm runoff was used as the principal design storm for this project.

The onsite detention basin was sized based on the incremental volume generated due to the development during the 24-hour, 100-year storm event.

3.3 Hydrologic Results

Offsite Hydrology

The existing and developed hydrologic conditions were analyzed as part of this study. The proposed peak 100-year, 1-, 3-, 6-, and 24-hour flows were determined for each of the project's eight offsite Sub-basins. The proposed hydrology map contained in the Appendix of this report defines the watershed. Copies of the CIVILDESIGN analyses are located in Appendix 1. Table 1 details the Sub-basin areas and flow rates computed by the computer program.

TABLE 1
OFFSITE HYDROLOGY
100-YEAR STORM EVENT

Area	Area A.C.	1-Hour	3-Hour	6-Hour	24-Hour
A-1	744	868	770	728	426
A-2	13.6	34	23	21	9
A-3	35.7	76	54	51	24
A-4	78	169	117	105	51
A-5	202	361	268	251	128
A-6	45	94	69	66	30
A-7	681	945	797	744	411
A-8	141	306	212	198	93

Onsite Hydrology

The existing and proposed hydrology for the 10-year and 100-year, 1-, 3-, 6, and 24-hour storm events was analyzed as part of this study. Riverside County dictates that the developed runoff peak flow cannot exceed the existing peak flow through the use of detention basins. Onsite basins were sized based on the difference in runoff volume from the existing and developed condition as a conservative estimate. Based on the provided site plan, excess area for detention basins are available.

The above analysis was performed for each alternative. The result of the analysis is summarized in Tables 2 and 3 for 10-year and 100-year storm event respectively.

TABLE 2
ONSITE HYDROLOGY
10-YEAR STORM EVENT

UNDEVELOPED CONDITION								
STORM DURATION	**ALT. NO. 1 A = 15.95**		**ALT. NO. 2 A = 12.8**		**ALT. NO. 3 A = 5.9**		**PREF. ALT. A = 16.3**	
	V_{10} Ac-Ft	**Q_{10} cfs**	**V_{10} Ac-Ft**	**Q_{10} cfs**	**V_{10} Ac-Ft**	**Q_{10} cfs**	**V_{10} Ac-Ft**	**Q_{10} cfs**
24-Hour	1.9	5.9	1 .5	4.7	0.7	2.2	2.0	6.0
6-Hour	1.4	16.0	1.1	12.8	0.5	5.9	1.4	16.3
3-Hour	1.2	17.1	0.9	13.7	0.4	6.3	1.2	17.5
1-Hour	0.9	29.3	0.7	23.5	0.3	10.8	0.9	29.9
DEVELOPED CONDITION								
24-Hour	3.7	7.3	2.8	5.9	1.3	2.7	3.6	7.5
6-Hour	2.2	18.8	1.7	15.1	0.8	7.0	2.2	19.2
3-Hour	1.6	19.3	1.3	15.5	0.6	7.1	1.6	19.7
1-Hour	1.0	28.7	0.8	23.0	0.4	10.6	1.0	29.3

TABLE 3

ONSITE HYDROLOGY
100-YEAR STORM EVENT

UNDEVELOPED CONDITION								
STORM DURATION	**ALT. NO. 1 A = 15.95**		**ALT. NO. 2 A = 12.8**		**ALT. NO. 3 A = 5.9**		**PREF. ALT. A = 16.3**	
	V_{100} Ac-Ft	**Q_{100} cfs**	**V_{100} Ac-Ft**	**Q_{100} cfs**	**V_{100} Ac-Ft**	**Q_{100} cfs**	**V_{100} Ac-Ft**	**Q_{100} cfs**
24-Hour	4.1	10.7	3.3	8.6	1.5	4.0	4.2	10.9
6-Hour	2.6	24.6	2.1	19.7	1.0	9.1	2.7	25.1
3-Hour	2.1	27.2	1.7	21.9	0.8	10.0	2.1	27.8
1-Hour	1.4	44.3	1.1	35.5	0.5	16.4	1.4	45.2
DEVELOPED CONDITION								
24-Hour	6.1	12.1	4.9	9.7	2.2	4.5	6.2	12.4
6-Hour	3.4	28	2.7	22.4	1.3	10.3	3.5	28.6
3-Hour	2.5	29.5	2.0	23.8	0.9	11.0	2.6	30.3
1-Hour	1.5	42.6	1.2	34.2	0.5	15.7	1.5	43.5

The hydrology calculations for the WQMP requirements are included in Table 4.

TABLE 4

WQMP
2-YEAR STORM EVENT

STORM DURATION	ALT. NO. 1 A = 15.95		ALT. NO. 2 A = 12.8		ALT. NO. 3 A = 5.9		PREF. ALT. A = 16.3	
	V Ac-Ft	Q cfs	V Ac-Ft	Q cfs	V Ac-Ft	Q cfs	V Ac-Ft	Q cfs
24-Hour	2.0	3.9	1.6	3.2	0.7	1.5	2.0	4.0
6-Hour	1.3	12.4	1.1	10.0	0.5	4.6	1.3	12.7
3-Hour	0.9	12.0	0.7	9.7	0.3	4.5	0.9	12.3
1-Hour	0.6	18.9	0.5	15.2	0.2	7.0	0.7	19.3

Proposed Grading Recommendations
The offsite flows from east and south of Lake Park Drive will be conveyed under Soboba Road to a concrete lined channel along the west side of the road. (Exhibit 2, Facility No. 7) The channel will continue parallel to Lake Park Drive near the northeast corner of the existing mobile home park. Significant fill along the west side of Soboba Road, south of Lake Park Drive, is required to widen the road and to accommodate proposed storm drain infrastructure along the edge of the widened roadway.

Storm Drain Facilities
Numerous storm drain facilities are proposed for the development of the site based on the analysis performed and the assumptions made for this study. First, the onsite improvements will be discussed.

Offsite flows from Sub-basins 2, 3 and 4 (Q_{100} = 279 cfs) will be directed to the proposed channel along the west side of Soboba Road (Facility No. 7). The channel will continue westerly along the south side of Lake Park Drive. The

basin will collect flows from onsite areas. The portion of the development adjacent to Lake Park Drive can have its runoff discharged directly into the proposed culvert (Facility No. 8) under Lake Park Drive which will ultimately discharge into a detention basin in the southwest corner of the golf course. The detention requirement imposed by Riverside County can be met by configuring the drainage in this way. The proposed detention basin (Facility No. 9) will need to hold approximately 4 ac-ft of runoff. This can be accomplished with a 2-acre basin that is about 4 feet deep, which leaves excess room for open space. The basin volume required will vary based on the level of development proposed for each alternative.

The onsite detention basin (Facility No. 9) will discharge its flow into a 42-inch RCP culvert (Facility No. 11) within a proposed drainage easement that traverses the site from the south to the northwest. Along its course the culvert will have several connection points for local onsite drainage. This culvert will discharge to the proposed channel which conveys offsite flows toward the proposed three 60-inch RCP culverts under Lake Park Drive. Runoff from the road may be directed to the catch basins and then to the main storm drain. The culvert beneath Lake Park Drive will discharge its flow into a detention basin in the southwest corner of the golf course (Facility No. 12).

A detention basin will also be constructed at northwest corner of Horseshoe Grande Property (Facility No. 10). As delineated on the above exhibit, the onsite flows along the west side of the Horseshoe Grande property will continue in a northerly direction to this basin. The outflow from the basin along with the onsite runoff from the existing mobile home park will be conveyed north of Lake Park Drive via the existing three 45-inch culverts to the detention basin in the southwest corner of the golf course (Facility No. 12).

A more detailed drainage study will be required to design an outlet structure and a storm drain facility (Facility No.14) to convey flows from the detention basin (Facility No.12) northerly to discharge into San Jacinto River. Additionally, the existing 60-inch RCP storm drain carrying offsite runoff from the basin down stream the existing 10'x7' RCB (Facility No.5) will be extended westerly to connect to the proposed storm drain (Facility No.14). This will eliminate the discharge of offsite runoff into the golf course.

The onsite drainage improvements proposed will include grading, additional culverts under Soboba Road, local storm drains and construction of a concrete-lined trapezoidal channel to convey onsite and offsite flows toward the golf course north of Lake Park Drive.

TABLE 5

DETENTION BASIN VOLUME
INCLUDING WQMP

SITE ALTERNATIVE	VOLUME – AC-FT
1	4.0
2	3.2
3	1.4
4 (Preferred Alternative)	4.0

All the culvert sizing calculations are provided in the Appendix of this report.

Detention
As previously discussed the size of the detention basin will vary based on the size of the developments proposed for each alternative.

Table 5 details total volume required for the proposed onsite detention basin for each alternative.

Open Space and detention areas have not been calculated, since they will not contribute to developed flows.

In general, the detention requirement must be estimated by a hydraulic retarding basin calculation which was not performed as part of this study. The net volume runoff method is conservative and deemed appropriate for this level of study.

The proposed detention basin on the south portion of the site is oversized and will attenuate the 100-year incremental flows from the site then on to the golf

course thereby providing some measure of flood control to the downstream areas. The degree of the potential attenuation has not been quantified and should be addressed in a more detailed drainage study.

Soboba Road Improvements

Exhibit 2 shows the proposed improvements to Soboba Road along the project's frontage. Exhibit 3, Drainage Map, and Table 1 show the magnitude and direction of the offsite flows that impact the roadway. In general, the proposed grading scheme is to transport the flows from the ravines through culverts beneath the existing roadway to the site. As mentioned previously, flows from Sub-basins 2, 3 and 4 will be conveyed through a channel along Soboba Road and along the south side of Lake Park Drive. The offsite flows along with the onsite runoff from the basin will be directed northerly toward the golf course via three 60-inch RCPs.

Hence the typical Soboba Road Cross Section shows a proposed ditch on the east side with a culvert inlet, and a concrete-lined channel along the west side of the road.

Culvert sizing calculations are in the Appendix of this report. Current RCFC&WCD's criterion requires that peak 10-year, 1-hour flows be contained within top of curb and peak 100-year, 1-hour flows are contained within the street right-of-way. Since the flows that cross or come into contact with the road are substantial, improvements to the roadway will have to include some improvements to the east side of the existing roadway.

In general cross culverts will convey flow from the defined ravines below the roadway to the channel or will overtop the road and be conveyed along the west edge of the road to the discharge location. An extra 20 feet beyond the right-of-way may be required to accommodate this concept.

Some options are available regarding improvements to the eastern half of the roadway. First, the proposed channel along the entire roadway may not be required. Local depressed areas for the culvert inlets may be adequate until the roadway is fully improved. Second, the proposed un-curbed median can serve as an inlet to street surface drainage; this may lessen the impact of ponding on the existing roadway.

4.0 Summary

The Soboba Band of Luiseno Indians has proposed to transfer 34 parcels totaling approximately 534.9 acres currently held in fee-title to trust status. This real estate is collectively known as the "Horseshoe Grande" property. The tribe intends to relocate its existing casino, which presently resides on trust lands, to the Horseshoe Grande property.

There are four alternative developments proposed for this project: Alternative 1 includes approximately 54.5 acres of developments including construction of a casino, hotel, convention center, event arena, restaurant, administration buildings, retail shops and parking structures. Alternative 2 considers approximately 51.7 acres in development with 20 percent reduction in development areas as compared to Alternative 1. Alternative 3 includes 22.45 acres of development while Alternative 4 is considered as the preferred alternative with approximately 54.5 of improvements in two phases.

The hydrology analysis is performed to determine the tributary offsite flows to the site and evaluate the existing drainage facilities to convey the subject runoff across Soboba Road. Additional drainage improvements are proposed to provide mitigation measures for the current drainage deficiencies. The onsite hydrology is performed to quantify the peak runoff generated under the existing and developed conditions for all four alternatives. Additional analysis is also performed to incorporate the WQMP requirement for each development alternative. Exhibits 1 and 2 of this report delineate the existing and proposed drainage facilities considered for this project. The proposed onsite drainage facilities and the proposed road culvert crossings are adequate to safely convey the offsite and onsite runoff toward the golf course ponds as an outlet located north of Lake Park Drive.

APPENDIX

EXHIBITS

OFFSITE HYDROLOGY

100-YEAR STORM EVENT

OFFSITE HYDROLOGY 100-YEAR STORM EVENT					
AREA	**1-HOUR**	**3-HOUR**	**6-HOUR**	**24-HOUR**	**AREA AC**
A-1	868	770	728	426	744
A-2	34	23	21	9	13.6
A-3	76	54	51	24	35.7
A-4	169	117	105	51	78.6
A-5	361	268	251	128	202
A-6	94	69	66	30	45
A-7	945	797	744	411	681
A-8	306	212	198	93	141

AREA 1

soba11100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: soba11100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 744.00(Ac.) = 1.163 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 744.00(Ac.) = 1.163 Sq. Mi.
Length along longest watercourse = 17919.00(Ft.)
Length along longest watercourse measured to centroid = 7620.00(Ft.)
Length along longest watercourse = 3.394 Mi.
Length along longest watercourse measured to centroid = 1.443 Mi.
Difference in elevation = 2020.00(Ft.)
Slope along watercourse = 595.2118 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.587 Hr.
Lag time = 35.20 Min.
25% of lag time = 8.80 Min.
40% of lag time = 14.08 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
744.00	0.55	409.20

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
744.00	1.20	892.80

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.33 %
Adjusted average point rain = 1.192(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
744.000	86.00	0.000

Total Area Entered = 744.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	14.203	0.900	6.745
2	0.167	28.406	2.212	16.586
3	0.250	42.609	3.136	23.514
4	0.333	56.812	4.106	30.785
5	0.417	71.015	5.707	42.793
6	0.500	85.218	8.037	60.259
7	0.583	99.421	14.623	109.644
8	0.667	113.625	15.667	117.474
9	0.750	127.828	7.415	55.600
10	0.833	142.031	5.432	40.728
11	0.917	156.234	4.341	32.546
12	1.000	170.437	3.473	26.038
13	1.083	184.640	3.182	23.858
14	1.167	198.843	2.651	19.881
15	1.250	213.046	2.374	17.798
16	1.333	227.249	2.043	15.318
17	1.417	241.452	1.825	13.685
18	1.500	255.655	1.677	12.577
19	1.583	269.858	1.425	10.687
20	1.667	284.061	1.317	9.877
21	1.750	298.264	1.151	8.631
22	1.833	312.468	1.049	7.863
23	1.917	326.671	0.909	6.817
24	2.000	340.874	0.770	5.775
25	2.083	355.077	0.674	5.057
26	2.167	369.280	0.592	4.436
27	2.250	383.483	0.538	4.032
28	2.333	397.686	0.412	3.086
29	2.417	411.889	0.318	2.385
30	2.500	426.092	0.173	1.301
31	2.583	440.295	0.170	1.278
32	2.667	454.498	0.169	1.267
33	2.750	468.701	0.149	1.115
34	2.833	482.904	0.142	1.065
35	2.917	497.107	0.142	1.065
36	3.000	511.311	0.124	0.930
37	3.083	525.514	0.086	0.648
38	3.167	539.717	0.085	0.639
39	3.250	553.920	0.086	0.647
40	3.333	568.123	0.106	0.796
41	3.417	582.326	0.114	0.852
42	3.500	596.529	0.114	0.852
43	3.583	610.732	0.097	0.730
44	3.667	624.935	0.059	0.439
45	3.750	639.138	0.057	0.426
46	3.833	653.341	0.056	0.420
47	3.917	667.544	0.037	0.275
48	4.000	681.747	0.028	0.213
49	4.083	695.950	0.028	0.213
50	4.167	710.154	0.022	0.167
			Sum = 100.000	Sum= 749.813

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.601	0.176	---	0.43
2	0.17	4.30	0.615	0.176	---	0.44
3	0.25	5.00	0.715	0.176	---	0.54
4	0.33	5.00	0.715	0.176	---	0.54
5	0.42	5.80	0.830	0.176	---	0.65
6	0.50	6.50	0.930	0.176	---	0.75
7	0.58	7.40	1.058	0.176	---	0.88
8	0.67	8.60	1.230	0.176	---	1.05
9	0.75	12.30	1.759	0.176	---	1.58
10	0.83	29.10	4.162	0.176	---	3.99
11	0.92	6.80	0.973	0.176	---	0.80
12	1.00	5.00	0.715	0.176	---	0.54
Sum =		100.0			Sum =	12.2

Flood volume = Effective rainfall 1.02(In)

soba11100

times area 744.0(Ac.)/[(In)/(Ft.)] = 63.0(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 10.887(Ac.Ft)
Total rainfall = 1.19(In)
Flood volume = 2744766.0 Cubic Feet
Total soil loss = 474246.4 Cubic Feet

Peak flow rate of this hydrograph = 868.789(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 225.0 450.0 675.0 900.0
0+ 5	0.0198	2.87	Q
0+10	0.0888	10.02	Q
0+15	0.2329	20.93	Q
0+20	0.4811	36.03	VQ
0+25	0.8791	57.80	V Q
0+30	1.4969	89.70	V Q
0+35	2.5072	146.71	V Q
0+40	3.9773	213.45	V Q
0+45	5.8175	267.20	V Q
0+50	8.1678	341.27	V Q
0+55	11.0703	421.45	V Q
1+ 0	14.4779	494.78	V Q
1+ 5	18.3682	564.88	V Q
1+10	22.7898	642.01	V Q
1+15	27.8389	733.13	V Q
1+20	33.8223	868.79	V Q
1+25	39.4455	816.48	V Q
1+30	43.2798	556.75	Q V
1+35	46.1909	422.69	Q V
1+40	48.4142	322.82	Q V
1+45	50.2556	267.38	Q V
1+50	51.8678	234.09	Q V
1+55	53.2566	201.66	Q V
2+ 0	54.4855	178.42	Q V
2+ 5	55.5607	156.13	Q V
2+10	56.5173	138.90	Q V
2+15	57.3729	124.23	Q V
2+20	58.1227	108.87	Q V
2+25	58.7928	97.31	Q V
2+30	59.3781	84.99	Q V
2+35	59.8946	74.99	Q V
2+40	60.3400	64.67	Q V
2+45	60.7207	55.28	Q V
2+50	61.0474	47.43	Q V
2+55	61.3271	40.62	Q V
3+ 0	61.5664	34.74	Q V
3+ 5	61.7572	27.72	Q V
3+10	61.9077	21.85	Q V
3+15	62.0180	16.01	Q V
3+20	62.1163	14.28	Q V
3+25	62.2068	13.14	Q V
3+30	62.2908	12.20	Q V
3+35	62.3703	11.54	Q V
3+40	62.4451	10.86	Q V
3+45	62.5125	9.79	Q V
3+50	62.5710	8.50	Q V
3+55	62.6266	8.07	Q V
4+ 0	62.6808	7.86	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: soba13100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 744.00(Ac.) = 1.163 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 744.00(Ac.) = 1.163 Sq. Mi.
Length along longest watercourse = 17919.00(Ft.)
Length along longest watercourse measured to centroid = 7620.00(Ft.)
Length along longest watercourse = 3.394 Mi.
Length along longest watercourse measured to centroid = 1.443 Mi.
Difference in elevation = 2020.00(Ft.)
Slope along watercourse = 595.2118 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.587 Hr.
Lag time = 35.20 Min.
25% of lag time = 8.80 Min.
40% of lag time = 14.08 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
744.00	0.90	669.60

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
744.00	2.10	1562.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.67 %
Adjusted average point rain = 2.093(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
744.000	86.00	0.000

Total Area Entered = 744.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

soba13100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	14.203	0.900	6.745
2	0.167	28.406	2.212	16.586
3	0.250	42.609	3.136	23.514
4	0.333	56.812	4.106	30.785
5	0.417	71.015	5.707	42.793
6	0.500	85.218	8.037	60.259
7	0.583	99.421	14.623	109.644
8	0.667	113.625	15.667	117.474
9	0.750	127.828	7.415	55.600
10	0.833	142.031	5.432	40.728
11	0.917	156.234	4.341	32.546
12	1.000	170.437	3.473	26.038
13	1.083	184.640	3.182	23.858
14	1.167	198.843	2.651	19.881
15	1.250	213.046	2.374	17.798
16	1.333	227.249	2.043	15.318
17	1.417	241.452	1.825	13.685
18	1.500	255.655	1.677	12.577
19	1.583	269.858	1.425	10.687
20	1.667	284.061	1.317	9.877
21	1.750	298.264	1.151	8.631
22	1.833	312.468	1.049	7.863
23	1.917	326.671	0.909	6.817
24	2.000	340.874	0.770	5.775
25	2.083	355.077	0.674	5.057
26	2.167	369.280	0.592	4.436
27	2.250	383.483	0.538	4.032
28	2.333	397.686	0.412	3.086
29	2.417	411.889	0.318	2.385
30	2.500	426.092	0.173	1.301
31	2.583	440.295	0.170	1.278
32	2.667	454.498	0.169	1.267
33	2.750	468.701	0.149	1.115
34	2.833	482.904	0.142	1.065
35	2.917	497.107	0.142	1.065
36	3.000	511.311	0.124	0.930
37	3.083	525.514	0.086	0.648
38	3.167	539.717	0.085	0.639
39	3.250	553.920	0.086	0.647
40	3.333	568.123	0.106	0.796
41	3.417	582.326	0.114	0.852
42	3.500	596.529	0.114	0.852
43	3.583	610.732	0.097	0.730
44	3.667	624.935	0.059	0.439
45	3.750	639.138	0.057	0.426
46	3.833	653.341	0.056	0.420
47	3.917	667.544	0.037	0.275
48	4.000	681.747	0.028	0.213
49	4.083	695.950	0.028	0.213
50	4.167	710.154	0.022	0.167
			Sum = 100.000	Sum= 749.813

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.327	0.176	---	0.15
2	0.17	1.30	0.327	0.176	---	0.15
3	0.25	1.10	0.276	0.176	---	0.10
4	0.33	1.50	0.377	0.176	---	0.20
5	0.42	1.50	0.377	0.176	---	0.20
6	0.50	1.80	0.452	0.176	---	0.28
7	0.58	1.50	0.377	0.176	---	0.20
8	0.67	1.80	0.452	0.176	---	0.28
9	0.75	1.80	0.452	0.176	---	0.28
10	0.83	1.50	0.377	0.176	---	0.20
11	0.92	1.60	0.402	0.176	---	0.23
12	1.00	1.80	0.452	0.176	---	0.28
13	1.08	2.20	0.553	0.176	---	0.38
14	1.17	2.20	0.553	0.176	---	0.38
15	1.25	2.20	0.553	0.176	---	0.38
16	1.33	2.00	0.502	0.176	---	0.33

17	1.42	2.60	0.653	0.176	---	0.48
18	1.50	2.70	0.678	0.176	---	0.50
19	1.58	2.40	0.603	0.176	---	0.43
20	1.67	2.70	0.678	0.176	---	0.50
21	1.75	3.30	0.829	0.176	---	0.65
22	1.83	3.10	0.779	0.176	---	0.60
23	1.92	2.90	0.728	0.176	---	0.55
24	2.00	3.00	0.754	0.176	---	0.58
25	2.08	3.10	0.779	0.176	---	0.60
26	2.17	4.20	1.055	0.176	---	0.88
27	2.25	5.00	1.256	0.176	---	1.08
28	2.33	3.50	0.879	0.176	---	0.70
29	2.42	6.80	1.708	0.176	---	1.53
30	2.50	7.30	1.834	0.176	---	1.66
31	2.58	8.20	2.060	0.176	---	1.88
32	2.67	5.90	1.482	0.176	---	1.31
33	2.75	2.00	0.502	0.176	---	0.33
34	2.83	1.80	0.452	0.176	---	0.28
35	2.92	1.80	0.452	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.8

Flood volume = Effective rainfall 1.57(In)
times area 744.0(Ac.)/[(In)/(Ft.)] = 97.3(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 32.455(Ac.Ft)
Total rainfall = 2.09(In)
Flood volume = 4239306.0 Cubic Feet
Total soil loss = 1413745.2 Cubic Feet

Peak flow rate of this hydrograph = 769.889(CFS)

---

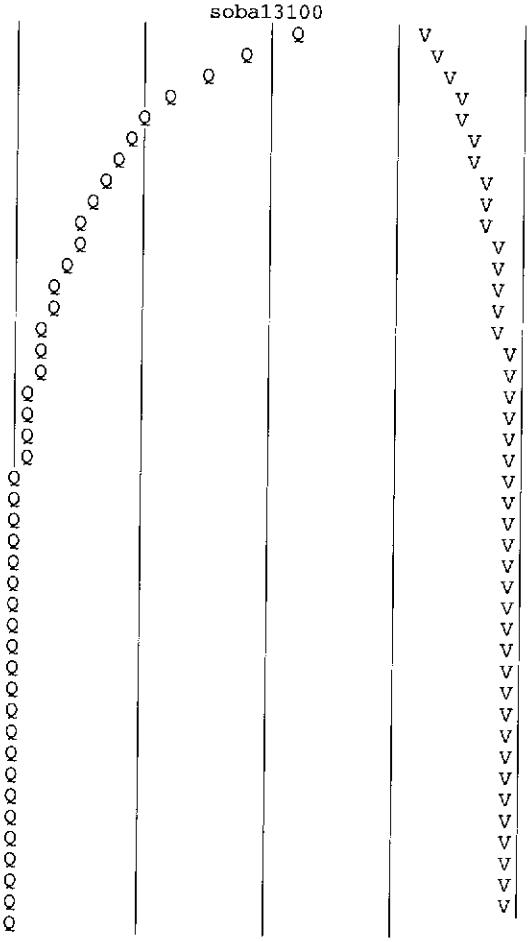
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 200.0 400.0 600.0 800.0
0+ 5	0.0070	1.02	Q
0+10	0.0313	3.52	Q
0+15	0.0777	6.74	Q
0+20	0.1550	11.23	Q
0+25	0.2802	18.18	Q
0+30	0.4771	28.60	VQ
0+35	0.7998	46.84	V Q
0+40	1.2604	66.89	V Q
0+45	1.7951	77.63	V Q
0+50	2.4222	91.07	V Q
0+55	3.1630	107.55	V Q
1+ 0	3.9960	120.96	V Q
1+ 5	4.9047	131.94	V Q
1+10	5.8750	140.90	V Q
1+15	6.9300	153.18	V Q
1+20	8.0225	158.63	V Q
1+25	9.1643	165.79	V Q
1+30	10.4233	182.81	V Q
1+35	11.8290	204.10	V Q
1+40	13.3682	223.49	V Q
1+45	15.0074	238.02	V Q
1+50	16.7420	251.85	V Q
1+55	18.6139	271.80	V Q
2+ 0	20.6536	296.16	V Q
2+ 5	22.7943	310.83	V Q
2+10	25.0562	328.42	V Q
2+15	27.5351	359.95	V Q
2+20	30.1935	385.99	V Q
2+25	32.9803	404.65	V Q
2+30	35.9804	435.61	V Q
2+35	39.3047	482.70	V Q
2+40	43.0659	546.12	V Q
2+45	47.2873	612.94	V Q
2+50	51.7523	648.32	V Q
2+55	56.5570	697.65	V Q
3+ 0	61.8252	764.95	V Q
3+ 5	67.1275	769.89	V Q
3+10	72.0110	709.09	V Q
3+15	75.9393	570.38	Q V

soba13100

3+20	78.9920	443.25	
3+25	81.5801	375.80	
3+30	83.7295	312.08	
3+35	85.4891	255.50	
3+40	87.0000	219.38	
3+45	88.3112	190.39	
3+50	89.4635	167.30	
3+55	90.4782	147.33	
4+ 0	91.3751	130.24	
4+ 5	92.1643	114.59	
4+10	92.8577	100.69	
4+15	93.4686	88.70	
4+20	94.0036	77.67	
4+25	94.4685	67.51	
4+30	94.8689	58.14	
4+35	95.2132	50.00	
4+40	95.5072	42.69	
4+45	95.7573	36.31	
4+50	95.9629	29.86	
4+55	96.1303	24.31	
5+ 0	96.2686	20.08	
5+ 5	96.3872	17.22	
5+10	96.4934	15.42	
5+15	96.5887	13.83	
5+20	96.6746	12.47	
5+25	96.7532	11.42	
5+30	96.8250	10.42	
5+35	96.8893	9.34	
5+40	96.9488	8.65	
5+45	97.0056	8.24	
5+50	97.0597	7.86	
5+55	97.1107	7.41	
6+ 0	97.1560	6.57	
6+ 5	97.1943	5.56	
6+10	97.2259	4.59	
6+15	97.2517	3.74	
6+20	97.2728	3.06	
6+25	97.2889	2.34	
6+30	97.3010	1.76	
6+35	97.3099	1.29	
6+40	97.3158	0.86	
6+45	97.3188	0.43	
6+50	97.3200	0.18	



soba16100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: soba16100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 744.00(Ac.) = 1.163 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 744.00(Ac.) = 1.163 Sq. Mi.
Length along longest watercourse = 17919.00(Ft.)
Length along longest watercourse measured to centroid = 7620.00(Ft.)
Length along longest watercourse = 3.394 Mi.
Length along longest watercourse measured to centroid = 1.443 Mi.
Difference in elevation = 2020.00(Ft.)
Slope along watercourse = 595.2118 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.587 Hr.
Lag time = 35.20 Min.
25% of lag time = 8.80 Min.
40% of lag time = 14.08 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
744.00	1.40	1041.60

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
744.00	3.00	2232.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.74 %
Adjusted average point rain = 2.992(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
744.000	86.00	0.000

Total Area Entered = 744.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

soba16100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	14.203	0.900	6.745
2	0.167	28.406	2.212	16.586
3	0.250	42.609	3.136	23.514
4	0.333	56.812	4.106	30.785
5	0.417	71.015	5.707	42.793
6	0.500	85.218	8.037	60.259
7	0.583	99.421	14.623	109.644
8	0.667	113.625	15.667	117.474
9	0.750	127.828	7.415	55.600
10	0.833	142.031	5.432	40.728
11	0.917	156.234	4.341	32.546
12	1.000	170.437	3.473	26.038
13	1.083	184.640	3.182	23.858
14	1.167	198.843	2.651	19.881
15	1.250	213.046	2.374	17.798
16	1.333	227.249	2.043	15.318
17	1.417	241.452	1.825	13.685
18	1.500	255.655	1.677	12.577
19	1.583	269.858	1.425	10.687
20	1.667	284.061	1.317	9.877
21	1.750	298.264	1.151	8.631
22	1.833	312.468	1.049	7.863
23	1.917	326.671	0.909	6.817
24	2.000	340.874	0.770	5.775
25	2.083	355.077	0.674	5.057
26	2.167	369.280	0.592	4.436
27	2.250	383.483	0.538	4.032
28	2.333	397.686	0.412	3.086
29	2.417	411.889	0.318	2.385
30	2.500	426.092	0.173	1.301
31	2.583	440.295	0.170	1.278
32	2.667	454.498	0.169	1.267
33	2.750	468.701	0.149	1.115
34	2.833	482.904	0.142	1.065
35	2.917	497.107	0.142	1.065
36	3.000	511.311	0.124	0.930
37	3.083	525.514	0.086	0.648
38	3.167	539.717	0.085	0.639
39	3.250	553.920	0.086	0.647
40	3.333	568.123	0.106	0.796
41	3.417	582.326	0.114	0.852
42	3.500	596.529	0.114	0.852
43	3.583	610.732	0.097	0.730
44	3.667	624.935	0.059	0.439
45	3.750	639.138	0.057	0.426
46	3.833	653.341	0.056	0.420
47	3.917	667.544	0.037	0.275
48	4.000	681.747	0.028	0.213
49	4.083	695.950	0.028	0.213
50	4.167	710.154	0.022	0.167
			Sum = 100.000	Sum= 749.813

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.215	0.176	---	0.04
3	0.25	0.60	0.215	0.176	---	0.04
4	0.33	0.60	0.215	0.176	---	0.04
5	0.42	0.60	0.215	0.176	---	0.04
6	0.50	0.70	0.251	0.176	---	0.08
7	0.58	0.70	0.251	0.176	---	0.08
8	0.67	0.70	0.251	0.176	---	0.08
9	0.75	0.70	0.251	0.176	---	0.08
10	0.83	0.70	0.251	0.176	---	0.08
11	0.92	0.70	0.251	0.176	---	0.08
12	1.00	0.80	0.287	0.176	---	0.11
13	1.08	0.80	0.287	0.176	---	0.11
14	1.17	0.80	0.287	0.176	---	0.11
15	1.25	0.80	0.287	0.176	---	0.11
16	1.33	0.80	0.287	0.176	---	0.11

17	1.42	0.80	0.287	0.176	---	0.11
18	1.50	0.80	0.287	0.176	---	0.11
19	1.58	0.80	0.287	0.176	---	0.11
20	1.67	0.80	0.287	0.176	---	0.11
21	1.75	0.80	0.287	0.176	---	0.11
22	1.83	0.80	0.287	0.176	---	0.11
23	1.92	0.80	0.287	0.176	---	0.11
24	2.00	0.90	0.323	0.176	---	0.15
25	2.08	0.80	0.287	0.176	---	0.11
26	2.17	0.90	0.323	0.176	---	0.15
27	2.25	0.90	0.323	0.176	---	0.15
28	2.33	0.90	0.323	0.176	---	0.15
29	2.42	0.90	0.323	0.176	---	0.15
30	2.50	0.90	0.323	0.176	---	0.15
31	2.58	0.90	0.323	0.176	---	0.15
32	2.67	0.90	0.323	0.176	---	0.15
33	2.75	1.00	0.359	0.176	---	0.18
34	2.83	1.00	0.359	0.176	---	0.18
35	2.92	1.00	0.359	0.176	---	0.18
36	3.00	1.00	0.359	0.176	---	0.18
37	3.08	1.00	0.359	0.176	---	0.18
38	3.17	1.10	0.395	0.176	---	0.22
39	3.25	1.10	0.395	0.176	---	0.22
40	3.33	1.10	0.395	0.176	---	0.22
41	3.42	1.20	0.431	0.176	---	0.26
42	3.50	1.30	0.467	0.176	---	0.29
43	3.58	1.40	0.503	0.176	---	0.33
44	3.67	1.40	0.503	0.176	---	0.33
45	3.75	1.50	0.539	0.176	---	0.36
46	3.83	1.50	0.539	0.176	---	0.36
47	3.92	1.60	0.575	0.176	---	0.40
48	4.00	1.60	0.575	0.176	---	0.40
49	4.08	1.70	0.610	0.176	---	0.43
50	4.17	1.80	0.646	0.176	---	0.47
51	4.25	1.90	0.682	0.176	---	0.51
52	4.33	2.00	0.718	0.176	---	0.54
53	4.42	2.10	0.754	0.176	---	0.58
54	4.50	2.10	0.754	0.176	---	0.58
55	4.58	2.20	0.790	0.176	---	0.61
56	4.67	2.30	0.826	0.176	---	0.65
57	4.75	2.40	0.862	0.176	---	0.69
58	4.83	2.40	0.862	0.176	---	0.69
59	4.92	2.50	0.898	0.176	---	0.72
60	5.00	2.60	0.934	0.176	---	0.76
61	5.08	3.10	1.113	0.176	---	0.94
62	5.17	3.60	1.293	0.176	---	1.12
63	5.25	3.90	1.400	0.176	---	1.22
64	5.33	4.20	1.508	0.176	---	1.33
65	5.42	4.70	1.688	0.176	---	1.51
66	5.50	5.60	2.011	0.176	---	1.84
67	5.58	1.90	0.682	0.176	---	0.51
68	5.67	0.90	0.323	0.176	---	0.15
69	5.75	0.60	0.215	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.95(In)
times area 744.0(Ac.)/[(In)/(Ft.)] = 121.2(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 64.344(Ac.Ft)
Total rainfall = 2.99(In)
Flood volume = 5278634.7 Cubic Feet
Total soil loss = 2802804.0 Cubic Feet

Peak flow rate of this hydrograph = 727.884(CFS)

++

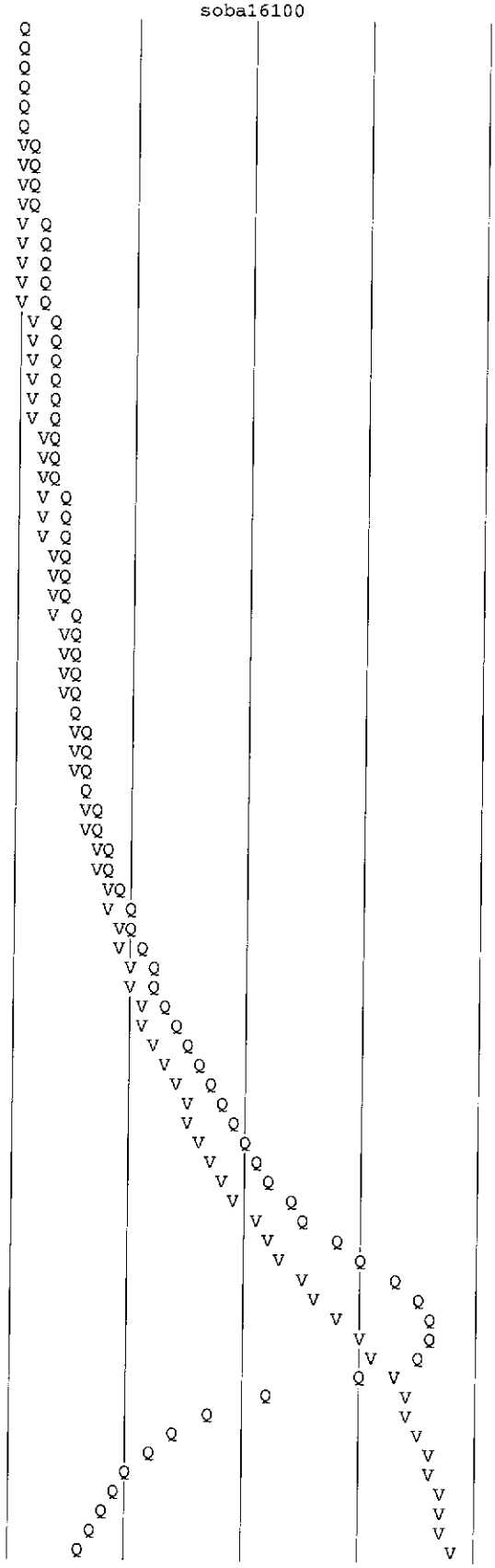
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	200.0	400.0	600.0	800.0
0+ 5	0.0002	0.03	Q				
0+10	0.0025	0.33	Q				
0+15	0.0095	1.02	Q				

soba16100

0+20	0.0232	1.99	Q
0+25	0.0457	3.26	Q
0+30	0.0821	5.28	Q
0+35	0.1404	8.47	Q
0+40	0.2349	13.72	Q
0+45	0.3676	19.27	Q
0+50	0.5258	22.96	VQ
0+55	0.7098	26.72	VQ
1+ 0	0.9313	32.17	VQ
1+ 5	1.1932	38.02	VQ
1+10	1.4810	41.80	V Q
1+15	1.7919	45.15	V Q
1+20	2.1264	48.56	V Q
1+25	2.4863	52.26	V Q
1+30	2.8829	57.60	V Q
1+35	3.3170	63.03	V Q
1+40	3.7721	66.09	V Q
1+45	4.2438	68.49	V Q
1+50	4.7293	70.49	V Q
1+55	5.2265	72.19	V Q
2+ 0	5.7357	73.94	V Q
2+ 5	6.2562	75.59	VQ
2+10	6.7881	77.23	VQ
2+15	7.3328	79.09	VQ
2+20	7.8925	81.26	V Q
2+25	8.4695	83.78	V Q
2+30	9.0738	87.74	V Q
2+35	9.6988	90.76	VQ
2+40	10.3392	92.98	VQ
2+45	11.0096	97.35	VQ
2+50	11.6985	100.02	V Q
2+55	12.4037	102.40	VQ
3+ 0	13.1259	104.86	VQ
3+ 5	13.8658	107.43	VQ
3+10	14.6291	110.83	VQ
3+15	15.4291	116.17	Q
3+20	16.2691	121.96	VQ
3+25	17.1364	125.93	VQ
3+30	18.0338	130.30	VQ
3+35	18.9693	135.84	Q
3+40	19.9589	143.69	VQ
3+45	21.0120	152.91	VQ
3+50	22.1235	161.39	VQ
3+55	23.3118	172.54	VQ
4+ 0	24.5967	186.57	VQ
4+ 5	25.9810	201.01	V Q
4+10	27.4571	214.32	VQ
4+15	29.0231	227.38	V Q
4+20	30.6848	241.28	V Q
4+25	32.4443	255.48	V Q
4+30	34.3093	270.81	V Q
4+35	36.2844	286.79	V Q
4+40	38.3887	305.54	V Q
4+45	40.6297	325.39	V Q
4+50	43.0083	345.38	V Q
4+55	45.5234	365.19	V Q
5+ 0	48.1644	383.47	V Q
5+ 5	50.9379	402.70	V Q
5+10	53.8752	426.51	V Q
5+15	56.9985	453.50	V Q
5+20	60.3223	482.61	V Q
5+25	63.8819	516.85	V Q
5+30	67.7544	562.29	V Q
5+35	71.9844	614.20	V Q
5+40	76.5573	663.98	V Q
5+45	81.3835	700.77	V Q
5+50	86.3579	722.29	V Q
5+55	91.3709	727.88	V Q
6+ 0	96.2658	710.74	V Q
6+ 5	100.4453	606.85	Q V
6+10	103.5206	446.54	Q V
6+15	105.9376	350.95	Q V
6+20	107.9285	289.08	Q V
6+25	109.6210	245.75	Q V
6+30	111.1006	214.83	Q V
6+35	112.3872	186.82	Q V
6+40	113.5151	163.76	Q V
6+45	114.5056	143.82	Q V
6+50	115.3799	126.95	Q V



soba16100

6+55	116.1523	112.16	Q V
7+ 0	116.8292	98.28	Q V
7+ 5	117.4247	86.46	Q V
7+10	117.9444	75.47	QQ V
7+15	118.3975	65.78	QQ V
7+20	118.7881	56.72	QQQ V
7+25	119.1225	48.55	QQQ V
7+30	119.4081	41.46	QQQ V
7+35	119.6502	35.16	QQQ V
7+40	119.8538	29.56	QQQ V
7+45	120.0207	24.23	QQQ V
7+50	120.1578	19.91	QQQ V
7+55	120.2716	16.52	QQQ V
8+ 0	120.3740	14.87	QQQ V
8+ 5	120.4678	13.62	QQQ V
8+10	120.5532	12.40	QQQ V
8+15	120.6313	11.34	QQQ V
8+20	120.7026	10.35	QQQ V
8+25	120.7669	9.34	QQQ V
8+30	120.8249	8.43	QQQ V
8+35	120.8794	7.91	QQ V
8+			

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: soba124100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 744.00(Ac.) = 1.163 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 744.00(Ac.) = 1.163 Sq. Mi.
Length along longest watercourse = 17919.00(Ft.)
Length along longest watercourse measured to centroid = 7620.00(Ft.)
Length along longest watercourse = 3.394 Mi.
Length along longest watercourse measured to centroid = 1.443 Mi.
Difference in elevation = 2020.00(Ft.)
Slope along watercourse = 595.2118 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.587 Hr.
Lag time = 35.20 Min.
25% of lag time = 8.80 Min.
40% of lag time = 14.08 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
744.00	2.25	1674.00

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
744.00	6.00	4464.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 99.85 %
Adjusted average point rain = 5.991(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
744.000	86.00	0.000

Total Area Entered = 744.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

soba124100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	14.203	0.900	6.745
2	0.167	28.406	2.212	16.586
3	0.250	42.609	3.136	23.514
4	0.333	56.812	4.106	30.785
5	0.417	71.015	5.707	42.793
6	0.500	85.218	8.037	60.259
7	0.583	99.421	14.623	109.644
8	0.667	113.625	15.667	117.474
9	0.750	127.828	7.415	55.600
10	0.833	142.031	5.432	40.728
11	0.917	156.234	4.341	32.546
12	1.000	170.437	3.473	26.038
13	1.083	184.640	3.182	23.858
14	1.167	198.843	2.651	19.881
15	1.250	213.046	2.374	17.798
16	1.333	227.249	2.043	15.318
17	1.417	241.452	1.825	13.685
18	1.500	255.655	1.677	12.577
19	1.583	269.858	1.425	10.687
20	1.667	284.061	1.317	9.877
21	1.750	298.264	1.151	8.631
22	1.833	312.468	1.049	7.863
23	1.917	326.671	0.909	6.817
24	2.000	340.874	0.770	5.775
25	2.083	355.077	0.674	5.057
26	2.167	369.280	0.592	4.436
27	2.250	383.483	0.538	4.032
28	2.333	397.686	0.412	3.086
29	2.417	411.889	0.318	2.385
30	2.500	426.092	0.173	1.301
31	2.583	440.295	0.170	1.278
32	2.667	454.498	0.169	1.267
33	2.750	468.701	0.149	1.115
34	2.833	482.904	0.142	1.065
35	2.917	497.107	0.142	1.065
36	3.000	511.311	0.124	0.930
37	3.083	525.514	0.086	0.648
38	3.167	539.717	0.085	0.639
39	3.250	553.920	0.086	0.647
40	3.333	568.123	0.106	0.796
41	3.417	582.326	0.114	0.852
42	3.500	596.529	0.114	0.852
43	3.583	610.732	0.097	0.730
44	3.667	624.935	0.059	0.439
45	3.750	639.138	0.057	0.426
46	3.833	653.341	0.056	0.420
47	3.917	667.544	0.037	0.275
48	4.000	681.747	0.028	0.213
49	4.083	695.950	0.028	0.213
50	4.167	710.154	0.022	0.167
			Sum = 100.000	Sum= 749.813

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01

17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.129	0.01
47	3.92	0.20	0.144	0.258	0.129	0.01
48	4.00	0.20	0.144	0.257	0.129	0.01
49	4.08	0.20	0.144	0.256	0.129	0.01
50	4.17	0.20	0.144	0.255	0.129	0.01
51	4.25	0.20	0.144	0.254	0.129	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02
59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.129	0.01
62	5.17	0.20	0.144	0.242	0.129	0.01
63	5.25	0.20	0.144	0.241	0.129	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.07
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10

96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.359	0.207	---	0.15
98	8.17	0.50	0.359	0.206	---	0.15
99	8.25	0.50	0.359	0.205	---	0.15
100	8.33	0.50	0.359	0.204	---	0.16
101	8.42	0.50	0.359	0.203	---	0.16
102	8.50	0.50	0.359	0.202	---	0.16
103	8.58	0.53	0.383	0.201	---	0.18
104	8.67	0.53	0.383	0.200	---	0.18
105	8.75	0.53	0.383	0.199	---	0.18
106	8.83	0.57	0.407	0.198	---	0.21
107	8.92	0.57	0.407	0.197	---	0.21
108	9.00	0.57	0.407	0.196	---	0.21
109	9.08	0.63	0.455	0.195	---	0.26
110	9.17	0.63	0.455	0.195	---	0.26
111	9.25	0.63	0.455	0.194	---	0.26
112	9.33	0.67	0.479	0.193	---	0.29
113	9.42	0.67	0.479	0.192	---	0.29
114	9.50	0.67	0.479	0.191	---	0.29
115	9.58	0.70	0.503	0.190	---	0.31
116	9.67	0.70	0.503	0.189	---	0.31
117	9.75	0.70	0.503	0.188	---	0.32
118	9.83	0.73	0.527	0.187	---	0.34
119	9.92	0.73	0.527	0.186	---	0.34
120	10.00	0.73	0.527	0.185	---	0.34
121	10.08	0.50	0.359	0.185	---	0.17
122	10.17	0.50	0.359	0.184	---	0.18
123	10.25	0.50	0.359	0.183	---	0.18
124	10.33	0.50	0.359	0.182	---	0.18
125	10.42	0.50	0.359	0.181	---	0.18
126	10.50	0.50	0.359	0.180	---	0.18
127	10.58	0.67	0.479	0.179	---	0.30
128	10.67	0.67	0.479	0.178	---	0.30
129	10.75	0.67	0.479	0.177	---	0.30
130	10.83	0.67	0.479	0.177	---	0.30
131	10.92	0.67	0.479	0.176	---	0.30
132	11.00	0.67	0.479	0.175	---	0.30
133	11.08	0.63	0.455	0.174	---	0.28
134	11.17	0.63	0.455	0.173	---	0.28
135	11.25	0.63	0.455	0.172	---	0.28
136	11.33	0.63	0.455	0.171	---	0.28
137	11.42	0.63	0.455	0.171	---	0.28
138	11.50	0.63	0.455	0.170	---	0.29
139	11.58	0.57	0.407	0.169	---	0.24
140	11.67	0.57	0.407	0.168	---	0.24
141	11.75	0.57	0.407	0.167	---	0.24
142	11.83	0.60	0.431	0.166	---	0.26
143	11.92	0.60	0.431	0.166	---	0.27
144	12.00	0.60	0.431	0.165	---	0.27
145	12.08	0.83	0.599	0.164	---	0.44
146	12.17	0.83	0.599	0.163	---	0.44
147	12.25	0.83	0.599	0.162	---	0.44
148	12.33	0.87	0.623	0.161	---	0.46
149	12.42	0.87	0.623	0.161	---	0.46
150	12.50	0.87	0.623	0.160	---	0.46
151	12.58	0.93	0.671	0.159	---	0.51
152	12.67	0.93	0.671	0.158	---	0.51
153	12.75	0.93	0.671	0.157	---	0.51
154	12.83	0.97	0.695	0.157	---	0.54
155	12.92	0.97	0.695	0.156	---	0.54
156	13.00	0.97	0.695	0.155	---	0.54
157	13.08	1.13	0.815	0.154	---	0.66
158	13.17	1.13	0.815	0.154	---	0.66
159	13.25	1.13	0.815	0.153	---	0.66
160	13.33	1.13	0.815	0.152	---	0.66
161	13.42	1.13	0.815	0.151	---	0.66
162	13.50	1.13	0.815	0.150	---	0.66
163	13.58	0.77	0.551	0.150	---	0.40
164	13.67	0.77	0.551	0.149	---	0.40
165	13.75	0.77	0.551	0.148	---	0.40
166	13.83	0.77	0.551	0.147	---	0.40
167	13.92	0.77	0.551	0.147	---	0.40
168	14.00	0.77	0.551	0.146	---	0.41
169	14.08	0.90	0.647	0.145	---	0.50
170	14.17	0.90	0.647	0.144	---	0.50
171	14.25	0.90	0.647	0.144	---	0.50
172	14.33	0.87	0.623	0.143	---	0.48
173	14.42	0.87	0.623	0.142	---	0.48
174	14.50	0.87	0.623	0.141	---	0.48

175	14.58	0.87	0.623	0.141	---	0.48
176	14.67	0.87	0.623	0.140	---	0.48
177	14.75	0.87	0.623	0.139	---	0.48
178	14.83	0.83	0.599	0.139	---	0.46
179	14.92	0.83	0.599	0.138	---	0.46
180	15.00	0.83	0.599	0.137	---	0.46
181	15.08	0.80	0.575	0.136	---	0.44
182	15.17	0.80	0.575	0.136	---	0.44
183	15.25	0.80	0.575	0.135	---	0.44
184	15.33	0.77	0.551	0.134	---	0.42
185	15.42	0.77	0.551	0.134	---	0.42
186	15.50	0.77	0.551	0.133	---	0.42
187	15.58	0.63	0.455	0.132	---	0.32
188	15.67	0.63	0.455	0.132	---	0.32
189	15.75	0.63	0.455	0.131	---	0.32
190	15.83	0.63	0.455	0.130	---	0.33
191	15.92	0.63	0.455	0.130	---	0.33
192	16.00	0.63	0.455	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01
217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01

254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00
Sum =		100.0			Sum =	36.8

Flood volume = Effective rainfall 3.07(In)
times area 744.0(Ac.)/[(In)/(Ft.)] = 190.3(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 181.132(Ac.Ft)
Total rainfall = 5.99(In)
Flood volume = 8290650.9 Cubic Feet
Total soil loss = 7890122.2 Cubic Feet

Peak flow rate of this hydrograph = 426.454(CFS)

++

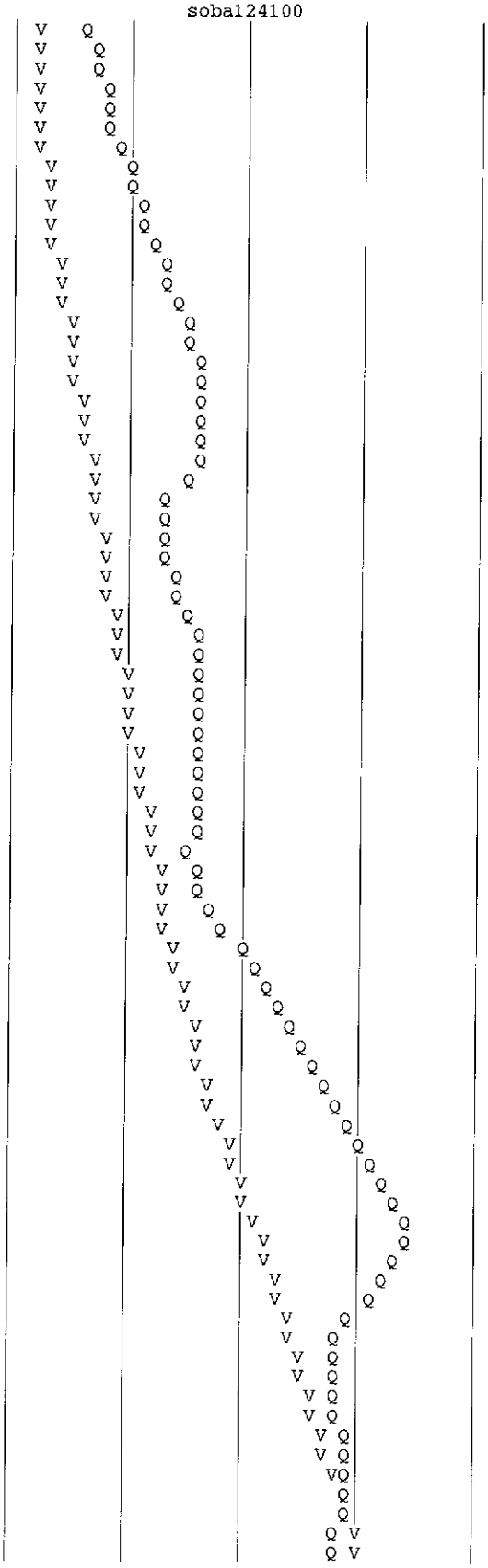
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	125.0	250.0	375.0	500.0
0+ 5	0.0002	0.03	Q				
0+10	0.0010	0.11	Q				
0+15	0.0025	0.22	Q				
0+20	0.0052	0.39	Q				
0+25	0.0096	0.63	Q				
0+30	0.0163	0.98	Q				
0+35	0.0272	1.58	Q				
0+40	0.0426	2.24	Q				
0+45	0.0609	2.66	Q				
0+50	0.0825	3.13	Q				
0+55	0.1073	3.61	Q				
1+ 0	0.1343	3.92	Q				
1+ 5	0.1632	4.19	Q				
1+10	0.1937	4.43	Q				
1+15	0.2258	4.66	Q				
1+20	0.2601	4.98	Q				
1+25	0.2965	5.28	Q				
1+30	0.3335	5.37	Q				
1+35	0.3699	5.29	Q				
1+40	0.4055	5.17	Q				
1+45	0.4411	5.17	Q				
1+50	0.4769	5.21	Q				
1+55	0.5132	5.27	Q				
2+ 0	0.5501	5.36	Q				

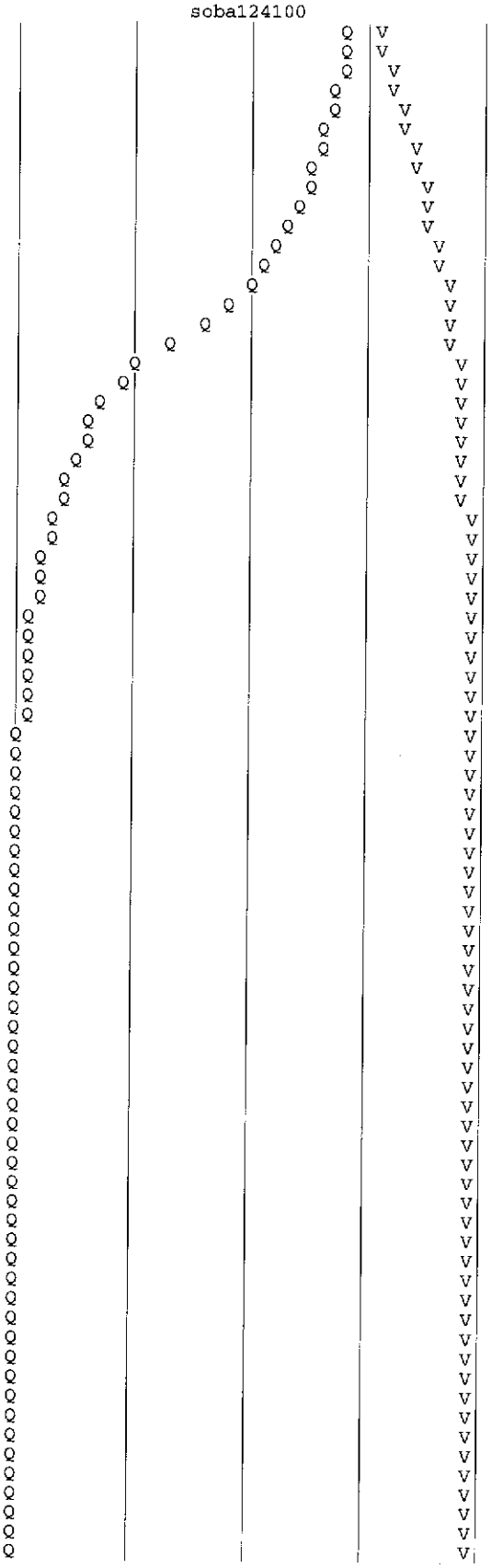
2+ 5	0.5877	5.45	Q
2+10	0.6261	5.58	Q
2+15	0.6657	5.74	Q
2+20	0.7072	6.02	Q
2+25	0.7507	6.32	Q
2+30	0.7951	6.46	Q
2+35	0.8404	6.58	Q
2+40	0.8866	6.70	Q
2+45	0.9336	6.82	Q
2+50	0.9815	6.95	Q
2+55	1.0304	7.11	Q
3+ 0	1.0806	7.30	Q
3+ 5	1.1330	7.60	Q
3+10	1.1874	7.91	Q
3+15	1.2431	8.07	Q
3+20	1.2995	8.20	Q
3+25	1.3567	8.30	Q
3+30	1.4145	8.39	Q
3+35	1.4728	8.47	Q
3+40	1.5317	8.54	Q
3+45	1.5909	8.60	Q
3+50	1.6506	8.67	Q
3+55	1.7109	8.75	Q
4+ 0	1.7718	8.85	Q
4+ 5	1.8335	8.96	Q
4+10	1.8961	9.09	Q
4+15	1.9599	9.26	Q
4+20	2.0258	9.56	Q
4+25	2.0940	9.90	Q
4+30	2.1636	10.11	Q
4+35	2.2345	10.29	Q
4+40	2.3068	10.49	Q
4+45	2.3805	10.71	Q
4+50	2.4566	11.05	Q
4+55	2.5353	11.43	Q
5+ 0	2.6156	11.66	Q
5+ 5	2.6972	11.84	Q
5+10	2.7797	11.98	Q
5+15	2.8632	12.11	Q
5+20	2.9481	12.33	Q
5+25	3.0343	12.52	VQ
5+30	3.1203	12.49	Q
5+35	3.2044	12.21	Q
5+40	3.2865	11.92	Q
5+45	3.3689	11.96	Q
5+50	3.4529	12.20	Q
5+55	3.5390	12.51	VQ
6+ 0	3.6268	12.74	VQ
6+ 5	3.7168	13.07	VQ
6+10	3.8092	13.43	VQ
6+15	3.9032	13.64	VQ
6+20	3.9985	13.84	VQ
6+25	4.0952	14.04	VQ
6+30	4.1934	14.26	VQ
6+35	4.2936	14.55	VQ
6+40	4.3955	14.79	VQ
6+45	4.4977	14.84	VQ
6+50	4.5999	14.83	VQ
6+55	4.7014	14.74	VQ
7+ 0	4.8017	14.57	Q
7+ 5	4.8990	14.12	Q
7+10	4.9935	13.72	Q
7+15	5.0887	13.83	Q
7+20	5.1869	14.25	Q
7+25	5.2901	14.99	Q
7+30	5.4002	15.98	Q
7+35	5.5195	17.33	Q
7+40	5.6521	19.24	Q
7+45	5.8020	21.77	Q
7+50	5.9800	25.85	VQ
7+55	6.1912	30.66	VQ
8+ 0	6.4293	34.58	VQ
8+ 5	6.7038	39.85	V Q
8+10	7.0198	45.89	V Q
8+15	7.3713	51.05	V Q
8+20	7.7662	57.34	V Q
8+25	8.2078	64.11	V Q
8+30	8.6902	70.05	V Q
8+35	9.2277	78.05	V Q

soba124100

8+40	9.8223	86.34	
8+45	10.4532	91.60	
8+50	11.1166	96.34	
8+55	11.8126	101.06	
9+ 0	12.5423	105.95	
9+ 5	13.3157	112.29	
9+10	14.1374	119.31	
9+15	15.0011	125.42	
9+20	15.9147	132.66	
9+25	16.8828	140.56	
9+30	17.9001	147.72	
9+35	18.9815	157.02	
9+40	20.1304	166.82	
9+45	21.3283	173.92	
9+50	22.5792	181.64	
9+55	23.8840	189.45	
10+ 0	25.2330	195.89	
10+ 5	26.6237	201.93	
10+10	28.0445	206.29	
10+15	29.4775	208.07	
10+20	30.9180	209.16	
10+25	32.3503	207.98	
10+30	33.7415	202.00	
10+35	35.0359	187.95	
10+40	36.2298	173.35	
10+45	37.3980	169.62	
10+50	38.5620	169.02	
10+55	39.7396	170.99	
11+ 0	40.9513	175.94	
11+ 5	42.2380	186.82	
11+10	43.6081	198.94	
11+15	45.0108	203.68	
11+20	46.4347	206.75	
11+25	47.8723	208.73	
11+30	49.3155	209.56	
11+35	50.7539	208.86	
11+40	52.1802	207.09	
11+45	53.6013	206.34	
11+50	55.0169	205.55	
11+55	56.4257	204.56	
12+ 0	57.8240	203.03	
12+ 5	59.2038	200.35	
12+10	60.5765	199.31	
12+15	61.9728	202.75	
12+20	63.4162	209.58	
12+25	64.9263	219.26	
12+30	66.5168	230.95	
12+35	68.2462	251.11	
12+40	70.1283	273.28	
12+45	72.0963	285.75	
12+50	74.1444	297.39	
12+55	76.2695	308.56	
13+ 0	78.4601	318.07	
13+ 5	80.7349	330.31	
13+10	83.1007	343.52	
13+15	85.5423	354.52	
13+20	88.0655	366.37	
13+25	90.6765	379.11	
13+30	93.3758	391.94	
13+35	96.1862	408.07	
13+40	99.0927	422.03	
13+45	102.0283	426.24	
13+50	104.9653	426.45	
13+55	107.8730	422.20	
14+ 0	110.7125	412.29	
14+ 5	113.3945	389.43	
14+10	115.9063	364.72	
14+15	118.3620	356.56	
14+20	120.7883	352.31	
14+25	123.2036	350.70	
14+30	125.6273	351.92	
14+35	128.0927	357.97	
14+40	130.6090	365.37	
14+45	133.1344	366.69	
14+50	135.6531	365.71	
14+55	138.1585	363.78	
15+ 0	140.6559	362.63	
15+ 5	143.1464	361.63	
15+10	145.6261	360.05	

soba124100

15+15	148.0923	358.09
15+20	150.5340	354.53
15+25	152.9471	350.39
15+30	155.3385	347.23
15+35	157.6970	342.45
15+40	160.0147	336.52
15+45	162.2953	331.14
15+50	164.5301	324.50
15+55	166.7125	316.88
16+ 0	168.8437	309.46
16+ 5	170.8791	295.54
16+10	172.7938	278.01
16+15	174.6150	264.44
16+20	176.3372	250.07
16+25	177.9401	232.74
16+30	179.3899	210.51
16+35	180.5809	172.94
16+40	181.4984	133.22
16+45	182.2790	113.35
16+50	182.9568	98.42
16+55	183.5505	86.21
17+ 0	184.0750	76.15
17+ 5	184.5360	66.93
17+10	184.9437	59.20
17+15	185.3044	52.37
17+20	185.6241	46.43
17+25	185.9076	41.17
17+30	186.1586	36.44
17+35	186.3824	32.50
17+40	186.5803	28.74
17+45	186.7500	24.65
17+50	186.8936	20.84
17+55	187.0191	18.22
18+ 0	187.1309	16.24
18+ 5	187.2316	14.62
18+10	187.3233	13.31
18+15	187.4075	12.23
18+20	187.4883	11.73
18+25	187.5673	11.46
18+30	187.6444	11.20
18+35	187.7193	10.87
18+40	187.7915	10.49
18+45	187.8611	10.10
18+50	187.9277	9.68
18+55	187.9910	9.18
19+ 0	188.0507	8.67
19+ 5	188.1067	8.13
19+10	188.1591	7.60
19+15	188.2086	7.19
19+20	188.2545	6.67
19+25	188.2972	6.20
19+30	188.3382	5.95
19+35	188.3789	5.91
19+40	188.4203	6.01
19+45	188.4618	6.03
19+50	188.5038	6.10
19+55	188.5463	6.17
20+ 0	188.5880	6.05
20+ 5	188.6277	5.76
20+10	188.6651	5.44
20+15	188.7015	5.28
20+20	188.7363	5.05
20+25	188.7697	4.84
20+30	188.8029	4.83
20+35	188.8372	4.97
20+40	188.8727	5.16
20+45	188.9086	5.22
20+50	188.9447	5.23
20+55	188.9806	5.22
21+ 0	189.0162	5.17
21+ 5	189.0516	5.14
21+10	189.0866	5.09
21+15	189.1211	5.01
21+20	189.1543	4.82
21+25	189.1860	4.60
21+30	189.2175	4.57
21+35	189.2497	4.68
21+40	189.2829	4.82
21+45	189.3160	4.81



21+50	189.3479	4.64	Q				V
21+55	189.3786	4.46	Q				V
22+ 0	189.4092	4.43	Q				V
22+ 5	189.4406	4.56	Q				V
22+10	189.4732	4.72	Q				V
22+15	189.5057	4.72	Q				V
22+20	189.5372	4.57	Q				V
22+25	189.5674	4.39	Q				V
22+30	189.5976	4.38	Q				V
22+35	189.6286	4.50	Q				V
22+40	189.6604	4.62	Q				V
22+45	189.6919	4.57	Q				V
22+50	189.7220	4.37	Q				V
22+55	189.7504	4.13	Q				V
23+ 0	189.7782	4.03	Q				V
23+ 5	189.8055	3.96	Q				V
23+10	189.8324	3.91	Q				V
23+15	189.8591	3.88	Q				V
23+20	189.8856	3.84	Q				V
23+25	189.9118	3.81	Q				V
23+30	189.9379	3.78	Q				V
23+35	189.9637	3.76	Q				V
23+40	189.9895	3.74	Q				V
23+45	190.0151	3.72	Q				V
23+50	190.0407	3.71	Q				V
23+55	190.0661	3.70	Q				V
24+ 0	190.0915	3.68	Q				V
24+ 5	190.1165	3.63	Q				V
24+10	190.1409	3.54	Q				V
24+15	190.1645	3.42	Q				V
24+20	190.1870	3.27	Q				V
24+25	190.2081	3.06	Q				V
24+30	190.2271	2.76	Q				V
24+35	190.2424	2.23	Q				V
24+40	190.2539	1.66	Q				V
24+45	190.2635	1.39	Q				V
24+50	190.2717	1.19	Q				V
24+55	190.2788	1.04	Q				V
25+ 0	190.2851	0.91	Q				V
25+ 5	190.2906	0.80	Q				V
25+10	190.2954	0.70	Q				V
25+15	190.2996	0.61	Q				V
25+20	190.3033	0.54	Q				V
25+25	190.3066	0.47	Q				V
25+30	190.3094	0.41	Q				V
25+35	190.3119	0.36	Q				V
25+40	190.3140	0.31	Q				V
25+45	190.3159	0.27	Q				V
25+50	190.3174	0.23	Q				V
25+55	190.3188	0.20	Q				V
26+ 0	190.3199	0.17	Q				V
26+ 5	190.3209	0.14	Q				V
26+10	190.3217	0.12	Q				V
26+15	190.3224	0.10	Q				V
26+20	190.3230	0.09	Q				V
26+25	190.3235	0.07	Q				V
26+30	190.3240	0.07	Q				V
26+35	190.3244	0.06	Q				V
26+40	190.3248	0.06	Q				V
26+45	190.3251	0.05	Q				V
26+50	190.3254	0.04	Q				V
26+55	190.3257	0.04	Q				V
27+ 0	190.3260	0.04	Q				V
27+ 5	190.3262	0.03	Q				V
27+10	190.3264	0.03	Q				V
27+15	190.3265	0.03	Q				V
27+20	190.3267	0.02	Q				V
27+25	190.3268	0.02	Q				V
27+30	190.3269	0.01	Q				V
27+35	190.3270	0.01	Q				V
27+40	190.3270	0.01	Q				V
27+45	190.3271	0.01	Q				V
27+50	190.3271	0.00	Q				V
27+55	190.3271	0.00	Q				V
28+ 0	190.3272	0.00	Q				V
28+ 5	190.3272	0.00	Q				V

AREA 2

SOBA21100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA21100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 13.60(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.60(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1830.00(Ft.)
Length along longest watercourse measured to centroid = 820.00(Ft.)
Length along longest watercourse = 0.347 Mi.
Length along longest watercourse measured to centroid = 0.155 Mi.
Difference in elevation = 160.00(Ft.)
Slope along watercourse = 461.6393 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.111 Hr.
Lag time = 6.65 Min.
25% of lag time = 1.66 Min.
40% of lag time = 2.66 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.60	0.55	7.48

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.60	1.20	16.32

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.600	86.00	0.000

Total Area Entered = 13.60(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	75.134	8.068	1.106
2	0.167	150.267	45.105	6.182
3	0.250	225.401	26.605	3.647
4	0.333	300.534	10.301	1.412
5	0.417	375.668	5.451	0.747
6	0.500	450.801	2.466	0.338
7	0.583	525.935	0.870	0.119
8	0.667	601.068	0.550	0.075
9	0.750	676.202	0.430	0.059
10	0.833	751.335	0.155	0.021
			Sum = 100.000 Sum=	13.706

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.176	---	0.43
2	0.17	4.30	0.619	0.176	---	0.44
3	0.25	5.00	0.720	0.176	---	0.54
4	0.33	5.00	0.720	0.176	---	0.54
5	0.42	5.80	0.835	0.176	---	0.66
6	0.50	6.50	0.936	0.176	---	0.76
7	0.58	7.40	1.065	0.176	---	0.89
8	0.67	8.60	1.238	0.176	---	1.06
9	0.75	12.30	1.771	0.176	---	1.60
10	0.83	29.10	4.190	0.176	---	4.01
11	0.92	6.80	0.979	0.176	---	0.80
12	1.00	5.00	0.720	0.176	---	0.54
Sum =		100.0			Sum =	12.3

Flood volume = Effective rainfall 1.02(In)
times area 13.6(Ac.)/[(In)/(Ft.)] = 1.2(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.199(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 50565.3 Cubic Feet
Total soil loss = 8669.0 Cubic Feet

Peak flow rate of this hydrograph = 34.124(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 10.0 20.0 30.0 40.0
0+ 5	0.0033	0.47	Q
0+10	0.0249	3.15	V Q
0+15	0.0588	4.91	V Q
0+20	0.1014	6.19	V Q
0+25	0.1498	7.03	V Q
0+30	0.2060	8.15	VQ
0+35	0.2712	9.47	Q
0+40	0.3474	11.06	Q
0+45	0.4401	13.46	Q V
0+50	0.5804	20.38	VQ
0+55	0.8154	34.12	V
1+ 0	0.9790	23.75	Q
1+ 5	1.0736	13.73	Q
1+10	1.1212	6.91	Q
1+15	1.1423	3.07	Q
1+20	1.1517	1.36	Q
1+25	1.1565	0.70	Q
1+30	1.1592	0.40	Q
1+35	1.1604	0.17	Q
1+40	1.1607	0.05	Q
1+45	1.1608	0.01	Q

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA23100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 13.60(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.60(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1830.00(Ft.)
Length along longest watercourse measured to centroid = 820.00(Ft.)
Length along longest watercourse = 0.347 Mi.
Length along longest watercourse measured to centroid = 0.155 Mi.
Difference in elevation = 160.00(Ft.)
Slope along watercourse = 461.6393 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.111 Hr.
Lag time = 6.65 Min.
25% of lag time = 1.66 Min.
40% of lag time = 2.66 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.60	0.90	12.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.60	2.10	28.56

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.600	86.00	0.000

Total Area Entered = 13.60(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

SOBA23100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	75.134	8.068	1.106
2	0.167	150.267	45.105	6.182
3	0.250	225.401	26.605	3.647
4	0.333	300.534	10.301	1.412
5	0.417	375.668	5.451	0.747
6	0.500	450.801	2.466	0.338
7	0.583	525.935	0.870	0.119
8	0.667	601.068	0.550	0.075
9	0.750	676.202	0.430	0.059
10	0.833	751.335	0.155	0.021
			Sum = 100.000	Sum= 13.706

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.176	---	0.15
2	0.17	1.30	0.328	0.176	---	0.15
3	0.25	1.10	0.277	0.176	---	0.10
4	0.33	1.50	0.378	0.176	---	0.20
5	0.42	1.50	0.378	0.176	---	0.20
6	0.50	1.80	0.454	0.176	---	0.28
7	0.58	1.50	0.378	0.176	---	0.20
8	0.67	1.80	0.454	0.176	---	0.28
9	0.75	1.80	0.454	0.176	---	0.28
10	0.83	1.50	0.378	0.176	---	0.20
11	0.92	1.60	0.403	0.176	---	0.23
12	1.00	1.80	0.454	0.176	---	0.28
13	1.08	2.20	0.554	0.176	---	0.38
14	1.17	2.20	0.554	0.176	---	0.38
15	1.25	2.20	0.554	0.176	---	0.38
16	1.33	2.00	0.504	0.176	---	0.33
17	1.42	2.60	0.655	0.176	---	0.48
18	1.50	2.70	0.680	0.176	---	0.50
19	1.58	2.40	0.605	0.176	---	0.43
20	1.67	2.70	0.680	0.176	---	0.50
21	1.75	3.30	0.832	0.176	---	0.66
22	1.83	3.10	0.781	0.176	---	0.61
23	1.92	2.90	0.731	0.176	---	0.56
24	2.00	3.00	0.756	0.176	---	0.58
25	2.08	3.10	0.781	0.176	---	0.61
26	2.17	4.20	1.058	0.176	---	0.88
27	2.25	5.00	1.260	0.176	---	1.08
28	2.33	3.50	0.882	0.176	---	0.71
29	2.42	6.80	1.713	0.176	---	1.54
30	2.50	7.30	1.839	0.176	---	1.66
31	2.58	8.20	2.066	0.176	---	1.89
32	2.67	5.90	1.487	0.176	---	1.31
33	2.75	2.00	0.504	0.176	---	0.33
34	2.83	1.80	0.454	0.176	---	0.28
35	2.92	1.80	0.454	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.9

Flood volume = Effective rainfall 1.58(In)
times area 13.6(Ac.)/[(In)/(Ft.)] = 1.8(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 0.593(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 77822.2 Cubic Feet
Total soil loss = 25844.4 Cubic Feet

Peak flow rate of this hydrograph = 22.480(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0

SOBA23100

0+ 5	0.0012	0.17	Q
0+10	0.0088	1.11	VQ
0+15	0.0199	1.61	V Q
0+20	0.0310	1.62	V Q
0+25	0.0460	2.17	VQ
0+30	0.0639	2.61	V Q
0+35	0.0854	3.11	V Q
0+40	0.1066	3.07	V Q
0+45	0.1301	3.41	V Q
0+50	0.1546	3.56	VQ
0+55	0.1767	3.20	VQ
1+ 0	0.1986	3.18	Q
1+ 5	0.2235	3.62	QV
1+10	0.2539	4.41	Q
1+15	0.2873	4.85	Q
1+20	0.3215	4.97	QV
1+25	0.3554	4.92	QV
1+30	0.3949	5.74	QV
1+35	0.4384	6.31	QV
1+40	0.4811	6.20	Q V
1+45	0.5272	6.70	Q V
1+50	0.5810	7.81	Q V
1+55	0.6366	8.07	Q V
2+ 0	0.6907	7.86	Q V
2+ 5	0.7453	7.93	Q V
2+10	0.8033	8.43	Q V
2+15	0.8754	10.46	Q V
2+20	0.9604	12.35	Q V
2+25	1.0436	12.08	Q V
2+30	1.1572	16.49	Q V
2+35	1.2967	20.26	Q V
2+40	1.4516	22.48	Q V
2+45	1.5849	19.35	Q V
2+50	1.6660	11.79	Q V
2+55	1.7168	7.37	Q V
3+ 0	1.7527	5.21	Q V
3+ 5	1.7709	2.65	Q V
3+10	1.7792	1.20	Q V
3+15	1.7834	0.61	Q V
3+20	1.7853	0.28	Q V
3+25	1.7860	0.11	Q V
3+30	1.7863	0.05	Q V
3+35	1.7865	0.02	Q V
3+40	1.7865	0.01	Q V
3+45	1.7866	0.00	Q V

SOBA26100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA26100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 13.60(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.60(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1830.00(Ft.)
Length along longest watercourse measured to centroid = 820.00(Ft.)
Length along longest watercourse = 0.347 Mi.
Length along longest watercourse measured to centroid = 0.155 Mi.
Difference in elevation = 160.00(Ft.)
Slope along watercourse = 461.6393 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.111 Hr.
Lag time = 6.65 Min.
25% of lag time = 1.66 Min.
40% of lag time = 2.66 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.60	1.40	19.04

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.60	3.00	40.80

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.600	86.00	0.000

Total Area Entered = 13.60(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

SOBA26100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit	time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	75.134	8.068	1.106
2	0.167	150.267	45.105	6.182
3	0.250	225.401	26.605	3.647
4	0.333	300.534	10.301	1.412
5	0.417	375.668	5.451	0.747
6	0.500	450.801	2.466	0.338
7	0.583	525.935	0.870	0.119
8	0.667	601.068	0.550	0.075
9	0.750	676.202	0.430	0.059
10	0.833	751.335	0.155	0.021
			Sum = 100.000 Sum=	13.706

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.216	0.176	---	0.04
3	0.25	0.60	0.216	0.176	---	0.04
4	0.33	0.60	0.216	0.176	---	0.04
5	0.42	0.60	0.216	0.176	---	0.04
6	0.50	0.70	0.252	0.176	---	0.08
7	0.58	0.70	0.252	0.176	---	0.08
8	0.67	0.70	0.252	0.176	---	0.08
9	0.75	0.70	0.252	0.176	---	0.08
10	0.83	0.70	0.252	0.176	---	0.08
11	0.92	0.70	0.252	0.176	---	0.08
12	1.00	0.80	0.288	0.176	---	0.11
13	1.08	0.80	0.288	0.176	---	0.11
14	1.17	0.80	0.288	0.176	---	0.11
15	1.25	0.80	0.288	0.176	---	0.11
16	1.33	0.80	0.288	0.176	---	0.11
17	1.42	0.80	0.288	0.176	---	0.11
18	1.50	0.80	0.288	0.176	---	0.11
19	1.58	0.80	0.288	0.176	---	0.11
20	1.67	0.80	0.288	0.176	---	0.11
21	1.75	0.80	0.288	0.176	---	0.11
22	1.83	0.80	0.288	0.176	---	0.11
23	1.92	0.80	0.288	0.176	---	0.11
24	2.00	0.90	0.324	0.176	---	0.15
25	2.08	0.80	0.288	0.176	---	0.11
26	2.17	0.90	0.324	0.176	---	0.15
27	2.25	0.90	0.324	0.176	---	0.15
28	2.33	0.90	0.324	0.176	---	0.15
29	2.42	0.90	0.324	0.176	---	0.15
30	2.50	0.90	0.324	0.176	---	0.15
31	2.58	0.90	0.324	0.176	---	0.15
32	2.67	0.90	0.324	0.176	---	0.15
33	2.75	1.00	0.360	0.176	---	0.18
34	2.83	1.00	0.360	0.176	---	0.18
35	2.92	1.00	0.360	0.176	---	0.18
36	3.00	1.00	0.360	0.176	---	0.18
37	3.08	1.00	0.360	0.176	---	0.18
38	3.17	1.10	0.396	0.176	---	0.22
39	3.25	1.10	0.396	0.176	---	0.22
40	3.33	1.10	0.396	0.176	---	0.22
41	3.42	1.20	0.432	0.176	---	0.26
42	3.50	1.30	0.468	0.176	---	0.29
43	3.58	1.40	0.504	0.176	---	0.33
44	3.67	1.40	0.504	0.176	---	0.33
45	3.75	1.50	0.540	0.176	---	0.36
46	3.83	1.50	0.540	0.176	---	0.36
47	3.92	1.60	0.576	0.176	---	0.40
48	4.00	1.60	0.576	0.176	---	0.40
49	4.08	1.70	0.612	0.176	---	0.44
50	4.17	1.80	0.648	0.176	---	0.47
51	4.25	1.90	0.684	0.176	---	0.51
52	4.33	2.00	0.720	0.176	---	0.54
53	4.42	2.10	0.756	0.176	---	0.58
54	4.50	2.10	0.756	0.176	---	0.58
55	4.58	2.20	0.792	0.176	---	0.62
56	4.67	2.30	0.828	0.176	---	0.65

57	4.75	2.40	0.864	0.176	---	0.69
58	4.83	2.40	0.864	0.176	---	0.69
59	4.92	2.50	0.900	0.176	---	0.72
60	5.00	2.60	0.936	0.176	---	0.76
61	5.08	3.10	1.116	0.176	---	0.94
62	5.17	3.60	1.296	0.176	---	1.12
63	5.25	3.90	1.404	0.176	---	1.23
64	5.33	4.20	1.512	0.176	---	1.34
65	5.42	4.70	1.692	0.176	---	1.52
66	5.50	5.60	2.016	0.176	---	1.84
67	5.58	1.90	0.684	0.176	---	0.51
68	5.67	0.90	0.324	0.176	---	0.15
69	5.75	0.60	0.216	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 13.6(Ac.)/[(In)/(Ft.)] = 2.2(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 1.176(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 96861.4 Cubic Feet
Total soil loss = 51235.7 Cubic Feet

Peak flow rate of this hydrograph = 20.889(CFS)

++

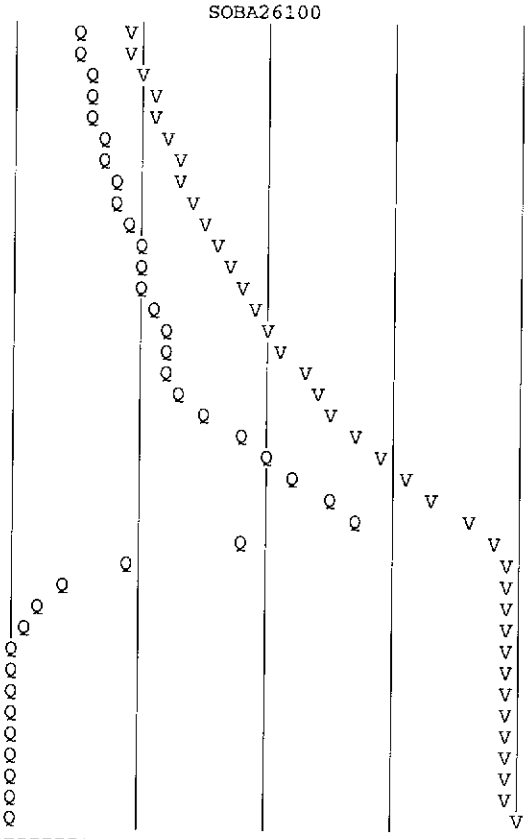
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 7.5 15.0 22.5 30.0
0+ 5	0.0000	0.00	Q
0+10	0.0005	0.07	Q
0+15	0.0027	0.31	Q
0+20	0.0058	0.45	Q
0+25	0.0092	0.50	Q
0+30	0.0131	0.57	Q
0+35	0.0187	0.81	VQ
0+40	0.0252	0.94	VQ
0+45	0.0320	1.00	VQ
0+50	0.0391	1.02	VQ
0+55	0.0462	1.04	VQ
1+ 0	0.0537	1.08	VQ
1+ 5	0.0627	1.31	Q
1+10	0.0726	1.44	Q
1+15	0.0829	1.49	Q
1+20	0.0933	1.52	VQ
1+25	0.1039	1.53	VQ
1+30	0.1145	1.54	Q
1+35	0.1251	1.54	Q
1+40	0.1357	1.54	Q
1+45	0.1463	1.54	Q
1+50	0.1569	1.54	Q
1+55	0.1675	1.54	QV
2+ 0	0.1784	1.58	QV
2+ 5	0.1906	1.76	QV
2+10	0.2023	1.71	QV
2+15	0.2151	1.85	QV
2+20	0.2286	1.96	Q V
2+25	0.2424	2.00	Q V
2+30	0.2563	2.02	Q V
2+35	0.2702	2.03	Q V
2+40	0.2842	2.03	Q V
2+45	0.2985	2.07	Q V
2+50	0.3143	2.30	Q V
2+55	0.3311	2.43	Q V
3+ 0	0.3481	2.48	Q V
3+ 5	0.3654	2.51	Q V
3+10	0.3830	2.56	Q V
3+15	0.4022	2.79	Q V
3+20	0.4223	2.92	Q V
3+25	0.4430	3.01	Q V
3+30	0.4658	3.30	Q V
3+35	0.4913	3.71	Q V

SOBA26100

3+40	0.5197	4.12	
3+45	0.5498	4.37	
3+50	0.5820	4.68	
3+55	0.6158	4.90	
4+ 0	0.6515	5.19	
4+ 5	0.6887	5.40	
4+10	0.7282	5.73	
4+15	0.7706	6.16	
4+20	0.8162	6.62	
4+25	0.8651	7.10	
4+30	0.9170	7.54	
4+35	0.9708	7.81	
4+40	1.0271	8.17	
4+45	1.0864	8.61	
4+50	1.1487	9.04	
4+55	1.2127	9.30	
5+ 0	1.2792	9.66	
5+ 5	1.3499	10.26	
5+10	1.4309	11.77	
5+15	1.5256	13.75	
5+20	1.6323	15.49	
5+25	1.7505	17.16	
5+30	1.8840	19.38	
5+35	2.0278	20.89	
5+40	2.1232	13.84	
5+45	2.1735	7.30	
5+50	2.1993	3.74	
5+55	2.2115	1.78	
6+ 0	2.2175	0.87	
6+ 5	2.2208	0.49	
6+10	2.2226	0.26	
6+15	2.2233	0.10	
6+20	2.2235	0.03	
6+25	2.2236	0.01	
6+30	2.2236	0.00	
6+35	2.2236	0.00	
6+40	2.2236	0.00	
6+45	2.2236	0.00	



SOBA224100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA224100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 13.60(Ac.) = 0.021 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 13.60(Ac.) = 0.021 Sq. Mi.
Length along longest watercourse = 1830.00(Ft.)
Length along longest watercourse measured to centroid = 820.00(Ft.)
Length along longest watercourse = 0.347 Mi.
Length along longest watercourse measured to centroid = 0.155 Mi.
Difference in elevation = 160.00(Ft.)
Slope along watercourse = 461.6393 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.111 Hr.
Lag time = 6.65 Min.
25% of lag time = 1.66 Min.
40% of lag time = 2.66 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.60	2.25	30.60

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
13.60	6.00	81.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
13.600	86.00	0.000

Total Area Entered = 13.60(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

SOBA224100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	75.134	8.068	1.106
2	0.167	150.267	45.105	6.182
3	0.250	225.401	26.605	3.647
4	0.333	300.534	10.301	1.412
5	0.417	375.668	5.451	0.747
6	0.500	450.801	2.466	0.338
7	0.583	525.935	0.870	0.119
8	0.667	601.068	0.550	0.075
9	0.750	676.202	0.430	0.059
10	0.833	751.335	0.155	0.021
			Sum = 100.000 Sum=	13.706

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.130	0.01
47	3.92	0.20	0.144	0.258	0.130	0.01
48	4.00	0.20	0.144	0.257	0.130	0.01
49	4.08	0.20	0.144	0.256	0.130	0.01
50	4.17	0.20	0.144	0.255	0.130	0.01
51	4.25	0.20	0.144	0.254	0.130	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02

57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02
59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.130	0.01
62	5.17	0.20	0.144	0.242	0.130	0.01
63	5.25	0.20	0.144	0.241	0.130	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.08
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.16
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.384	0.201	---	0.18
104	8.67	0.53	0.384	0.200	---	0.18
105	8.75	0.53	0.384	0.199	---	0.18
106	8.83	0.57	0.408	0.198	---	0.21
107	8.92	0.57	0.408	0.197	---	0.21
108	9.00	0.57	0.408	0.196	---	0.21
109	9.08	0.63	0.456	0.195	---	0.26
110	9.17	0.63	0.456	0.195	---	0.26
111	9.25	0.63	0.456	0.194	---	0.26
112	9.33	0.67	0.480	0.193	---	0.29
113	9.42	0.67	0.480	0.192	---	0.29
114	9.50	0.67	0.480	0.191	---	0.29
115	9.58	0.70	0.504	0.190	---	0.31
116	9.67	0.70	0.504	0.189	---	0.31
117	9.75	0.70	0.504	0.188	---	0.32
118	9.83	0.73	0.528	0.187	---	0.34
119	9.92	0.73	0.528	0.186	---	0.34
120	10.00	0.73	0.528	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.18
122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.480	0.179	---	0.30
128	10.67	0.67	0.480	0.178	---	0.30
129	10.75	0.67	0.480	0.177	---	0.30
130	10.83	0.67	0.480	0.177	---	0.30
131	10.92	0.67	0.480	0.176	---	0.30
132	11.00	0.67	0.480	0.175	---	0.31
133	11.08	0.63	0.456	0.174	---	0.28
134	11.17	0.63	0.456	0.173	---	0.28
135	11.25	0.63	0.456	0.172	---	0.28

136	11.33	0.63	0.456	0.171	---	0.28
137	11.42	0.63	0.456	0.171	---	0.29
138	11.50	0.63	0.456	0.170	---	0.29
139	11.58	0.57	0.408	0.169	---	0.24
140	11.67	0.57	0.408	0.168	---	0.24
141	11.75	0.57	0.408	0.167	---	0.24
142	11.83	0.60	0.432	0.166	---	0.27
143	11.92	0.60	0.432	0.166	---	0.27
144	12.00	0.60	0.432	0.165	---	0.27
145	12.08	0.83	0.600	0.164	---	0.44
146	12.17	0.83	0.600	0.163	---	0.44
147	12.25	0.83	0.600	0.162	---	0.44
148	12.33	0.87	0.624	0.161	---	0.46
149	12.42	0.87	0.624	0.161	---	0.46
150	12.50	0.87	0.624	0.160	---	0.46
151	12.58	0.93	0.672	0.159	---	0.51
152	12.67	0.93	0.672	0.158	---	0.51
153	12.75	0.93	0.672	0.157	---	0.51
154	12.83	0.97	0.696	0.157	---	0.54
155	12.92	0.97	0.696	0.156	---	0.54
156	13.00	0.97	0.696	0.155	---	0.54
157	13.08	1.13	0.816	0.154	---	0.66
158	13.17	1.13	0.816	0.154	---	0.66
159	13.25	1.13	0.816	0.153	---	0.66
160	13.33	1.13	0.816	0.152	---	0.66
161	13.42	1.13	0.816	0.151	---	0.66
162	13.50	1.13	0.816	0.150	---	0.67
163	13.58	0.77	0.552	0.150	---	0.40
164	13.67	0.77	0.552	0.149	---	0.40
165	13.75	0.77	0.552	0.148	---	0.40
166	13.83	0.77	0.552	0.147	---	0.40
167	13.92	0.77	0.552	0.147	---	0.41
168	14.00	0.77	0.552	0.146	---	0.41
169	14.08	0.90	0.648	0.145	---	0.50
170	14.17	0.90	0.648	0.144	---	0.50
171	14.25	0.90	0.648	0.144	---	0.50
172	14.33	0.87	0.624	0.143	---	0.48
173	14.42	0.87	0.624	0.142	---	0.48
174	14.50	0.87	0.624	0.141	---	0.48
175	14.58	0.87	0.624	0.141	---	0.48
176	14.67	0.87	0.624	0.140	---	0.48
177	14.75	0.87	0.624	0.139	---	0.48
178	14.83	0.83	0.600	0.139	---	0.46
179	14.92	0.83	0.600	0.138	---	0.46
180	15.00	0.83	0.600	0.137	---	0.46
181	15.08	0.80	0.576	0.136	---	0.44
182	15.17	0.80	0.576	0.136	---	0.44
183	15.25	0.80	0.576	0.135	---	0.44
184	15.33	0.77	0.552	0.134	---	0.42
185	15.42	0.77	0.552	0.134	---	0.42
186	15.50	0.77	0.552	0.133	---	0.42
187	15.58	0.63	0.456	0.132	---	0.32
188	15.67	0.63	0.456	0.132	---	0.32
189	15.75	0.63	0.456	0.131	---	0.33
190	15.83	0.63	0.456	0.130	---	0.33
191	15.92	0.63	0.456	0.130	---	0.33
192	16.00	0.63	0.456	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01

215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01
217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00
	Sum =	100.0			Sum =	36.9

Flood volume = Effective rainfall 3.08(In)
times area 13.6(Ac.)/[(In)/(Ft.)] = 3.5(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 3.313(Ac.Ft)

Total rainfall = 6.00(In)
Flood volume = 151887.2 Cubic Feet
Total soil loss = 144313.0 Cubic Feet

Peak flow rate of this hydrograph = 9.075(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.01	Q				
0+10	0.0003	0.03	Q				
0+15	0.0006	0.05	Q				
0+20	0.0011	0.06	Q				
0+25	0.0016	0.08	Q				
0+30	0.0022	0.09	Q				
0+35	0.0029	0.09	Q				
0+40	0.0036	0.10	Q				
0+45	0.0042	0.10	Q				
0+50	0.0049	0.10	Q				
0+55	0.0057	0.12	Q				
1+ 0	0.0066	0.12	Q				
1+ 5	0.0075	0.13	Q				
1+10	0.0082	0.11	Q				
1+15	0.0090	0.10	Q				
1+20	0.0097	0.10	Q				
1+25	0.0103	0.10	Q				
1+30	0.0110	0.10	Q				
1+35	0.0117	0.10	Q				
1+40	0.0124	0.10	Q				
1+45	0.0131	0.10	Q				
1+50	0.0138	0.10	Q				
1+55	0.0146	0.12	Q				
2+ 0	0.0154	0.12	Q				
2+ 5	0.0163	0.13	Q				
2+10	0.0172	0.13	Q				
2+15	0.0181	0.13	Q				
2+20	0.0190	0.13	Q				
2+25	0.0199	0.13	Q				
2+30	0.0208	0.13	Q				
2+35	0.0218	0.13	Q				
2+40	0.0228	0.15	Q				
2+45	0.0239	0.16	Q				
2+50	0.0250	0.16	Q				
2+55	0.0261	0.16	Q				
3+ 0	0.0272	0.16	Q				
3+ 5	0.0284	0.16	Q				
3+10	0.0295	0.16	Q				
3+15	0.0306	0.16	Q				
3+20	0.0318	0.16	Q				
3+25	0.0329	0.16	Q				
3+30	0.0340	0.16	Q				
3+35	0.0352	0.16	Q				
3+40	0.0363	0.16	Q				
3+45	0.0374	0.16	Q				
3+50	0.0386	0.17	Q				
3+55	0.0398	0.18	Q				
4+ 0	0.0411	0.19	Q				
4+ 5	0.0425	0.19	Q				
4+10	0.0438	0.20	Q				
4+15	0.0452	0.20	Q				
4+20	0.0466	0.20	Q				
4+25	0.0480	0.21	Q				
4+30	0.0496	0.22	Q				
4+35	0.0512	0.23	Q				
4+40	0.0527	0.23	Q				
4+45	0.0543	0.23	Q				
4+50	0.0559	0.23	Q				
4+55	0.0576	0.25	Q				
5+ 0	0.0594	0.26	VQ				
5+ 5	0.0611	0.25	VQ				
5+10	0.0627	0.23	Q				
5+15	0.0641	0.21	Q				
5+20	0.0656	0.21	Q				

5+25	0.0671	0.22	Q
5+30	0.0686	0.22	Q
5+35	0.0702	0.23	Q
5+40	0.0719	0.25	Q
5+45	0.0737	0.26	VQ
5+50	0.0755	0.26	VQ
5+55	0.0773	0.26	VQ
6+ 0	0.0791	0.26	VQ
6+ 5	0.0809	0.27	VQ
6+10	0.0828	0.28	VQ
6+15	0.0848	0.29	VQ
6+20	0.0868	0.29	VQ
6+25	0.0889	0.29	|Q
6+30	0.0909	0.30	|Q
6+35	0.0929	0.29	|Q
6+40	0.0946	0.25	|Q
6+45	0.0963	0.24	QV
6+50	0.0979	0.24	QV
6+55	0.0996	0.25	QV
7+ 0	0.1014	0.26	|Q
7+ 5	0.1032	0.27	|Q
7+10	0.1052	0.28	|Q
7+15	0.1072	0.30	|Q
7+20	0.1095	0.34	|Q
7+25	0.1130	0.50	|Q
7+30	0.1171	0.60	|VQ
7+35	0.1217	0.67	|VQ
7+40	0.1276	0.85	|V Q
7+45	0.1342	0.96	|V Q
7+50	0.1414	1.04	|V Q
7+55	0.1498	1.22	|V Q
8+ 0	0.1590	1.33	|V Q
8+ 5	0.1689	1.44	|V Q
8+10	0.1810	1.76	| V Q
8+15	0.1945	1.96	| V Q
8+20	0.2086	2.05	| V Q
8+25	0.2231	2.10	| V Q
8+30	0.2378	2.13	| V Q
8+35	0.2527	2.17	| V Q
8+40	0.2688	2.34	| V Q
8+45	0.2857	2.44	| V Q|
8+50	0.3030	2.52	| V Q
8+55	0.3216	2.70	| V Q
9+ 0	0.3409	2.81	| V |Q
9+ 5	0.3609	2.91	| V |Q
9+10	0.3832	3.24	| V | Q
9+15	0.4069	3.43	| V | Q
9+20	0.4313	3.55	| V | Q
9+25	0.4571	3.74	| V | Q
9+30	0.4837	3.86	| V | Q
9+35	0.5108	3.94	| V | Q
9+40	0.5392	4.12	| V | Q
9+45	0.5684	4.23	| V | Q
9+50	0.5981	4.31	| V | Q
9+55	0.6290	4.49	| V | Q
10+ 0	0.6607	4.60	| V | Q
10+ 5	0.6915	4.47	| V | Q
10+10	0.7153	3.46	| V Q|
10+15	0.7351	2.87	| V |Q
10+20	0.7533	2.65	| V Q
10+25	0.7707	2.53	| V Q
10+30	0.7879	2.49	| Q|
10+35	0.8059	2.62	| VQ
10+40	0.8290	3.36	| V| Q
10+45	0.8552	3.80	| V| Q
10+50	0.8826	3.98	| V Q
10+55	0.9107	4.08	| V Q
11+ 0	0.9391	4.13	| V Q
11+ 5	0.9675	4.13	| V Q
11+10	0.9951	4.00	| V Q
11+15	1.0222	3.93	| V Q
11+20	1.0492	3.91	| V Q
11+25	1.0761	3.91	| V Q
11+30	1.1030	3.91	| V Q
11+35	1.1296	3.87	| V Q
11+40	1.1543	3.58	| VQ
11+45	1.1778	3.41	| Q
11+50	1.2011	3.38	| Q
11+55	1.2253	3.51	| Q

SOBA224100

12+ 0	1.2500	3.59	
12+ 5	1.2763	3.82	
12+10	1.3099	4.88	
12+15	1.3479	5.51	
12+20	1.3877	5.79	
12+25	1.4296	6.07	
12+30	1.4725	6.23	
12+35	1.5162	6.35	
12+40	1.5623	6.69	
12+45	1.6098	6.89	
12+50	1.6580	7.01	
12+55	1.7076	7.20	
13+ 0	1.7580	7.32	
13+ 5	1.8097	7.50	
13+10	1.8667	8.28	
13+15	1.9269	8.74	
13+20	1.9883	8.92	
13+25	2.0504	9.02	
13+30	2.1129	9.07	
13+35	2.1736	8.81	
13+40	2.2231	7.19	
13+45	2.2662	6.25	
13+50	2.3067	5.89	
13+55	2.3460	5.70	
14+ 0	2.3847	5.62	
14+ 5	2.4241	5.71	
14+10	2.4674	6.29	
14+15	2.5131	6.64	
14+20	2.5596	6.75	
14+25	2.6056	6.68	
14+30	2.6514	6.64	
14+35	2.6970	6.63	
14+40	2.7426	6.63	
14+45	2.7883	6.63	
14+50	2.8339	6.62	
14+55	2.8785	6.48	
15+ 0	2.9226	6.40	
15+ 5	2.9663	6.35	
15+10	3.0089	6.19	
15+15	3.0509	6.10	
15+20	3.0926	6.05	
15+25	3.1331	5.89	
15+30	3.1731	5.80	
15+35	3.2122	5.67	
15+40	3.2470	5.06	
15+45	3.2795	4.71	
15+50	3.3111	4.58	
15+55	3.3422	4.52	
16+ 0	3.3732	4.50	
16+ 5	3.4017	4.14	
16+10	3.4167	2.17	
16+15	3.4236	1.01	
16+20	3.4275	0.56	
16+25	3.4297	0.33	
16+30	3.4313	0.22	
16+35	3.4325	0.18	
16+40	3.4334	0.14	
16+45	3.4342	0.11	
16+50	3.4349	0.10	
16+55	3.4356	0.10	
17+ 0	3.4363	0.10	
17+ 5	3.4370	0.10	
17+10	3.4379	0.13	
17+15	3.4389	0.14	
17+20	3.4394	0.08	
17+25	3.4397	0.04	
17+30	3.4399	0.03	
17+35	3.4401	0.03	
17+40	3.4404	0.04	
17+45	3.4407	0.04	
17+50	3.4411	0.06	
17+55	3.4417	0.09	
18+ 0	3.4425	0.11	
18+ 5	3.4434	0.12	
18+10	3.4442	0.13	
18+15	3.4451	0.13	
18+20	3.4460	0.13	
18+25	3.4469	0.13	
18+30	3.4478	0.13	

18+35	3.4487	0.13	Q				V
18+40	3.4495	0.11	Q				V
18+45	3.4502	0.11	Q				V
18+50	3.4509	0.10	Q				V
18+55	3.4515	0.08	Q				V
19+ 0	3.4520	0.07	Q				V
19+ 5	3.4525	0.07	Q				V
19+10	3.4531	0.08	Q				V
19+15	3.4537	0.09	Q				V
19+20	3.4544	0.10	Q				V
19+25	3.4552	0.11	Q				V
19+30	3.4560	0.12	Q				V
19+35	3.4569	0.13	Q				V
19+40	3.4577	0.11	Q				V
19+45	3.4584	0.10	Q				V
19+50	3.4591	0.10	Q				V
19+55	3.4597	0.08	Q				V
20+ 0	3.4602	0.07	Q				V
20+ 5	3.4607	0.07	Q				V
20+10	3.4612	0.08	Q				V
20+15	3.4619	0.09	Q				V
20+20	3.4625	0.10	Q				V
20+25	3.4632	0.10	Q				V
20+30	3.4639	0.10	Q				V
20+35	3.4646	0.10	Q				V
20+40	3.4652	0.10	Q				V
20+45	3.4659	0.10	Q				V
20+50	3.4666	0.10	Q				V
20+55	3.4671	0.08	Q				V
21+ 0	3.4676	0.07	Q				V
21+ 5	3.4681	0.07	Q				V
21+10	3.4687	0.08	Q				V
21+15	3.4694	0.09	Q				V
21+20	3.4700	0.09	Q				V
21+25	3.4706	0.08	Q				V
21+30	3.4710	0.07	Q				V
21+35	3.4715	0.07	Q				V
21+40	3.4721	0.08	Q				V
21+45	3.4728	0.09	Q				V
21+50	3.4734	0.09	Q				V
21+55	3.4740	0.08	Q				V
22+ 0	3.4744	0.07	Q				V
22+ 5	3.4749	0.07	Q				V
22+10	3.4755	0.08	Q				V
22+15	3.4762	0.09	Q				V
22+20	3.4768	0.09	Q				V
22+25	3.4774	0.08	Q				V
22+30	3.4778	0.07	Q				V
22+35	3.4783	0.07	Q				V
22+40	3.4788	0.07	Q				V
22+45	3.4792	0.07	Q				V
22+50	3.4797	0.07	Q				V
22+55	3.4802	0.07	Q				V
23+ 0	3.4806	0.07	Q				V
23+ 5	3.4811	0.07	Q				V
23+10	3.4815	0.07	Q				V
23+15	3.4820	0.07	Q				V
23+20	3.4824	0.07	Q				V
23+25	3.4829	0.07	Q				V
23+30	3.4833	0.07	Q				V
23+35	3.4838	0.07	Q				V
23+40	3.4842	0.07	Q				V
23+45	3.4847	0.07	Q				V
23+50	3.4851	0.07	Q				V
23+55	3.4856	0.07	Q				V
24+ 0	3.4860	0.07	Q				V
24+ 5	3.4865	0.06	Q				V
24+10	3.4867	0.03	Q				V
24+15	3.4868	0.01	Q				V
24+20	3.4868	0.01	Q				V
24+25	3.4868	0.00	Q				V
24+30	3.4868	0.00	Q				V
24+35	3.4868	0.00	Q				V
24+40	3.4868	0.00	Q				V
24+45	3.4868	0.00	Q				V

AREA 3

SOBA31100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA31100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 35.70(Ac.) = 0.056 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 35.70(Ac.) = 0.056 Sq. Mi.
Length along longest watercourse = 2755.00(Ft.)
Length along longest watercourse measured to centroid = 1370.00(Ft.)
Length along longest watercourse = 0.522 Mi.
Length along longest watercourse measured to centroid = 0.259 Mi.
Difference in elevation = 240.00(Ft.)
Slope along watercourse = 459.9637 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.158 Hr.
Lag time = 9.45 Min.
25% of lag time = 2.36 Min.
40% of lag time = 3.78 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
35.70	0.55	19.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
35.70	1.20	42.84

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
35.700	86.00	0.000

Total Area Entered = 35.70(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	52.883	4.637	1.668
2	0.167	105.766	23.657	8.511
3	0.250	158.648	37.344	13.436
4	0.333	211.531	13.836	4.978
5	0.417	264.414	7.994	2.876
6	0.500	317.297	5.138	1.849
7	0.583	370.179	3.253	1.171
8	0.667	423.062	1.863	0.670
9	0.750	475.945	0.759	0.273
10	0.833	528.828	0.511	0.184
11	0.917	581.711	0.358	0.129
12	1.000	634.593	0.369	0.133
13	1.083	687.476	0.198	0.071
14	1.167	740.359	0.082	0.030
			Sum = 100.000	Sum= 35.979

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.176	---	0.43
2	0.17	4.30	0.619	0.176	---	0.44
3	0.25	5.00	0.720	0.176	---	0.54
4	0.33	5.00	0.720	0.176	---	0.54
5	0.42	5.80	0.835	0.176	---	0.66
6	0.50	6.50	0.936	0.176	---	0.76
7	0.58	7.40	1.065	0.176	---	0.89
8	0.67	8.60	1.238	0.176	---	1.06
9	0.75	12.30	1.771	0.176	---	1.60
10	0.83	29.10	4.189	0.176	---	4.01
11	0.92	6.80	0.979	0.176	---	0.80
12	1.00	5.00	0.720	0.176	---	0.54
Sum =		100.0			Sum =	12.3

Flood volume = Effective rainfall 1.02(In)
times area 35.7(Ac.)/[(In)/(Ft.)] = 3.0(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.522(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 132702.7 Cubic Feet
Total soil loss = 22756.2 Cubic Feet

Peak flow rate of this hydrograph = 76.044(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 20.0 40.0 60.0 80.0
0+ 5	0.0049	0.72	Q
0+10	0.0352	4.39	V Q
0+15	0.1072	10.45	V Q
0+20	0.2011	13.64	V Q
0+25	0.3147	16.49	V Q
0+30	0.4454	18.98	V Q
0+35	0.5998	22.42	V Q
0+40	0.7805	26.23	V Q
0+45	0.9968	31.41	V Q
0+50	1.2971	43.60	V Q
0+55	1.7629	67.64	V Q
1+ 0	2.2867	76.04	V Q
1+ 5	2.5895	43.97	Q V
1+10	2.7835	28.17	Q V
1+15	2.8910	15.62	Q V
1+20	2.9566	9.52	Q V
1+25	2.9948	5.55	Q V
1+30	3.0147	2.89	Q V

SOBA31100

1+35	3.0268	1.76	Q	V
1+40	3.0346	1.13	Q	V
1+45	3.0407	0.88	Q	V
1+50	3.0442	0.51	Q	V
1+55	3.0459	0.25	Q	V
2+ 0	3.0463	0.06	Q	V
2+ 5	3.0464	0.02	Q	V

SOBA33100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA33100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 35.70(Ac.) = 0.056 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 35.70(Ac.) = 0.056 Sq. Mi.
Length along longest watercourse = 2755.00(Ft.)
Length along longest watercourse measured to centroid = 1370.00(Ft.)
Length along longest watercourse = 0.522 Mi.
Length along longest watercourse measured to centroid = 0.259 Mi.
Difference in elevation = 240.00(Ft.)
Slope along watercourse = 459.9637 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.158 Hr.
Lag time = 9.45 Min.
25% of lag time = 2.36 Min.
40% of lag time = 3.78 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
35.70	0.90	32.13

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
35.70	2.10	74.97

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
35.700	86.00	0.000

Total Area Entered = 35.70(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

SOBA33100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	52.883	4.637	1.668
2	0.167	105.766	23.657	8.511
3	0.250	158.648	37.344	13.436
4	0.333	211.531	13.836	4.978
5	0.417	264.414	7.994	2.876
6	0.500	317.297	5.138	1.849
7	0.583	370.179	3.253	1.171
8	0.667	423.062	1.863	0.670
9	0.750	475.945	0.759	0.273
10	0.833	528.828	0.511	0.184
11	0.917	581.711	0.358	0.129
12	1.000	634.593	0.369	0.133
13	1.083	687.476	0.198	0.071
14	1.167	740.359	0.082	0.030
			Sum = 100.000	Sum= 35.979

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.176	---	0.15
2	0.17	1.30	0.328	0.176	---	0.15
3	0.25	1.10	0.277	0.176	---	0.10
4	0.33	1.50	0.378	0.176	---	0.20
5	0.42	1.50	0.378	0.176	---	0.20
6	0.50	1.80	0.454	0.176	---	0.28
7	0.58	1.50	0.378	0.176	---	0.20
8	0.67	1.80	0.454	0.176	---	0.28
9	0.75	1.80	0.454	0.176	---	0.28
10	0.83	1.50	0.378	0.176	---	0.20
11	0.92	1.60	0.403	0.176	---	0.23
12	1.00	1.80	0.454	0.176	---	0.28
13	1.08	2.20	0.554	0.176	---	0.38
14	1.17	2.20	0.554	0.176	---	0.38
15	1.25	2.20	0.554	0.176	---	0.38
16	1.33	2.00	0.504	0.176	---	0.33
17	1.42	2.60	0.655	0.176	---	0.48
18	1.50	2.70	0.680	0.176	---	0.50
19	1.58	2.40	0.605	0.176	---	0.43
20	1.67	2.70	0.680	0.176	---	0.50
21	1.75	3.30	0.831	0.176	---	0.66
22	1.83	3.10	0.781	0.176	---	0.61
23	1.92	2.90	0.731	0.176	---	0.56
24	2.00	3.00	0.756	0.176	---	0.58
25	2.08	3.10	0.781	0.176	---	0.61
26	2.17	4.20	1.058	0.176	---	0.88
27	2.25	5.00	1.260	0.176	---	1.08
28	2.33	3.50	0.882	0.176	---	0.71
29	2.42	6.80	1.713	0.176	---	1.54
30	2.50	7.30	1.839	0.176	---	1.66
31	2.58	8.20	2.066	0.176	---	1.89
32	2.67	5.90	1.487	0.176	---	1.31
33	2.75	2.00	0.504	0.176	---	0.33
34	2.83	1.80	0.454	0.176	---	0.28
35	2.92	1.80	0.454	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.9

Flood volume = Effective rainfall 1.58(In)
times area 35.7(Ac.)/[(In)/(Ft.)] = 4.7(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 1.557(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 204257.1 Cubic Feet
Total soil loss = 67841.5 Cubic Feet

Peak flow rate of this hydrograph = 54.264(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 15.0 30.0 45.0 60.0
0+ 5	0.0017	0.25	Q
0+10	0.0124	1.55	VQ
0+15	0.0366	3.51	V Q
0+20	0.0641	4.00	V Q
0+25	0.0959	4.62	V Q
0+30	0.1382	6.13	V Q
0+35	0.1876	7.18	V Q
0+40	0.2426	7.98	V Q
0+45	0.2988	8.15	V Q
0+50	0.3607	9.00	V Q
0+55	0.4211	8.77	V Q
1+ 0	0.4780	8.25	VQ
1+ 5	0.5395	8.94	VQ
1+10	0.6115	10.45	VQ
1+15	0.6945	12.04	V Q
1+20	0.7811	12.59	V Q
1+25	0.8692	12.79	VQ
1+30	0.9635	13.69	VQ
1+35	1.0717	15.71	VQ
1+40	1.1834	16.22	Q
1+45	1.2977	16.60	Q
1+50	1.4269	18.76	Q
1+55	1.5691	20.64	Q
2+ 0	1.7106	20.55	QV
2+ 5	1.8512	20.42	Q V
2+10	1.9985	21.39	Q V
2+15	2.1674	24.53	Q V
2+20	2.3707	29.52	QV
2+25	2.5902	31.86	QV
2+30	2.8377	35.94	QV
2+35	3.1670	47.82	V Q
2+40	3.5408	54.26	V Q
2+45	3.9092	53.49	V Q
2+50	4.1850	40.05	Q V
2+55	4.3588	25.24	Q V
3+ 0	4.4873	18.66	Q V
3+ 5	4.5755	12.82	Q V
3+10	4.6227	6.85	Q V
3+15	4.6494	3.87	Q V
3+20	4.6653	2.31	Q V
3+25	4.6754	1.47	Q V
3+30	4.6817	0.92	Q V
3+35	4.6854	0.54	Q V
3+40	4.6874	0.28	Q V
3+45	4.6884	0.14	Q V
3+50	4.6888	0.07	Q V
3+55	4.6890	0.03	Q V
4+ 0	4.6891	0.01	Q V
4+ 5	4.6891	0.00	Q V

SOBA36100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA36100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 35.70(Ac.) = 0.056 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 35.70(Ac.) = 0.056 Sq. Mi.
Length along longest watercourse = 2755.00(Ft.)
Length along longest watercourse measured to centroid = 1370.00(Ft.)
Length along longest watercourse = 0.522 Mi.
Length along longest watercourse measured to centroid = 0.259 Mi.
Difference in elevation = 240.00(Ft.)
Slope along watercourse = 459.9637 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.158 Hr.
Lag time = 9.45 Min.
25% of lag time = 2.36 Min.
40% of lag time = 3.78 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
35.70	1.40	49.98

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
35.70	3.00	107.10

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 3.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
35.700	86.00	0.000

Total Area Entered = 35.70(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

SOBA36100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	52.883	4.637	1.668
2	0.167	105.766	23.657	8.511
3	0.250	158.648	37.344	13.436
4	0.333	211.531	13.836	4.978
5	0.417	264.414	7.994	2.876
6	0.500	317.297	5.138	1.849
7	0.583	370.179	3.253	1.171
8	0.667	423.062	1.863	0.670
9	0.750	475.945	0.759	0.273
10	0.833	528.828	0.511	0.184
11	0.917	581.711	0.358	0.129
12	1.000	634.593	0.369	0.133
13	1.083	687.476	0.198	0.071
14	1.167	740.359	0.082	0.030
			Sum = 100.000 Sum=	35.979

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.216	0.176	---	0.04
3	0.25	0.60	0.216	0.176	---	0.04
4	0.33	0.60	0.216	0.176	---	0.04
5	0.42	0.60	0.216	0.176	---	0.04
6	0.50	0.70	0.252	0.176	---	0.08
7	0.58	0.70	0.252	0.176	---	0.08
8	0.67	0.70	0.252	0.176	---	0.08
9	0.75	0.70	0.252	0.176	---	0.08
10	0.83	0.70	0.252	0.176	---	0.08
11	0.92	0.70	0.252	0.176	---	0.08
12	1.00	0.80	0.288	0.176	---	0.11
13	1.08	0.80	0.288	0.176	---	0.11
14	1.17	0.80	0.288	0.176	---	0.11
15	1.25	0.80	0.288	0.176	---	0.11
16	1.33	0.80	0.288	0.176	---	0.11
17	1.42	0.80	0.288	0.176	---	0.11
18	1.50	0.80	0.288	0.176	---	0.11
19	1.58	0.80	0.288	0.176	---	0.11
20	1.67	0.80	0.288	0.176	---	0.11
21	1.75	0.80	0.288	0.176	---	0.11
22	1.83	0.80	0.288	0.176	---	0.11
23	1.92	0.80	0.288	0.176	---	0.11
24	2.00	0.90	0.324	0.176	---	0.15
25	2.08	0.80	0.288	0.176	---	0.11
26	2.17	0.90	0.324	0.176	---	0.15
27	2.25	0.90	0.324	0.176	---	0.15
28	2.33	0.90	0.324	0.176	---	0.15
29	2.42	0.90	0.324	0.176	---	0.15
30	2.50	0.90	0.324	0.176	---	0.15
31	2.58	0.90	0.324	0.176	---	0.15
32	2.67	0.90	0.324	0.176	---	0.15
33	2.75	1.00	0.360	0.176	---	0.18
34	2.83	1.00	0.360	0.176	---	0.18
35	2.92	1.00	0.360	0.176	---	0.18
36	3.00	1.00	0.360	0.176	---	0.18
37	3.08	1.00	0.360	0.176	---	0.18
38	3.17	1.10	0.396	0.176	---	0.22
39	3.25	1.10	0.396	0.176	---	0.22
40	3.33	1.10	0.396	0.176	---	0.22
41	3.42	1.20	0.432	0.176	---	0.26
42	3.50	1.30	0.468	0.176	---	0.29
43	3.58	1.40	0.504	0.176	---	0.33
44	3.67	1.40	0.504	0.176	---	0.33
45	3.75	1.50	0.540	0.176	---	0.36
46	3.83	1.50	0.540	0.176	---	0.36
47	3.92	1.60	0.576	0.176	---	0.40
48	4.00	1.60	0.576	0.176	---	0.40
49	4.08	1.70	0.612	0.176	---	0.44
50	4.17	1.80	0.648	0.176	---	0.47
51	4.25	1.90	0.684	0.176	---	0.51
52	4.33	2.00	0.720	0.176	---	0.54

53	4.42	2.10	0.756	0.176	---	0.58
54	4.50	2.10	0.756	0.176	---	0.58
55	4.58	2.20	0.792	0.176	---	0.62
56	4.67	2.30	0.828	0.176	---	0.65
57	4.75	2.40	0.864	0.176	---	0.69
58	4.83	2.40	0.864	0.176	---	0.69
59	4.92	2.50	0.900	0.176	---	0.72
60	5.00	2.60	0.936	0.176	---	0.76
61	5.08	3.10	1.116	0.176	---	0.94
62	5.17	3.60	1.296	0.176	---	1.12
63	5.25	3.90	1.404	0.176	---	1.23
64	5.33	4.20	1.512	0.176	---	1.34
65	5.42	4.70	1.692	0.176	---	1.52
66	5.50	5.60	2.016	0.176	---	1.84
67	5.58	1.90	0.684	0.176	---	0.51
68	5.67	0.90	0.324	0.176	---	0.15
69	5.75	0.60	0.216	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 35.7(Ac.)/[(In)/(Ft.)] = 5.8(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 3.088(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 254231.6 Cubic Feet
Total soil loss = 134493.6 Cubic Feet

Peak flow rate of this hydrograph = 51.335(CFS)

++

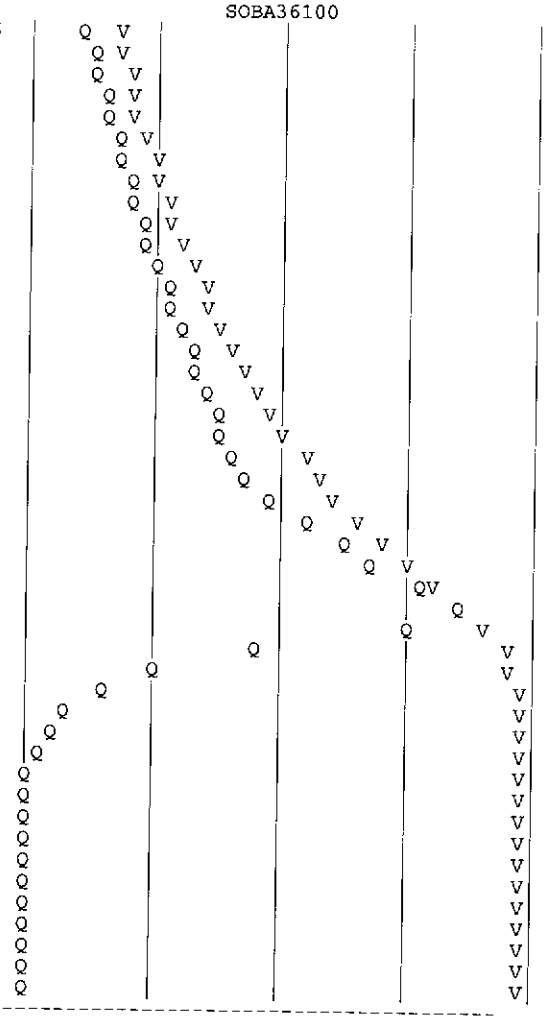
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0001	0.01	Q				
0+10	0.0008	0.10	Q				
0+15	0.0040	0.47	Q				
0+20	0.0107	0.98	Q				
0+25	0.0188	1.17	Q				
0+30	0.0280	1.34	Q				
0+35	0.0398	1.72	VQ				
0+40	0.0553	2.25	VQ				
0+45	0.0722	2.45	VQ				
0+50	0.0898	2.57	VQ				
0+55	0.1080	2.64	VQ				
1+ 0	0.1269	2.75	VQ				
1+ 5	0.1482	3.08	VQ				
1+10	0.1728	3.58	VQ				
1+15	0.1988	3.77	VQ				
1+20	0.2254	3.87	VQ				
1+25	0.2526	3.95	VQ				
1+30	0.2801	3.99	VQ				
1+35	0.3077	4.02	Q				
1+40	0.3355	4.03	Q				
1+45	0.3632	4.03	Q				
1+50	0.3910	4.04	Q				
1+55	0.4189	4.04	Q				
2+ 0	0.4471	4.10	QV				
2+ 5	0.4771	4.35	QV				
2+10	0.5087	4.59	Q				
2+15	0.5403	4.59	Q				
2+20	0.5747	5.00	Q				
2+25	0.6101	5.14	QV				
2+30	0.6461	5.22	QV				
2+35	0.6824	5.27	QV				
2+40	0.7189	5.30	QV				
2+45	0.7559	5.38	Q V				
2+50	0.7951	5.69	Q V				
2+55	0.8377	6.18	QV				
3+ 0	0.8815	6.36	Q V				
3+ 5	0.9261	6.47	Q V				
3+10	0.9715	6.60	Q V				
3+15	1.0194	6.95	Q V				

SOBA36100

3+20	1.0708	7.46
3+25	1.1238	7.71
3+30	1.1802	8.18
3+35	1.2429	9.11
3+40	1.3126	10.12
3+45	1.3882	10.98
3+50	1.4684	11.64
3+55	1.5538	12.41
4+ 0	1.6435	13.03
4+ 5	1.7383	13.76
4+10	1.8375	14.41
4+15	1.9438	15.43
4+20	2.0579	16.57
4+25	2.1803	17.76
4+30	2.3107	18.94
4+35	2.4478	19.90
4+40	2.5903	20.69
4+45	2.7404	21.80
4+50	2.8982	22.92
4+55	3.0624	23.84
5+ 0	3.2319	24.61
5+ 5	3.4105	25.94
5+10	3.6074	28.59
5+15	3.8353	33.09
5+20	4.0951	37.72
5+25	4.3840	41.94
5+30	4.7072	46.94
5+35	5.0608	51.33
5+40	5.3742	45.51
5+45	5.5602	27.00
5+50	5.6711	16.11
5+55	5.7380	9.71
6+ 0	5.7782	5.84
6+ 5	5.8024	3.50
6+10	5.8160	1.98
6+15	5.8242	1.19
6+20	5.8295	0.78
6+25	5.8332	0.52
6+30	5.8351	0.29
6+35	5.8360	0.12
6+40	5.8362	0.04
6+45	5.8363	0.01
6+50	5.8363	0.00
6+55	5.8363	0.00
7+ 0	5.8364	0.00
7+ 5	5.8364	0.00



SOBA324100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA324100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 35.70(Ac.) = 0.056 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 35.70(Ac.) = 0.056 Sq. Mi.
Length along longest watercourse = 2755.00(Ft.)
Length along longest watercourse measured to centroid = 1370.00(Ft.)
Length along longest watercourse = 0.522 Mi.
Length along longest watercourse measured to centroid = 0.259 Mi.
Difference in elevation = 240.00(Ft.)
Slope along watercourse = 459.9637 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.158 Hr.
Lag time = 9.45 Min.
25% of lag time = 2.36 Min.
40% of lag time = 3.78 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
35.70	2.25	80.33

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
35.70	6.00	214.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 6.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
35.700	86.00	0.000

Total Area Entered = 35.70(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

SOBA324100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	52.883	4.637	1.668
2	0.167	105.766	23.657	8.511
3	0.250	158.648	37.344	13.436
4	0.333	211.531	13.836	4.978
5	0.417	264.414	7.994	2.876
6	0.500	317.297	5.138	1.849
7	0.583	370.179	3.253	1.171
8	0.667	423.062	1.863	0.670
9	0.750	475.945	0.759	0.273
10	0.833	528.828	0.511	0.184
11	0.917	581.711	0.358	0.129
12	1.000	634.593	0.369	0.133
13	1.083	687.476	0.198	0.071
14	1.167	740.359	0.082	0.030
			Sum = 100.000 Sum=	35.979

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.130	0.01
47	3.92	0.20	0.144	0.258	0.130	0.01
48	4.00	0.20	0.144	0.257	0.130	0.01
49	4.08	0.20	0.144	0.256	0.130	0.01
50	4.17	0.20	0.144	0.255	0.130	0.01
51	4.25	0.20	0.144	0.254	0.130	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02

53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02
59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.130	0.01
62	5.17	0.20	0.144	0.242	0.130	0.01
63	5.25	0.20	0.144	0.241	0.130	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.08
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.16
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.384	0.201	---	0.18
104	8.67	0.53	0.384	0.200	---	0.18
105	8.75	0.53	0.384	0.199	---	0.18
106	8.83	0.57	0.408	0.198	---	0.21
107	8.92	0.57	0.408	0.197	---	0.21
108	9.00	0.57	0.408	0.196	---	0.21
109	9.08	0.63	0.456	0.195	---	0.26
110	9.17	0.63	0.456	0.195	---	0.26
111	9.25	0.63	0.456	0.194	---	0.26
112	9.33	0.67	0.480	0.193	---	0.29
113	9.42	0.67	0.480	0.192	---	0.29
114	9.50	0.67	0.480	0.191	---	0.29
115	9.58	0.70	0.504	0.190	---	0.31
116	9.67	0.70	0.504	0.189	---	0.31
117	9.75	0.70	0.504	0.188	---	0.32
118	9.83	0.73	0.528	0.187	---	0.34
119	9.92	0.73	0.528	0.186	---	0.34
120	10.00	0.73	0.528	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.18
122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.480	0.179	---	0.30
128	10.67	0.67	0.480	0.178	---	0.30
129	10.75	0.67	0.480	0.177	---	0.30
130	10.83	0.67	0.480	0.177	---	0.30
131	10.92	0.67	0.480	0.176	---	0.30

132	11.00	0.67	0.480	0.175	---	0.31
133	11.08	0.63	0.456	0.174	---	0.28
134	11.17	0.63	0.456	0.173	---	0.28
135	11.25	0.63	0.456	0.172	---	0.28
136	11.33	0.63	0.456	0.171	---	0.28
137	11.42	0.63	0.456	0.171	---	0.29
138	11.50	0.63	0.456	0.170	---	0.29
139	11.58	0.57	0.408	0.169	---	0.24
140	11.67	0.57	0.408	0.168	---	0.24
141	11.75	0.57	0.408	0.167	---	0.24
142	11.83	0.60	0.432	0.166	---	0.27
143	11.92	0.60	0.432	0.166	---	0.27
144	12.00	0.60	0.432	0.165	---	0.27
145	12.08	0.83	0.600	0.164	---	0.44
146	12.17	0.83	0.600	0.163	---	0.44
147	12.25	0.83	0.600	0.162	---	0.44
148	12.33	0.87	0.624	0.161	---	0.46
149	12.42	0.87	0.624	0.161	---	0.46
150	12.50	0.87	0.624	0.160	---	0.46
151	12.58	0.93	0.672	0.159	---	0.51
152	12.67	0.93	0.672	0.158	---	0.51
153	12.75	0.93	0.672	0.157	---	0.51
154	12.83	0.97	0.696	0.157	---	0.54
155	12.92	0.97	0.696	0.156	---	0.54
156	13.00	0.97	0.696	0.155	---	0.54
157	13.08	1.13	0.816	0.154	---	0.66
158	13.17	1.13	0.816	0.154	---	0.66
159	13.25	1.13	0.816	0.153	---	0.66
160	13.33	1.13	0.816	0.152	---	0.66
161	13.42	1.13	0.816	0.151	---	0.66
162	13.50	1.13	0.816	0.150	---	0.67
163	13.58	0.77	0.552	0.150	---	0.40
164	13.67	0.77	0.552	0.149	---	0.40
165	13.75	0.77	0.552	0.148	---	0.40
166	13.83	0.77	0.552	0.147	---	0.40
167	13.92	0.77	0.552	0.147	---	0.41
168	14.00	0.77	0.552	0.146	---	0.41
169	14.08	0.90	0.648	0.145	---	0.50
170	14.17	0.90	0.648	0.144	---	0.50
171	14.25	0.90	0.648	0.144	---	0.50
172	14.33	0.87	0.624	0.143	---	0.48
173	14.42	0.87	0.624	0.142	---	0.48
174	14.50	0.87	0.624	0.141	---	0.48
175	14.58	0.87	0.624	0.141	---	0.48
176	14.67	0.87	0.624	0.140	---	0.48
177	14.75	0.87	0.624	0.139	---	0.48
178	14.83	0.83	0.600	0.139	---	0.46
179	14.92	0.83	0.600	0.138	---	0.46
180	15.00	0.83	0.600	0.137	---	0.46
181	15.08	0.80	0.576	0.136	---	0.44
182	15.17	0.80	0.576	0.136	---	0.44
183	15.25	0.80	0.576	0.135	---	0.44
184	15.33	0.77	0.552	0.134	---	0.42
185	15.42	0.77	0.552	0.134	---	0.42
186	15.50	0.77	0.552	0.133	---	0.42
187	15.58	0.63	0.456	0.132	---	0.32
188	15.67	0.63	0.456	0.132	---	0.32
189	15.75	0.63	0.456	0.131	---	0.33
190	15.83	0.63	0.456	0.130	---	0.33
191	15.92	0.63	0.456	0.130	---	0.33
192	16.00	0.63	0.456	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00

211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01
217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00
	Sum =	100.0			Sum =	36.9

Flood volume = Effective rainfall 3.08(In)
times area 35.7(Ac.)/[(In)/(Ft.)] = 9.2(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 8.696(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 398677.0 Cubic Feet
Total soil loss = 378814.8 Cubic Feet

Peak flow rate of this hydrograph = 23.550(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

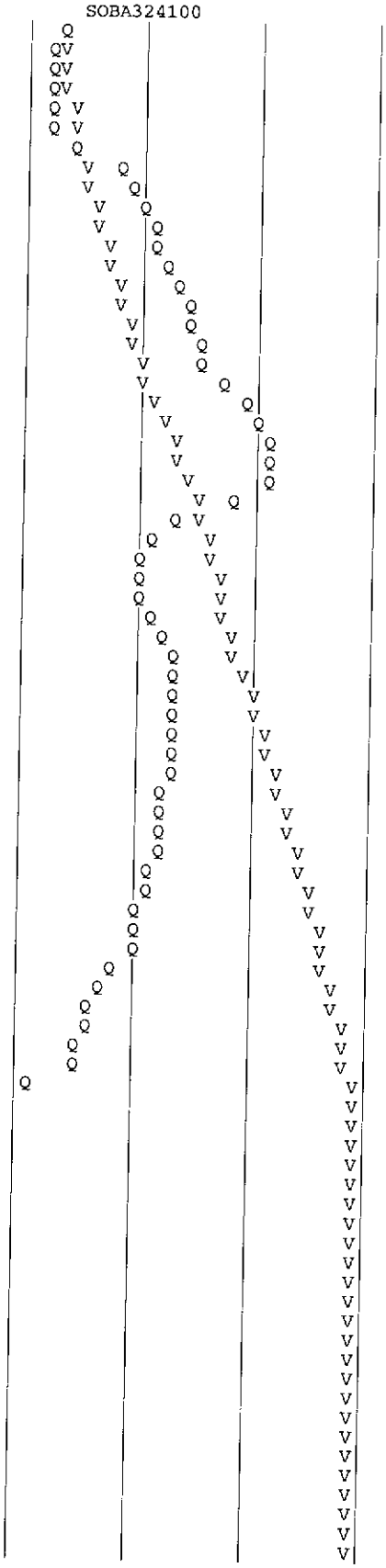
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0001	0.01	Q				
0+10	0.0004	0.05	Q				
0+15	0.0012	0.11	Q				
0+20	0.0021	0.14	Q				
0+25	0.0034	0.18	Q				
0+30	0.0048	0.22	Q				
0+35	0.0065	0.23	Q				
0+40	0.0081	0.24	Q				
0+45	0.0099	0.25	Q				
0+50	0.0116	0.26	Q				
0+55	0.0136	0.28	Q				
1+ 0	0.0157	0.31	Q				
1+ 5	0.0180	0.32	Q				
1+10	0.0201	0.31	Q				
1+15	0.0220	0.28	Q				
1+20	0.0239	0.27	Q				
1+25	0.0258	0.27	Q				
1+30	0.0276	0.26	Q				
1+35	0.0294	0.26	Q				
1+40	0.0312	0.26	Q				
1+45	0.0330	0.26	Q				
1+50	0.0348	0.26	Q				
1+55	0.0368	0.28	Q				
2+ 0	0.0389	0.32	Q				
2+ 5	0.0412	0.33	Q				
2+10	0.0435	0.33	Q				
2+15	0.0458	0.34	Q				
2+20	0.0482	0.34	Q				
2+25	0.0505	0.34	Q				
2+30	0.0529	0.34	Q				
2+35	0.0553	0.35	Q				
2+40	0.0579	0.37	Q				
2+45	0.0606	0.40	Q				
2+50	0.0635	0.41	Q				
2+55	0.0664	0.42	Q				
3+ 0	0.0693	0.43	Q				
3+ 5	0.0723	0.43	Q				
3+10	0.0752	0.43	Q				
3+15	0.0782	0.43	Q				
3+20	0.0812	0.43	Q				
3+25	0.0841	0.43	Q				
3+30	0.0871	0.43	Q				
3+35	0.0901	0.43	Q				
3+40	0.0931	0.43	Q				
3+45	0.0960	0.43	Q				
3+50	0.0990	0.44	Q				
3+55	0.1022	0.46	Q				
4+ 0	0.1055	0.49	Q				
4+ 5	0.1090	0.50	Q				
4+10	0.1125	0.51	Q				
4+15	0.1160	0.51	Q				
4+20	0.1196	0.52	Q				
4+25	0.1233	0.54	Q				
4+30	0.1273	0.57	Q				
4+35	0.1313	0.59	Q				
4+40	0.1354	0.59	Q				
4+45	0.1395	0.60	Q				
4+50	0.1437	0.61	Q				
4+55	0.1480	0.63	Q				
5+ 0	0.1525	0.66	Q				

5+ 5	0.1571	0.66	Q
5+10	0.1615	0.63	Q
5+15	0.1654	0.57	Q
5+20	0.1692	0.55	Q
5+25	0.1731	0.56	Q
5+30	0.1771	0.59	Q
5+35	0.1812	0.60	Q
5+40	0.1855	0.62	Q
5+45	0.1900	0.66	Q
5+50	0.1947	0.67	Q
5+55	0.1993	0.68	Q
6+ 0	0.2041	0.68	Q
6+ 5	0.2088	0.69	Q
6+10	0.2137	0.71	Q
6+15	0.2189	0.75	Q
6+20	0.2241	0.76	VQ
6+25	0.2294	0.77	|Q
6+30	0.2347	0.77	|Q
6+35	0.2399	0.76	|Q
6+40	0.2448	0.71	QV
6+45	0.2493	0.64	QV
6+50	0.2536	0.63	QV
6+55	0.2581	0.64	QV
7+ 0	0.2626	0.67	QV
7+ 5	0.2674	0.69	QV
7+10	0.2724	0.72	QV
7+15	0.2776	0.76	|Q
7+20	0.2833	0.83	|Q
7+25	0.2906	1.07	|Q
7+30	0.3005	1.43	|Q
7+35	0.3116	1.62	VQ
7+40	0.3249	1.93	VQ
7+45	0.3410	2.33	V Q
7+50	0.3586	2.55	V Q
7+55	0.3784	2.88	V Q
8+ 0	0.4010	3.29	V Q
8+ 5	0.4255	3.55	V Q
8+10	0.4537	4.09	V Q
8+15	0.4869	4.82	V Q
8+20	0.5222	5.13	V Q
8+25	0.5588	5.32	V Q
8+30	0.5964	5.45	V Q
8+35	0.6349	5.59	V Q
8+40	0.6753	5.87	V Q
8+45	0.7183	6.24	V Q
8+50	0.7626	6.44	V Q
8+55	0.8092	6.76	V Q
9+ 0	0.8585	7.16	V Q
9+ 5	0.9097	7.43	V Q
9+10	0.9645	7.96	V Q
9+15	1.0243	8.69	V |Q
9+20	1.0866	9.03	V Q
9+25	1.1515	9.43	V Q
9+30	1.2196	9.88	V Q
9+35	1.2894	10.14	V Q
9+40	1.3616	10.48	V Q
9+45	1.4366	10.90	V Q
9+50	1.5132	11.13	V Q
9+55	1.5921	11.46	V Q
10+ 0	1.6739	11.87	V Q
10+ 5	1.7550	11.78	V Q
10+10	1.8271	10.47	V Q
10+15	1.8842	8.30	V |Q
10+20	1.9361	7.53	V Q
10+25	1.9849	7.10	VQ|
10+30	2.0320	6.83	VQ|
10+35	2.0793	6.87	Q|
10+40	2.1331	7.81	VQ
10+45	2.1979	9.41	V| Q
10+50	2.2669	10.01	V| Q
10+55	2.3383	10.37	V Q
11+ 0	2.4113	10.60	V Q
11+ 5	2.4852	10.72	V Q
11+10	2.5583	10.62	|V Q
11+15	2.6297	10.36	V Q
11+20	2.7006	10.30	V Q
11+25	2.7714	10.28	VQ
11+30	2.8422	10.28	VQ
11+35	2.9125	10.21	VQ

SOBA324100

11+40	2.9801	9.82
11+45	3.0434	9.20
11+50	3.1056	9.02
11+55	3.1684	9.12
12+ 0	3.2330	9.38
12+ 5	3.3001	9.75
12+10	3.3776	11.25
12+15	3.4710	13.57
12+20	3.5708	14.49
12+25	3.6756	15.22
12+30	3.7850	15.88
12+35	3.8973	16.31
12+40	4.0139	16.93
12+45	4.1357	17.70
12+50	4.2602	18.07
12+55	4.3874	18.47
13+ 0	4.5179	18.94
13+ 5	4.6512	19.36
13+10	4.7926	20.52
13+15	4.9457	22.23
13+20	5.1033	22.89
13+25	5.2637	23.29
13+30	5.4259	23.55
13+35	5.5862	23.29
13+40	5.7319	21.15
13+45	5.8536	17.67
13+50	5.9665	16.40
13+55	6.0746	15.69
14+ 0	6.1795	15.24
14+ 5	6.2837	15.13
14+10	6.3925	15.80
14+15	6.5099	17.04
14+20	6.6301	17.46
14+25	6.7508	17.52
14+30	6.8705	17.37
14+35	6.9901	17.37
14+40	7.1098	17.39
14+45	7.2296	17.39
14+50	7.3492	17.37
14+55	7.4676	17.19
15+ 0	7.5840	16.90
15+ 5	7.6994	16.76
15+10	7.8132	16.52
15+15	7.9245	16.17
15+20	8.0348	16.01
15+25	8.1432	15.74
15+30	8.2492	15.39
15+35	8.3532	15.11
15+40	8.4512	14.22
15+45	8.5401	12.90
15+50	8.6256	12.42
15+55	8.7093	12.15
16+ 0	8.7918	11.98
16+ 5	8.8700	11.36
16+10	8.9292	8.60
16+15	8.9590	4.31
16+20	8.9777	2.72
16+25	8.9901	1.80
16+30	8.9983	1.20
16+35	9.0039	0.82
16+40	9.0079	0.58
16+45	9.0111	0.46
16+50	9.0138	0.39
16+55	9.0162	0.34
17+ 0	9.0182	0.30
17+ 5	9.0201	0.28
17+10	9.0223	0.31
17+15	9.0247	0.35
17+20	9.0267	0.28
17+25	9.0277	0.15
17+30	9.0284	0.11
17+35	9.0291	0.10
17+40	9.0299	0.10
17+45	9.0306	0.11
17+50	9.0315	0.13
17+55	9.0328	0.19
18+ 0	9.0347	0.27
18+ 5	9.0368	0.30
18+10	9.0390	0.32



18+15	9.0412	0.33	Q	|	|	V |
18+20	9.0435	0.34	Q	|	|	V |
18+25	9.0459	0.34	Q	|	|	V |
18+30	9.0482	0.34	Q	|	|	V |
18+35	9.0506	0.34	Q	|	|	V |
18+40	9.0528	0.32	Q	|	|	V |
18+45	9.0548	0.29	Q	|	|	V |
18+50	9.0566	0.27	Q	|	|	V |
18+55	9.0583	0.25	Q	|	|	V |
19+ 0	9.0598	0.21	Q	|	|	V |
19+ 5	9.0611	0.20	Q	|	|	V |
19+10	9.0626	0.21	Q	|	|	V |
19+15	9.0642	0.24	Q	|	|	V |
19+20	9.0659	0.25	Q	|	|	V |
19+25	9.0678	0.28	Q	|	|	V |
19+30	9.0700	0.31	Q	|	|	V |
19+35	9.0722	0.32	Q	|	|	V |
19+40	9.0743	0.31	Q	|	|	V |
19+45	9.0762	0.28	Q	|	|	V |
19+50	9.0781	0.27	Q	|	|	V |
19+55	9.0798	0.24	Q	|	|	V |
20+ 0	9.0812	0.21	Q	|	|	V |
20+ 5	9.0826	0.20	Q	|	|	V |
20+10	9.0840	0.21	Q	|	|	V |
20+15	9.0856	0.24	Q	|	|	V |
20+20	9.0873	0.25	Q	|	|	V |
20+25	9.0890	0.25	Q	|	|	V |
20+30	9.0908	0.25	Q	|	|	V |
20+35	9.0926	0.26	Q	|	|	V |
20+40	9.0943	0.26	Q	|	|	V |
20+45	9.0961	0.26	Q	|	|	V |
20+50	9.0979	0.25	Q	|	|	V |
20+55	9.0995	0.23	Q	|	|	V |
21+ 0	9.1009	0.20	Q	|	|	V |
21+ 5	9.1022	0.19	Q	|	|	V |
21+10	9.1036	0.21	Q	|	|	V |
21+15	9.1053	0.24	Q	|	|	V |
21+20	9.1069	0.24	Q	|	|	V |
21+25	9.1085	0.23	Q	|	|	V |
21+30	9.1098	0.20	Q	|	|	V |
21+35	9.1112	0.19	Q	|	|	V |
21+40	9.1126	0.21	Q	|	|	V |
21+45	9.1142	0.23	Q	|	|	V |
21+50	9.1159	0.24	Q	|	|	V |
21+55	9.1174	0.23	Q	|	|	V |
22+ 0	9.1188	0.20	Q	|	|	V |
22+ 5	9.1201	0.19	Q	|	|	V |
22+10	9.1215	0.21	Q	|	|	V |
22+15	9.1231	0.23	Q	|	|	V |
22+20	9.1248	0.24	Q	|	|	V |
22+25	9.1263	0.23	Q	|	|	V |
22+30	9.1277	0.20	Q	|	|	V |
22+35	9.1290	0.19	Q	|	|	V |
22+40	9.1302	0.18	Q	|	|	V |
22+45	9.1315	0.18	Q	|	|	V |
22+50	9.1327	0.18	Q	|	|	V |
22+55	9.1339	0.17	Q	|	|	V |
23+ 0	9.1351	0.17	Q	|	|	V |
23+ 5	9.1363	0.17	Q	|	|	V |
23+10	9.1375	0.17	Q	|	|	V |
23+15	9.1387	0.17	Q	|	|	V |
23+20	9.1398	0.17	Q	|	|	V |
23+25	9.1410	0.17	Q	|	|	V |
23+30	9.1422	0.17	Q	|	|	V |
23+35	9.1434	0.17	Q	|	|	V |
23+40	9.1446	0.17	Q	|	|	V |
23+45	9.1458	0.17	Q	|	|	V |
23+50	9.1470	0.17	Q	|	|	V |
23+55	9.1482	0.17	Q	|	|	V |
24+ 0	9.1494	0.17	Q	|	|	V |
24+ 5	9.1505	0.16	Q	|	|	V |
24+10	9.1514	0.12	Q	|	|	V |
24+15	9.1518	0.06	Q	|	|	V |
24+20	9.1520	0.04	Q	|	|	V |
24+25	9.1522	0.02	Q	|	|	V |
24+30	9.1522	0.01	Q	|	|	V |
24+35	9.1523	0.01	Q	|	|	V |
24+40	9.1523	0.00	Q	|	|	V |
24+45	9.1523	0.00	Q	|	|	V |

24+50	9.1524	0.00	Q			V
24+55	9.1524	0.00	Q			V
25+ 0	9.1524	0.00	Q			V
25+ 5	9.1524	0.00	Q			V

AREA 4

SOBA41100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA41100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 78.00(Ac.) = 0.122 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 78.00(Ac.) = 0.122 Sq. Mi.
Length along longest watercourse = 3160.00(Ft.)
Length along longest watercourse measured to centroid = 2000.00(Ft.)
Length along longest watercourse = 0.598 Mi.
Length along longest watercourse measured to centroid = 0.379 Mi.
Difference in elevation = 360.00(Ft.)
Slope along watercourse = 601.5190 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.182 Hr.
Lag time = 10.93 Min.
25% of lag time = 2.73 Min.
40% of lag time = 4.37 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
78.00	0.55	42.90

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
78.00	1.20	93.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.93 %
Adjusted average point rain = 1.199(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
78.000	86.00	0.000

Total Area Entered = 78.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	45.749	3.777	2.969
2	0.167	91.498	15.791	12.413
3	0.250	137.247	37.719	29.651
4	0.333	182.996	16.864	13.257
5	0.417	228.745	8.964	7.046
6	0.500	274.494	5.922	4.655
7	0.583	320.243	4.081	3.208
8	0.667	365.992	2.726	2.143
9	0.750	411.741	1.710	1.344
10	0.833	457.490	0.761	0.598
11	0.917	503.239	0.489	0.384
12	1.000	548.988	0.353	0.278
13	1.083	594.737	0.318	0.250
14	1.167	640.486	0.294	0.231
15	1.250	686.235	0.156	0.122
16	1.333	731.984	0.075	0.059
			Sum = 100.000 Sum=	78.609

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.604	0.176	---	0.43
2	0.17	4.30	0.619	0.176	---	0.44
3	0.25	5.00	0.719	0.176	---	0.54
4	0.33	5.00	0.719	0.176	---	0.54
5	0.42	5.80	0.835	0.176	---	0.66
6	0.50	6.50	0.935	0.176	---	0.76
7	0.58	7.40	1.065	0.176	---	0.89
8	0.67	8.60	1.238	0.176	---	1.06
9	0.75	12.30	1.770	0.176	---	1.59
10	0.83	29.10	4.187	0.176	---	4.01
11	0.92	6.80	0.979	0.176	---	0.80
12	1.00	5.00	0.719	0.176	---	0.54
Sum =		100.0			Sum =	12.3

Flood volume = Effective rainfall 1.02(In)
times area 78.0(Ac.)/[(In)/(Ft.)] = 6.7(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 1.141(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 289808.4 Cubic Feet
Total soil loss = 49719.4 Cubic Feet

Peak flow rate of this hydrograph = 168.576(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0088	1.27	Q				
0+10	0.0545	6.64	VQ				
0+15	0.1912	19.84	V Q				
0+20	0.3785	27.20	V Q				
0+25	0.6109	33.75	V Q				
0+30	0.8789	38.91	V Q				
0+35	1.1965	46.12	V Q				
0+40	1.5697	54.19	VQ				
0+45	2.0162	64.83	Q				
0+50	2.6168	87.21	V Q				
0+55	3.4973	127.84	V Q				
1+ 0	4.6583	168.58	V Q				
1+ 5	5.3891	106.11	Q V				
1+10	5.8697	69.79	Q V				
1+15	6.1542	41.30	Q V				
1+20	6.3377	26.65	Q V				

SOBA41100

1+25	6.4577	17.43	Q			V
1+30	6.5329	10.91	Q			V
1+35	6.5746	6.07	Q			V
1+40	6.6008	3.80	Q			V
1+45	6.6184	2.55	Q			V
1+50	6.6321	1.99	Q			V
1+55	6.6427	1.54	Q			V
2+ 0	6.6489	0.91	Q			V
2+ 5	6.6521	0.46	Q			V
2+10	6.6529	0.11	Q			V
2+15	6.6531	0.03	Q			V

SOBA43100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA43100.out

++++-++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 78.00(Ac.) = 0.122 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 78.00(Ac.) = 0.122 Sq. Mi.
Length along longest watercourse = 3160.00(Ft.)
Length along longest watercourse measured to centroid = 2000.00(Ft.)
Length along longest watercourse = 0.598 Mi.
Length along longest watercourse measured to centroid = 0.379 Mi.
Difference in elevation = 360.00(Ft.)
Slope along watercourse = 601.5190 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.182 Hr.
Lag time = 10.93 Min.
25% of lag time = 2.73 Min.
40% of lag time = 4.37 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
78.00	0.90	70.20

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
78.00	2.10	163.80

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 2.099(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
78.000	86.00	0.000

Total Area Entered = 78.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

SOBA43100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	45.749	3.777	2.969
2	0.167	91.498	15.791	12.413
3	0.250	137.247	37.719	29.651
4	0.333	182.996	16.864	13.257
5	0.417	228.745	8.964	7.046
6	0.500	274.494	5.922	4.655
7	0.583	320.243	4.081	3.208
8	0.667	365.992	2.726	2.143
9	0.750	411.741	1.710	1.344
10	0.833	457.490	0.761	0.598
11	0.917	503.239	0.489	0.384
12	1.000	548.988	0.353	0.278
13	1.083	594.737	0.318	0.250
14	1.167	640.486	0.294	0.231
15	1.250	686.235	0.156	0.122
16	1.333	731.984	0.075	0.059
			Sum = 100.000	Sum= 78.609

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.327	0.176	---	0.15
2	0.17	1.30	0.327	0.176	---	0.15
3	0.25	1.10	0.277	0.176	---	0.10
4	0.33	1.50	0.378	0.176	---	0.20
5	0.42	1.50	0.378	0.176	---	0.20
6	0.50	1.80	0.453	0.176	---	0.28
7	0.58	1.50	0.378	0.176	---	0.20
8	0.67	1.80	0.453	0.176	---	0.28
9	0.75	1.80	0.453	0.176	---	0.28
10	0.83	1.50	0.378	0.176	---	0.20
11	0.92	1.60	0.403	0.176	---	0.23
12	1.00	1.80	0.453	0.176	---	0.28
13	1.08	2.20	0.554	0.176	---	0.38
14	1.17	2.20	0.554	0.176	---	0.38
15	1.25	2.20	0.554	0.176	---	0.38
16	1.33	2.00	0.504	0.176	---	0.33
17	1.42	2.60	0.655	0.176	---	0.48
18	1.50	2.70	0.680	0.176	---	0.50
19	1.58	2.40	0.605	0.176	---	0.43
20	1.67	2.70	0.680	0.176	---	0.50
21	1.75	3.30	0.831	0.176	---	0.66
22	1.83	3.10	0.781	0.176	---	0.61
23	1.92	2.90	0.731	0.176	---	0.55
24	2.00	3.00	0.756	0.176	---	0.58
25	2.08	3.10	0.781	0.176	---	0.61
26	2.17	4.20	1.058	0.176	---	0.88
27	2.25	5.00	1.260	0.176	---	1.08
28	2.33	3.50	0.882	0.176	---	0.71
29	2.42	6.80	1.713	0.176	---	1.54
30	2.50	7.30	1.839	0.176	---	1.66
31	2.58	8.20	2.066	0.176	---	1.89
32	2.67	5.90	1.486	0.176	---	1.31
33	2.75	2.00	0.504	0.176	---	0.33
34	2.83	1.80	0.453	0.176	---	0.28
35	2.92	1.80	0.453	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.9

Flood volume = Effective rainfall 1.58(In)
times area 78.0(Ac.)/[(In)/(Ft.)] = 10.2(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 3.403(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 446166.5 Cubic Feet
Total soil loss = 148224.6 Cubic Feet

Peak flow rate of this hydrograph = 116.792(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

SOBA43100

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0031	0.45	Q				
0+10	0.0192	2.34	Q				
0+15	0.0653	6.69	VQ				
0+20	0.1230	8.38	VQ				
0+25	0.1865	9.21	VQ				
0+30	0.2723	12.46	VQ				
0+35	0.3732	14.65	VQ				
0+40	0.4901	16.97	V Q				
0+45	0.6084	17.19	VQ				
0+50	0.7396	19.04	VQ				
0+55	0.8718	19.20	Q				
1+ 0	0.9958	18.00	Q				
1+ 5	1.1267	19.02	QV				
1+10	1.2769	21.81	Q				
1+15	1.4520	25.43	Q				
1+20	1.6377	26.95	QV				
1+25	1.8284	27.70	Q V				
1+30	2.0265	28.77	Q V				
1+35	2.2547	33.12	Q V				
1+40	2.4963	35.09	Q V				
1+45	2.7412	35.56	Q V				
1+50	3.0120	39.32	Q V				
1+55	3.3153	44.04	Q V				
2+ 0	3.6222	44.56	Q V				
2+ 5	3.9267	44.22	Q V				
2+10	4.2435	46.00	Q V				
2+15	4.5958	51.15	Q V				
2+20	5.0179	61.29	Q V				
2+25	5.4931	69.00	Q V				
2+30	5.9978	73.27	Q V				
2+35	6.6726	97.99	Q V				
2+40	7.4516	113.11	Q V				
2+45	8.2559	116.79	Q V				
2+50	8.9078	94.65	Q V				
2+55	9.3326	61.69	Q V				
3+ 0	9.6443	45.26	Q V				
3+ 5	9.8765	33.71	Q V				
3+10	10.0147	20.07	Q V				
3+15	10.0989	12.23	Q V				
3+20	10.1508	7.53	Q V				
3+25	10.1832	4.71	Q V				
3+30	10.2050	3.17	Q V				
3+35	10.2198	2.15	Q V				
3+40	10.2298	1.44	Q V				
3+45	10.2360	0.91	Q V				
3+50	10.2395	0.50	Q V				
3+55	10.2412	0.26	Q V				
4+ 0	10.2421	0.12	Q V				
4+ 5	10.2424	0.05	Q V				
4+10	10.2426	0.02	Q V				
4+15	10.2426	0.00	Q V				

SOBA46100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA46100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 78.00(Ac.) = 0.122 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 78.00(Ac.) = 0.122 Sq. Mi.
Length along longest watercourse = 3160.00(Ft.)
Length along longest watercourse measured to centroid = 2000.00(Ft.)
Length along longest watercourse = 0.598 Mi.
Length along longest watercourse measured to centroid = 0.379 Mi.
Difference in elevation = 360.00(Ft.)
Slope along watercourse = 601.5190 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.182 Hr.
Lag time = 10.93 Min.
25% of lag time = 2.73 Min.
40% of lag time = 4.37 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
78.00	1.40	109.20

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
78.00	3.00	234.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 2.999(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
78.000	86.00	0.000

Total Area Entered = 78.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

SOBA46100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	45.749	3.777	2.969
2	0.167	91.498	15.791	12.413
3	0.250	137.247	37.719	29.651
4	0.333	182.996	16.864	13.257
5	0.417	228.745	8.964	7.046
6	0.500	274.494	5.922	4.655
7	0.583	320.243	4.081	3.208
8	0.667	365.992	2.726	2.143
9	0.750	411.741	1.710	1.344
10	0.833	457.490	0.761	0.598
11	0.917	503.239	0.489	0.384
12	1.000	548.988	0.353	0.278
13	1.083	594.737	0.318	0.250
14	1.167	640.486	0.294	0.231
15	1.250	686.235	0.156	0.122
16	1.333	731.984	0.075	0.059
			Sum = 100.000 Sum=	78.609

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.216	0.176	---	0.04
3	0.25	0.60	0.216	0.176	---	0.04
4	0.33	0.60	0.216	0.176	---	0.04
5	0.42	0.60	0.216	0.176	---	0.04
6	0.50	0.70	0.252	0.176	---	0.08
7	0.58	0.70	0.252	0.176	---	0.08
8	0.67	0.70	0.252	0.176	---	0.08
9	0.75	0.70	0.252	0.176	---	0.08
10	0.83	0.70	0.252	0.176	---	0.08
11	0.92	0.70	0.252	0.176	---	0.08
12	1.00	0.80	0.288	0.176	---	0.11
13	1.08	0.80	0.288	0.176	---	0.11
14	1.17	0.80	0.288	0.176	---	0.11
15	1.25	0.80	0.288	0.176	---	0.11
16	1.33	0.80	0.288	0.176	---	0.11
17	1.42	0.80	0.288	0.176	---	0.11
18	1.50	0.80	0.288	0.176	---	0.11
19	1.58	0.80	0.288	0.176	---	0.11
20	1.67	0.80	0.288	0.176	---	0.11
21	1.75	0.80	0.288	0.176	---	0.11
22	1.83	0.80	0.288	0.176	---	0.11
23	1.92	0.80	0.288	0.176	---	0.11
24	2.00	0.90	0.324	0.176	---	0.15
25	2.08	0.80	0.288	0.176	---	0.11
26	2.17	0.90	0.324	0.176	---	0.15
27	2.25	0.90	0.324	0.176	---	0.15
28	2.33	0.90	0.324	0.176	---	0.15
29	2.42	0.90	0.324	0.176	---	0.15
30	2.50	0.90	0.324	0.176	---	0.15
31	2.58	0.90	0.324	0.176	---	0.15
32	2.67	0.90	0.324	0.176	---	0.15
33	2.75	1.00	0.360	0.176	---	0.18
34	2.83	1.00	0.360	0.176	---	0.18
35	2.92	1.00	0.360	0.176	---	0.18
36	3.00	1.00	0.360	0.176	---	0.18
37	3.08	1.00	0.360	0.176	---	0.18
38	3.17	1.10	0.396	0.176	---	0.22
39	3.25	1.10	0.396	0.176	---	0.22
40	3.33	1.10	0.396	0.176	---	0.22
41	3.42	1.20	0.432	0.176	---	0.26
42	3.50	1.30	0.468	0.176	---	0.29
43	3.58	1.40	0.504	0.176	---	0.33
44	3.67	1.40	0.504	0.176	---	0.33
45	3.75	1.50	0.540	0.176	---	0.36
46	3.83	1.50	0.540	0.176	---	0.36
47	3.92	1.60	0.576	0.176	---	0.40
48	4.00	1.60	0.576	0.176	---	0.40
49	4.08	1.70	0.612	0.176	---	0.44
50	4.17	1.80	0.648	0.176	---	0.47

51	4.25	1.90	0.684	0.176	---	0.51
52	4.33	2.00	0.720	0.176	---	0.54
53	4.42	2.10	0.756	0.176	---	0.58
54	4.50	2.10	0.756	0.176	---	0.58
55	4.58	2.20	0.792	0.176	---	0.62
56	4.67	2.30	0.828	0.176	---	0.65
57	4.75	2.40	0.864	0.176	---	0.69
58	4.83	2.40	0.864	0.176	---	0.69
59	4.92	2.50	0.900	0.176	---	0.72
60	5.00	2.60	0.936	0.176	---	0.76
61	5.08	3.10	1.116	0.176	---	0.94
62	5.17	3.60	1.296	0.176	---	1.12
63	5.25	3.90	1.404	0.176	---	1.23
64	5.33	4.20	1.512	0.176	---	1.34
65	5.42	4.70	1.692	0.176	---	1.52
66	5.50	5.60	2.015	0.176	---	1.84
67	5.58	1.90	0.684	0.176	---	0.51
68	5.67	0.90	0.324	0.176	---	0.15
69	5.75	0.60	0.216	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 78.0(Ac.)/[(In)/(Ft.)] = 12.7(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 6.746(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 555341.1 Cubic Feet
Total soil loss = 293851.1 Cubic Feet

Peak flow rate of this hydrograph = 107.797(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 50.0 100.0 150.0 200.0
0+ 5	0.0001	0.01	Q
0+10	0.0013	0.17	Q
0+15	0.0065	0.75	Q
0+20	0.0194	1.88	Q
0+25	0.0358	2.38	Q
0+30	0.0548	2.76	Q
0+35	0.0782	3.39	Q
0+40	0.1098	4.59	Q
0+45	0.1452	5.15	VQ
0+50	0.1827	5.45	VQ
0+55	0.2216	5.64	VQ
1+ 0	0.2621	5.88	VQ
1+ 5	0.3063	6.41	VQ
1+10	0.3582	7.54	|Q
1+15	0.4136	8.05	|Q
1+20	0.4709	8.32	|Q
1+25	0.5295	8.50	|Q
1+30	0.5889	8.62	|Q
1+35	0.6488	8.71	|QV
1+40	0.7092	8.76	|QV
1+45	0.7697	8.79	|QV
1+50	0.8303	8.80	|QV
1+55	0.8910	8.81	|QV
2+ 0	0.9525	8.93	|QV
2+ 5	1.0163	9.27	|Q V
2+10	1.0853	10.01	| QV
2+15	1.1532	9.87	|Q V
2+20	1.2270	10.71	| QV
2+25	1.3034	11.10	| Q V
2+30	1.3813	11.30	| Q V
2+35	1.4600	11.43	| Q V
2+40	1.5393	11.52	| Q V
2+45	1.6197	11.68	| Q V
2+50	1.7035	12.16	| Q V
2+55	1.7947	13.25	| Q V
3+ 0	1.8894	13.74	| Q V
3+ 5	1.9858	14.00	| Q V

SOBA46100

3+10	2.0841	14.28	
3+15	2.1864	14.85	
3+20	2.2966	16.00	
3+25	2.4111	16.63	
3+30	2.5314	17.46	
3+35	2.6641	19.26	
3+40	2.8113	21.38	
3+45	2.9723	23.37	
3+50	3.1429	24.78	
3+55	3.3255	26.51	
4+ 0	3.5171	27.81	
4+ 5	3.7202	29.49	
4+10	3.9327	30.85	
4+15	4.1595	32.93	
4+20	4.4028	35.33	
4+25	4.6636	37.88	
4+30	4.9420	40.42	
4+35	5.2360	42.69	
4+40	5.5416	44.38	
4+45	5.8632	46.69	
4+50	6.2016	49.14	
4+55	6.5551	51.33	
5+ 0	6.9199	52.97	
5+ 5	7.3033	55.66	
5+10	7.7192	60.40	
5+15	8.1966	69.31	
5+20	8.7427	79.30	
5+25	9.3517	88.43	
5+30	10.0309	98.62	
5+35	10.7733	107.80	
5+40	11.4931	104.51	
5+45	11.9567	67.32	
5+50	12.2433	41.62	
5+55	12.4258	26.49	
6+ 0	12.5435	17.09	
6+ 5	12.6205	11.18	
6+10	12.6688	7.01	
6+15	12.6970	4.10	
6+20	12.7153	2.65	
6+25	12.7279	1.83	
6+30	12.7370	1.32	
6+35	12.7432	0.91	
6+40	12.7467	0.50	
6+45	12.7482	0.23	
6+50	12.7487	0.06	
6+55	12.7488	0.02	
7+ 0	12.7488	0.01	
7+ 5	12.7489	0.00	
7+10	12.7489	0.00	
7+15	12.7489	0.00	

SOBA424100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA424100.out

++++++

SOBA424100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	45.749	3.777	2.969
2	0.167	91.498	15.791	12.413
3	0.250	137.247	37.719	29.651
4	0.333	182.996	16.864	13.257
5	0.417	228.745	8.964	7.046
6	0.500	274.494	5.922	4.655
7	0.583	320.243	4.081	3.208
8	0.667	365.992	2.726	2.143
9	0.750	411.741	1.710	1.344
10	0.833	457.490	0.761	0.598
11	0.917	503.239	0.489	0.384
12	1.000	548.988	0.353	0.278
13	1.083	594.737	0.318	0.250
14	1.167	640.486	0.294	0.231
15	1.250	686.235	0.156	0.122
16	1.333	731.984	0.075	0.059
			Sum = 100.000	Sum= 78.609

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.130	0.01
47	3.92	0.20	0.144	0.258	0.130	0.01
48	4.00	0.20	0.144	0.257	0.130	0.01
49	4.08	0.20	0.144	0.256	0.130	0.01
50	4.17	0.20	0.144	0.255	0.130	0.01

51	4.25	0.20	0.144	0.254	0.130	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02
59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.130	0.01
62	5.17	0.20	0.144	0.242	0.130	0.01
63	5.25	0.20	0.144	0.241	0.130	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.08
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.16
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.384	0.201	---	0.18
104	8.67	0.53	0.384	0.200	---	0.18
105	8.75	0.53	0.384	0.199	---	0.18
106	8.83	0.57	0.408	0.198	---	0.21
107	8.92	0.57	0.408	0.197	---	0.21
108	9.00	0.57	0.408	0.196	---	0.21
109	9.08	0.63	0.456	0.195	---	0.26
110	9.17	0.63	0.456	0.195	---	0.26
111	9.25	0.63	0.456	0.194	---	0.26
112	9.33	0.67	0.480	0.193	---	0.29
113	9.42	0.67	0.480	0.192	---	0.29
114	9.50	0.67	0.480	0.191	---	0.29
115	9.58	0.70	0.504	0.190	---	0.31
116	9.67	0.70	0.504	0.189	---	0.31
117	9.75	0.70	0.504	0.188	---	0.32
118	9.83	0.73	0.528	0.187	---	0.34
119	9.92	0.73	0.528	0.186	---	0.34
120	10.00	0.73	0.528	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.18
122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.480	0.179	---	0.30
128	10.67	0.67	0.480	0.178	---	0.30
129	10.75	0.67	0.480	0.177	---	0.30

130	10.83	0.67	0.480	0.177	---	0.30
131	10.92	0.67	0.480	0.176	---	0.30
132	11.00	0.67	0.480	0.175	---	0.31
133	11.08	0.63	0.456	0.174	---	0.28
134	11.17	0.63	0.456	0.173	---	0.28
135	11.25	0.63	0.456	0.172	---	0.28
136	11.33	0.63	0.456	0.171	---	0.28
137	11.42	0.63	0.456	0.171	---	0.29
138	11.50	0.63	0.456	0.170	---	0.29
139	11.58	0.57	0.408	0.169	---	0.24
140	11.67	0.57	0.408	0.168	---	0.24
141	11.75	0.57	0.408	0.167	---	0.24
142	11.83	0.60	0.432	0.166	---	0.27
143	11.92	0.60	0.432	0.166	---	0.27
144	12.00	0.60	0.432	0.165	---	0.27
145	12.08	0.83	0.600	0.164	---	0.44
146	12.17	0.83	0.600	0.163	---	0.44
147	12.25	0.83	0.600	0.162	---	0.44
148	12.33	0.87	0.624	0.161	---	0.46
149	12.42	0.87	0.624	0.161	---	0.46
150	12.50	0.87	0.624	0.160	---	0.46
151	12.58	0.93	0.672	0.159	---	0.51
152	12.67	0.93	0.672	0.158	---	0.51
153	12.75	0.93	0.672	0.157	---	0.51
154	12.83	0.97	0.696	0.157	---	0.54
155	12.92	0.97	0.696	0.156	---	0.54
156	13.00	0.97	0.696	0.155	---	0.54
157	13.08	1.13	0.816	0.154	---	0.66
158	13.17	1.13	0.816	0.154	---	0.66
159	13.25	1.13	0.816	0.153	---	0.66
160	13.33	1.13	0.816	0.152	---	0.66
161	13.42	1.13	0.816	0.151	---	0.66
162	13.50	1.13	0.816	0.150	---	0.67
163	13.58	0.77	0.552	0.150	---	0.40
164	13.67	0.77	0.552	0.149	---	0.40
165	13.75	0.77	0.552	0.148	---	0.40
166	13.83	0.77	0.552	0.147	---	0.40
167	13.92	0.77	0.552	0.147	---	0.41
168	14.00	0.77	0.552	0.146	---	0.41
169	14.08	0.90	0.648	0.145	---	0.50
170	14.17	0.90	0.648	0.144	---	0.50
171	14.25	0.90	0.648	0.144	---	0.50
172	14.33	0.87	0.624	0.143	---	0.48
173	14.42	0.87	0.624	0.142	---	0.48
174	14.50	0.87	0.624	0.141	---	0.48
175	14.58	0.87	0.624	0.141	---	0.48
176	14.67	0.87	0.624	0.140	---	0.48
177	14.75	0.87	0.624	0.139	---	0.48
178	14.83	0.83	0.600	0.139	---	0.46
179	14.92	0.83	0.600	0.138	---	0.46
180	15.00	0.83	0.600	0.137	---	0.46
181	15.08	0.80	0.576	0.136	---	0.44
182	15.17	0.80	0.576	0.136	---	0.44
183	15.25	0.80	0.576	0.135	---	0.44
184	15.33	0.77	0.552	0.134	---	0.42
185	15.42	0.77	0.552	0.134	---	0.42
186	15.50	0.77	0.552	0.133	---	0.42
187	15.58	0.63	0.456	0.132	---	0.32
188	15.67	0.63	0.456	0.132	---	0.32
189	15.75	0.63	0.456	0.131	---	0.32
190	15.83	0.63	0.456	0.130	---	0.33
191	15.92	0.63	0.456	0.130	---	0.33
192	16.00	0.63	0.456	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00

209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01
217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00

SOBA424100

288 24.00 0.07 0.048 0.088 0.043 0.00

Sum = 100.0 Sum = 36.9

Flood volume = Effective rainfall 3.08(In)
times area 78.0(Ac.)/[(In)/(Ft.)] = 20.0(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 19.000(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 870946.8 Cubic Feet
Total soil loss = 827634.4 Cubic Feet

Peak flow rate of this hydrograph = 51.048(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0001	0.01	Q				
0+10	0.0006	0.07	Q				
0+15	0.0021	0.22	Q				
0+20	0.0041	0.29	Q				
0+25	0.0065	0.35	Q				
0+30	0.0095	0.44	Q				
0+35	0.0129	0.49	Q				
0+40	0.0165	0.52	Q				
0+45	0.0202	0.54	Q				
0+50	0.0240	0.55	Q				
0+55	0.0281	0.59	Q				
1+ 0	0.0327	0.67	Q				
1+ 5	0.0374	0.69	Q				
1+10	0.0422	0.68	Q				
1+15	0.0465	0.62	Q				
1+20	0.0506	0.60	Q				
1+25	0.0547	0.59	Q				
1+30	0.0587	0.58	Q				
1+35	0.0626	0.58	Q				
1+40	0.0666	0.57	Q				
1+45	0.0705	0.57	Q				
1+50	0.0745	0.58	Q				
1+55	0.0786	0.60	Q				
2+ 0	0.0833	0.68	Q				
2+ 5	0.0881	0.71	Q				
2+10	0.0931	0.72	Q				
2+15	0.0982	0.73	Q				
2+20	0.1033	0.74	Q				
2+25	0.1084	0.75	Q				
2+30	0.1136	0.75	Q				
2+35	0.1188	0.76	Q				
2+40	0.1243	0.79	Q				
2+45	0.1302	0.86	Q				
2+50	0.1364	0.89	Q				
2+55	0.1426	0.91	Q				
3+ 0	0.1490	0.92	Q				
3+ 5	0.1554	0.93	Q				
3+10	0.1618	0.94	Q				
3+15	0.1683	0.94	Q				
3+20	0.1748	0.94	Q				
3+25	0.1813	0.94	Q				
3+30	0.1878	0.94	Q				
3+35	0.1943	0.94	Q				
3+40	0.2007	0.94	Q				
3+45	0.2072	0.94	Q				
3+50	0.2138	0.95	Q				
3+55	0.2205	0.98	Q				
4+ 0	0.2278	1.05	Q				
4+ 5	0.2353	1.08	Q				
4+10	0.2428	1.10	Q				
4+15	0.2505	1.11	Q				
4+20	0.2582	1.13	Q				
4+25	0.2662	1.16	Q				
4+30	0.2748	1.24	Q				
4+35	0.2835	1.27	Q				
4+40	0.2924	1.29	Q				
4+45	0.3013	1.30	Q				
4+50	0.3104	1.31	Q				

4+55	0.3197	1.35	Q
5+ 0	0.3295	1.42	Q
5+ 5	0.3394	1.44	Q
5+10	0.3491	1.40	Q
5+15	0.3578	1.27	Q
5+20	0.3662	1.22	Q
5+25	0.3747	1.22	Q
5+30	0.3835	1.28	Q
5+35	0.3924	1.30	Q
5+40	0.4017	1.34	Q
5+45	0.4114	1.42	Q
5+50	0.4214	1.45	Q
5+55	0.4316	1.47	Q
6+ 0	0.4418	1.49	Q
6+ 5	0.4522	1.50	VQ
6+10	0.4628	1.54	VQ
6+15	0.4739	1.61	VQ
6+20	0.4852	1.65	VQ
6+25	0.4967	1.66	VQ
6+30	0.5082	1.68	|Q
6+35	0.5197	1.67	|Q
6+40	0.5307	1.60	|Q
6+45	0.5405	1.43	QV
6+50	0.5501	1.39	QV
6+55	0.5598	1.41	QV
7+ 0	0.5698	1.45	QV
7+ 5	0.5801	1.50	QV
7+10	0.5908	1.56	|Q
7+15	0.6020	1.62	|Q
7+20	0.6142	1.77	|Q
7+25	0.6290	2.14	|Q
7+30	0.6491	2.93	|Q
7+35	0.6725	3.39	|VQ
7+40	0.6996	3.94	|VQ
7+45	0.7329	4.84	|V Q
7+50	0.7700	5.38	|V Q
7+55	0.8111	5.98	|V Q
8+ 0	0.8587	6.91	|V Q
8+ 5	0.9106	7.54	|V Q
8+10	0.9688	8.44	|V Q
8+15	1.0382	10.09	| V Q
8+20	1.1133	10.90	| V Q
8+25	1.1917	11.38	| V Q
8+30	1.2724	11.72	| V Q
8+35	1.3553	12.04	| V Q
8+40	1.4417	12.53	| V Q
8+45	1.5339	13.39	| V Q
8+50	1.6296	13.90	| V Q
8+55	1.7292	14.46	| V Q
9+ 0	1.8351	15.37	| V Q
9+ 5	1.9453	16.00	| V Q
9+10	2.0617	16.90	| V Q
9+15	2.1894	18.55	| V Q
9+20	2.3232	19.42	| V Q
9+25	2.4623	20.19	| V Q
9+30	2.6086	21.24	| V Q
9+35	2.7592	21.88	| V Q
9+40	2.9144	22.53	| V Q
9+45	3.0763	23.50	| V Q
9+50	3.2421	24.08	| V Q
9+55	3.4122	24.69	| V Q
10+ 0	3.5888	25.64	| V Q
10+ 5	3.7653	25.63	| V Q
10+10	3.9296	23.86	| V Q
10+15	4.0612	19.10	| V Q
10+20	4.1786	17.04	| V Q
10+25	4.2887	16.00	| V Q
10+30	4.3943	15.33	| V Q
10+35	4.4992	15.24	| VQ
10+40	4.6125	16.45	| VQ
10+45	4.7493	19.86	| V| Q
10+50	4.8969	21.43	| V| Q
10+55	5.0504	22.29	| V Q
11+ 0	5.2079	22.87	| V Q
11+ 5	5.3677	23.21	| V Q
11+10	5.5275	23.20	| |V Q
11+15	5.6838	22.70	| |V Q
11+20	5.8388	22.51	| |V Q
11+25	5.9934	22.45	| |V Q

SOBA424100

11+30	6.1480	22.44	
11+35	6.3017	22.32	
11+40	6.4516	21.76	
11+45	6.5920	20.39	
11+50	6.7290	19.88	
11+55	6.8660	19.90	
12+ 0	7.0068	20.45	
12+ 5	7.1526	21.17	
12+10	7.3137	23.38	
12+15	7.5098	28.48	
12+20	7.7225	30.89	
12+25	7.9461	32.47	
12+30	8.1806	34.04	
12+35	8.4224	35.11	
12+40	8.6723	36.30	
12+45	8.9349	38.12	
12+50	9.2040	39.07	
12+55	9.4787	39.90	
13+ 0	9.7609	40.98	
13+ 5	10.0497	41.92	
13+10	10.3513	43.80	
13+15	10.6793	47.62	
13+20	11.0195	49.40	
13+25	11.3664	50.38	
13+30	11.7180	51.05	
13+35	12.0675	50.74	
13+40	12.3966	47.80	
13+45	12.6735	40.20	
13+50	12.9272	36.84	
13+55	13.1689	35.09	
14+ 0	13.4028	33.96	
14+ 5	13.6334	33.49	
14+10	13.8689	34.20	
14+15	14.1222	36.77	
14+20	14.3830	37.88	
14+25	14.6462	38.21	
14+30	14.9074	37.93	
14+35	15.1685	37.91	
14+40	15.4298	37.95	
14+45	15.6915	37.99	
14+50	15.9528	37.94	
14+55	16.2123	37.68	
15+ 0	16.4672	37.02	
15+ 5	16.7200	36.70	
15+10	16.9700	36.30	
15+15	17.2147	35.54	
15+20	17.4566	35.12	
15+25	17.6953	34.66	
15+30	17.9284	33.85	
15+35	18.1571	33.21	
15+40	18.3764	31.84	
15+45	18.5755	28.90	
15+50	18.7654	27.58	
15+55	18.9506	26.89	
16+ 0	19.1328	26.45	
16+ 5	19.3066	25.23	
16+10	19.4520	21.11	
16+15	19.5317	11.58	
16+20	19.5822	7.32	
16+25	19.6169	5.05	
16+30	19.6414	3.55	
16+35	19.6586	2.50	
16+40	19.6708	1.77	
16+45	19.6794	1.26	
16+50	19.6866	1.03	
16+55	19.6927	0.90	
17+ 0	19.6982	0.80	
17+ 5	19.7032	0.72	
17+10	19.7081	0.71	
17+15	19.7134	0.77	
17+20	19.7180	0.67	
17+25	19.7206	0.38	
17+30	19.7225	0.27	
17+35	19.7242	0.24	
17+40	19.7258	0.24	
17+45	19.7275	0.25	
17+50	19.7294	0.28	
17+55	19.7320	0.37	
18+ 0	19.7358	0.55	

18+ 5	19.7401	0.63	Q			V
18+10	19.7448	0.68	Q			V
18+15	19.7496	0.70	Q			V
18+20	19.7546	0.72	Q			V
18+25	19.7596	0.73	Q			V
18+30	19.7647	0.74	Q			V
18+35	19.7698	0.74	Q			V
18+40	19.7747	0.71	Q			V
18+45	19.7792	0.64	Q			V
18+50	19.7833	0.61	Q			V
18+55	19.7872	0.56	Q			V
19+ 0	19.7905	0.48	Q			V
19+ 5	19.7936	0.45	Q			V
19+10	19.7967	0.45	Q			V
19+15	19.8002	0.51	Q			V
19+20	19.8039	0.54	Q			V
19+25	19.8079	0.58	Q			V
19+30	19.8125	0.66	Q			V
19+35	19.8172	0.69	Q			V
19+40	19.8219	0.68	Q			V
19+45	19.8262	0.62	Q			V
19+50	19.8303	0.59	Q			V
19+55	19.8341	0.55	Q			V
20+ 0	19.8373	0.47	Q			V
20+ 5	19.8404	0.44	Q			V
20+10	19.8435	0.45	Q			V
20+15	19.8470	0.51	Q			V
20+20	19.8507	0.53	Q			V
20+25	19.8544	0.54	Q			V
20+30	19.8582	0.55	Q			V
20+35	19.8621	0.56	Q			V
20+40	19.8659	0.56	Q			V
20+45	19.8698	0.56	Q			V
20+50	19.8736	0.56	Q			V
20+55	19.8773	0.53	Q			V
21+ 0	19.8804	0.46	Q			V
21+ 5	19.8834	0.43	Q			V
21+10	19.8865	0.45	Q			V
21+15	19.8899	0.51	Q			V
21+20	19.8936	0.52	Q			V
21+25	19.8970	0.51	Q			V
21+30	19.9001	0.44	Q			V
21+35	19.9030	0.42	Q			V
21+40	19.9060	0.44	Q			V
21+45	19.9095	0.50	Q			V
21+50	19.9131	0.52	Q			V
21+55	19.9165	0.50	Q			V
22+ 0	19.9196	0.44	Q			V
22+ 5	19.9225	0.42	Q			V
22+10	19.9255	0.44	Q			V
22+15	19.9290	0.50	Q			V
22+20	19.9326	0.52	Q			V
22+25	19.9360	0.50	Q			V
22+30	19.9391	0.44	Q			V
22+35	19.9419	0.42	Q			V
22+40	19.9447	0.40	Q			V
22+45	19.9474	0.39	Q			V
22+50	19.9501	0.39	Q			V
22+55	19.9528	0.38	Q			V
23+ 0	19.9554	0.38	Q			V
23+ 5	19.9580	0.38	Q			V
23+10	19.9606	0.38	Q			V
23+15	19.9632	0.38	Q			V
23+20	19.9658	0.38	Q			V
23+25	19.9684	0.38	Q			V
23+30	19.9710	0.38	Q			V
23+35	19.9736	0.38	Q			V
23+40	19.9762	0.38	Q			V
23+45	19.9788	0.38	Q			V
23+50	19.9814	0.38	Q			V
23+55	19.9840	0.38	Q			V
24+ 0	19.9866	0.38	Q			V
24+ 5	19.9891	0.36	Q			V
24+10	19.9912	0.30	Q			V
24+15	19.9923	0.16	Q			V
24+20	19.9930	0.10	Q			V
24+25	19.9934	0.06	Q			V
24+30	19.9937	0.04	Q			V
24+35	19.9939	0.03	Q			V

SOBA424100

24+40	19.9940	0.02	Q	V
24+45	19.9941	0.01	Q	V
24+50	19.9941	0.01	Q	V
24+55	19.9941	0.00	Q	V
25+ 0	19.9942	0.00	Q	V
25+ 5	19.9942	0.00	Q	V
25+10	19.9942	0.00	Q	V
25+15	19.9942	0.00	Q	V

AREA 5

SOBA51100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA51100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 202.00(Ac.) = 0.316 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 202.00(Ac.) = 0.316 Sq. Mi.
Length along longest watercourse = 6660.00(Ft.)
Length along longest watercourse measured to centroid = 3715.00(Ft.)
Length along longest watercourse = 1.261 Mi.
Length along longest watercourse measured to centroid = 0.704 Mi.
Difference in elevation = 1120.00(Ft.)
Slope along watercourse = 887.9279 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.284 Hr.
Lag time = 17.05 Min.
25% of lag time = 4.26 Min.
40% of lag time = 6.82 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
202.00	0.55	111.10

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
202.00	1.20	242.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.82 %
Adjusted average point rain = 1.198(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
202.000	86.00	0.000

Total Area Entered = 202.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	29.328	2.089	4.252
2	0.167	58.656	6.632	13.501
3	0.250	87.984	12.791	26.040
4	0.333	117.312	28.157	57.322
5	0.417	146.641	16.393	33.372
6	0.500	175.969	8.495	17.294
7	0.583	205.297	6.101	12.420
8	0.667	234.625	4.579	9.322
9	0.750	263.953	3.599	7.326
10	0.833	293.281	2.821	5.743
11	0.917	322.609	2.240	4.560
12	1.000	351.937	1.691	3.442
13	1.083	381.265	1.269	2.583
14	1.167	410.593	0.899	1.831
15	1.250	439.922	0.448	0.911
16	1.333	469.250	0.339	0.691
17	1.417	498.578	0.297	0.604
18	1.500	527.906	0.240	0.489
19	1.583	557.234	0.178	0.362
20	1.667	586.562	0.218	0.444
21	1.750	615.890	0.217	0.443
22	1.833	645.218	0.130	0.264
23	1.917	674.546	0.097	0.197
24	2.000	703.874	0.081	0.165
			Sum = 100.000	Sum= 203.578

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.604	0.176	---	0.43
2	0.17	4.30	0.618	0.176	---	0.44
3	0.25	5.00	0.719	0.176	---	0.54
4	0.33	5.00	0.719	0.176	---	0.54
5	0.42	5.80	0.834	0.176	---	0.66
6	0.50	6.50	0.934	0.176	---	0.76
7	0.58	7.40	1.064	0.176	---	0.89
8	0.67	8.60	1.236	0.176	---	1.06
9	0.75	12.30	1.768	0.176	---	1.59
10	0.83	29.10	4.183	0.176	---	4.01
11	0.92	6.80	0.977	0.176	---	0.80
12	1.00	5.00	0.719	0.176	---	0.54
Sum =		100.0			Sum =	12.3

Flood volume = Effective rainfall 1.02(In)
times area 202.0(Ac.)/[(In)/(Ft.)] = 17.2(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 2.956(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 749540.8 Cubic Feet
Total soil loss = 128760.5 Cubic Feet

Peak flow rate of this hydrograph = 360.721(CFS)

++

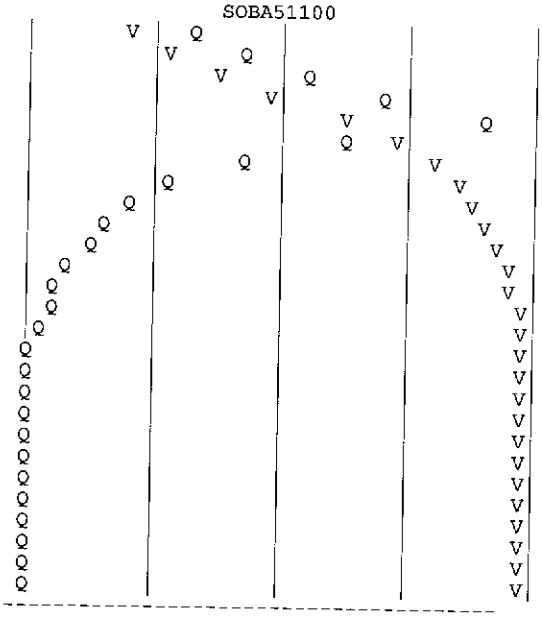
1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 100.0 200.0 300.0 400.0
0+ 5	0.0125	1.82	Q
0+10	0.0653	7.67	Q
0+15	0.1992	19.44	VQ
0+20	0.5141	45.73	V Q
0+25	0.9546	63.95	V Q
0+30	1.5028	79.59	V Q
0+35	2.1462	93.43	V Q
0+40	2.9109	111.04	V Q

SOBA51100

0+45	3.8278	133.13	
0+50	5.0079	171.35	
0+55	6.5530	224.35	
1+ 0	8.5213	285.80	
1+ 5	11.0056	360.72	
1+10	12.7864	258.56	
1+15	13.9935	175.28	
1+20	14.8086	118.35	
1+25	15.3935	84.92	
1+30	15.8422	65.16	
1+35	16.1883	50.25	
1+40	16.4556	38.81	
1+45	16.6568	29.22	
1+50	16.8057	21.62	
1+55	16.9111	15.30	
2+ 0	16.9786	9.81	
2+ 5	17.0286	7.25	
2+10	17.0681	5.74	
2+15	17.1003	4.68	
2+20	17.1268	3.84	
2+25	17.1517	3.62	
2+30	17.1731	3.10	
2+35	17.1878	2.14	
2+40	17.1982	1.50	
2+45	17.2048	0.96	
2+50	17.2065	0.24	
2+55	17.2071	0.09	



SOBA53100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA53100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 202.00(Ac.) = 0.316 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 202.00(Ac.) = 0.316 Sq. Mi.
Length along longest watercourse = 6660.00(Ft.)
Length along longest watercourse measured to centroid = 3715.00(Ft.)
Length along longest watercourse = 1.261 Mi.
Length along longest watercourse measured to centroid = 0.704 Mi.
Difference in elevation = 1120.00(Ft.)
Slope along watercourse = 887.9279 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.284 Hr.
Lag time = 17.05 Min.
25% of lag time = 4.26 Min.
40% of lag time = 6.82 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
202.00	0.90	181.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
202.00	2.10	424.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.91 %
Adjusted average point rain = 2.098(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
202.000	86.00	0.000

Total Area Entered = 202.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

SOBA53100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	29.328	2.089	4.252
2	0.167	58.656	6.632	13.501
3	0.250	87.984	12.791	26.040
4	0.333	117.312	28.157	57.322
5	0.417	146.641	16.393	33.372
6	0.500	175.969	8.495	17.294
7	0.583	205.297	6.101	12.420
8	0.667	234.625	4.579	9.322
9	0.750	263.953	3.599	7.326
10	0.833	293.281	2.821	5.743
11	0.917	322.609	2.240	4.560
12	1.000	351.937	1.691	3.442
13	1.083	381.265	1.269	2.583
14	1.167	410.593	0.899	1.831
15	1.250	439.922	0.448	0.911
16	1.333	469.250	0.339	0.691
17	1.417	498.578	0.297	0.604
18	1.500	527.906	0.240	0.489
19	1.583	557.234	0.178	0.362
20	1.667	586.562	0.218	0.444
21	1.750	615.890	0.217	0.443
22	1.833	645.218	0.130	0.264
23	1.917	674.546	0.097	0.197
24	2.000	703.874	0.081	0.165
			Sum = 100.000	Sum= 203.578

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.327	0.176	---	0.15
2	0.17	1.30	0.327	0.176	---	0.15
3	0.25	1.10	0.277	0.176	---	0.10
4	0.33	1.50	0.378	0.176	---	0.20
5	0.42	1.50	0.378	0.176	---	0.20
6	0.50	1.80	0.453	0.176	---	0.28
7	0.58	1.50	0.378	0.176	---	0.20
8	0.67	1.80	0.453	0.176	---	0.28
9	0.75	1.80	0.453	0.176	---	0.28
10	0.83	1.50	0.378	0.176	---	0.20
11	0.92	1.60	0.403	0.176	---	0.23
12	1.00	1.80	0.453	0.176	---	0.28
13	1.08	2.20	0.554	0.176	---	0.38
14	1.17	2.20	0.554	0.176	---	0.38
15	1.25	2.20	0.554	0.176	---	0.38
16	1.33	2.00	0.504	0.176	---	0.33
17	1.42	2.60	0.655	0.176	---	0.48
18	1.50	2.70	0.680	0.176	---	0.50
19	1.58	2.40	0.604	0.176	---	0.43
20	1.67	2.70	0.680	0.176	---	0.50
21	1.75	3.30	0.831	0.176	---	0.66
22	1.83	3.10	0.781	0.176	---	0.60
23	1.92	2.90	0.730	0.176	---	0.55
24	2.00	3.00	0.755	0.176	---	0.58
25	2.08	3.10	0.781	0.176	---	0.60
26	2.17	4.20	1.057	0.176	---	0.88
27	2.25	5.00	1.259	0.176	---	1.08
28	2.33	3.50	0.881	0.176	---	0.71
29	2.42	6.80	1.712	0.176	---	1.54
30	2.50	7.30	1.838	0.176	---	1.66
31	2.58	8.20	2.065	0.176	---	1.89
32	2.67	5.90	1.485	0.176	---	1.31
33	2.75	2.00	0.504	0.176	---	0.33
34	2.83	1.80	0.453	0.176	---	0.28
35	2.92	1.80	0.453	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.9

Flood volume = Effective rainfall 1.57(In)
times area 202.0(Ac.)/[(In)/(Ft.)] = 26.5(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 8.812(Ac.Ft)
Total rainfall = 2.10(In)

SOBA53100

Flood volume = 1154626.0 Cubic Feet
Total soil loss = 383859.1 Cubic Feet

Peak flow rate of this hydrograph = 268.236(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 75.0 150.0 225.0 300.0
0+ 5	0.0044	0.65	Q
0+10	0.0230	2.69	Q
0+15	0.0673	6.43	Q
0+20	0.1698	14.88	VQ
0+25	0.3075	20.00	V Q
0+30	0.4637	22.68	V Q
0+35	0.6659	29.36	V Q
0+40	0.9037	34.53	V Q
0+45	1.1802	40.15	V Q
0+50	1.4670	41.64	V Q
0+55	1.7776	45.10	V Q
1+ 0	2.1000	46.81	V Q
1+ 5	2.4172	46.06	V Q
1+10	2.7547	49.01	V Q
1+15	3.1334	54.99	V Q
1+20	3.5637	62.47	V Q
1+25	4.0241	66.85	V Q
1+30	4.5072	70.15	V Q
1+35	5.0099	72.99	V Q
1+40	5.5695	81.26	V Q
1+45	6.1733	87.68	V Q
1+50	6.7986	90.78	V Q
1+55	7.4744	98.13	V Q
2+ 0	8.2184	108.03	V Q
2+ 5	8.9837	111.12	VQ
2+10	9.7595	112.64	VQ
2+15	10.5833	119.62	Q
2+20	11.4847	130.88	Q
2+25	12.5335	152.29	V Q
2+30	13.7470	176.21	V Q
2+35	15.0641	191.23	V Q
2+40	16.7012	237.71	V Q
2+45	18.5307	265.65	V Q
2+50	20.3781	268.24	V Q
2+55	21.9523	228.57	Q V
3+ 0	23.0789	163.58	Q V
3+ 5	23.9346	124.25	Q V
3+10	24.6161	98.95	Q V
3+15	25.1051	71.00	Q V
3+20	25.4620	51.82	Q V
3+25	25.7316	39.15	Q V
3+30	25.9353	29.58	Q V
3+35	26.0852	21.78	Q V
3+40	26.1934	15.70	Q V
3+45	26.2699	11.12	Q V
3+50	26.3257	8.09	Q V
3+55	26.3686	6.23	Q V
4+ 0	26.4023	4.90	Q V
4+ 5	26.4296	3.96	Q V
4+10	26.4524	3.31	Q V
4+15	26.4711	2.71	Q V
4+20	26.4852	2.05	Q V
4+25	26.4946	1.37	Q V
4+30	26.5009	0.91	Q V
4+35	26.5042	0.48	Q V
4+40	26.5055	0.19	Q V
4+45	26.5062	0.10	Q V
4+50	26.5065	0.05	Q V
4+55	26.5066	0.00	Q V

SOBA56100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA56100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 202.00(Ac.) = 0.316 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 202.00(Ac.) = 0.316 Sq. Mi.
Length along longest watercourse = 6660.00(Ft.)
Length along longest watercourse measured to centroid = 3715.00(Ft.)
Length along longest watercourse = 1.261 Mi.
Length along longest watercourse measured to centroid = 0.704 Mi.
Difference in elevation = 1120.00(Ft.)
Slope along watercourse = 887.9279 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.284 Hr.
Lag time = 17.05 Min.
25% of lag time = 4.26 Min.
40% of lag time = 6.82 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
202.00	1.40	282.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
202.00	3.00	606.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.93 %
Adjusted average point rain = 2.998(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
202.000	86.00	0.000

Total Area Entered = 202.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

SOBA56100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	29.328	2.089	4.252
2	0.167	58.656	6.632	13.501
3	0.250	87.984	12.791	26.040
4	0.333	117.312	28.157	57.322
5	0.417	146.641	16.393	33.372
6	0.500	175.969	8.495	17.294
7	0.583	205.297	6.101	12.420
8	0.667	234.625	4.579	9.322
9	0.750	263.953	3.599	7.326
10	0.833	293.281	2.821	5.743
11	0.917	322.609	2.240	4.560
12	1.000	351.937	1.691	3.442
13	1.083	381.265	1.269	2.583
14	1.167	410.593	0.899	1.831
15	1.250	439.922	0.448	0.911
16	1.333	469.250	0.339	0.691
17	1.417	498.578	0.297	0.604
18	1.500	527.906	0.240	0.489
19	1.583	557.234	0.178	0.362
20	1.667	586.562	0.218	0.444
21	1.750	615.890	0.217	0.443
22	1.833	645.218	0.130	0.264
23	1.917	674.546	0.097	0.197
24	2.000	703.874	0.081	0.165
			Sum = 100.000	Sum= 203.578

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.216	0.176	---	0.04
3	0.25	0.60	0.216	0.176	---	0.04
4	0.33	0.60	0.216	0.176	---	0.04
5	0.42	0.60	0.216	0.176	---	0.04
6	0.50	0.70	0.252	0.176	---	0.08
7	0.58	0.70	0.252	0.176	---	0.08
8	0.67	0.70	0.252	0.176	---	0.08
9	0.75	0.70	0.252	0.176	---	0.08
10	0.83	0.70	0.252	0.176	---	0.08
11	0.92	0.70	0.252	0.176	---	0.08
12	1.00	0.80	0.288	0.176	---	0.11
13	1.08	0.80	0.288	0.176	---	0.11
14	1.17	0.80	0.288	0.176	---	0.11
15	1.25	0.80	0.288	0.176	---	0.11
16	1.33	0.80	0.288	0.176	---	0.11
17	1.42	0.80	0.288	0.176	---	0.11
18	1.50	0.80	0.288	0.176	---	0.11
19	1.58	0.80	0.288	0.176	---	0.11
20	1.67	0.80	0.288	0.176	---	0.11
21	1.75	0.80	0.288	0.176	---	0.11
22	1.83	0.80	0.288	0.176	---	0.11
23	1.92	0.80	0.288	0.176	---	0.11
24	2.00	0.90	0.324	0.176	---	0.15
25	2.08	0.80	0.288	0.176	---	0.11
26	2.17	0.90	0.324	0.176	---	0.15
27	2.25	0.90	0.324	0.176	---	0.15
28	2.33	0.90	0.324	0.176	---	0.15
29	2.42	0.90	0.324	0.176	---	0.15
30	2.50	0.90	0.324	0.176	---	0.15
31	2.58	0.90	0.324	0.176	---	0.15
32	2.67	0.90	0.324	0.176	---	0.15
33	2.75	1.00	0.360	0.176	---	0.18
34	2.83	1.00	0.360	0.176	---	0.18
35	2.92	1.00	0.360	0.176	---	0.18
36	3.00	1.00	0.360	0.176	---	0.18
37	3.08	1.00	0.360	0.176	---	0.18
38	3.17	1.10	0.396	0.176	---	0.22
39	3.25	1.10	0.396	0.176	---	0.22
40	3.33	1.10	0.396	0.176	---	0.22
41	3.42	1.20	0.432	0.176	---	0.26
42	3.50	1.30	0.468	0.176	---	0.29

43	3.58	1.40	0.504	0.176	---	0.33
44	3.67	1.40	0.504	0.176	---	0.33
45	3.75	1.50	0.540	0.176	---	0.36
46	3.83	1.50	0.540	0.176	---	0.36
47	3.92	1.60	0.576	0.176	---	0.40
48	4.00	1.60	0.576	0.176	---	0.40
49	4.08	1.70	0.612	0.176	---	0.44
50	4.17	1.80	0.648	0.176	---	0.47
51	4.25	1.90	0.684	0.176	---	0.51
52	4.33	2.00	0.720	0.176	---	0.54
53	4.42	2.10	0.755	0.176	---	0.58
54	4.50	2.10	0.755	0.176	---	0.58
55	4.58	2.20	0.791	0.176	---	0.62
56	4.67	2.30	0.827	0.176	---	0.65
57	4.75	2.40	0.863	0.176	---	0.69
58	4.83	2.40	0.863	0.176	---	0.69
59	4.92	2.50	0.899	0.176	---	0.72
60	5.00	2.60	0.935	0.176	---	0.76
61	5.08	3.10	1.115	0.176	---	0.94
62	5.17	3.60	1.295	0.176	---	1.12
63	5.25	3.90	1.403	0.176	---	1.23
64	5.33	4.20	1.511	0.176	---	1.34
65	5.42	4.70	1.691	0.176	---	1.52
66	5.50	5.60	2.015	0.176	---	1.84
67	5.58	1.90	0.684	0.176	---	0.51
68	5.67	0.90	0.324	0.176	---	0.15
69	5.75	0.60	0.216	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 202.0(Ac.)/[(In)/(Ft.)] = 33.0(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 17.470(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 1437257.7 Cubic Feet
Total soil loss = 760994.8 Cubic Feet

Peak flow rate of this hydrograph = 251.136(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	75.0	150.0	225.0	300.0
0+ 5	0.0001	0.02	Q				
0+10	0.0017	0.23	Q				
0+15	0.0074	0.83	Q				
0+20	0.0212	2.01	Q				
0+25	0.0503	4.21	Q				
0+30	0.0891	5.64	Q				
0+35	0.1360	6.80	Q				
0+40	0.1927	8.23	VQ				
0+45	0.2661	10.66	VQ				
0+50	0.3497	12.15	VQ				
0+55	0.4392	13.00	VQ				
1+ 0	0.5341	13.78	VQ				
1+ 5	0.6356	14.73	VQ				
1+10	0.7460	16.03	V Q				
1+15	0.8725	18.37	VQ				
1+20	1.0087	19.77	VQ				
1+25	1.1502	20.55	VQ				
1+30	1.2957	21.11	VQ				
1+35	1.4440	21.53	VQ				
1+40	1.5944	21.84	VQ				
1+45	1.7466	22.09	Q				
1+50	1.9001	22.30	Q				
1+55	2.0547	22.45	Q				
2+ 0	2.2112	22.72	VQ				
2+ 5	2.3705	23.14	VQ				
2+10	2.5343	23.79	Q				
2+15	2.7095	25.44	Q				
2+20	2.8854	25.54	Q				
2+25	3.0717	27.05	Q				

SOBA56100

2+30	3.2651	28.09	Q
2+35	3.4622	28.61	QV
2+40	3.6619	29.00	QV
2+45	3.8647	29.45	QV
2+50	4.0725	30.16	Q
2+55	4.2878	31.27	QV
3+ 0	4.5183	33.47	QV
3+ 5	4.7577	34.76	QV
3+10	5.0029	35.60	Q V
3+15	5.2549	36.59	Q V
3+20	5.5159	37.89	QV
3+25	5.7941	40.39	Q V
3+30	6.0865	42.46	Q V
3+35	6.3953	44.84	Q V
3+40	6.7321	48.91	Q V
3+45	7.1020	53.70	QV
3+50	7.5043	58.42	Q V
3+55	7.9315	62.03	QV
4+ 0	8.3873	66.17	Q V
4+ 5	8.8670	69.66	QV
4+10	9.3760	73.90	Q V
4+15	9.9121	77.84	Q V
4+20	10.4836	82.98	QV
4+25	11.0963	88.96	Q V
4+30	11.7514	95.12	Q V
4+35	12.4483	101.19	Q V
4+40	13.1850	106.97	QV
4+45	13.9548	111.77	Q V
4+50	14.7634	117.40	Q V
4+55	15.6130	123.36	Q V
5+ 0	16.5023	129.13	Q V
5+ 5	17.4289	134.54	Q V
5+10	18.4129	142.88	Q V
5+15	19.4826	155.31	Q V
5+20	20.6896	175.26	Q V
5+25	22.0574	198.60	Q
5+30	23.5863	222.00	VQ
5+35	25.2505	241.65	V Q
5+40	26.9801	251.14	VQ
5+45	28.6507	242.57	Q V
5+50	29.8516	174.36	Q
5+55	30.6633	117.86	Q
6+ 0	31.2459	84.60	Q
6+ 5	31.6796	62.98	Q
6+10	32.0130	48.40	Q
6+15	32.2683	37.08	Q
6+20	32.4603	27.87	Q
6+25	32.6018	20.55	Q
6+30	32.7046	14.92	Q
6+35	32.7773	10.56	Q
6+40	32.8277	7.32	Q
6+45	32.8663	5.60	Q
6+50	32.8975	4.54	Q
6+55	32.9230	3.70	Q
7+ 0	32.9439	3.04	Q
7+ 5	32.9617	2.57	Q
7+10	32.9754	2.00	Q
7+15	32.9845	1.32	Q
7+20	32.9903	0.84	Q
7+25	32.9935	0.47	Q
7+30	32.9945	0.13	Q
7+35	32.9947	0.04	Q
7+40	32.9948	0.01	Q
7+45	32.9949	0.00	Q
7+50	32.9949	0.00	Q
7+55	32.9949	0.00	Q

SOBA524100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/04/08 File: SOBA524100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 202.00(Ac.) = 0.316 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 202.00(Ac.) = 0.316 Sq. Mi.
Length along longest watercourse = 6660.00(Ft.)
Length along longest watercourse measured to centroid = 3715.00(Ft.)
Length along longest watercourse = 1.261 Mi.
Length along longest watercourse measured to centroid = 0.704 Mi.
Difference in elevation = 1120.00(Ft.)
Slope along watercourse = 887.9279 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.284 Hr.
Lag time = 17.05 Min.
25% of lag time = 4.26 Min.
40% of lag time = 6.82 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
202.00	2.25	454.50

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
202.00	6.00	1212.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 99.96 %
Adjusted average point rain = 5.998(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
202.000	86.00	0.000

Total Area Entered = 202.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

SOBA524100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	29.328	2.089	4.252
2	0.167	58.656	6.632	13.501
3	0.250	87.984	12.791	26.040
4	0.333	117.312	28.157	57.322
5	0.417	146.641	16.393	33.372
6	0.500	175.969	8.495	17.294
7	0.583	205.297	6.101	12.420
8	0.667	234.625	4.579	9.322
9	0.750	263.953	3.599	7.326
10	0.833	293.281	2.821	5.743
11	0.917	322.609	2.240	4.560
12	1.000	351.937	1.691	3.442
13	1.083	381.265	1.269	2.583
14	1.167	410.593	0.899	1.831
15	1.250	439.922	0.448	0.911
16	1.333	469.250	0.339	0.691
17	1.417	498.578	0.297	0.604
18	1.500	527.906	0.240	0.489
19	1.583	557.234	0.178	0.362
20	1.667	586.562	0.218	0.444
21	1.750	615.890	0.217	0.443
22	1.833	645.218	0.130	0.264
23	1.917	674.546	0.097	0.197
24	2.000	703.874	0.081	0.165
			Sum = 100.000	Sum= 203.578

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01

SOBA524100

43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.130	0.01
47	3.92	0.20	0.144	0.258	0.130	0.01
48	4.00	0.20	0.144	0.257	0.130	0.01
49	4.08	0.20	0.144	0.256	0.130	0.01
50	4.17	0.20	0.144	0.255	0.130	0.01
51	4.25	0.20	0.144	0.254	0.130	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02
59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.130	0.01
62	5.17	0.20	0.144	0.242	0.130	0.01
63	5.25	0.20	0.144	0.241	0.130	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.08
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.15
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.384	0.201	---	0.18
104	8.67	0.53	0.384	0.200	---	0.18
105	8.75	0.53	0.384	0.199	---	0.18
106	8.83	0.57	0.408	0.198	---	0.21
107	8.92	0.57	0.408	0.197	---	0.21
108	9.00	0.57	0.408	0.196	---	0.21
109	9.08	0.63	0.456	0.195	---	0.26
110	9.17	0.63	0.456	0.195	---	0.26
111	9.25	0.63	0.456	0.194	---	0.26
112	9.33	0.67	0.480	0.193	---	0.29
113	9.42	0.67	0.480	0.192	---	0.29
114	9.50	0.67	0.480	0.191	---	0.29
115	9.58	0.70	0.504	0.190	---	0.31
116	9.67	0.70	0.504	0.189	---	0.31
117	9.75	0.70	0.504	0.188	---	0.32
118	9.83	0.73	0.528	0.187	---	0.34
119	9.92	0.73	0.528	0.186	---	0.34
120	10.00	0.73	0.528	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.18

122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.480	0.179	---	0.30
128	10.67	0.67	0.480	0.178	---	0.30
129	10.75	0.67	0.480	0.177	---	0.30
130	10.83	0.67	0.480	0.177	---	0.30
131	10.92	0.67	0.480	0.176	---	0.30
132	11.00	0.67	0.480	0.175	---	0.30
133	11.08	0.63	0.456	0.174	---	0.28
134	11.17	0.63	0.456	0.173	---	0.28
135	11.25	0.63	0.456	0.172	---	0.28
136	11.33	0.63	0.456	0.171	---	0.28
137	11.42	0.63	0.456	0.171	---	0.29
138	11.50	0.63	0.456	0.170	---	0.29
139	11.58	0.57	0.408	0.169	---	0.24
140	11.67	0.57	0.408	0.168	---	0.24
141	11.75	0.57	0.408	0.167	---	0.24
142	11.83	0.60	0.432	0.166	---	0.27
143	11.92	0.60	0.432	0.166	---	0.27
144	12.00	0.60	0.432	0.165	---	0.27
145	12.08	0.83	0.600	0.164	---	0.44
146	12.17	0.83	0.600	0.163	---	0.44
147	12.25	0.83	0.600	0.162	---	0.44
148	12.33	0.87	0.624	0.161	---	0.46
149	12.42	0.87	0.624	0.161	---	0.46
150	12.50	0.87	0.624	0.160	---	0.46
151	12.58	0.93	0.672	0.159	---	0.51
152	12.67	0.93	0.672	0.158	---	0.51
153	12.75	0.93	0.672	0.157	---	0.51
154	12.83	0.97	0.696	0.157	---	0.54
155	12.92	0.97	0.696	0.156	---	0.54
156	13.00	0.97	0.696	0.155	---	0.54
157	13.08	1.13	0.816	0.154	---	0.66
158	13.17	1.13	0.816	0.154	---	0.66
159	13.25	1.13	0.816	0.153	---	0.66
160	13.33	1.13	0.816	0.152	---	0.66
161	13.42	1.13	0.816	0.151	---	0.66
162	13.50	1.13	0.816	0.150	---	0.67
163	13.58	0.77	0.552	0.150	---	0.40
164	13.67	0.77	0.552	0.149	---	0.40
165	13.75	0.77	0.552	0.148	---	0.40
166	13.83	0.77	0.552	0.147	---	0.40
167	13.92	0.77	0.552	0.147	---	0.41
168	14.00	0.77	0.552	0.146	---	0.41
169	14.08	0.90	0.648	0.145	---	0.50
170	14.17	0.90	0.648	0.144	---	0.50
171	14.25	0.90	0.648	0.144	---	0.50
172	14.33	0.87	0.624	0.143	---	0.48
173	14.42	0.87	0.624	0.142	---	0.48
174	14.50	0.87	0.624	0.141	---	0.48
175	14.58	0.87	0.624	0.141	---	0.48
176	14.67	0.87	0.624	0.140	---	0.48
177	14.75	0.87	0.624	0.139	---	0.48
178	14.83	0.83	0.600	0.139	---	0.46
179	14.92	0.83	0.600	0.138	---	0.46
180	15.00	0.83	0.600	0.137	---	0.46
181	15.08	0.80	0.576	0.136	---	0.44
182	15.17	0.80	0.576	0.136	---	0.44
183	15.25	0.80	0.576	0.135	---	0.44
184	15.33	0.77	0.552	0.134	---	0.42
185	15.42	0.77	0.552	0.134	---	0.42
186	15.50	0.77	0.552	0.133	---	0.42
187	15.58	0.63	0.456	0.132	---	0.32
188	15.67	0.63	0.456	0.132	---	0.32
189	15.75	0.63	0.456	0.131	---	0.32
190	15.83	0.63	0.456	0.130	---	0.33
191	15.92	0.63	0.456	0.130	---	0.33
192	16.00	0.63	0.456	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01

201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01
217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00

280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00
Sum =		100.0			Sum =	36.9

Flood volume = Effective rainfall 3.07(In)
times area 202.0(Ac.)/[(In)/(Ft.)] = 51.8(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 49.200(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 2254677.5 Cubic Feet
Total soil loss = 2143146.7 Cubic Feet

Peak flow rate of this hydrograph = 128.046(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

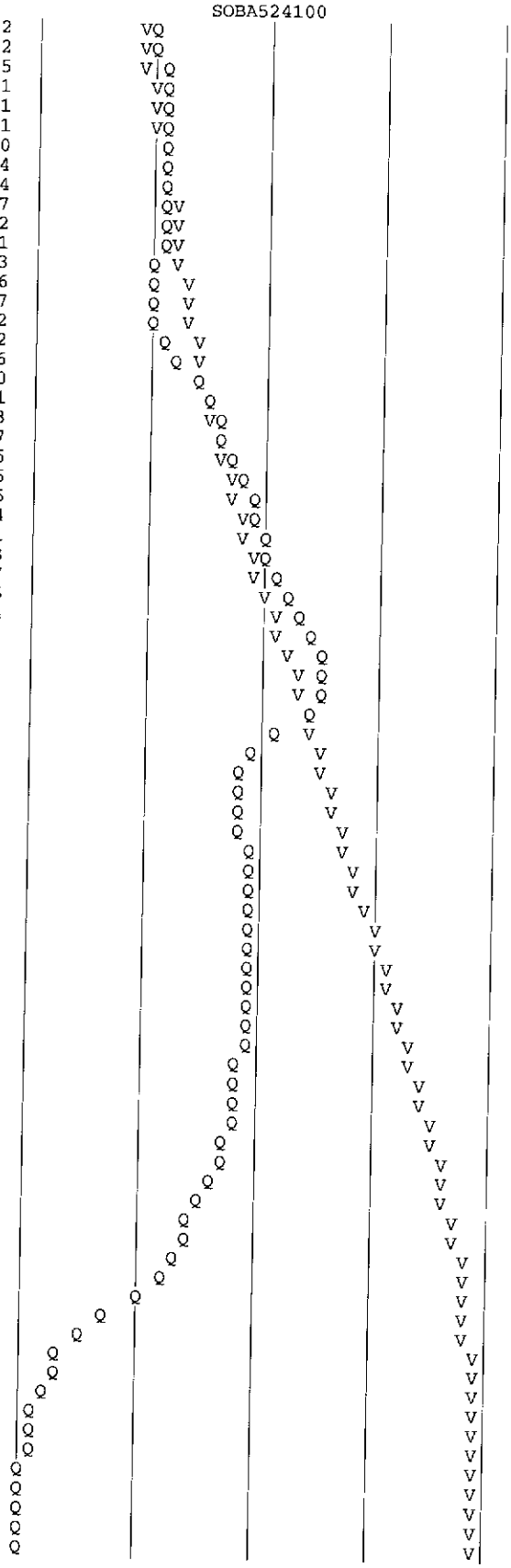
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0001	0.02	Q				
0+10	0.0007	0.09	Q				
0+15	0.0022	0.21	Q				
0+20	0.0056	0.50	Q				
0+25	0.0103	0.69	Q				
0+30	0.0161	0.83	Q				
0+35	0.0232	1.03	Q				
0+40	0.0311	1.16	Q				
0+45	0.0396	1.23	Q				
0+50	0.0486	1.30	Q				
0+55	0.0581	1.38	Q				
1+ 0	0.0682	1.47	Q				
1+ 5	0.0794	1.63	Q				
1+10	0.0911	1.69	Q				
1+15	0.1027	1.69	Q				
1+20	0.1136	1.59	Q				
1+25	0.1242	1.54	Q				
1+30	0.1347	1.52	Q				
1+35	0.1450	1.51	Q				
1+40	0.1553	1.50	Q				
1+45	0.1656	1.49	Q				
1+50	0.1759	1.50	Q				
1+55	0.1864	1.52	Q				
2+ 0	0.1973	1.58	Q				
2+ 5	0.2091	1.72	Q				
2+10	0.2215	1.79	Q				
2+15	0.2341	1.83	Q				
2+20	0.2470	1.86	Q				
2+25	0.2599	1.89	Q				
2+30	0.2730	1.90	Q				
2+35	0.2863	1.93	Q				
2+40	0.2999	1.97	Q				
2+45	0.3139	2.04	Q				
2+50	0.3290	2.18	Q				
2+55	0.3446	2.27	Q				
3+ 0	0.3605	2.31	Q				
3+ 5	0.3766	2.34	Q				
3+10	0.3929	2.37	Q				
3+15	0.4093	2.38	Q				
3+20	0.4258	2.40	Q				
3+25	0.4424	2.41	Q				
3+30	0.4591	2.42	Q				
3+35	0.4758	2.43	Q				
3+40	0.4926	2.43	Q				
3+45	0.5093	2.43	Q				
3+50	0.5262	2.45	Q				
3+55	0.5433	2.48	Q				
4+ 0	0.5608	2.54	Q				
4+ 5	0.5793	2.68	Q				
4+10	0.5983	2.76	Q				

4+15	0.6176	2.81	Q
4+20	0.6372	2.85	Q
4+25	0.6572	2.90	Q
4+30	0.6778	2.98	Q
4+35	0.6993	3.13	Q
4+40	0.7215	3.22	Q
4+45	0.7441	3.27	Q
4+50	0.7670	3.32	Q
4+55	0.7902	3.38	Q
5+ 0	0.8141	3.46	Q
5+ 5	0.8389	3.59	Q
5+10	0.8638	3.62	Q
5+15	0.8882	3.55	Q
5+20	0.9111	3.32	Q
5+25	0.9333	3.22	Q
5+30	0.9555	3.22	Q
5+35	0.9784	3.33	Q
5+40	1.0018	3.41	Q
5+45	1.0258	3.48	Q
5+50	1.0508	3.63	Q
5+55	1.0764	3.72	Q
6+ 0	1.1023	3.76	Q
6+ 5	1.1286	3.81	Q
6+10	1.1552	3.87	Q
6+15	1.1824	3.95	Q
6+20	1.2107	4.11	Q
6+25	1.2396	4.20	Q
6+30	1.2689	4.25	Q
6+35	1.2982	4.26	QV
6+40	1.3272	4.21	QV
6+45	1.3553	4.08	QV
6+50	1.3813	3.77	QV
6+55	1.4066	3.68	QV
7+ 0	1.4322	3.71	QV
7+ 5	1.4583	3.80	QV
7+10	1.4852	3.91	QV
7+15	1.5131	4.04	QV
7+20	1.5426	4.29	QV
7+25	1.5754	4.77	QV
7+30	1.6138	5.57	Q
7+35	1.6635	7.22	Q
7+40	1.7223	8.53	Q
7+45	1.7895	9.76	Q
7+50	1.8703	11.73	VQ
7+55	1.9618	13.28	VQ
8+ 0	2.0629	14.69	VQ
8+ 5	2.1793	16.90	V Q
8+10	2.3093	18.87	V Q
8+15	2.4538	20.99	V Q
8+20	2.6221	24.44	V Q
8+25	2.8054	26.61	V Q
8+30	2.9977	27.92	V Q
8+35	3.1976	29.03	V Q
8+40	3.4053	30.16	V Q
8+45	3.6219	31.45	V Q
8+50	3.8525	33.48	V Q
8+55	4.0942	35.09	V Q
9+ 0	4.3458	36.53	V Q
9+ 5	4.6127	38.76	V Q
9+10	4.8933	40.74	V Q
9+15	5.1884	42.84	V Q
9+20	5.5077	46.37	V Q
9+25	5.8443	48.87	V Q
9+30	6.1942	50.81	V Q
9+35	6.5612	53.29	V Q
9+40	6.9416	55.23	V Q
9+45	7.3338	56.94	V Q
9+50	7.7420	59.27	V Q
9+55	8.1628	61.10	V Q
10+ 0	8.5947	62.70	V Q
10+ 5	9.0364	64.14	V Q
10+10	9.4723	63.30	V Q
10+15	9.8845	59.85	V Q
10+20	10.2354	50.95	V Q
10+25	10.5518	45.94	VQ
10+30	10.8517	43.54	Q
10+35	11.1436	42.38	Q
10+40	11.4384	42.81	Q
10+45	11.7485	45.03	Q

SOBA524100

10+50	12.1013	51.22
10+55	12.4782	54.72
11+ 0	12.8670	56.45
11+ 5	13.2638	57.61
11+10	13.6653	58.31
11+15	14.0690	58.61
11+20	14.4685	58.00
11+25	14.8668	57.84
11+30	15.2658	57.94
11+35	15.6644	57.87
11+40	16.0592	57.32
11+45	16.4456	56.11
11+50	16.8143	53.53
11+55	17.1748	52.36
12+ 0	17.5348	52.27
12+ 5	17.9061	53.92
12+10	18.2968	56.72
12+15	18.7193	61.36
12+20	19.2103	71.30
12+25	19.7435	77.41
12+30	20.3022	81.13
12+35	20.8874	84.97
12+40	21.4945	88.16
12+45	22.1229	91.25
12+50	22.7810	95.55
12+55	23.4604	98.64
13+ 0	24.1560	101.01
13+ 5	24.8738	104.23
13+10	25.6154	107.67
13+15	26.3863	111.95
13+20	27.2110	119.74
13+25	28.0684	124.49
13+30	28.9442	127.17
13+35	29.8261	128.05
13+40	30.6942	126.05
13+45	31.5236	120.43
13+50	32.2556	106.29
13+55	32.9326	98.30
14+ 0	33.5826	94.38
14+ 5	34.2163	92.02
14+10	34.8449	91.27
14+15	35.4794	92.13
14+20	36.1424	96.27
14+25	36.8187	98.19
14+30	37.4974	98.55
14+35	38.1715	97.89
14+40	38.8444	97.70
14+45	39.5191	97.96
14+50	40.1947	98.11
14+55	40.8697	98.01
15+ 0	41.5418	97.58
15+ 5	42.2047	96.26
15+10	42.8606	95.23
15+15	43.5095	94.22
15+20	44.1467	92.53
15+25	44.7754	91.28
15+30	45.3965	90.19
15+35	46.0035	88.13
15+40	46.5949	85.87
15+45	47.1656	82.87
15+50	47.6960	77.02
15+55	48.2028	73.59
16+ 0	48.6973	71.79
16+ 5	49.1736	69.16
16+10	49.6139	63.93
16+15	49.9924	54.95
16+20	50.2416	36.19
16+25	50.4146	25.13
16+30	50.5476	19.30
16+35	50.6515	15.10
16+40	50.7336	11.92
16+45	50.7986	9.43
16+50	50.8496	7.40
16+55	50.8896	5.81
17+ 0	50.9214	4.62
17+ 5	50.9473	3.75
17+10	50.9691	3.17
17+15	50.9890	2.90
17+20	51.0081	2.76



17+25	51.0247	2.41	Q		V
17+30	51.0363	1.68	Q		V
17+35	51.0452	1.30	Q		V
17+40	51.0526	1.08	Q		V
17+45	51.0590	0.92	Q		V
17+50	51.0650	0.87	Q		V
17+55	51.0713	0.91	Q		V
18+ 0	51.0784	1.04	Q		V
18+ 5	51.0878	1.36	Q		V
18+10	51.0985	1.55	Q		V
18+15	51.1098	1.65	Q		V
18+20	51.1217	1.72	Q		V
18+25	51.1339	1.78	Q		V
18+30	51.1464	1.82	Q		V
18+35	51.1591	1.85	Q		V
18+40	51.1718	1.84	Q		V
18+45	51.1842	1.80	Q		V
18+50	51.1957	1.67	Q		V
18+55	51.2065	1.56	Q		V
19+ 0	51.2165	1.46	Q		V
19+ 5	51.2256	1.31	Q		V
19+10	51.2341	1.24	Q		V
19+15	51.2427	1.25	Q		V
19+20	51.2520	1.36	Q		V
19+25	51.2620	1.44	Q		V
19+30	51.2724	1.52	Q		V
19+35	51.2838	1.66	Q		V
19+40	51.2956	1.71	Q		V
19+45	51.3074	1.70	Q		V
19+50	51.3183	1.59	Q		V
19+55	51.3287	1.50	Q		V
20+ 0	51.3384	1.42	Q		V
20+ 5	51.3473	1.28	Q		V
20+10	51.3557	1.23	Q		V
20+15	51.3642	1.24	Q		V
20+20	51.3734	1.34	Q		V
20+25	51.3830	1.39	Q		V
20+30	51.3927	1.41	Q		V
20+35	51.4025	1.42	Q		V
20+40	51.4123	1.43	Q		V
20+45	51.4222	1.44	Q		V
20+50	51.4320	1.43	Q		V
20+55	51.4417	1.41	Q		V
21+ 0	51.4510	1.35	Q		V
21+ 5	51.4595	1.23	Q		V
21+10	51.4676	1.18	Q		V
21+15	51.4759	1.20	Q		V
21+20	51.4849	1.30	Q		V
21+25	51.4940	1.33	Q		V
21+30	51.5029	1.29	Q		V
21+35	51.5110	1.18	Q		V
21+40	51.5189	1.14	Q		V
21+45	51.5269	1.17	Q		V
21+50	51.5357	1.28	Q		V
21+55	51.5448	1.31	Q		V
22+ 0	51.5536	1.28	Q		V
22+ 5	51.5616	1.17	Q		V
22+10	51.5695	1.14	Q		V
22+15	51.5775	1.17	Q		V
22+20	51.5863	1.28	Q		V
22+25	51.5953	1.31	Q		V
22+30	51.6041	1.28	Q		V
22+35	51.6121	1.16	Q		V
22+40	51.6196	1.09	Q		V
22+45	51.6269	1.06	Q		V
22+50	51.6341	1.04	Q		V
22+55	51.6412	1.03	Q		V
23+ 0	51.6482	1.02	Q		V
23+ 5	51.6551	1.01	Q		V
23+10	51.6620	1.00	Q		V
23+15	51.6688	0.99	Q		V
23+20	51.6756	0.99	Q		V
23+25	51.6824	0.98	Q		V
23+30	51.6892	0.98	Q		V
23+35	51.6960	0.98	Q		V
23+40	51.7027	0.98	Q		V
23+45	51.7095	0.98	Q		V
23+50	51.7162	0.98	Q		V
23+55	51.7230	0.98	Q		V

SOBA524100

24+ 0	51.7297	0.98	Q	V
24+ 5	51.7363	0.96	Q	V
24+10	51.7424	0.89	Q	V
24+15	51.7477	0.77	Q	V
24+20	51.7511	0.49	Q	V
24+25	51.7534	0.33	Q	V
24+30	51.7551	0.25	Q	V
24+35	51.7564	0.19	Q	V
24+40	51.7574	0.14	Q	V
24+45	51.7582	0.11	Q	V
24+50	51.7587	0.08	Q	V
24+55	51.7591	0.06	Q	V
25+ 0	51.7594	0.04	Q	V
25+ 5	51.7596	0.03	Q	V
25+10	51.7598	0.02	Q	V
25+15	51.7599	0.02	Q	V
25+20	51.7600	0.01	Q	V
25+25	51.7601	0.01	Q	V
25+30	51.7602	0.01	Q	V
25+35	51.7602	0.01	Q	V
25+40	51.7602	0.01	Q	V
25+45	51.7603	0.00	Q	V
25+50	51.7603	0.00	Q	V
25+55	51.7603	0.00	Q	V

AREA 6

SOBA61100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba61100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 45.00(Ac.) = 0.070 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 45.00(Ac.) = 0.070 Sq. Mi.
Length along longest watercourse = 3090.00(Ft.)
Length along longest watercourse measured to centroid = 1300.00(Ft.)
Length along longest watercourse = 0.585 Mi.
Length along longest watercourse measured to centroid = 0.246 Mi.
Difference in elevation = 400.00(Ft.)
Slope along watercourse = 683.4951 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.150 Hr.
Lag time = 8.98 Min.
25% of lag time = 2.24 Min.
40% of lag time = 3.59 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
45.00	0.55	24.75

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
45.00	1.20	54.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.96 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
45.000	86.00	0.000

Total Area Entered = 45.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	55.682	5.002	2.268
2	0.167	111.364	26.890	12.195
3	0.250	167.046	36.130	16.386
4	0.333	222.727	13.222	5.996
5	0.417	278.409	7.647	3.468
6	0.500	334.091	4.830	2.190
7	0.583	389.773	2.914	1.322
8	0.667	445.455	1.461	0.662
9	0.750	501.137	0.636	0.289
10	0.833	556.819	0.442	0.201
11	0.917	612.501	0.397	0.180
12	1.000	668.182	0.284	0.129
13	1.083	723.864	0.145	0.066
			Sum = 100.000	Sum= 45.352

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.176	---	0.43
2	0.17	4.30	0.619	0.176	---	0.44
3	0.25	5.00	0.720	0.176	---	0.54
4	0.33	5.00	0.720	0.176	---	0.54
5	0.42	5.80	0.835	0.176	---	0.66
6	0.50	6.50	0.936	0.176	---	0.76
7	0.58	7.40	1.065	0.176	---	0.89
8	0.67	8.60	1.238	0.176	---	1.06
9	0.75	12.30	1.770	0.176	---	1.59
10	0.83	29.10	4.189	0.176	---	4.01
11	0.92	6.80	0.979	0.176	---	0.80
12	1.00	5.00	0.720	0.176	---	0.54
Sum =		100.0			Sum =	12.3

Flood volume = Effective rainfall 1.02(In)
times area 45.0(Ac.)/[(In)/(Ft.)] = 3.8(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.658(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 167255.8 Cubic Feet
Total soil loss = 28684.3 Cubic Feet

Peak flow rate of this hydrograph = 93.874(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 25.0 50.0 75.0 100.0
0+ 5	0.0067	0.97	Q
0+10	0.0497	6.24	V Q
0+15	0.1439	13.68	V Q
0+20	0.2659	17.72	V Q
0+25	0.4119	21.20	V Q
0+30	0.5802	24.43	V Q
0+35	0.7785	28.79	V Q
0+40	1.0101	33.63	V Q
0+45	1.2879	40.34	V Q
0+50	1.6784	56.70	V Q
0+55	2.2956	89.62	V Q
1+ 0	2.9421	93.87	V Q
1+ 5	3.3134	53.91	Q V
1+10	3.5455	33.70	Q V
1+15	3.6714	18.29	Q V
1+20	3.7455	10.75	Q V
1+25	3.7861	5.89	Q V
1+30	3.8073	3.09	Q V
1+35	3.8203	1.88	Q V

SOBA61100

1+40	3.8293	1.32	Q	V
1+45	3.8354	0.88	Q	V
1+50	3.8386	0.46	Q	V
1+55	3.8394	0.12	Q	V
2+ 0	3.8397	0.04	Q	V

SOBA63100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba63100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 45.00(Ac.) = 0.070 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 45.00(Ac.) = 0.070 Sq. Mi.
Length along longest watercourse = 3090.00(Ft.)
Length along longest watercourse measured to centroid = 1300.00(Ft.)
Length along longest watercourse = 0.585 Mi.
Length along longest watercourse measured to centroid = 0.246 Mi.
Difference in elevation = 400.00(Ft.)
Slope along watercourse = 683.4951 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.150 Hr.
Lag time = 8.98 Min.
25% of lag time = 2.24 Min.
40% of lag time = 3.59 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
45.00	0.90	40.50

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
45.00	2.10	94.50

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
45.000	86.00	0.000

Total Area Entered = 45.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

SOBA63100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	55.682	5.002	2.268
2	0.167	111.364	26.890	12.195
3	0.250	167.046	36.130	16.386
4	0.333	222.727	13.222	5.996
5	0.417	278.409	7.647	3.468
6	0.500	334.091	4.830	2.190
7	0.583	389.773	2.914	1.322
8	0.667	445.455	1.461	0.662
9	0.750	501.137	0.636	0.289
10	0.833	556.819	0.442	0.201
11	0.917	612.501	0.397	0.180
12	1.000	668.182	0.284	0.129
13	1.083	723.864	0.145	0.066
			Sum = 100.000 Sum=	45.352

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.176	---	0.15
2	0.17	1.30	0.328	0.176	---	0.15
3	0.25	1.10	0.277	0.176	---	0.10
4	0.33	1.50	0.378	0.176	---	0.20
5	0.42	1.50	0.378	0.176	---	0.20
6	0.50	1.80	0.454	0.176	---	0.28
7	0.58	1.50	0.378	0.176	---	0.20
8	0.67	1.80	0.454	0.176	---	0.28
9	0.75	1.80	0.454	0.176	---	0.28
10	0.83	1.50	0.378	0.176	---	0.20
11	0.92	1.60	0.403	0.176	---	0.23
12	1.00	1.80	0.454	0.176	---	0.28
13	1.08	2.20	0.554	0.176	---	0.38
14	1.17	2.20	0.554	0.176	---	0.38
15	1.25	2.20	0.554	0.176	---	0.38
16	1.33	2.00	0.504	0.176	---	0.33
17	1.42	2.60	0.655	0.176	---	0.48
18	1.50	2.70	0.680	0.176	---	0.50
19	1.58	2.40	0.605	0.176	---	0.43
20	1.67	2.70	0.680	0.176	---	0.50
21	1.75	3.30	0.831	0.176	---	0.66
22	1.83	3.10	0.781	0.176	---	0.61
23	1.92	2.90	0.731	0.176	---	0.56
24	2.00	3.00	0.756	0.176	---	0.58
25	2.08	3.10	0.781	0.176	---	0.61
26	2.17	4.20	1.058	0.176	---	0.88
27	2.25	5.00	1.260	0.176	---	1.08
28	2.33	3.50	0.882	0.176	---	0.71
29	2.42	6.80	1.713	0.176	---	1.54
30	2.50	7.30	1.839	0.176	---	1.66
31	2.58	8.20	2.066	0.176	---	1.89
32	2.67	5.90	1.487	0.176	---	1.31
33	2.75	2.00	0.504	0.176	---	0.33
34	2.83	1.80	0.454	0.176	---	0.28
35	2.92	1.80	0.454	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.9

Flood volume = Effective rainfall 1.58(In)
times area 45.0(Ac.)/[(In)/(Ft.)] = 5.9(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 1.963(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 257453.0 Cubic Feet
Total soil loss = 85514.4 Cubic Feet

Peak flow rate of this hydrograph = 69.440(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

SOBA63100

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 17.5 35.0 52.5 70.0
0+ 5	0.0024	0.34	
0+10	0.0175	2.20	
0+15	0.0490	4.58	
0+20	0.0842	5.10	
0+25	0.1257	6.03	
0+30	0.1800	7.89	
0+35	0.2438	9.27	
0+40	0.3134	10.10	
0+45	0.3852	10.43	
0+50	0.4640	11.44	
0+55	0.5398	11.01	
1+ 0	0.6116	10.43	
1+ 5	0.6899	11.37	
1+10	0.7821	13.39	
1+15	0.8876	15.32	
1+20	0.9976	15.97	
1+25	1.1089	16.15	
1+30	1.2295	17.52	
1+35	1.3673	20.00	
1+40	1.5082	20.47	
1+45	1.6535	21.09	
1+50	1.8187	23.99	
1+55	1.9990	26.18	
2+ 0	2.1776	25.93	
2+ 5	2.3554	25.82	
2+10	2.5420	27.10	
2+15	2.7587	31.47	
2+20	3.0191	37.80	
2+25	3.2956	40.15	
2+30	3.6167	46.63	
2+35	4.0397	61.41	
2+40	4.5179	69.44	
2+45	4.9802	67.13	
2+50	5.3167	48.86	
2+55	5.5280	30.69	
3+ 0	5.6834	22.56	
3+ 5	5.7864	14.96	
3+10	5.8394	7.70	
3+15	5.8689	4.29	
3+20	5.8865	2.55	
3+25	5.8975	1.60	
3+30	5.9039	0.94	
3+35	5.9074	0.50	
3+40	5.9090	0.24	
3+45	5.9098	0.11	
3+50	5.9102	0.06	
3+55	5.9103	0.02	
4+ 0	5.9103	0.00	

SOBA66100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba66100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 45.00(Ac.) = 0.070 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 45.00(Ac.) = 0.070 Sq. Mi.
Length along longest watercourse = 3090.00(Ft.)
Length along longest watercourse measured to centroid = 1300.00(Ft.)
Length along longest watercourse = 0.585 Mi.
Length along longest watercourse measured to centroid = 0.246 Mi.
Difference in elevation = 400.00(Ft.)
Slope along watercourse = 683.4951 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.150 Hr.
Lag time = 8.98 Min.
25% of lag time = 2.24 Min.
40% of lag time = 3.59 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
45.00	1.40	63.00

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
45.00	3.00	135.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 3.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
45.000	86.00	0.000

Total Area Entered = 45.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

SOBA66100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	55.682	5.002	2.268
2	0.167	111.364	26.890	12.195
3	0.250	167.046	36.130	16.386
4	0.333	222.727	13.222	5.996
5	0.417	278.409	7.647	3.468
6	0.500	334.091	4.830	2.190
7	0.583	389.773	2.914	1.322
8	0.667	445.455	1.461	0.662
9	0.750	501.137	0.636	0.289
10	0.833	556.819	0.442	0.201
11	0.917	612.501	0.397	0.180
12	1.000	668.182	0.284	0.129
13	1.083	723.864	0.145	0.066
			Sum = 100.000 Sum=	45.352

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.216	0.176	---	0.04
3	0.25	0.60	0.216	0.176	---	0.04
4	0.33	0.60	0.216	0.176	---	0.04
5	0.42	0.60	0.216	0.176	---	0.04
6	0.50	0.70	0.252	0.176	---	0.08
7	0.58	0.70	0.252	0.176	---	0.08
8	0.67	0.70	0.252	0.176	---	0.08
9	0.75	0.70	0.252	0.176	---	0.08
10	0.83	0.70	0.252	0.176	---	0.08
11	0.92	0.70	0.252	0.176	---	0.08
12	1.00	0.80	0.288	0.176	---	0.11
13	1.08	0.80	0.288	0.176	---	0.11
14	1.17	0.80	0.288	0.176	---	0.11
15	1.25	0.80	0.288	0.176	---	0.11
16	1.33	0.80	0.288	0.176	---	0.11
17	1.42	0.80	0.288	0.176	---	0.11
18	1.50	0.80	0.288	0.176	---	0.11
19	1.58	0.80	0.288	0.176	---	0.11
20	1.67	0.80	0.288	0.176	---	0.11
21	1.75	0.80	0.288	0.176	---	0.11
22	1.83	0.80	0.288	0.176	---	0.11
23	1.92	0.80	0.288	0.176	---	0.11
24	2.00	0.90	0.324	0.176	---	0.15
25	2.08	0.80	0.288	0.176	---	0.11
26	2.17	0.90	0.324	0.176	---	0.15
27	2.25	0.90	0.324	0.176	---	0.15
28	2.33	0.90	0.324	0.176	---	0.15
29	2.42	0.90	0.324	0.176	---	0.15
30	2.50	0.90	0.324	0.176	---	0.15
31	2.58	0.90	0.324	0.176	---	0.15
32	2.67	0.90	0.324	0.176	---	0.15
33	2.75	1.00	0.360	0.176	---	0.18
34	2.83	1.00	0.360	0.176	---	0.18
35	2.92	1.00	0.360	0.176	---	0.18
36	3.00	1.00	0.360	0.176	---	0.18
37	3.08	1.00	0.360	0.176	---	0.18
38	3.17	1.10	0.396	0.176	---	0.22
39	3.25	1.10	0.396	0.176	---	0.22
40	3.33	1.10	0.396	0.176	---	0.22
41	3.42	1.20	0.432	0.176	---	0.26
42	3.50	1.30	0.468	0.176	---	0.29
43	3.58	1.40	0.504	0.176	---	0.33
44	3.67	1.40	0.504	0.176	---	0.33
45	3.75	1.50	0.540	0.176	---	0.36
46	3.83	1.50	0.540	0.176	---	0.36
47	3.92	1.60	0.576	0.176	---	0.40
48	4.00	1.60	0.576	0.176	---	0.40
49	4.08	1.70	0.612	0.176	---	0.44
50	4.17	1.80	0.648	0.176	---	0.47
51	4.25	1.90	0.684	0.176	---	0.51
52	4.33	2.00	0.720	0.176	---	0.54
53	4.42	2.10	0.756	0.176	---	0.58

54	4.50	2.10	0.756	0.176	---	0.58
55	4.58	2.20	0.792	0.176	---	0.62
56	4.67	2.30	0.828	0.176	---	0.65
57	4.75	2.40	0.864	0.176	---	0.69
58	4.83	2.40	0.864	0.176	---	0.69
59	4.92	2.50	0.900	0.176	---	0.72
60	5.00	2.60	0.936	0.176	---	0.76
61	5.08	3.10	1.116	0.176	---	0.94
62	5.17	3.60	1.296	0.176	---	1.12
63	5.25	3.90	1.404	0.176	---	1.23
64	5.33	4.20	1.512	0.176	---	1.34
65	5.42	4.70	1.692	0.176	---	1.52
66	5.50	5.60	2.016	0.176	---	1.84
67	5.58	1.90	0.684	0.176	---	0.51
68	5.67	0.90	0.324	0.176	---	0.15
69	5.75	0.60	0.216	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 45.0(Ac.)/[(In)/(Ft.)] = 7.4(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 3.892(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 320444.5 Cubic Feet
Total soil loss = 169529.7 Cubic Feet

Peak flow rate of this hydrograph = 65.537(CFS)

++

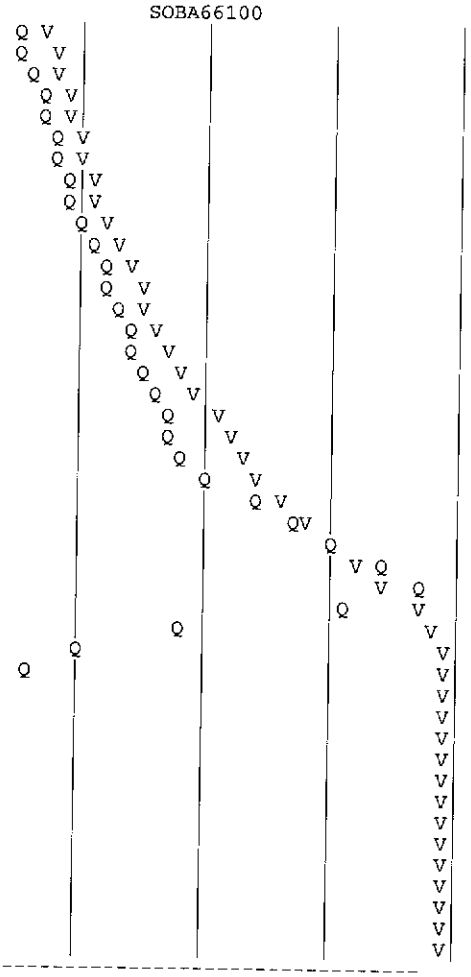
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0001	0.01	Q				
0+10	0.0011	0.14	Q				
0+15	0.0056	0.66	Q				
0+20	0.0143	1.27	Q				
0+25	0.0247	1.50	Q				
0+30	0.0365	1.72	Q				
0+35	0.0520	2.24	VQ				
0+40	0.0719	2.88	VQ				
0+45	0.0934	3.12	VQ				
0+50	0.1158	3.26	VQ				
0+55	0.1389	3.35	VQ				
1+ 0	0.1629	3.48	VQ				
1+ 5	0.1901	3.95	VQ				
1+10	0.2215	4.56	VQ				
1+15	0.2544	4.78	VQ				
1+20	0.2882	4.91	VQ				
1+25	0.3226	4.99	VQ				
1+30	0.3573	5.04	VQ				
1+35	0.3922	5.07	Q				
1+40	0.4272	5.08	Q				
1+45	0.4622	5.08	Q				
1+50	0.4973	5.09	Q				
1+55	0.5324	5.10	Q				
2+ 0	0.5680	5.18	QV				
2+ 5	0.6062	5.54	Q				
2+10	0.6459	5.77	Q				
2+15	0.6861	5.83	Q				
2+20	0.7297	6.33	Q				
2+25	0.7745	6.50	QV				
2+30	0.8199	6.60	QV				
2+35	0.8658	6.65	QV				
2+40	0.9118	6.69	QV				
2+45	0.9586	6.79	Q V				
2+50	1.0084	7.24	QV				
2+55	1.0624	7.83	QV				
3+ 0	1.1178	8.05	Q V				
3+ 5	1.1742	8.18	Q V				
3+10	1.2316	8.34	Q V				
3+15	1.2925	8.83	Q V				
3+20	1.3575	9.44	Q V				

SOBA66100

3+25	1.4247	9.75	
3+30	1.4963	10.41	
3+35	1.5762	11.60	
3+40	1.6651	12.90	
3+45	1.7611	13.94	
3+50	1.8630	14.81	
3+55	1.9714	15.74	
4+ 0	2.0854	16.55	
4+ 5	2.2055	17.43	
4+10	2.3315	18.29	
4+15	2.4664	19.60	
4+20	2.6114	21.05	
4+25	2.7669	22.57	
4+30	2.9325	24.06	
4+35	3.1062	25.22	
4+40	3.2869	26.24	
4+45	3.4773	27.65	
4+50	3.6775	29.06	
4+55	3.8853	30.17	
5+ 0	4.1000	31.17	
5+ 5	4.3265	32.89	
5+10	4.5776	36.47	
5+15	4.8689	42.30	
5+20	5.2005	48.14	
5+25	5.5689	53.50	
5+30	5.9818	59.95	
5+35	6.4332	65.54	
5+40	6.8179	55.85	
5+45	7.0418	32.52	
5+50	7.1731	19.06	
5+55	7.2503	11.21	
6+ 0	7.2953	6.53	
6+ 5	7.3213	3.78	
6+10	7.3360	2.13	
6+15	7.3448	1.28	
6+20	7.3506	0.84	
6+25	7.3541	0.50	
6+30	7.3557	0.24	
6+35	7.3562	0.07	
6+40	7.3563	0.02	
6+45	7.3564	0.01	
6+50	7.3564	0.00	
6+55	7.3564	0.00	
7+ 0	7.3564	0.00	



SOBA624100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba624100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 45.00(Ac.) = 0.070 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 45.00(Ac.) = 0.070 Sq. Mi.
Length along longest watercourse = 3090.00(Ft.)
Length along longest watercourse measured to centroid = 1300.00(Ft.)
Length along longest watercourse = 0.585 Mi.
Length along longest watercourse measured to centroid = 0.246 Mi.
Difference in elevation = 400.00(Ft.)
Slope along watercourse = 683.4951 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.150 Hr.
Lag time = 8.98 Min.
25% of lag time = 2.24 Min.
40% of lag time = 3.59 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
45.00	2.25	101.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
45.00	6.00	270.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 5.999(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
45.000	86.00	0.000

Total Area Entered = 45.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

SOBA624100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	55.682	5.002	2.268
2	0.167	111.364	26.890	12.195
3	0.250	167.046	36.130	16.386
4	0.333	222.727	13.222	5.996
5	0.417	278.409	7.647	3.468
6	0.500	334.091	4.830	2.190
7	0.583	389.773	2.914	1.322
8	0.667	445.455	1.461	0.662
9	0.750	501.137	0.636	0.289
10	0.833	556.819	0.442	0.201
11	0.917	612.501	0.397	0.180
12	1.000	668.182	0.284	0.129
13	1.083	723.864	0.145	0.066
			Sum = 100.000 Sum=	45.352

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.130	0.01
47	3.92	0.20	0.144	0.258	0.130	0.01
48	4.00	0.20	0.144	0.257	0.130	0.01
49	4.08	0.20	0.144	0.256	0.130	0.01
50	4.17	0.20	0.144	0.255	0.130	0.01
51	4.25	0.20	0.144	0.254	0.130	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02

54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02
59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.130	0.01
62	5.17	0.20	0.144	0.242	0.130	0.01
63	5.25	0.20	0.144	0.241	0.130	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.08
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.16
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.384	0.201	---	0.18
104	8.67	0.53	0.384	0.200	---	0.18
105	8.75	0.53	0.384	0.199	---	0.18
106	8.83	0.57	0.408	0.198	---	0.21
107	8.92	0.57	0.408	0.197	---	0.21
108	9.00	0.57	0.408	0.196	---	0.21
109	9.08	0.63	0.456	0.195	---	0.26
110	9.17	0.63	0.456	0.195	---	0.26
111	9.25	0.63	0.456	0.194	---	0.26
112	9.33	0.67	0.480	0.193	---	0.29
113	9.42	0.67	0.480	0.192	---	0.29
114	9.50	0.67	0.480	0.191	---	0.29
115	9.58	0.70	0.504	0.190	---	0.31
116	9.67	0.70	0.504	0.189	---	0.31
117	9.75	0.70	0.504	0.188	---	0.32
118	9.83	0.73	0.528	0.187	---	0.34
119	9.92	0.73	0.528	0.186	---	0.34
120	10.00	0.73	0.528	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.18
122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.480	0.179	---	0.30
128	10.67	0.67	0.480	0.178	---	0.30
129	10.75	0.67	0.480	0.177	---	0.30
130	10.83	0.67	0.480	0.177	---	0.30
131	10.92	0.67	0.480	0.176	---	0.30
132	11.00	0.67	0.480	0.175	---	0.31

133	11.08	0.63	0.456	0.174	---	0.28
134	11.17	0.63	0.456	0.173	---	0.28
135	11.25	0.63	0.456	0.172	---	0.28
136	11.33	0.63	0.456	0.171	---	0.28
137	11.42	0.63	0.456	0.171	---	0.29
138	11.50	0.63	0.456	0.170	---	0.29
139	11.58	0.57	0.408	0.169	---	0.24
140	11.67	0.57	0.408	0.168	---	0.24
141	11.75	0.57	0.408	0.167	---	0.24
142	11.83	0.60	0.432	0.166	---	0.27
143	11.92	0.60	0.432	0.166	---	0.27
144	12.00	0.60	0.432	0.165	---	0.27
145	12.08	0.83	0.600	0.164	---	0.44
146	12.17	0.83	0.600	0.163	---	0.44
147	12.25	0.83	0.600	0.162	---	0.44
148	12.33	0.87	0.624	0.161	---	0.46
149	12.42	0.87	0.624	0.161	---	0.46
150	12.50	0.87	0.624	0.160	---	0.46
151	12.58	0.93	0.672	0.159	---	0.51
152	12.67	0.93	0.672	0.158	---	0.51
153	12.75	0.93	0.672	0.157	---	0.51
154	12.83	0.97	0.696	0.157	---	0.54
155	12.92	0.97	0.696	0.156	---	0.54
156	13.00	0.97	0.696	0.155	---	0.54
157	13.08	1.13	0.816	0.154	---	0.66
158	13.17	1.13	0.816	0.154	---	0.66
159	13.25	1.13	0.816	0.153	---	0.66
160	13.33	1.13	0.816	0.152	---	0.66
161	13.42	1.13	0.816	0.151	---	0.66
162	13.50	1.13	0.816	0.150	---	0.67
163	13.58	0.77	0.552	0.150	---	0.40
164	13.67	0.77	0.552	0.149	---	0.40
165	13.75	0.77	0.552	0.148	---	0.40
166	13.83	0.77	0.552	0.147	---	0.40
167	13.92	0.77	0.552	0.147	---	0.41
168	14.00	0.77	0.552	0.146	---	0.41
169	14.08	0.90	0.648	0.145	---	0.50
170	14.17	0.90	0.648	0.144	---	0.50
171	14.25	0.90	0.648	0.144	---	0.50
172	14.33	0.87	0.624	0.143	---	0.48
173	14.42	0.87	0.624	0.142	---	0.48
174	14.50	0.87	0.624	0.141	---	0.48
175	14.58	0.87	0.624	0.141	---	0.48
176	14.67	0.87	0.624	0.140	---	0.48
177	14.75	0.87	0.624	0.139	---	0.48
178	14.83	0.83	0.600	0.139	---	0.46
179	14.92	0.83	0.600	0.138	---	0.46
180	15.00	0.83	0.600	0.137	---	0.46
181	15.08	0.80	0.576	0.136	---	0.44
182	15.17	0.80	0.576	0.136	---	0.44
183	15.25	0.80	0.576	0.135	---	0.44
184	15.33	0.77	0.552	0.134	---	0.42
185	15.42	0.77	0.552	0.134	---	0.42
186	15.50	0.77	0.552	0.133	---	0.42
187	15.58	0.63	0.456	0.132	---	0.32
188	15.67	0.63	0.456	0.132	---	0.32
189	15.75	0.63	0.456	0.131	---	0.33
190	15.83	0.63	0.456	0.130	---	0.33
191	15.92	0.63	0.456	0.130	---	0.33
192	16.00	0.63	0.456	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00

212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01
217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00
	Sum =	100.0			Sum =	36.9

Flood volume = Effective rainfall 3.08(In)

SOBA624100

times area 45.0(Ac.)/[(In)/(Ft.)] = 11.5(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 10.962(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 502519.8 Cubic Feet
Total soil loss = 477494.1 Cubic Feet

Peak flow rate of this hydrograph = 29.755(CFS)

++

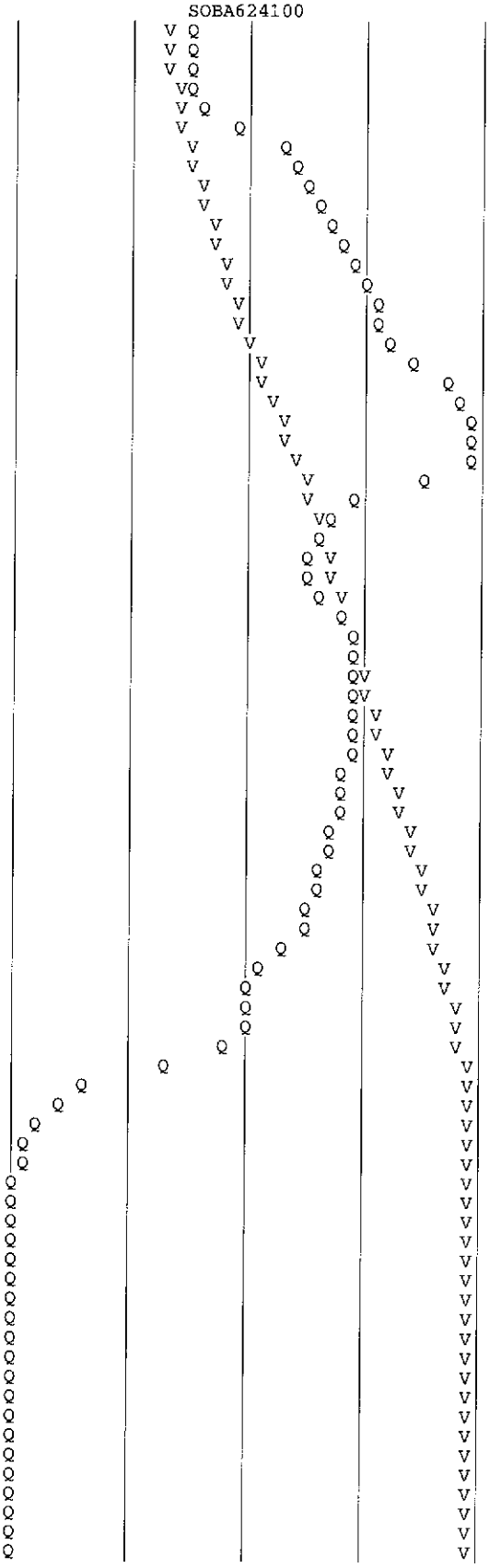
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0001	0.01	Q				
0+10	0.0006	0.07	Q				
0+15	0.0016	0.15	Q				
0+20	0.0028	0.18	Q				
0+25	0.0044	0.23	Q				
0+30	0.0063	0.28	Q				
0+35	0.0084	0.30	Q				
0+40	0.0105	0.31	Q				
0+45	0.0127	0.32	Q				
0+50	0.0149	0.33	Q				
0+55	0.0174	0.36	Q				
1+ 0	0.0202	0.40	Q				
1+ 5	0.0230	0.41	Q				
1+10	0.0257	0.39	Q				
1+15	0.0281	0.35	Q				
1+20	0.0305	0.34	Q				
1+25	0.0328	0.34	Q				
1+30	0.0351	0.33	Q				
1+35	0.0373	0.33	Q				
1+40	0.0396	0.33	Q				
1+45	0.0419	0.33	Q				
1+50	0.0441	0.33	Q				
1+55	0.0466	0.36	Q				
2+ 0	0.0494	0.40	Q				
2+ 5	0.0523	0.42	Q				
2+10	0.0552	0.42	Q				
2+15	0.0581	0.43	Q				
2+20	0.0611	0.43	Q				
2+25	0.0641	0.43	Q				
2+30	0.0671	0.43	Q				
2+35	0.0701	0.44	Q				
2+40	0.0733	0.47	Q				
2+45	0.0769	0.51	Q				
2+50	0.0805	0.52	Q				
2+55	0.0841	0.53	Q				
3+ 0	0.0878	0.54	Q				
3+ 5	0.0916	0.54	Q				
3+10	0.0953	0.54	Q				
3+15	0.0990	0.54	Q				
3+20	0.1028	0.54	Q				
3+25	0.1065	0.54	Q				
3+30	0.1103	0.54	Q				
3+35	0.1140	0.54	Q				
3+40	0.1178	0.54	Q				
3+45	0.1215	0.54	Q				
3+50	0.1253	0.55	Q				
3+55	0.1293	0.58	Q				
4+ 0	0.1336	0.62	Q				
4+ 5	0.1379	0.63	Q				
4+10	0.1423	0.64	Q				
4+15	0.1468	0.65	Q				
4+20	0.1513	0.66	Q				
4+25	0.1560	0.69	Q				
4+30	0.1610	0.73	Q				
4+35	0.1661	0.74	Q				
4+40	0.1713	0.75	Q				
4+45	0.1765	0.76	VQ				
4+50	0.1817	0.76	VQ				
4+55	0.1872	0.79	VQ				
5+ 0	0.1930	0.83	VQ				
5+ 5	0.1988	0.84	VQ				

5+10	0.2042	0.79	VQ
5+15	0.2091	0.72	Q
5+20	0.2139	0.70	Q
5+25	0.2188	0.71	Q
5+30	0.2239	0.74	Q
5+35	0.2291	0.75	VQ
5+40	0.2345	0.79	VQ
5+45	0.2402	0.83	VQ
5+50	0.2461	0.85	VQ
5+55	0.2520	0.86	VQ
6+ 0	0.2579	0.86	VQ
6+ 5	0.2640	0.87	VQ
6+10	0.2702	0.90	VQ
6+15	0.2767	0.94	VQ
6+20	0.2833	0.96	VQ
6+25	0.2899	0.97	Q
6+30	0.2966	0.97	Q
6+35	0.3033	0.96	Q
6+40	0.3094	0.89	Q
6+45	0.3149	0.80	Q
6+50	0.3204	0.80	Q
6+55	0.3260	0.81	Q
7+ 0	0.3318	0.84	Q
7+ 5	0.3378	0.87	Q
7+10	0.3441	0.91	Q
7+15	0.3507	0.96	Q
7+20	0.3579	1.05	Q
7+25	0.3675	1.39	Q
7+30	0.3801	1.83	VQ
7+35	0.3944	2.07	VQ
7+40	0.4115	2.49	V Q
7+45	0.4321	2.98	V Q
7+50	0.4545	3.26	V Q
7+55	0.4799	3.69	V Q
8+ 0	0.5088	4.19	V Q
8+ 5	0.5400	4.52	V Q
8+10	0.5762	5.26	V Q
8+15	0.6185	6.15	V Q
8+20	0.6634	6.52	V Q
8+25	0.7099	6.75	V Q
8+30	0.7575	6.91	V Q
8+35	0.8062	7.08	V Q
8+40	0.8575	7.45	V Q
8+45	0.9120	7.90	V Q
8+50	0.9681	8.15	V Q
8+55	1.0272	8.58	V Q
9+ 0	1.0897	9.08	V Q
9+ 5	1.1545	9.41	V Q
9+10	1.2243	10.13	V Q
9+15	1.3003	11.02	V Q
9+20	1.3791	11.44	V Q
9+25	1.4615	11.97	V Q
9+30	1.5477	12.52	V Q
9+35	1.6360	12.83	V Q
9+40	1.7275	13.28	V Q
9+45	1.8224	13.79	V Q
9+50	1.9193	14.07	V Q
9+55	2.0193	14.51	V Q
10+ 0	2.1226	15.01	V Q
10+ 5	2.2249	14.85	V Q
10+10	2.3141	12.95	V Q
10+15	2.3850	10.30	V Q
10+20	2.4495	9.37	V Q
10+25	2.5105	8.85	V Q
10+30	2.5692	8.53	V Q
10+35	2.6286	8.63	V Q
10+40	2.6976	10.02	V Q
10+45	2.7802	11.98	V Q
10+50	2.8677	12.71	V Q
10+55	2.9582	13.14	V Q
11+ 0	3.0506	13.42	V Q
11+ 5	3.1439	13.55	V Q
11+10	3.2361	13.38	V Q
11+15	3.3260	13.06	V Q
11+20	3.4154	12.98	V Q
11+25	3.5046	12.95	V Q
11+30	3.5938	12.96	V Q
11+35	3.6824	12.86	V Q
11+40	3.7671	12.30	V Q

SOBA624100

11+45	3.8466	11.54	
11+50	3.9247	11.34	
11+55	4.0039	11.50	
12+ 0	4.0853	11.83	
12+ 5	4.1702	12.32	
12+10	4.2698	14.46	
12+15	4.3889	17.29	
12+20	4.5157	18.41	
12+25	4.6488	19.33	
12+30	4.7875	20.13	
12+35	4.9297	20.65	
12+40	5.0775	21.47	
12+45	5.2318	22.40	
12+50	5.3891	22.84	
12+55	5.5501	23.38	
13+ 0	5.7150	23.95	
13+ 5	5.8836	24.48	
13+10	6.0634	26.10	
13+15	6.2574	28.17	
13+20	6.4569	28.97	
13+25	6.6596	29.44	
13+30	6.8646	29.76	
13+35	7.0668	29.36	
13+40	7.2476	26.26	
13+45	7.3991	22.00	
13+50	7.5401	20.48	
13+55	7.6752	19.62	
14+ 0	7.8067	19.09	
14+ 5	7.9376	19.00	
14+10	8.0755	20.03	
14+15	8.2240	21.56	
14+20	8.3760	22.06	
14+25	8.5281	22.09	
14+30	8.6790	21.91	
14+35	8.8298	21.90	
14+40	8.9808	21.92	
14+45	9.1318	21.93	
14+50	9.2826	21.89	
14+55	9.4315	21.63	
15+ 0	9.5781	21.28	
15+ 5	9.7235	21.11	
15+10	9.8665	20.77	
15+15	10.0066	20.35	
15+20	10.1454	20.15	
15+25	10.2817	19.79	
15+30	10.4151	19.37	
15+35	10.5459	19.00	
15+40	10.6682	17.76	
15+45	10.7794	16.15	
15+50	10.8866	15.57	
15+55	10.9916	15.24	
16+ 0	11.0953	15.05	
16+ 5	11.1933	14.23	
16+10	11.2643	10.31	
16+15	11.2993	5.08	
16+20	11.3211	3.17	
16+25	11.3352	2.05	
16+30	11.3445	1.34	
16+35	11.3508	0.91	
16+40	11.3554	0.67	
16+45	11.3592	0.54	
16+50	11.3624	0.47	
16+55	11.3651	0.40	
17+ 0	11.3676	0.35	
17+ 5	11.3699	0.34	
17+10	11.3727	0.40	
17+15	11.3758	0.45	
17+20	11.3781	0.34	
17+25	11.3793	0.18	
17+30	11.3802	0.14	
17+35	11.3811	0.12	
17+40	11.3820	0.13	
17+45	11.3829	0.14	
17+50	11.3841	0.17	
17+55	11.3858	0.25	
18+ 0	11.3882	0.35	
18+ 5	11.3908	0.38	
18+10	11.3936	0.40	
18+15	11.3965	0.42	

18+20	11.3994	0.43	Q			V
18+25	11.4024	0.43	Q			V
18+30	11.4054	0.43	Q			V
18+35	11.4083	0.43	Q			V
18+40	11.4111	0.40	Q			V
18+45	11.4136	0.36	Q			V
18+50	11.4159	0.34	Q			V
18+55	11.4180	0.30	Q			V
19+ 0	11.4198	0.26	Q			V
19+ 5	11.4215	0.25	Q			V
19+10	11.4233	0.27	Q			V
19+15	11.4254	0.30	Q			V
19+20	11.4276	0.32	Q			V
19+25	11.4300	0.35	Q			V
19+30	11.4327	0.40	Q			V
19+35	11.4355	0.41	Q			V
19+40	11.4382	0.39	Q			V
19+45	11.4406	0.35	Q			V
19+50	11.4430	0.34	Q			V
19+55	11.4450	0.30	Q			V
20+ 0	11.4468	0.26	Q			V
20+ 5	11.4485	0.25	Q			V
20+10	11.4503	0.27	Q			V
20+15	11.4524	0.30	Q			V
20+20	11.4545	0.31	Q			V
20+25	11.4567	0.32	Q			V
20+30	11.4589	0.32	Q			V
20+35	11.4612	0.32	Q			V
20+40	11.4634	0.33	Q			V
20+45	11.4657	0.33	Q			V
20+50	11.4679	0.32	Q			V
20+55	11.4699	0.29	Q			V
21+ 0	11.4716	0.25	Q			V
21+ 5	11.4733	0.24	Q			V
21+10	11.4751	0.26	Q			V
21+15	11.4772	0.30	Q			V
21+20	11.4793	0.30	Q			V
21+25	11.4812	0.28	Q			V
21+30	11.4829	0.25	Q			V
21+35	11.4846	0.24	Q			V
21+40	11.4864	0.26	Q			V
21+45	11.4884	0.30	Q			V
21+50	11.4905	0.30	Q			V
21+55	11.4925	0.28	Q			V
22+ 0	11.4942	0.25	Q			V
22+ 5	11.4958	0.24	Q			V
22+10	11.4976	0.26	Q			V
22+15	11.4997	0.30	Q			V
22+20	11.5018	0.30	Q			V
22+25	11.5037	0.28	Q			V
22+30	11.5054	0.25	Q			V
22+35	11.5070	0.24	Q			V
22+40	11.5086	0.23	Q			V
22+45	11.5101	0.22	Q			V
22+50	11.5117	0.22	Q			V
22+55	11.5132	0.22	Q			V
23+ 0	11.5147	0.22	Q			V
23+ 5	11.5162	0.22	Q			V
23+10	11.5177	0.22	Q			V
23+15	11.5192	0.22	Q			V
23+20	11.5207	0.22	Q			V
23+25	11.5222	0.22	Q			V
23+30	11.5237	0.22	Q			V
23+35	11.5252	0.22	Q			V
23+40	11.5267	0.22	Q			V
23+45	11.5282	0.22	Q			V
23+50	11.5297	0.22	Q			V
23+55	11.5312	0.22	Q			V
24+ 0	11.5327	0.22	Q			V
24+ 5	11.5341	0.21	Q			V
24+10	11.5351	0.15	Q			V
24+15	11.5356	0.07	Q			V
24+20	11.5359	0.04	Q			V
24+25	11.5361	0.02	Q			V
24+30	11.5361	0.01	Q			V
24+35	11.5362	0.01	Q			V
24+40	11.5362	0.00	Q			V
24+45	11.5362	0.00	Q			V
24+50	11.5363	0.00	Q			V

SOBA624100

24+55	11.5363	0.00	Q			V
25+ 0	11.5363	0.00	Q			V

AREA 7

SOBA71100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba71100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 681.00(Ac.) = 1.064 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 681.00(Ac.) = 1.064 Sq. Mi.
Length along longest watercourse = 11200.00(Ft.)
Length along longest watercourse measured to centroid = 7000.00(Ft.)
Length along longest watercourse = 2.121 Mi.
Length along longest watercourse measured to centroid = 1.326 Mi.
Difference in elevation = 2200.00(Ft.)
Slope along watercourse = 1037.1429 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.428 Hr.
Lag time = 25.66 Min.
25% of lag time = 6.41 Min.
40% of lag time = 10.26 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
681.00	0.55	374.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
681.00	1.20	817.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.38 %
Adjusted average point rain = 1.193(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
681.000	86.00	0.000

Total Area Entered = 681.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	19.488	1.267	8.695
2	0.167	38.976	3.514	24.121
3	0.250	58.464	5.305	36.408
4	0.333	77.952	8.184	56.170
5	0.417	97.440	14.963	102.691
6	0.500	116.928	21.331	146.400
7	0.583	136.416	9.626	66.064
8	0.667	155.904	6.529	44.812
9	0.750	175.391	4.873	33.446
10	0.833	194.879	4.072	27.949
11	0.917	214.367	3.374	23.156
12	1.000	233.855	2.785	19.113
13	1.083	253.343	2.401	16.481
14	1.167	272.831	2.031	13.942
15	1.250	292.319	1.748	11.995
16	1.333	311.807	1.504	10.320
17	1.417	331.295	1.255	8.615
18	1.500	350.783	1.007	6.910
19	1.583	370.271	0.851	5.843
20	1.667	389.759	0.712	4.890
21	1.750	409.247	0.517	3.551
22	1.833	428.735	0.277	1.900
23	1.917	448.223	0.234	1.605
24	2.000	467.711	0.218	1.495
25	2.083	487.199	0.195	1.339
26	2.167	506.687	0.190	1.306
27	2.250	526.174	0.134	0.918
28	2.333	545.662	0.117	0.802
29	2.417	565.150	0.129	0.883
30	2.500	584.638	0.155	1.063
31	2.583	604.126	0.154	1.058
32	2.667	623.614	0.102	0.701
33	2.750	643.102	0.078	0.535
34	2.833	662.590	0.070	0.479
35	2.917	682.078	0.041	0.284
36	3.000	701.566	0.055	0.380
			Sum = 100.000	Sum= 686.320

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.601	0.176	---	0.43
2	0.17	4.30	0.615	0.176	---	0.44
3	0.25	5.00	0.716	0.176	---	0.54
4	0.33	5.00	0.716	0.176	---	0.54
5	0.42	5.80	0.830	0.176	---	0.65
6	0.50	6.50	0.930	0.176	---	0.75
7	0.58	7.40	1.059	0.176	---	0.88
8	0.67	8.60	1.231	0.176	---	1.06
9	0.75	12.30	1.760	0.176	---	1.58
10	0.83	29.10	4.165	0.176	---	3.99
11	0.92	6.80	0.973	0.176	---	0.80
12	1.00	5.00	0.716	0.176	---	0.54
Sum =		100.0			Sum =	12.2

Flood volume = Effective rainfall 1.02(In)
times area 681.0(Ac.)/[(In)/(Ft.)] = 57.7(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 9.965(Ac.Ft)
Total rainfall = 1.19(In)
Flood volume = 2514040.0 Cubic Feet
Total soil loss = 434088.5 Cubic Feet

Peak flow rate of this hydrograph = 944.920(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

SOBA71100

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 250.0 500.0 750.0 1000.0
0+ 5	0.0255	3.70	Q
0+10	0.1226	14.09	Q
0+15	0.3347	30.81	VQ
0+20	0.7318	57.66	V Q
0+25	1.4675	106.82	V Q
0+30	2.7064	179.88	V Q
0+35	4.2773	228.10	V Q
0+40	6.1883	277.48	V Q
0+45	8.4598	329.82	V Q
0+50	11.3588	420.94	V Q
0+55	15.0035	529.22	V Q
1+ 0	19.3206	626.83	V Q
1+ 5	24.4224	740.79	V Q
1+10	30.5889	895.37	V Q
1+15	37.0966	944.92	V Q
1+20	41.3881	623.13	Q V
1+25	44.5637	461.10	Q V
1+30	46.8429	330.94	Q V
1+35	48.6889	268.04	Q V
1+40	50.2156	221.67	Q V
1+45	51.4917	185.29	Q V
1+50	52.5703	156.62	Q V
1+55	53.4778	131.77	Q V
2+ 0	54.2448	111.37	Q V
2+ 5	54.8891	93.55	Q V
2+10	55.4214	77.29	Q V
2+15	55.8523	62.57	Q V
2+20	56.2038	51.03	Q V
2+25	56.4854	40.90	Q V
2+30	56.6982	30.90	Q V
2+35	56.8482	21.78	Q V
2+40	56.9709	17.81	Q V
2+45	57.0773	15.45	Q V
2+50	57.1731	13.90	Q V
2+55	57.2603	12.67	Q V
3+ 0	57.3338	10.67	Q V
3+ 5	57.3996	9.56	Q V
3+10	57.4627	9.16	Q V
3+15	57.5249	9.03	Q V
3+20	57.5807	8.11	Q V
3+25	57.6228	6.11	Q V
3+30	57.6549	4.66	Q V
3+35	57.6795	3.57	Q V
3+40	57.6961	2.41	Q V
3+45	57.7099	2.00	Q V
3+50	57.7130	0.46	Q V
3+55	57.7144	0.21	Q V

SOBA73100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba73100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 681.00(Ac.) = 1.064 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 681.00(Ac.) = 1.064 Sq. Mi.
Length along longest watercourse = 11200.00(Ft.)
Length along longest watercourse measured to centroid = 7000.00(Ft.)
Length along longest watercourse = 2.121 Mi.
Length along longest watercourse measured to centroid = 1.326 Mi.
Difference in elevation = 2200.00(Ft.)
Slope along watercourse = 1037.1429 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.428 Hr.
Lag time = 25.66 Min.
25% of lag time = 6.41 Min.
40% of lag time = 10.26 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
681.00	0.90	612.90

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
681.00	2.10	1430.10

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.70 %
Adjusted average point rain = 2.094(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
681.000	86.00	0.000

Total Area Entered = 681.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

SOBA73100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	19.488	1.267	8.695
2	0.167	38.976	3.514	24.121
3	0.250	58.464	5.305	36.408
4	0.333	77.952	8.184	56.170
5	0.417	97.440	14.963	102.691
6	0.500	116.928	21.331	146.400
7	0.583	136.416	9.626	66.064
8	0.667	155.904	6.529	44.812
9	0.750	175.391	4.873	33.446
10	0.833	194.879	4.072	27.949
11	0.917	214.367	3.374	23.156
12	1.000	233.855	2.785	19.113
13	1.083	253.343	2.401	16.481
14	1.167	272.831	2.031	13.942
15	1.250	292.319	1.748	11.995
16	1.333	311.807	1.504	10.320
17	1.417	331.295	1.255	8.615
18	1.500	350.783	1.007	6.910
19	1.583	370.271	0.851	5.843
20	1.667	389.759	0.712	4.890
21	1.750	409.247	0.517	3.551
22	1.833	428.735	0.277	1.900
23	1.917	448.223	0.234	1.605
24	2.000	467.711	0.218	1.495
25	2.083	487.199	0.195	1.339
26	2.167	506.687	0.190	1.306
27	2.250	526.174	0.134	0.918
28	2.333	545.662	0.117	0.802
29	2.417	565.150	0.129	0.883
30	2.500	584.638	0.155	1.063
31	2.583	604.126	0.154	1.058
32	2.667	623.614	0.102	0.701
33	2.750	643.102	0.078	0.535
34	2.833	662.590	0.070	0.479
35	2.917	682.078	0.041	0.284
36	3.000	701.566	0.055	0.380
			Sum = 100.000	Sum= 686.320

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.327	0.176	---	0.15
2	0.17	1.30	0.327	0.176	---	0.15
3	0.25	1.10	0.276	0.176	---	0.10
4	0.33	1.50	0.377	0.176	---	0.20
5	0.42	1.50	0.377	0.176	---	0.20
6	0.50	1.80	0.452	0.176	---	0.28
7	0.58	1.50	0.377	0.176	---	0.20
8	0.67	1.80	0.452	0.176	---	0.28
9	0.75	1.80	0.452	0.176	---	0.28
10	0.83	1.50	0.377	0.176	---	0.20
11	0.92	1.60	0.402	0.176	---	0.23
12	1.00	1.80	0.452	0.176	---	0.28
13	1.08	2.20	0.553	0.176	---	0.38
14	1.17	2.20	0.553	0.176	---	0.38
15	1.25	2.20	0.553	0.176	---	0.38
16	1.33	2.00	0.502	0.176	---	0.33
17	1.42	2.60	0.653	0.176	---	0.48
18	1.50	2.70	0.678	0.176	---	0.50
19	1.58	2.40	0.603	0.176	---	0.43
20	1.67	2.70	0.678	0.176	---	0.50
21	1.75	3.30	0.829	0.176	---	0.65
22	1.83	3.10	0.779	0.176	---	0.60
23	1.92	2.90	0.729	0.176	---	0.55
24	2.00	3.00	0.754	0.176	---	0.58
25	2.08	3.10	0.779	0.176	---	0.60
26	2.17	4.20	1.055	0.176	---	0.88
27	2.25	5.00	1.256	0.176	---	1.08
28	2.33	3.50	0.879	0.176	---	0.70
29	2.42	6.80	1.708	0.176	---	1.53
30	2.50	7.30	1.834	0.176	---	1.66

31	2.58	8.20	2.060	0.176	---	1.88
32	2.67	5.90	1.482	0.176	---	1.31
33	2.75	2.00	0.502	0.176	---	0.33
34	2.83	1.80	0.452	0.176	---	0.28
35	2.92	1.80	0.452	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.8

Flood volume = Effective rainfall 1.57(In)
times area 681.0(Ac.)/[(In)/(Ft.)] = 89.1(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 29.707(Ac.Ft)
Total rainfall = 2.09(In)
Flood volume = 3881755.6 Cubic Feet
Total soil loss = 1294040.7 Cubic Feet

Peak flow rate of this hydrograph = 796.902(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 200.0 400.0 600.0 800.0
0+ 5	0.0090	1.31	Q
0+10	0.0432	4.96	Q
0+15	0.1122	10.02	Q
0+20	0.2374	18.17	Q
0+25	0.4735	34.28	VQ
0+30	0.8722	57.90	V Q
0+35	1.3511	69.53	V Q
0+40	1.9079	80.85	V Q
0+45	2.6008	100.61	V Q
0+50	3.3916	114.82	V Q
0+55	4.2667	127.08	V Q
1+ 0	5.1752	131.91	V Q
1+ 5	6.1686	144.25	V Q
1+10	7.2001	149.77	V Q
1+15	8.2584	153.67	V Q
1+20	9.4114	167.41	V Q
1+25	10.7019	187.38	V Q
1+30	12.1436	209.33	V Q
1+35	13.6747	222.32	V Q
1+40	15.2785	232.88	V Q
1+45	16.9905	248.57	V Q
1+50	18.8930	276.24	V Q
1+55	20.9028	291.82	V Q
2+ 0	22.9976	304.17	V Q
2+ 5	25.2655	329.29	V Q
2+10	27.7107	355.05	V Q
2+15	30.2535	369.21	V Q
2+20	32.9092	385.61	V Q
2+25	35.7762	416.29	V Q
2+30	39.0293	472.36	V Q
2+35	42.8422	553.63	V Q
2+40	47.1048	618.93	V Q
2+45	51.7280	671.28	V Q
2+50	57.0288	769.68	V Q
2+55	62.5171	796.90	V Q
3+ 0	67.7422	758.68	V Q
3+ 5	71.9685	613.66	Q V
3+10	75.1048	455.39	Q V
3+15	77.6771	373.50	Q V
3+20	79.7788	305.17	Q V
3+25	81.4053	236.17	Q V
3+30	82.7317	192.60	Q V
3+35	83.8366	160.43	Q V
3+40	84.7664	135.00	Q V
3+45	85.5477	113.45	Q V
3+50	86.2006	94.80	Q V
3+55	86.7403	78.36	Q V
4+ 0	87.1818	64.11	Q V
4+ 5	87.5423	52.34	Q V
4+10	87.8304	41.83	Q V
4+15	88.0552	32.64	Q V
4+20	88.2279	25.08	Q V
4+25	88.3654	19.96	Q V

SOBA73100

4+30	88.4829	17.06	Q	V
4+35	88.5836	14.62	Q	V
4+40	88.6704	12.60	Q	V
4+45	88.7458	10.95	Q	V
4+50	88.8125	9.68	Q	V
4+55	88.8747	9.04	Q	V
5+ 0	88.9316	8.26	Q	V
5+ 5	88.9808	7.13	Q	V
5+10	89.0205	5.77	Q	V
5+15	89.0502	4.32	Q	V
5+20	89.0743	3.49	Q	V
5+25	89.0913	2.47	Q	V
5+30	89.1023	1.60	Q	V
5+35	89.1084	0.88	Q	V
5+40	89.1107	0.34	Q	V
5+45	89.1121	0.19	Q	V
5+50	89.1128	0.11	Q	V
5+55	89.1128	0.01	Q	V

SOBA76100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba76100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 681.00(Ac.) = 1.064 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 681.00(Ac.) = 1.064 Sq. Mi.
Length along longest watercourse = 11200.00(Ft.)
Length along longest watercourse measured to centroid = 7000.00(Ft.)
Length along longest watercourse = 2.121 Mi.
Length along longest watercourse measured to centroid = 1.326 Mi.
Difference in elevation = 2200.00(Ft.)
Slope along watercourse = 1037.1429 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.428 Hr.
Lag time = 25.66 Min.
25% of lag time = 6.41 Min.
40% of lag time = 10.26 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
681.00	1.40	953.40

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
681.00	3.00	2043.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.77 %
Adjusted average point rain = 2.993(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
681.000	86.00	0.000

Total Area Entered = 681.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

SOBA76100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	19.488	1.267	8.695
2	0.167	38.976	3.514	24.121
3	0.250	58.464	5.305	36.408
4	0.333	77.952	8.184	56.170
5	0.417	97.440	14.963	102.691
6	0.500	116.928	21.331	146.400
7	0.583	136.416	9.626	66.064
8	0.667	155.904	6.529	44.812
9	0.750	175.391	4.873	33.446
10	0.833	194.879	4.072	27.949
11	0.917	214.367	3.374	23.156
12	1.000	233.855	2.785	19.113
13	1.083	253.343	2.401	16.481
14	1.167	272.831	2.031	13.942
15	1.250	292.319	1.748	11.995
16	1.333	311.807	1.504	10.320
17	1.417	331.295	1.255	8.615
18	1.500	350.783	1.007	6.910
19	1.583	370.271	0.851	5.843
20	1.667	389.759	0.712	4.890
21	1.750	409.247	0.517	3.551
22	1.833	428.735	0.277	1.900
23	1.917	448.223	0.234	1.605
24	2.000	467.711	0.218	1.495
25	2.083	487.199	0.195	1.339
26	2.167	506.687	0.190	1.306
27	2.250	526.174	0.134	0.918
28	2.333	545.662	0.117	0.802
29	2.417	565.150	0.129	0.883
30	2.500	584.638	0.155	1.063
31	2.583	604.126	0.154	1.058
32	2.667	623.614	0.102	0.701
33	2.750	643.102	0.078	0.535
34	2.833	662.590	0.070	0.479
35	2.917	682.078	0.041	0.284
36	3.000	701.566	0.055	0.380
			Sum = 100.000	Sum= 686.320

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.215	0.176	---	0.04
3	0.25	0.60	0.215	0.176	---	0.04
4	0.33	0.60	0.215	0.176	---	0.04
5	0.42	0.60	0.215	0.176	---	0.04
6	0.50	0.70	0.251	0.176	---	0.08
7	0.58	0.70	0.251	0.176	---	0.08
8	0.67	0.70	0.251	0.176	---	0.08
9	0.75	0.70	0.251	0.176	---	0.08
10	0.83	0.70	0.251	0.176	---	0.08
11	0.92	0.70	0.251	0.176	---	0.08
12	1.00	0.80	0.287	0.176	---	0.11
13	1.08	0.80	0.287	0.176	---	0.11
14	1.17	0.80	0.287	0.176	---	0.11
15	1.25	0.80	0.287	0.176	---	0.11
16	1.33	0.80	0.287	0.176	---	0.11
17	1.42	0.80	0.287	0.176	---	0.11
18	1.50	0.80	0.287	0.176	---	0.11
19	1.58	0.80	0.287	0.176	---	0.11
20	1.67	0.80	0.287	0.176	---	0.11
21	1.75	0.80	0.287	0.176	---	0.11
22	1.83	0.80	0.287	0.176	---	0.11
23	1.92	0.80	0.287	0.176	---	0.11
24	2.00	0.90	0.323	0.176	---	0.15
25	2.08	0.80	0.287	0.176	---	0.11
26	2.17	0.90	0.323	0.176	---	0.15
27	2.25	0.90	0.323	0.176	---	0.15
28	2.33	0.90	0.323	0.176	---	0.15
29	2.42	0.90	0.323	0.176	---	0.15
30	2.50	0.90	0.323	0.176	---	0.15

31	2.58	0.90	0.323	0.176	---	0.15
32	2.67	0.90	0.323	0.176	---	0.15
33	2.75	1.00	0.359	0.176	---	0.18
34	2.83	1.00	0.359	0.176	---	0.18
35	2.92	1.00	0.359	0.176	---	0.18
36	3.00	1.00	0.359	0.176	---	0.18
37	3.08	1.00	0.359	0.176	---	0.18
38	3.17	1.10	0.395	0.176	---	0.22
39	3.25	1.10	0.395	0.176	---	0.22
40	3.33	1.10	0.395	0.176	---	0.22
41	3.42	1.20	0.431	0.176	---	0.26
42	3.50	1.30	0.467	0.176	---	0.29
43	3.58	1.40	0.503	0.176	---	0.33
44	3.67	1.40	0.503	0.176	---	0.33
45	3.75	1.50	0.539	0.176	---	0.36
46	3.83	1.50	0.539	0.176	---	0.36
47	3.92	1.60	0.575	0.176	---	0.40
48	4.00	1.60	0.575	0.176	---	0.40
49	4.08	1.70	0.611	0.176	---	0.43
50	4.17	1.80	0.646	0.176	---	0.47
51	4.25	1.90	0.682	0.176	---	0.51
52	4.33	2.00	0.718	0.176	---	0.54
53	4.42	2.10	0.754	0.176	---	0.58
54	4.50	2.10	0.754	0.176	---	0.58
55	4.58	2.20	0.790	0.176	---	0.61
56	4.67	2.30	0.826	0.176	---	0.65
57	4.75	2.40	0.862	0.176	---	0.69
58	4.83	2.40	0.862	0.176	---	0.69
59	4.92	2.50	0.898	0.176	---	0.72
60	5.00	2.60	0.934	0.176	---	0.76
61	5.08	3.10	1.113	0.176	---	0.94
62	5.17	3.60	1.293	0.176	---	1.12
63	5.25	3.90	1.401	0.176	---	1.23
64	5.33	4.20	1.508	0.176	---	1.33
65	5.42	4.70	1.688	0.176	---	1.51
66	5.50	5.60	2.011	0.176	---	1.84
67	5.58	1.90	0.682	0.176	---	0.51
68	5.67	0.90	0.323	0.176	---	0.15
69	5.75	0.60	0.215	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 681.0(Ac.)/[(In)/(Ft.)] = 111.0(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 58.895(Ac.Ft)
Total rainfall = 2.99(In)
Flood volume = 4833252.4 Cubic Feet
Total soil loss = 2565477.0 Cubic Feet

Peak flow rate of this hydrograph = 743.516(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	200.0	400.0	600.0	800.0
0+ 5	0.0002	0.03	Q				
0+10	0.0033	0.44	Q				
0+15	0.0133	1.45	Q				
0+20	0.0339	2.99	Q				
0+25	0.0712	5.41	Q				
0+30	0.1400	10.00	Q				
0+35	0.2529	16.39	Q				
0+40	0.3924	20.25	VQ				
0+45	0.5577	24.01	VQ				
0+50	0.7576	29.02	VQ				
0+55	1.0012	35.37	VQ				
1+ 0	1.2696	38.97	VQ				
1+ 5	1.5602	42.20	V Q				
1+10	1.8725	45.35	V Q				
1+15	2.2095	48.93	V Q				
1+20	2.5808	53.92	V Q				
1+25	2.9960	60.27	V Q				

SOBA76100

1+30	3.4338	63.58	V Q
1+35	3.8881	65.96	V Q
1+40	4.3552	67.82	V Q
1+45	4.8330	69.39	V Q
1+50	5.3197	70.66	V Q
1+55	5.8133	71.67	VQ
2+ 0	6.3150	72.85	VQ
2+ 5	6.8257	74.14	VQ
2+10	7.3457	75.51	VQ
2+15	7.8799	77.57	VQ
2+20	8.4375	80.96	VQ
2+25	9.0221	84.88	VQ
2+30	9.6142	85.98	VQ
2+35	10.2392	90.74	VQ
2+40	10.8790	92.91	VQ
2+45	11.5316	94.76	Q
2+50	12.1980	96.76	Q
2+55	12.8801	99.04	Q
3+ 0	13.5819	101.90	VQ
3+ 5	14.3138	106.27	Q
3+10	15.0880	112.41	Q
3+15	15.8879	116.14	Q
3+20	16.7107	119.47	QV
3+25	17.5603	123.37	Q
3+30	18.4525	129.55	Q
3+35	19.4055	138.37	Q
3+40	20.4096	145.80	Q
3+45	21.4804	155.47	Q
3+50	22.6452	169.14	Q
3+55	23.9096	183.60	VQ
4+ 0	25.2663	196.98	Q
4+ 5	26.7024	208.53	VQ
4+10	28.2291	221.68	VQ
4+15	29.8408	234.02	VQ
4+20	31.5527	248.56	VQ
4+25	33.3638	262.98	VQ
4+30	35.2986	280.93	V Q
4+35	37.3632	299.78	VQ
4+40	39.5616	319.20	VQ
4+45	41.8936	338.61	VQ
4+50	44.3492	356.56	V Q
4+55	46.9169	372.82	V Q
5+ 0	49.6159	391.90	V Q
5+ 5	52.4577	412.63	V Q
5+10	55.4590	435.79	V Q
5+15	58.6436	462.40	V Q
5+20	62.0773	498.58	V Q
5+25	65.8558	548.63	V Q
5+30	70.1211	619.33	V Q
5+35	74.8337	684.26	V Q
5+40	79.8150	723.29	V Q
5+45	84.9356	743.52	V Q
5+50	90.0266	739.21	V Q
5+55	94.5571	657.83	Q V
6+ 0	97.7621	465.37	Q V
6+ 5	100.1489	346.56	Q V
6+10	102.0190	271.54	Q V
6+15	103.5484	222.07	Q V
6+20	104.8250	185.36	Q V
6+25	105.8913	154.82	Q V
6+30	106.7847	129.72	Q V
6+35	107.5332	108.69	Q V
6+40	108.1597	90.96	Q V
6+45	108.6800	75.55	Q V
6+50	109.1056	61.80	Q V
6+55	109.4489	49.85	Q V
7+ 0	109.7252	40.12	Q V
7+ 5	109.9445	31.83	Q V
7+10	110.1140	24.61	Q V
7+15	110.2446	18.96	Q V
7+20	110.3540	15.89	Q V
7+25	110.4494	13.86	Q V
7+30	110.5337	12.23	Q V
7+35	110.6085	10.86	Q V
7+40	110.6732	9.40	Q V
7+45	110.7310	8.39	Q V
7+50	110.7838	7.67	Q V
7+55	110.8311	6.87	Q V
8+ 0	110.8704	5.71	Q V

SOBA76100

8+ 5	110.8998	4.26	Q	V
8+10	110.9213	3.13	Q	V
8+15	110.9368	2.25	Q	V
8+20	110.9469	1.47	Q	V
8+25	110.9535	0.96	Q	V
8+30	110.9554	0.27	Q	V
8+35	110.9559	0.08	Q	V
8+40	110.9561	0.03	Q	V
8+45	110.9561	0.01	Q	V
8+50	110.9562	0.01	Q	V
8+55	110.9562	0.00	Q	V

SOBA724100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba724100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 681.00(Ac.) = 1.064 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 681.00(Ac.) = 1.064 Sq. Mi.
Length along longest watercourse = 11200.00(Ft.)
Length along longest watercourse measured to centroid = 7000.00(Ft.)
Length along longest watercourse = 2.121 Mi.
Length along longest watercourse measured to centroid = 1.326 Mi.
Difference in elevation = 2200.00(Ft.)
Slope along watercourse = 1037.1429 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.428 Hr.
Lag time = 25.66 Min.
25% of lag time = 6.41 Min.
40% of lag time = 10.26 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
681.00	2.25	1532.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
681.00	6.00	4086.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 99.87 %
Adjusted average point rain = 5.992(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
681.000	86.00	0.000

Total Area Entered = 681.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

SOBA724100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	19.488	1.267	8.695
2	0.167	38.976	3.514	24.121
3	0.250	58.464	5.305	36.408
4	0.333	77.952	8.184	56.170
5	0.417	97.440	14.963	102.691
6	0.500	116.928	21.331	146.400
7	0.583	136.416	9.626	66.064
8	0.667	155.904	6.529	44.812
9	0.750	175.391	4.873	33.446
10	0.833	194.879	4.072	27.949
11	0.917	214.367	3.374	23.156
12	1.000	233.855	2.785	19.113
13	1.083	253.343	2.401	16.481
14	1.167	272.831	2.031	13.942
15	1.250	292.319	1.748	11.995
16	1.333	311.807	1.504	10.320
17	1.417	331.295	1.255	8.615
18	1.500	350.783	1.007	6.910
19	1.583	370.271	0.851	5.843
20	1.667	389.759	0.712	4.890
21	1.750	409.247	0.517	3.551
22	1.833	428.735	0.277	1.900
23	1.917	448.223	0.234	1.605
24	2.000	467.711	0.218	1.495
25	2.083	487.199	0.195	1.339
26	2.167	506.687	0.190	1.306
27	2.250	526.174	0.134	0.918
28	2.333	545.662	0.117	0.802
29	2.417	565.150	0.129	0.883
30	2.500	584.638	0.155	1.063
31	2.583	604.126	0.154	1.058
32	2.667	623.614	0.102	0.701
33	2.750	643.102	0.078	0.535
34	2.833	662.590	0.070	0.479
35	2.917	682.078	0.041	0.284
36	3.000	701.566	0.055	0.380
			Sum = 100.000	Sum= 686.320

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01

31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.129	0.01
47	3.92	0.20	0.144	0.258	0.129	0.01
48	4.00	0.20	0.144	0.257	0.129	0.01
49	4.08	0.20	0.144	0.256	0.129	0.01
50	4.17	0.20	0.144	0.255	0.129	0.01
51	4.25	0.20	0.144	0.254	0.129	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02
59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.129	0.01
62	5.17	0.20	0.144	0.242	0.129	0.01
63	5.25	0.20	0.144	0.241	0.129	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.07
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.15
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.383	0.201	---	0.18
104	8.67	0.53	0.383	0.200	---	0.18
105	8.75	0.53	0.383	0.199	---	0.18
106	8.83	0.57	0.407	0.198	---	0.21
107	8.92	0.57	0.407	0.197	---	0.21
108	9.00	0.57	0.407	0.196	---	0.21
109	9.08	0.63	0.455	0.195	---	0.26

110	9.17	0.63	0.455	0.195	---	0.26
111	9.25	0.63	0.455	0.194	---	0.26
112	9.33	0.67	0.479	0.193	---	0.29
113	9.42	0.67	0.479	0.192	---	0.29
114	9.50	0.67	0.479	0.191	---	0.29
115	9.58	0.70	0.503	0.190	---	0.31
116	9.67	0.70	0.503	0.189	---	0.31
117	9.75	0.70	0.503	0.188	---	0.32
118	9.83	0.73	0.527	0.187	---	0.34
119	9.92	0.73	0.527	0.186	---	0.34
120	10.00	0.73	0.527	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.17
122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.479	0.179	---	0.30
128	10.67	0.67	0.479	0.178	---	0.30
129	10.75	0.67	0.479	0.177	---	0.30
130	10.83	0.67	0.479	0.177	---	0.30
131	10.92	0.67	0.479	0.176	---	0.30
132	11.00	0.67	0.479	0.175	---	0.30
133	11.08	0.63	0.455	0.174	---	0.28
134	11.17	0.63	0.455	0.173	---	0.28
135	11.25	0.63	0.455	0.172	---	0.28
136	11.33	0.63	0.455	0.171	---	0.28
137	11.42	0.63	0.455	0.171	---	0.28
138	11.50	0.63	0.455	0.170	---	0.29
139	11.58	0.57	0.407	0.169	---	0.24
140	11.67	0.57	0.407	0.168	---	0.24
141	11.75	0.57	0.407	0.167	---	0.24
142	11.83	0.60	0.431	0.166	---	0.27
143	11.92	0.60	0.431	0.166	---	0.27
144	12.00	0.60	0.431	0.165	---	0.27
145	12.08	0.83	0.599	0.164	---	0.44
146	12.17	0.83	0.599	0.163	---	0.44
147	12.25	0.83	0.599	0.162	---	0.44
148	12.33	0.87	0.623	0.161	---	0.46
149	12.42	0.87	0.623	0.161	---	0.46
150	12.50	0.87	0.623	0.160	---	0.46
151	12.58	0.93	0.671	0.159	---	0.51
152	12.67	0.93	0.671	0.158	---	0.51
153	12.75	0.93	0.671	0.157	---	0.51
154	12.83	0.97	0.695	0.157	---	0.54
155	12.92	0.97	0.695	0.156	---	0.54
156	13.00	0.97	0.695	0.155	---	0.54
157	13.08	1.13	0.815	0.154	---	0.66
158	13.17	1.13	0.815	0.154	---	0.66
159	13.25	1.13	0.815	0.153	---	0.66
160	13.33	1.13	0.815	0.152	---	0.66
161	13.42	1.13	0.815	0.151	---	0.66
162	13.50	1.13	0.815	0.150	---	0.66
163	13.58	0.77	0.551	0.150	---	0.40
164	13.67	0.77	0.551	0.149	---	0.40
165	13.75	0.77	0.551	0.148	---	0.40
166	13.83	0.77	0.551	0.147	---	0.40
167	13.92	0.77	0.551	0.147	---	0.40
168	14.00	0.77	0.551	0.146	---	0.41
169	14.08	0.90	0.647	0.145	---	0.50
170	14.17	0.90	0.647	0.144	---	0.50
171	14.25	0.90	0.647	0.144	---	0.50
172	14.33	0.87	0.623	0.143	---	0.48
173	14.42	0.87	0.623	0.142	---	0.48
174	14.50	0.87	0.623	0.141	---	0.48
175	14.58	0.87	0.623	0.141	---	0.48
176	14.67	0.87	0.623	0.140	---	0.48
177	14.75	0.87	0.623	0.139	---	0.48
178	14.83	0.83	0.599	0.139	---	0.46
179	14.92	0.83	0.599	0.138	---	0.46
180	15.00	0.83	0.599	0.137	---	0.46
181	15.08	0.80	0.575	0.136	---	0.44
182	15.17	0.80	0.575	0.136	---	0.44
183	15.25	0.80	0.575	0.135	---	0.44
184	15.33	0.77	0.551	0.134	---	0.42
185	15.42	0.77	0.551	0.134	---	0.42
186	15.50	0.77	0.551	0.133	---	0.42
187	15.58	0.63	0.455	0.132	---	0.32
188	15.67	0.63	0.455	0.132	---	0.32

189	15.75	0.63	0.455	0.131	---	0.32
190	15.83	0.63	0.455	0.130	---	0.33
191	15.92	0.63	0.455	0.130	---	0.33
192	16.00	0.63	0.455	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01
217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01

268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00
Sum =		100.0			Sum =	36.8

Flood volume = Effective rainfall 3.07(In)
times area 681.0(Ac.)/[(In)/(Ft.)] = 174.2(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 165.803(Ac.Ft)
Total rainfall = 5.99(In)
Flood volume = 7590078.2 Cubic Feet
Total soil loss = 7222373.8 Cubic Feet

Peak flow rate of this hydrograph = 411.129(CFS)

++

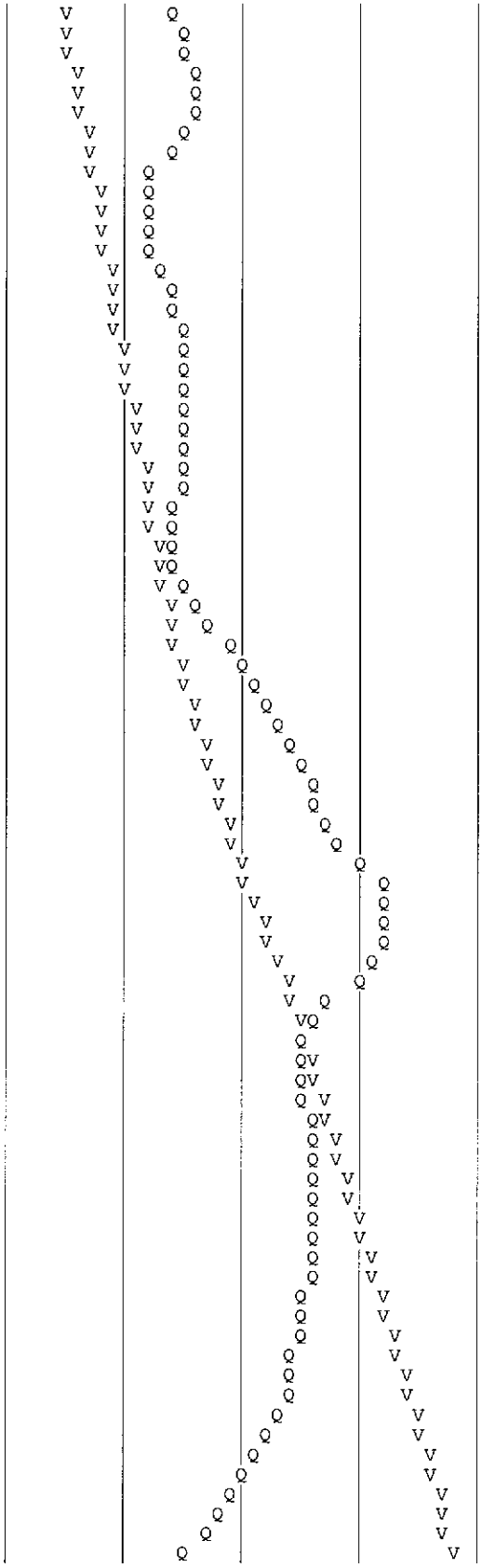
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	125.0	250.0	375.0	500.0
0+ 5	0.0003	0.04	Q				
0+10	0.0014	0.16	Q				
0+15	0.0037	0.33	Q				
0+20	0.0079	0.62	Q				
0+25	0.0160	1.17	Q				
0+30	0.0295	1.96	Q				
0+35	0.0462	2.41	Q				
0+40	0.0660	2.87	Q				
0+45	0.0893	3.39	Q				
0+50	0.1148	3.70	Q				
0+55	0.1421	3.98	Q				
1+ 0	0.1713	4.24	Q				
1+ 5	0.2023	4.50	Q				
1+10	0.2354	4.81	Q				
1+15	0.2710	5.17	Q				
1+20	0.3074	5.29	Q				
1+25	0.3434	5.22	Q				
1+30	0.3779	5.01	Q				
1+35	0.4121	4.97	Q				
1+40	0.4463	4.97	Q				
1+45	0.4805	4.97	Q				
1+50	0.5148	4.98	Q				
1+55	0.5495	5.04	Q				
2+ 0	0.5848	5.12	Q				
2+ 5	0.6210	5.25	Q				
2+10	0.6589	5.50	Q				
2+15	0.6991	5.84	Q				
2+20	0.7404	6.00	Q				
2+25	0.7825	6.11	Q				
2+30	0.8251	6.18	Q				
2+35	0.8683	6.27	Q				
2+40	0.9122	6.38	Q				
2+45	0.9571	6.51	Q				
2+50	1.0032	6.69	Q				
2+55	1.0512	6.97	Q				
3+ 0	1.1018	7.36	Q				
3+ 5	1.1538	7.54	Q				
3+10	1.2066	7.67	Q				

3+15	1.2600	7.76	Q
3+20	1.3141	7.85	Q
3+25	1.3686	7.91	Q
3+30	1.4234	7.97	Q
3+35	1.4786	8.01	Q
3+40	1.5340	8.04	Q
3+45	1.5896	8.08	Q
3+50	1.6456	8.12	Q
3+55	1.7021	8.21	Q
4+ 0	1.7593	8.31	Q
4+ 5	1.8176	8.46	Q
4+10	1.8777	8.72	Q
4+15	1.9402	9.08	Q
4+20	2.0041	9.27	Q
4+25	2.0691	9.44	Q
4+30	2.1353	9.61	Q
4+35	2.2029	9.82	Q
4+40	2.2726	10.12	Q
4+45	2.3451	10.52	Q
4+50	2.4191	10.75	Q
4+55	2.4945	10.95	Q
5+ 0	2.5713	11.15	Q
5+ 5	2.6493	11.33	Q
5+10	2.7288	11.54	Q
5+15	2.8099	11.78	Q
5+20	2.8908	11.75	Q
5+25	2.9698	11.46	Q
5+30	3.0453	10.97	Q
5+35	3.1204	10.90	Q
5+40	3.1967	11.07	Q
5+45	3.2753	11.42	Q
5+50	3.3554	11.63	Q
5+55	3.4375	11.92	Q
6+ 0	3.5222	12.30	Q
6+ 5	3.6083	12.50	VQ
6+10	3.6957	12.68	VQ
6+15	3.7842	12.86	VQ
6+20	3.8743	13.07	VQ
6+25	3.9664	13.38	VQ
6+30	4.0614	13.79	VQ
6+35	4.1573	13.93	VQ
6+40	4.2532	13.93	VQ
6+45	4.3485	13.84	VQ
6+50	4.4425	13.64	Q
6+55	4.5333	13.18	Q
7+ 0	4.6196	12.53	Q
7+ 5	4.7058	12.53	Q
7+10	4.7935	12.72	Q
7+15	4.8832	13.03	Q
7+20	4.9769	13.61	Q
7+25	5.0776	14.61	Q
7+30	5.1874	15.94	Q
7+35	5.3113	17.99	Q
7+40	5.4598	21.56	Q
7+45	5.6422	26.49	VQ
7+50	5.8502	30.20	VQ
7+55	6.0905	34.89	VQ
8+ 0	6.3707	40.68	V Q
8+ 5	6.6828	45.31	V Q
8+10	7.0353	51.19	V Q
8+15	7.4371	58.34	V Q
8+20	7.8801	64.33	V Q
8+25	8.3750	71.86	V Q
8+30	8.9334	81.08	V Q
8+35	9.5286	86.42	V Q
8+40	10.1546	90.89	V Q
8+45	10.8083	94.93	V Q
8+50	11.4919	99.25	V Q
8+55	12.2131	104.71	V Q
9+ 0	12.9788	111.19	V Q
9+ 5	13.7805	116.41	V Q
9+10	14.6261	122.78	V Q
9+15	15.5238	130.34	V Q
9+20	16.4663	136.85	V Q
9+25	17.4665	145.23	V Q
9+30	18.5374	155.50	V Q
9+35	19.6552	162.31	V Q
9+40	20.8215	169.35	V Q
9+45	22.0404	176.98	V Q

SOBA724100

9+50	23.3000	182.90	
9+55	24.6048	189.45	
10+ 0	25.9599	196.77	
10+ 5	27.3431	200.84	
10+10	28.7384	202.61	
10+15	30.1352	202.81	
10+20	31.4948	197.41	
10+25	32.7578	183.39	
10+30	33.8701	161.51	
10+35	34.9295	153.81	
10+40	35.9711	151.24	
10+45	37.0164	151.78	
10+50	38.0865	155.38	
10+55	39.2243	165.22	
11+ 0	40.4698	180.85	
11+ 5	41.7573	186.94	
11+10	43.0690	190.46	
11+15	44.3951	192.55	
11+20	45.7293	193.72	
11+25	47.0615	193.44	
11+30	48.3829	191.87	
11+35	49.7025	191.61	
11+40	51.0176	190.95	
11+45	52.3259	189.96	
11+50	53.6234	188.40	
11+55	54.8970	184.93	
12+ 0	56.1337	179.56	
12+ 5	57.3728	179.92	
12+10	58.6465	184.94	
12+15	59.9796	193.56	
12+20	61.3839	203.90	
12+25	62.9136	222.11	
12+30	64.6207	247.87	
12+35	66.4184	261.03	
12+40	68.2955	272.55	
12+45	70.2501	283.81	
12+50	72.2709	293.42	
12+55	74.3673	304.39	
13+ 0	76.5493	316.83	
13+ 5	78.7976	326.44	
13+10	81.1214	337.42	
13+15	83.5316	349.96	
13+20	86.0273	362.38	
13+25	88.6393	379.26	
13+30	91.3980	400.56	
13+35	94.2173	409.37	
13+40	97.0488	411.13	
13+45	99.8577	407.85	
13+50	102.6004	398.25	
13+55	105.1871	375.58	
14+ 0	107.5335	340.70	
14+ 5	109.7882	327.38	
14+10	111.9973	320.76	
14+15	114.1868	317.91	
14+20	116.3760	317.88	
14+25	118.6003	322.97	
14+30	120.8923	332.79	
14+35	123.1992	334.97	
14+40	125.5028	334.47	
14+45	127.7903	332.14	
14+50	130.0714	331.22	
14+55	132.3465	330.35	
15+ 0	134.6160	329.52	
15+ 5	136.8754	328.07	
15+10	139.1154	325.24	
15+15	141.3280	321.28	
15+20	143.5240	318.87	
15+25	145.6965	315.45	
15+30	147.8376	310.89	
15+35	149.9522	307.03	
15+40	152.0260	301.12	
15+45	154.0462	293.34	
15+50	156.0137	285.67	
15+55	157.9019	274.17	
16+ 0	159.6847	258.87	
16+ 5	161.3978	248.73	
16+10	163.0234	236.04	
16+15	164.5434	220.71	
16+20	165.9190	199.74	

SOBA724100

16+25	167.0525	164.59	
16+30	167.8514	116.00	
16+35	168.4938	93.27	
16+40	169.0274	77.49	
16+45	169.4785	65.50	
16+50	169.8602	55.41	
16+55	170.1832	46.90	
17+ 0	170.4571	39.78	
17+ 5	170.6901	33.82	
17+10	170.8890	28.89	
17+15	171.0590	24.68	
17+20	171.2044	21.11	
17+25	171.3298	18.21	
17+30	171.4392	15.88	
17+35	171.5289	13.02	
17+40	171.5973	9.93	
17+45	171.6542	8.27	
17+50	171.7056	7.45	
17+55	171.7534	6.95	
18+ 0	171.7987	6.58	
18+ 5	171.8429	6.41	
18+10	171.8880	6.54	
18+15	171.9363	7.01	
18+20	171.9850	7.07	
18+25	172.0331	7.00	
18+30	172.0799	6.79	
18+35	172.1252	6.58	
18+40	172.1694	6.42	
18+45	172.2125	6.26	
18+50	172.2540	6.03	
18+55	172.2933	5.71	
19+ 0	172.3293	5.22	
19+ 5	172.3638	5.01	
19+10	172.3966	4.77	
19+15	172.4273	4.46	
19+20	172.4577	4.42	
19+25	172.4893	4.59	
19+30	172.5232	4.92	
19+35	172.5583	5.10	
19+40	172.5949	5.31	
19+45	172.6333	5.58	
19+50	172.6718	5.59	
19+55	172.7090	5.40	
20+ 0	172.7438	5.05	
20+ 5	172.7771	4.85	
20+10	172.8089	4.61	
20+15	172.8387	4.32	
20+20	172.8682	4.29	
20+25	172.8986	4.41	
20+30	172.9308	4.68	
20+35	172.9636	4.76	
20+40	172.9967	4.81	
20+45	173.0300	4.83	
20+50	173.0632	4.83	
20+55	173.0962	4.78	
21+ 0	173.1286	4.70	
21+ 5	173.1602	4.59	
21+10	173.1906	4.41	
21+15	173.2192	4.15	
21+20	173.2475	4.11	
21+25	173.2764	4.20	
21+30	173.3067	4.39	
21+35	173.3369	4.38	
21+40	173.3662	4.25	
21+45	173.3939	4.03	
21+50	173.4216	4.01	
21+55	173.4499	4.12	
22+ 0	173.4797	4.32	
22+ 5	173.5094	4.31	
22+10	173.5383	4.19	
22+15	173.5656	3.97	
22+20	173.5929	3.96	
22+25	173.6210	4.07	
22+30	173.6505	4.28	
22+35	173.6798	4.27	
22+40	173.7080	4.09	
22+45	173.7342	3.79	
22+50	173.7595	3.68	
22+55	173.7843	3.60	

SOBA724100

23+ 0	173.8087	3.55	Q				V
23+ 5	173.8329	3.51	Q				V
23+10	173.8568	3.47	Q				V
23+15	173.8805	3.44	Q				V
23+20	173.9041	3.42	Q				V
23+25	173.9274	3.39	Q				V
23+30	173.9507	3.37	Q				V
23+35	173.9738	3.36	Q				V
23+40	173.9969	3.35	Q				V
23+45	174.0199	3.34	Q				V
23+50	174.0428	3.33	Q				V
23+55	174.0657	3.32	Q				V
24+ 0	174.0885	3.31	Q				V
24+ 5	174.1110	3.27	Q				V
24+10	174.1327	3.15	Q				V
24+15	174.1532	2.97	Q				V
24+20	174.1718	2.70	Q				V
24+25	174.1870	2.21	Q				V
24+30	174.1974	1.50	Q				V
24+35	174.2056	1.19	Q				V
24+40	174.2122	0.97	Q				V
24+45	174.2178	0.81	Q				V
24+50	174.2225	0.67	Q				V
24+55	174.2263	0.56	Q				V
25+ 0	174.2296	0.47	Q				V
25+ 5	174.2322	0.39	Q				V
25+10	174.2345	0.32	Q				V
25+15	174.2363	0.26	Q				V
25+20	174.2377	0.21	Q				V
25+25	174.2389	0.17	Q				V
25+30	174.2399	0.14	Q				V
25+35	174.2406	0.11	Q				V
25+40	174.2413	0.09	Q				V
25+45	174.2417	0.07	Q				V
25+50	174.2422	0.06	Q				V
25+55	174.2425	0.05	Q				V
26+ 0	174.2429	0.05	Q				V
26+ 5	174.2431	0.04	Q				V
26+10	174.2434	0.03	Q				V
26+15	174.2436	0.03	Q				V
26+20	174.2438	0.03	Q				V
26+25	174.2439	0.02	Q				V
26+30	174.2440	0.02	Q				V
26+35	174.2441	0.01	Q				V
26+40	174.2441	0.01	Q				V
26+45	174.2442	0.01	Q				V
26+50	174.2442	0.00	Q				V
26+55	174.2442	0.00	Q				V

AREA 8

SOBA81100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba81100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 141.00(Ac.) = 0.220 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 141.00(Ac.) = 0.220 Sq. Mi.
Length along longest watercourse = 5150.00(Ft.)
Length along longest watercourse measured to centroid = 1750.00(Ft.)
Length along longest watercourse = 0.975 Mi.
Length along longest watercourse measured to centroid = 0.331 Mi.
Difference in elevation = 1600.00(Ft.)
Slope along watercourse = 1640.3883 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.172 Hr.
Lag time = 10.34 Min.
25% of lag time = 2.58 Min.
40% of lag time = 4.13 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
141.00	0.55	77.55

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
141.00	1.20	169.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.87 %
Adjusted average point rain = 1.198(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
141.000	86.00	0.000

Total Area Entered = 141.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	48.372	4.085	5.805
2	0.167	96.744	18.416	26.170
3	0.250	145.116	38.448	54.635
4	0.333	193.489	15.309	21.754
5	0.417	241.861	8.599	12.219
6	0.500	290.233	5.629	7.998
7	0.583	338.605	3.791	5.387
8	0.667	386.977	2.407	3.420
9	0.750	435.349	1.323	1.880
10	0.833	483.722	0.585	0.831
11	0.917	532.094	0.446	0.633
12	1.000	580.466	0.320	0.455
13	1.083	628.838	0.346	0.492
14	1.167	677.210	0.194	0.276
15	1.250	725.582	0.103	0.147
			Sum = 100.000	Sum= 142.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.604	0.176	---	0.43
2	0.17	4.30	0.618	0.176	---	0.44
3	0.25	5.00	0.719	0.176	---	0.54
4	0.33	5.00	0.719	0.176	---	0.54
5	0.42	5.80	0.834	0.176	---	0.66
6	0.50	6.50	0.935	0.176	---	0.76
7	0.58	7.40	1.064	0.176	---	0.89
8	0.67	8.60	1.237	0.176	---	1.06
9	0.75	12.30	1.769	0.176	---	1.59
10	0.83	29.10	4.185	0.176	---	4.01
11	0.92	6.80	0.978	0.176	---	0.80
12	1.00	5.00	0.719	0.176	---	0.54
Sum =		100.0			Sum =	12.3

Flood volume = Effective rainfall 1.02(In)
times area 141.0(Ac.)/[(In)/(Ft.)] = 12.0(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 2.063(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 523533.8 Cubic Feet
Total soil loss = 89877.3 Cubic Feet

Peak flow rate of this hydrograph = 306.394(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 100.0 200.0 300.0 400.0
0+ 5	0.0171	2.49	Q
0+10	0.1121	13.79	VQ
0+15	0.3750	38.17	V Q
0+20	0.7257	50.92	V Q
0+25	1.1571	62.64	V Q
0+30	1.6531	72.03	V Q
0+35	2.2410	85.36	VQ
0+40	2.9305	100.11	VQ
0+45	3.7555	119.79	QV
0+50	4.8773	162.89	Q
0+55	6.5567	243.85	V Q
1+ 0	8.6669	306.39	V Q
1+ 5	9.9283	183.16	Q V
1+10	10.7589	120.60	Q V
1+15	11.2366	69.36	Q V
1+20	11.5405	44.12	Q V
1+25	11.7315	27.73	Q V

SOBA81100

1+30	11.8434	16.25	Q				V
1+35	11.9050	8.94	Q				V
1+40	11.9452	5.83	Q				V
1+45	11.9727	3.99	Q				V
1+50	11.9952	3.28	Q				V
1+55	12.0089	1.98	Q				V
2+ 0	12.0163	1.08	Q				V
2+ 5	12.0181	0.27	Q				V
2+10	12.0187	0.08	Q				V

SOBA83100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba83100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 141.00(Ac.) = 0.220 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 141.00(Ac.) = 0.220 Sq. Mi.
Length along longest watercourse = 5150.00(Ft.)
Length along longest watercourse measured to centroid = 1750.00(Ft.)
Length along longest watercourse = 0.975 Mi.
Length along longest watercourse measured to centroid = 0.331 Mi.
Difference in elevation = 1600.00(Ft.)
Slope along watercourse = 1640.3883 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.172 Hr.
Lag time = 10.34 Min.
25% of lag time = 2.58 Min.
40% of lag time = 4.13 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
141.00	0.90	126.90

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
141.00	2.10	296.10

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.94 %
Adjusted average point rain = 2.099(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
141.000	86.00	0.000

Total Area Entered = 141.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

SOBA83100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	48.372	4.085	5.805
2	0.167	96.744	18.416	26.170
3	0.250	145.116	38.448	54.635
4	0.333	193.489	15.309	21.754
5	0.417	241.861	8.599	12.219
6	0.500	290.233	5.629	7.998
7	0.583	338.605	3.791	5.387
8	0.667	386.977	2.407	3.420
9	0.750	435.349	1.323	1.880
10	0.833	483.722	0.585	0.831
11	0.917	532.094	0.446	0.633
12	1.000	580.466	0.320	0.455
13	1.083	628.838	0.346	0.492
14	1.167	677.210	0.194	0.276
15	1.250	725.582	0.103	0.147
			Sum = 100.000	Sum= 142.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.327	0.176	---	0.15
2	0.17	1.30	0.327	0.176	---	0.15
3	0.25	1.10	0.277	0.176	---	0.10
4	0.33	1.50	0.378	0.176	---	0.20
5	0.42	1.50	0.378	0.176	---	0.20
6	0.50	1.80	0.453	0.176	---	0.28
7	0.58	1.50	0.378	0.176	---	0.20
8	0.67	1.80	0.453	0.176	---	0.28
9	0.75	1.80	0.453	0.176	---	0.28
10	0.83	1.50	0.378	0.176	---	0.20
11	0.92	1.60	0.403	0.176	---	0.23
12	1.00	1.80	0.453	0.176	---	0.28
13	1.08	2.20	0.554	0.176	---	0.38
14	1.17	2.20	0.554	0.176	---	0.38
15	1.25	2.20	0.554	0.176	---	0.38
16	1.33	2.00	0.504	0.176	---	0.33
17	1.42	2.60	0.655	0.176	---	0.48
18	1.50	2.70	0.680	0.176	---	0.50
19	1.58	2.40	0.604	0.176	---	0.43
20	1.67	2.70	0.680	0.176	---	0.50
21	1.75	3.30	0.831	0.176	---	0.66
22	1.83	3.10	0.781	0.176	---	0.61
23	1.92	2.90	0.730	0.176	---	0.55
24	2.00	3.00	0.756	0.176	---	0.58
25	2.08	3.10	0.781	0.176	---	0.61
26	2.17	4.20	1.058	0.176	---	0.88
27	2.25	5.00	1.259	0.176	---	1.08
28	2.33	3.50	0.881	0.176	---	0.71
29	2.42	6.80	1.713	0.176	---	1.54
30	2.50	7.30	1.838	0.176	---	1.66
31	2.58	8.20	2.065	0.176	---	1.89
32	2.67	5.90	1.486	0.176	---	1.31
33	2.75	2.00	0.504	0.176	---	0.33
34	2.83	1.80	0.453	0.176	---	0.28
35	2.92	1.80	0.453	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.9

Flood volume = Effective rainfall 1.58(In)
times area 141.0(Ac.)/[(In)/(Ft.)] = 18.5(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 6.151(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 806237.1 Cubic Feet
Total soil loss = 267942.8 Cubic Feet

Peak flow rate of this hydrograph = 211.762(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

SOBA83100

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	75.0	150.0	225.0	300.0
0+ 5	0.0061	0.88	Q				
0+10	0.0395	4.86	Q				
0+15	0.1281	12.86	VQ				
0+20	0.2344	15.43	V Q				
0+25	0.3526	17.17	V Q				
0+30	0.5127	23.24	V Q				
0+35	0.6998	27.17	V Q				
0+40	0.9140	31.11	V Q				
0+45	1.1304	31.42	V Q				
0+50	1.3707	34.89	V Q				
0+55	1.6099	34.73	VQ				
1+ 0	1.8337	32.49	VQ				
1+ 5	2.0727	34.71	Q				
1+10	2.3489	40.10	Q				
1+15	2.6700	46.63	VQ				
1+20	3.0082	49.10	Q				
1+25	3.3542	50.24	QV				
1+30	3.7171	52.68	QV				
1+35	4.1357	60.78	Q				
1+40	4.5746	63.73	QV				
1+45	5.0200	64.67	Q V				
1+50	5.5170	72.17	Q V				
1+55	6.0712	80.46	Q V				
2+ 0	6.6274	80.77	Q V				
2+ 5	7.1795	80.16	Q V				
2+10	7.7555	83.63	Q V				
2+15	8.4028	94.00	Q V				
2+20	9.1815	113.06	Q V				
2+25	10.0457	125.48	Q V				
2+30	10.9778	135.35	Q V				
2+35	12.2317	182.06	Q V				
2+40	13.6658	208.23	Q V				
2+45	15.1242	211.76	Q V				
2+50	16.2704	166.43	Q V				
2+55	17.0032	106.40	Q V				
3+ 0	17.5447	78.63	Q V				
3+ 5	17.9379	57.10	Q V				
3+10	18.1614	32.45	Q V				
3+15	18.2943	19.30	Q V				
3+20	18.3742	11.59	Q V				
3+25	18.4247	7.34	Q V				
3+30	18.4582	4.86	Q V				
3+35	18.4804	3.22	Q V				
3+40	18.4941	1.99	Q V				
3+45	18.5018	1.11	Q V				
3+50	18.5056	0.56	Q V				
3+55	18.5075	0.27	Q V				
4+ 0	18.5083	0.12	Q V				
4+ 5	18.5086	0.04	Q V				
4+10	18.5087	0.00	Q V				

SOBA86100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba86100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 141.00(Ac.) = 0.220 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 141.00(Ac.) = 0.220 Sq. Mi.
Length along longest watercourse = 5150.00(Ft.)
Length along longest watercourse measured to centroid = 1750.00(Ft.)
Length along longest watercourse = 0.975 Mi.
Length along longest watercourse measured to centroid = 0.331 Mi.
Difference in elevation = 1600.00(Ft.)
Slope along watercourse = 1640.3883 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.172 Hr.
Lag time = 10.34 Min.
25% of lag time = 2.58 Min.
40% of lag time = 4.13 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
141.00	1.40	197.40

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
141.00	3.00	423.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 2.999(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
141.000	86.00	0.000

Total Area Entered = 141.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

SOBA86100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	48.372	4.085	5.805
2	0.167	96.744	18.416	26.170
3	0.250	145.116	38.448	54.635
4	0.333	193.489	15.309	21.754
5	0.417	241.861	8.599	12.219
6	0.500	290.233	5.629	7.998
7	0.583	338.605	3.791	5.387
8	0.667	386.977	2.407	3.420
9	0.750	435.349	1.323	1.880
10	0.833	483.722	0.585	0.831
11	0.917	532.094	0.446	0.633
12	1.000	580.466	0.320	0.455
13	1.083	628.838	0.346	0.492
14	1.167	677.210	0.194	0.276
15	1.250	725.582	0.103	0.147
			Sum = 100.000	Sum= 142.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.216	0.176	---	0.04
3	0.25	0.60	0.216	0.176	---	0.04
4	0.33	0.60	0.216	0.176	---	0.04
5	0.42	0.60	0.216	0.176	---	0.04
6	0.50	0.70	0.252	0.176	---	0.08
7	0.58	0.70	0.252	0.176	---	0.08
8	0.67	0.70	0.252	0.176	---	0.08
9	0.75	0.70	0.252	0.176	---	0.08
10	0.83	0.70	0.252	0.176	---	0.08
11	0.92	0.70	0.252	0.176	---	0.08
12	1.00	0.80	0.288	0.176	---	0.11
13	1.08	0.80	0.288	0.176	---	0.11
14	1.17	0.80	0.288	0.176	---	0.11
15	1.25	0.80	0.288	0.176	---	0.11
16	1.33	0.80	0.288	0.176	---	0.11
17	1.42	0.80	0.288	0.176	---	0.11
18	1.50	0.80	0.288	0.176	---	0.11
19	1.58	0.80	0.288	0.176	---	0.11
20	1.67	0.80	0.288	0.176	---	0.11
21	1.75	0.80	0.288	0.176	---	0.11
22	1.83	0.80	0.288	0.176	---	0.11
23	1.92	0.80	0.288	0.176	---	0.11
24	2.00	0.90	0.324	0.176	---	0.15
25	2.08	0.80	0.288	0.176	---	0.11
26	2.17	0.90	0.324	0.176	---	0.15
27	2.25	0.90	0.324	0.176	---	0.15
28	2.33	0.90	0.324	0.176	---	0.15
29	2.42	0.90	0.324	0.176	---	0.15
30	2.50	0.90	0.324	0.176	---	0.15
31	2.58	0.90	0.324	0.176	---	0.15
32	2.67	0.90	0.324	0.176	---	0.15
33	2.75	1.00	0.360	0.176	---	0.18
34	2.83	1.00	0.360	0.176	---	0.18
35	2.92	1.00	0.360	0.176	---	0.18
36	3.00	1.00	0.360	0.176	---	0.18
37	3.08	1.00	0.360	0.176	---	0.18
38	3.17	1.10	0.396	0.176	---	0.22
39	3.25	1.10	0.396	0.176	---	0.22
40	3.33	1.10	0.396	0.176	---	0.22
41	3.42	1.20	0.432	0.176	---	0.26
42	3.50	1.30	0.468	0.176	---	0.29
43	3.58	1.40	0.504	0.176	---	0.33
44	3.67	1.40	0.504	0.176	---	0.33
45	3.75	1.50	0.540	0.176	---	0.36
46	3.83	1.50	0.540	0.176	---	0.36
47	3.92	1.60	0.576	0.176	---	0.40
48	4.00	1.60	0.576	0.176	---	0.40
49	4.08	1.70	0.612	0.176	---	0.44
50	4.17	1.80	0.648	0.176	---	0.47
51	4.25	1.90	0.684	0.176	---	0.51

52	4.33	2.00	0.720	0.176	---	0.54
53	4.42	2.10	0.756	0.176	---	0.58
54	4.50	2.10	0.756	0.176	---	0.58
55	4.58	2.20	0.792	0.176	---	0.62
56	4.67	2.30	0.828	0.176	---	0.65
57	4.75	2.40	0.864	0.176	---	0.69
58	4.83	2.40	0.864	0.176	---	0.69
59	4.92	2.50	0.900	0.176	---	0.72
60	5.00	2.60	0.936	0.176	---	0.76
61	5.08	3.10	1.115	0.176	---	0.94
62	5.17	3.60	1.295	0.176	---	1.12
63	5.25	3.90	1.403	0.176	---	1.23
64	5.33	4.20	1.511	0.176	---	1.34
65	5.42	4.70	1.691	0.176	---	1.52
66	5.50	5.60	2.015	0.176	---	1.84
67	5.58	1.90	0.684	0.176	---	0.51
68	5.67	0.90	0.324	0.176	---	0.15
69	5.75	0.60	0.216	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 141.0(Ac.)/[(In)/(Ft.)] = 23.0(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 12.194(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 1003554.9 Cubic Feet
Total soil loss = 531190.9 Cubic Feet

Peak flow rate of this hydrograph = 197.882(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0002	0.03	Q				
0+10	0.0026	0.35	Q				
0+15	0.0131	1.52	Q				
0+20	0.0378	3.59	Q				
0+25	0.0682	4.42	Q				
0+30	0.1034	5.10	VQ				
0+35	0.1472	6.36	VQ				
0+40	0.2059	8.53	VQ				
0+45	0.2710	9.45	VQ				
0+50	0.3396	9.96	VQ				
0+55	0.4104	10.28	V Q				
1+ 0	0.4841	10.71	V Q				
1+ 5	0.5653	11.79	V Q				
1+10	0.6607	13.85	VQ				
1+15	0.7617	14.67	VQ				
1+20	0.8660	15.14	V Q				
1+25	0.9723	15.44	V Q				
1+30	1.0801	15.65	V Q				
1+35	1.1888	15.79	VQ				
1+40	1.2980	15.86	VQ				
1+45	1.4075	15.89	VQ				
1+50	1.5171	15.91	VQ				
1+55	1.6268	15.93	VQ				
2+ 0	1.7380	16.15	Q				
2+ 5	1.8544	16.90	Q				
2+10	1.9793	18.14	Q				
2+15	2.1025	17.89	Q				
2+20	2.2370	19.52	Q				
2+25	2.3757	20.15	Q				
2+30	2.5169	20.50	Q				
2+35	2.6595	20.71	Q				
2+40	2.8031	20.85	Q				
2+45	2.9488	21.15	QV				
2+50	3.1013	22.15	QV				
2+55	3.2676	24.14	QV				
3+ 0	3.4394	24.95	QV				
3+ 5	3.6143	25.39	QV				
3+10	3.7927	25.90	QV				

SOBA86100

3+15	3.9789	27.05	
3+20	4.1796	29.14	
3+25	4.3876	30.20	
3+30	4.6068	31.82	
3+35	4.8495	35.25	
3+40	5.1192	39.15	
3+45	5.4132	42.69	
3+50	5.7247	45.22	
3+55	6.0577	48.36	
4+ 0	6.4069	50.71	
4+ 5	6.7769	53.73	
4+10	7.1639	56.19	
4+15	7.5776	60.07	
4+20	8.0215	64.46	
4+25	8.4975	69.12	
4+30	9.0053	73.73	
4+35	9.5407	77.74	
4+40	10.0970	80.78	
4+45	10.6828	85.05	
4+50	11.2990	89.48	
4+55	11.9418	93.33	
5+ 0	12.6048	96.27	
5+ 5	13.3025	101.30	
5+10	14.0636	110.51	
5+15	14.9407	127.36	
5+20	15.9432	145.56	
5+25	17.0595	162.09	
5+30	18.3059	180.97	
5+35	19.6687	197.88	
5+40	20.9529	186.46	
5+45	21.7474	115.37	
5+50	22.2335	70.58	
5+55	22.5372	44.10	
6+ 0	22.7284	27.76	
6+ 5	22.8497	17.61	
6+10	22.9226	10.59	
6+15	22.9650	6.15	
6+20	22.9929	4.05	
6+25	23.0121	2.78	
6+30	23.0256	1.96	
6+35	23.0333	1.12	
6+40	23.0369	0.53	
6+45	23.0380	0.15	
6+50	23.0383	0.04	
6+55	23.0384	0.02	
7+ 0	23.0384	0.01	
7+ 5	23.0384	0.00	
7+10	23.0384	0.00	

SOBA824100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: soba824100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 141.00(Ac.) = 0.220 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 141.00(Ac.) = 0.220 Sq. Mi.
Length along longest watercourse = 5150.00(Ft.)
Length along longest watercourse measured to centroid = 1750.00(Ft.)
Length along longest watercourse = 0.975 Mi.
Length along longest watercourse measured to centroid = 0.331 Mi.
Difference in elevation = 1600.00(Ft.)
Slope along watercourse = 1640.3883 Ft./Mi.
Average Manning's 'N' = 0.045
Lag time = 0.172 Hr.
Lag time = 10.34 Min.
25% of lag time = 2.58 Min.
40% of lag time = 4.13 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
141.00	2.25	317.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
141.00	6.00	846.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 5.998(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
141.000	86.00	0.000

Total Area Entered = 141.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

SOBA824100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	48.372	4.085	5.805
2	0.167	96.744	18.416	26.170
3	0.250	145.116	38.448	54.635
4	0.333	193.489	15.309	21.754
5	0.417	241.861	8.599	12.219
6	0.500	290.233	5.629	7.998
7	0.583	338.605	3.791	5.387
8	0.667	386.977	2.407	3.420
9	0.750	435.349	1.323	1.880
10	0.833	483.722	0.585	0.831
11	0.917	532.094	0.446	0.633
12	1.000	580.466	0.320	0.455
13	1.083	628.838	0.346	0.492
14	1.167	677.210	0.194	0.276
15	1.250	725.582	0.103	0.147
			Sum = 100.000	Sum= 142.102

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.130	0.01
47	3.92	0.20	0.144	0.258	0.130	0.01
48	4.00	0.20	0.144	0.257	0.130	0.01
49	4.08	0.20	0.144	0.256	0.130	0.01
50	4.17	0.20	0.144	0.255	0.130	0.01
51	4.25	0.20	0.144	0.254	0.130	0.01

52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02
59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.130	0.01
62	5.17	0.20	0.144	0.242	0.130	0.01
63	5.25	0.20	0.144	0.241	0.130	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.08
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.15
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.384	0.201	---	0.18
104	8.67	0.53	0.384	0.200	---	0.18
105	8.75	0.53	0.384	0.199	---	0.18
106	8.83	0.57	0.408	0.198	---	0.21
107	8.92	0.57	0.408	0.197	---	0.21
108	9.00	0.57	0.408	0.196	---	0.21
109	9.08	0.63	0.456	0.195	---	0.26
110	9.17	0.63	0.456	0.195	---	0.26
111	9.25	0.63	0.456	0.194	---	0.26
112	9.33	0.67	0.480	0.193	---	0.29
113	9.42	0.67	0.480	0.192	---	0.29
114	9.50	0.67	0.480	0.191	---	0.29
115	9.58	0.70	0.504	0.190	---	0.31
116	9.67	0.70	0.504	0.189	---	0.31
117	9.75	0.70	0.504	0.188	---	0.32
118	9.83	0.73	0.528	0.187	---	0.34
119	9.92	0.73	0.528	0.186	---	0.34
120	10.00	0.73	0.528	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.18
122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.480	0.179	---	0.30
128	10.67	0.67	0.480	0.178	---	0.30
129	10.75	0.67	0.480	0.177	---	0.30
130	10.83	0.67	0.480	0.177	---	0.30

131	10.92	0.67	0.480	0.176	---	0.30
132	11.00	0.67	0.480	0.175	---	0.30
133	11.08	0.63	0.456	0.174	---	0.28
134	11.17	0.63	0.456	0.173	---	0.28
135	11.25	0.63	0.456	0.172	---	0.28
136	11.33	0.63	0.456	0.171	---	0.28
137	11.42	0.63	0.456	0.171	---	0.29
138	11.50	0.63	0.456	0.170	---	0.29
139	11.58	0.57	0.408	0.169	---	0.24
140	11.67	0.57	0.408	0.168	---	0.24
141	11.75	0.57	0.408	0.167	---	0.24
142	11.83	0.60	0.432	0.166	---	0.27
143	11.92	0.60	0.432	0.166	---	0.27
144	12.00	0.60	0.432	0.165	---	0.27
145	12.08	0.83	0.600	0.164	---	0.44
146	12.17	0.83	0.600	0.163	---	0.44
147	12.25	0.83	0.600	0.162	---	0.44
148	12.33	0.87	0.624	0.161	---	0.46
149	12.42	0.87	0.624	0.161	---	0.46
150	12.50	0.87	0.624	0.160	---	0.46
151	12.58	0.93	0.672	0.159	---	0.51
152	12.67	0.93	0.672	0.158	---	0.51
153	12.75	0.93	0.672	0.157	---	0.51
154	12.83	0.97	0.696	0.157	---	0.54
155	12.92	0.97	0.696	0.156	---	0.54
156	13.00	0.97	0.696	0.155	---	0.54
157	13.08	1.13	0.816	0.154	---	0.66
158	13.17	1.13	0.816	0.154	---	0.66
159	13.25	1.13	0.816	0.153	---	0.66
160	13.33	1.13	0.816	0.152	---	0.66
161	13.42	1.13	0.816	0.151	---	0.66
162	13.50	1.13	0.816	0.150	---	0.67
163	13.58	0.77	0.552	0.150	---	0.40
164	13.67	0.77	0.552	0.149	---	0.40
165	13.75	0.77	0.552	0.148	---	0.40
166	13.83	0.77	0.552	0.147	---	0.40
167	13.92	0.77	0.552	0.147	---	0.41
168	14.00	0.77	0.552	0.146	---	0.41
169	14.08	0.90	0.648	0.145	---	0.50
170	14.17	0.90	0.648	0.144	---	0.50
171	14.25	0.90	0.648	0.144	---	0.50
172	14.33	0.87	0.624	0.143	---	0.48
173	14.42	0.87	0.624	0.142	---	0.48
174	14.50	0.87	0.624	0.141	---	0.48
175	14.58	0.87	0.624	0.141	---	0.48
176	14.67	0.87	0.624	0.140	---	0.48
177	14.75	0.87	0.624	0.139	---	0.48
178	14.83	0.83	0.600	0.139	---	0.46
179	14.92	0.83	0.600	0.138	---	0.46
180	15.00	0.83	0.600	0.137	---	0.46
181	15.08	0.80	0.576	0.136	---	0.44
182	15.17	0.80	0.576	0.136	---	0.44
183	15.25	0.80	0.576	0.135	---	0.44
184	15.33	0.77	0.552	0.134	---	0.42
185	15.42	0.77	0.552	0.134	---	0.42
186	15.50	0.77	0.552	0.133	---	0.42
187	15.58	0.63	0.456	0.132	---	0.32
188	15.67	0.63	0.456	0.132	---	0.32
189	15.75	0.63	0.456	0.131	---	0.32
190	15.83	0.63	0.456	0.130	---	0.33
191	15.92	0.63	0.456	0.130	---	0.33
192	16.00	0.63	0.456	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00

210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01
217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00

Sum = 100.0 Sum = 36.9

Flood volume = Effective rainfall 3.08(In)
times area 141.0(Ac.)/[(In)/(Ft.)] = 36.1(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 34.344(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 1574101.9 Cubic Feet
Total soil loss = 1496032.4 Cubic Feet

Peak flow rate of this hydrograph = 92.561(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	25.0	50.0	75.0	100.0
0+ 5	0.0002	0.03	Q				
0+10	0.0012	0.15	Q				
0+15	0.0041	0.42	Q				
0+20	0.0078	0.53	Q				
0+25	0.0123	0.66	Q				
0+30	0.0180	0.83	Q				
0+35	0.0242	0.90	Q				
0+40	0.0307	0.95	Q				
0+45	0.0375	0.98	Q				
0+50	0.0444	1.01	Q				
0+55	0.0519	1.08	Q				
1+ 0	0.0603	1.22	Q				
1+ 5	0.0690	1.26	Q				
1+10	0.0775	1.23	Q				
1+15	0.0852	1.12	Q				
1+20	0.0927	1.08	Q				
1+25	0.1000	1.06	Q				
1+30	0.1072	1.05	Q				
1+35	0.1144	1.04	Q				
1+40	0.1215	1.03	Q				
1+45	0.1285	1.03	Q				
1+50	0.1357	1.04	Q				
1+55	0.1433	1.10	Q				
2+ 0	0.1518	1.23	Q				
2+ 5	0.1606	1.28	Q				
2+10	0.1697	1.31	Q				
2+15	0.1789	1.33	Q				
2+20	0.1881	1.34	Q				
2+25	0.1974	1.35	Q				
2+30	0.2068	1.36	Q				
2+35	0.2163	1.37	Q				
2+40	0.2262	1.44	Q				
2+45	0.2370	1.57	Q				
2+50	0.2482	1.62	Q				
2+55	0.2595	1.65	Q				
3+ 0	0.2711	1.67	Q				
3+ 5	0.2827	1.69	Q				
3+10	0.2943	1.69	Q				
3+15	0.3060	1.70	Q				
3+20	0.3178	1.70	Q				
3+25	0.3295	1.70	Q				
3+30	0.3412	1.70	Q				
3+35	0.3530	1.70	Q				
3+40	0.3647	1.71	Q				
3+45	0.3764	1.71	Q				
3+50	0.3883	1.72	Q				
3+55	0.4006	1.78	Q				
4+ 0	0.4137	1.91	Q				
4+ 5	0.4273	1.97	Q				
4+10	0.4410	2.00	Q				
4+15	0.4549	2.01	Q				
4+20	0.4690	2.04	Q				
4+25	0.4835	2.11	Q				
4+30	0.4990	2.25	Q				
4+35	0.5148	2.30	Q				
4+40	0.5309	2.33	Q				
4+45	0.5471	2.35	Q				
4+50	0.5635	2.38	Q				
4+55	0.5804	2.45	Q				

5+ 0	0.5982	2.59	VQ
5+ 5	0.6162	2.62	VQ
5+10	0.6336	2.52	VQ
5+15	0.6493	2.28	Q
5+20	0.6645	2.20	Q
5+25	0.6797	2.22	Q
5+30	0.6956	2.31	Q
5+35	0.7119	2.36	Q
5+40	0.7286	2.43	Q
5+45	0.7464	2.57	VQ
5+50	0.7645	2.64	VQ
5+55	0.7829	2.67	VQ
6+ 0	0.8015	2.69	VQ
6+ 5	0.8202	2.72	VQ
6+10	0.8394	2.79	VQ
6+15	0.8596	2.93	VQ
6+20	0.8801	2.98	VQ
6+25	0.9009	3.01	VQ
6+30	0.9218	3.04	Q
6+35	0.9426	3.01	Q
6+40	0.9623	2.86	Q
6+45	0.9799	2.56	Q
6+50	0.9972	2.51	Q
6+55	1.0147	2.54	Q
7+ 0	1.0327	2.61	Q
7+ 5	1.0513	2.71	Q
7+10	1.0708	2.82	Q
7+15	1.0911	2.95	Q
7+20	1.1133	3.22	Q
7+25	1.1407	3.99	Q
7+30	1.1782	5.43	VQ
7+35	1.2211	6.23	VQ
7+40	1.2713	7.29	VQ
7+45	1.3329	8.93	V Q
7+50	1.4008	9.86	V Q
7+55	1.4766	11.01	V Q
8+ 0	1.5640	12.69	V Q
8+ 5	1.6590	13.78	V Q
8+10	1.7662	15.57	V Q
8+15	1.8941	18.58	V Q
8+20	2.0313	19.92	V Q
8+25	2.1742	20.75	V Q
8+30	2.3211	21.33	V Q
8+35	2.4719	21.89	V Q
8+40	2.6292	22.84	V Q
8+45	2.7972	24.39	V Q
8+50	2.9710	25.24	V Q
8+55	3.1524	26.33	V Q
9+ 0	3.3452	28.00	V Q
9+ 5	3.5455	29.08	V Q
9+10	3.7581	30.86	V Q
9+15	3.9913	33.86	V Q
9+20	4.2346	35.33	V Q
9+25	4.4878	36.77	V Q
9+30	4.7541	38.66	V Q
9+35	5.0278	39.74	V Q
9+40	5.3100	40.98	V Q
9+45	5.6041	42.72	V Q
9+50	5.9050	43.69	V Q
9+55	6.2140	44.86	V Q
10+ 0	6.5346	46.56	V Q
10+ 5	6.8543	46.41	V Q
10+10	7.1473	42.54	V Q
10+15	7.3797	33.75	V Q
10+20	7.5889	30.38	V Q
10+25	7.7856	28.56	V Q
10+30	7.9743	27.40	V Q
10+35	8.1626	27.35	VQ
10+40	8.3696	30.06	V Q
10+45	8.6206	36.44	V Q
10+50	8.8896	39.05	V Q
10+55	9.1688	40.54	V Q
11+ 0	9.4550	41.55	V Q
11+ 5	9.7449	42.10	V Q
11+10	10.0339	41.96	V Q
11+15	10.3161	40.97	V Q
11+20	10.5962	40.67	V Q
11+25	10.8757	40.58	V Q
11+30	11.1550	40.56	V Q

SOBA824100

11+35	11.4328	40.33	
11+40	11.7024	39.15	
11+45	11.9546	36.62	
11+50	12.2013	35.81	
11+55	12.4489	35.96	
12+ 0	12.7037	36.99	
12+ 5	12.9677	38.34	
12+10	13.2637	42.98	
12+15	13.6244	52.37	
12+20	14.0127	56.38	
12+25	14.4206	59.23	
12+30	14.8477	62.02	
12+35	15.2874	63.84	
12+40	15.7425	66.08	
12+45	16.2199	69.33	
12+50	16.7083	70.91	
12+55	17.2071	72.43	
13+ 0	17.7193	74.37	
13+ 5	18.2431	76.06	
13+10	18.7929	79.83	
13+15	19.3909	86.82	
13+20	20.0088	89.72	
13+25	20.6384	91.42	
13+30	21.2759	92.56	
13+35	21.9083	91.83	
13+40	22.4969	85.47	
13+45	22.9886	71.39	
13+50	23.4422	65.87	
13+55	23.8750	62.83	
14+ 0	24.2943	60.89	
14+ 5	24.7088	60.19	
14+10	25.1354	61.94	
14+15	25.5955	66.81	
14+20	26.0683	68.65	
14+25	26.5444	69.13	
14+30	27.0166	68.57	
14+35	27.4887	68.54	
14+40	27.9612	68.61	
14+45	28.4341	68.66	
14+50	28.9063	68.57	
14+55	29.3748	68.03	
15+ 0	29.8350	66.82	
15+ 5	30.2915	66.28	
15+10	30.7424	65.47	
15+15	31.1837	64.07	
15+20	31.6201	63.37	
15+25	32.0503	62.46	
15+30	32.4704	61.01	
15+35	32.8828	59.88	
15+40	33.2758	57.07	
15+45	33.6317	51.67	
15+50	33.9728	49.52	
15+55	34.3057	48.34	
16+ 0	34.6335	47.61	
16+ 5	34.9456	45.31	
16+10	35.1985	36.72	
16+15	35.3308	19.22	
16+20	35.4151	12.24	
16+25	35.4723	8.31	
16+30	35.5118	5.73	
16+35	35.5391	3.97	
16+40	35.5583	2.79	
16+45	35.5725	2.05	
16+50	35.5844	1.74	
16+55	35.5948	1.51	
17+ 0	35.6041	1.35	
17+ 5	35.6124	1.20	
17+10	35.6209	1.23	
17+15	35.6304	1.38	
17+20	35.6386	1.18	
17+25	35.6429	0.63	
17+30	35.6462	0.47	
17+35	35.6490	0.42	
17+40	35.6519	0.41	
17+45	35.6549	0.44	
17+50	35.6584	0.51	
17+55	35.6632	0.70	
18+ 0	35.6703	1.02	
18+ 5	35.6783	1.16	

18+10	35.6868	1.24	Q			V
18+15	35.6956	1.28	Q			V
18+20	35.7046	1.31	Q			V
18+25	35.7138	1.33	Q			V
18+30	35.7231	1.35	Q			V
18+35	35.7323	1.34	Q			V
18+40	35.7411	1.28	Q			V
18+45	35.7490	1.15	Q			V
18+50	35.7565	1.09	Q			V
18+55	35.7634	1.00	Q			V
19+ 0	35.7693	0.85	Q			V
19+ 5	35.7747	0.80	Q			V
19+10	35.7804	0.82	Q			V
19+15	35.7868	0.93	Q			V
19+20	35.7936	0.98	Q			V
19+25	35.8009	1.06	Q			V
19+30	35.8092	1.21	Q			V
19+35	35.8178	1.26	Q			V
19+40	35.8263	1.23	Q			V
19+45	35.8340	1.12	Q			V
19+50	35.8414	1.07	Q			V
19+55	35.8481	0.98	Q			V
20+ 0	35.8539	0.84	Q			V
20+ 5	35.8594	0.79	Q			V
20+10	35.8650	0.82	Q			V
20+15	35.8714	0.93	Q			V
20+20	35.8780	0.97	Q			V
20+25	35.8848	0.99	Q			V
20+30	35.8917	1.00	Q			V
20+35	35.8987	1.01	Q			V
20+40	35.9057	1.02	Q			V
20+45	35.9127	1.02	Q			V
20+50	35.9196	1.01	Q			V
20+55	35.9261	0.94	Q			V
21+ 0	35.9317	0.81	Q			V
21+ 5	35.9371	0.78	Q			V
21+10	35.9426	0.81	Q			V
21+15	35.9490	0.92	Q			V
21+20	35.9555	0.95	Q			V
21+25	35.9618	0.91	Q			V
21+30	35.9672	0.79	Q			V
21+35	35.9724	0.76	Q			V
21+40	35.9780	0.80	Q			V
21+45	35.9843	0.92	Q			V
21+50	35.9908	0.94	Q			V
21+55	35.9970	0.90	Q			V
22+ 0	36.0024	0.79	Q			V
22+ 5	36.0077	0.76	Q			V
22+10	36.0132	0.80	Q			V
22+15	36.0195	0.92	Q			V
22+20	36.0260	0.94	Q			V
22+25	36.0323	0.90	Q			V
22+30	36.0377	0.79	Q			V
22+35	36.0428	0.75	Q			V
22+40	36.0478	0.73	Q			V
22+45	36.0527	0.71	Q			V
22+50	36.0575	0.70	Q			V
22+55	36.0623	0.69	Q			V
23+ 0	36.0670	0.69	Q			V
23+ 5	36.0717	0.69	Q			V
23+10	36.0765	0.69	Q			V
23+15	36.0812	0.68	Q			V
23+20	36.0859	0.68	Q			V
23+25	36.0906	0.68	Q			V
23+30	36.0953	0.68	Q			V
23+35	36.1000	0.68	Q			V
23+40	36.1047	0.68	Q			V
23+45	36.1094	0.68	Q			V
23+50	36.1141	0.68	Q			V
23+55	36.1188	0.68	Q			V
24+ 0	36.1235	0.68	Q			V
24+ 5	36.1280	0.65	Q			V
24+10	36.1316	0.53	Q			V
24+15	36.1335	0.27	Q			V
24+20	36.1346	0.16	Q			V
24+25	36.1353	0.10	Q			V
24+30	36.1357	0.06	Q			V
24+35	36.1360	0.04	Q			V
24+40	36.1362	0.02	Q			V

24+45	36.1362	0.01	Q				V
24+50	36.1363	0.01	Q				V
24+55	36.1364	0.01	Q				V
25+ 0	36.1364	0.00	Q				V
25+ 5	36.1364	0.00	Q				V
25+10	36.1364	0.00	Q				V

ONSITE HYDROLOGY
100-YEAR STORM EVENT

ONSITE HYDROLOGY
100-YEAR STORM EVENT

UNDEVELOPED CONDITION

STORM DURATION	Alt. No. 1 A = 15.95		Alt. No. 2 A = 12.8		Alt. No. 3 A = 5.9		Alt. No. 4 A = 16.3 Pref. Alt.	
	Vol. $_{100}$	Q_{100}	Vol. $_{100}$	Q_{100}	Vol. $_{100}$	Q_{100}	Vol. $_{100}$	Q_{100}
24-Hour	4.1	10.7	3.3	8.6	1.5	4.0	4.2	10.9
6-Hour	2.6	24.6	2.1	19.7	1.0	9.1	2.7	25.1
3-Hour	2.1	27.2	1.7	21.9	0.8	10.0	2.1	27.8
1-Hour	1.4	44.3	1.1	35.5	0.5	16.4	1.4	45.2

DEVELOPED CONDITION

STORM DURATION	Alt. No. 1 A = 15.95		Alt. No. 2 A = 12.8		Alt. No. 3 A = 5.9		Alt. No. 4 A = 16.3 Pref. Alt.	
24-Hour	6.1	12.1	4.9	9.7	2.2	4.5	6.2	12.4
6-Hour	3.4	28.0	2.7	22.4	1.3	10.3	3.5	28.6
3-Hour	2.5	29.6	2.0	23.8	0.9	11.0	2.6	30.3
1-Hour	1.5	42.6	1.2	34.2	0.6	15.7	1.5	43.5

ALTERNATIVE NO. 1

UNDEVELOPED CONDITION

sobonalt11100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt11100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	0.55	8.77

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	1.20	19.14

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	86.00	0.000

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.156
2	0.167	194.180	55.366	8.900
3	0.250	291.271	18.995	3.053
4	0.333	388.361	7.769	1.249
5	0.417	485.451	2.779	0.447
6	0.500	582.541	0.892	0.143
7	0.583	679.631	0.599	0.096
8	0.667	776.721	0.191	0.031
		Sum =	100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.176	---	0.43
2	0.17	4.30	0.619	0.176	---	0.44
3	0.25	5.00	0.720	0.176	---	0.54
4	0.33	5.00	0.720	0.176	---	0.54
5	0.42	5.80	0.835	0.176	---	0.66
6	0.50	6.50	0.936	0.176	---	0.76
7	0.58	7.40	1.065	0.176	---	0.89
8	0.67	8.60	1.238	0.176	---	1.06
9	0.75	12.30	1.771	0.176	---	1.60
10	0.83	29.10	4.190	0.176	---	4.01
11	0.92	6.80	0.979	0.176	---	0.80
12	1.00	5.00	0.720	0.176	---	0.54
Sum =		100.0			Sum =	12.3

Flood volume = Effective rainfall 1.02(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.233(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 59301.2 Cubic Feet
Total soil loss = 10167.0 Cubic Feet

Peak flow rate of this hydrograph = 44.265(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 12.5 25.0 37.5 50.0
0+ 5	0.0064	0.93	Q
0+10	0.0393	4.78	V Q
0+15	0.0836	6.43	V Q
0+20	0.1381	7.91	V Q
0+25	0.1978	8.68	VQ
0+30	0.2675	10.11	VQ
0+35	0.3483	11.73	QV
0+40	0.4429	13.74	Q V
0+45	0.5601	17.01	Q V
0+50	0.7510	27.72	Q
0+55	1.0559	44.27	V Q
1+ 0	1.2162	23.28	Q V
1+ 5	1.3077	13.29	Q V
1+10	1.3409	4.82	Q V
1+15	1.3533	1.80	Q V
1+20	1.3588	0.79	Q V
1+25	1.3607	0.28	Q V
1+30	1.3613	0.08	Q V
1+35	1.3614	0.02	Q V

sobonalt13100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt13100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	0.90	14.36

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	2.10	33.49

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	86.00	0.000

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt13100
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.156
2	0.167	194.180	55.366	8.900
3	0.250	291.271	18.995	3.053
4	0.333	388.361	7.769	1.249
5	0.417	485.451	2.779	0.447
6	0.500	582.541	0.892	0.143
7	0.583	679.631	0.599	0.096
8	0.667	776.721	0.191	0.031
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.176	---	0.15
2	0.17	1.30	0.328	0.176	---	0.15
3	0.25	1.10	0.277	0.176	---	0.10
4	0.33	1.50	0.378	0.176	---	0.20
5	0.42	1.50	0.378	0.176	---	0.20
6	0.50	1.80	0.454	0.176	---	0.28
7	0.58	1.50	0.378	0.176	---	0.20
8	0.67	1.80	0.454	0.176	---	0.28
9	0.75	1.80	0.454	0.176	---	0.28
10	0.83	1.50	0.378	0.176	---	0.20
11	0.92	1.60	0.403	0.176	---	0.23
12	1.00	1.80	0.454	0.176	---	0.28
13	1.08	2.20	0.554	0.176	---	0.38
14	1.17	2.20	0.554	0.176	---	0.38
15	1.25	2.20	0.554	0.176	---	0.38
16	1.33	2.00	0.504	0.176	---	0.33
17	1.42	2.60	0.655	0.176	---	0.48
18	1.50	2.70	0.680	0.176	---	0.50
19	1.58	2.40	0.605	0.176	---	0.43
20	1.67	2.70	0.680	0.176	---	0.50
21	1.75	3.30	0.832	0.176	---	0.66
22	1.83	3.10	0.781	0.176	---	0.61
23	1.92	2.90	0.731	0.176	---	0.56
24	2.00	3.00	0.756	0.176	---	0.58
25	2.08	3.10	0.781	0.176	---	0.61
26	2.17	4.20	1.058	0.176	---	0.88
27	2.25	5.00	1.260	0.176	---	1.08
28	2.33	3.50	0.882	0.176	---	0.71
29	2.42	6.80	1.713	0.176	---	1.54
30	2.50	7.30	1.839	0.176	---	1.66
31	2.58	8.20	2.066	0.176	---	1.89
32	2.67	5.90	1.487	0.176	---	1.31
33	2.75	2.00	0.504	0.176	---	0.33
34	2.83	1.80	0.454	0.176	---	0.28
35	2.92	1.80	0.454	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.9

Flood volume = Effective rainfall 1.58(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 2.1(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 0.696(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 91268.2 Cubic Feet
Total soil loss = 30310.2 Cubic Feet

Peak flow rate of this hydrograph = 27.242(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0023	0.33	Q				
0+10	0.0138	1.68	V Q				

sobonalt13100

0+15	0.0279	2.04	V Q
0+20	0.0416	2.00	V Q
0+25	0.0609	2.81	V Q
0+30	0.0832	3.24	V Q
0+35	0.1098	3.86	V Q
0+40	0.1348	3.63	V Q
0+45	0.1636	4.17	V Q
0+50	0.1924	4.19	V Q
0+55	0.2175	3.65	Q
1+ 0	0.2435	3.78	VQ
1+ 5	0.2741	4.43	Q
1+10	0.3119	5.49	V Q
1+15	0.3522	5.86	VQ
1+20	0.3928	5.90	Q
1+25	0.4329	5.83	QV
1+30	0.4818	7.09	Q
1+35	0.5339	7.56	Q
1+40	0.5842	7.30	Q V
1+45	0.6404	8.16	Q V
1+50	0.7062	9.56	QV
1+55	0.7720	9.54	Q V
2+ 0	0.8354	9.21	Q V
2+ 5	0.8998	9.35	Q V
2+10	0.9700	10.19	Q V
2+15	1.0608	13.19	Q V
2+20	1.1644	15.05	Q V
2+25	1.2639	14.45	Q V
2+30	1.4110	21.35	V Q
2+35	1.5843	25.16	V Q
2+40	1.7719	27.24	V Q
2+45	1.9176	21.16	Q V
2+50	1.9931	10.96	Q V
2+55	2.0411	6.97	Q V
3+ 0	2.0743	4.83	Q V
3+ 5	2.0874	1.90	Q V
3+10	2.0926	0.75	Q V
3+15	2.0943	0.25	Q V
3+20	2.0949	0.08	Q V
3+25	2.0952	0.04	Q V
3+30	2.0952	0.01	Q V
3+35	2.0952	0.00	Q V

sobonalt16100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt16100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	1.40	22.33

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	3.00	47.85

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 3.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	86.00	0.000

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt16100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.156
2	0.167	194.180	55.366	8.900
3	0.250	291.271	18.995	3.053
4	0.333	388.361	7.769	1.249
5	0.417	485.451	2.779	0.447
6	0.500	582.541	0.892	0.143
7	0.583	679.631	0.599	0.096
8	0.667	776.721	0.191	0.031
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.216	0.176	---	0.04
3	0.25	0.60	0.216	0.176	---	0.04
4	0.33	0.60	0.216	0.176	---	0.04
5	0.42	0.60	0.216	0.176	---	0.04
6	0.50	0.70	0.252	0.176	---	0.08
7	0.58	0.70	0.252	0.176	---	0.08
8	0.67	0.70	0.252	0.176	---	0.08
9	0.75	0.70	0.252	0.176	---	0.08
10	0.83	0.70	0.252	0.176	---	0.08
11	0.92	0.70	0.252	0.176	---	0.08
12	1.00	0.80	0.288	0.176	---	0.11
13	1.08	0.80	0.288	0.176	---	0.11
14	1.17	0.80	0.288	0.176	---	0.11
15	1.25	0.80	0.288	0.176	---	0.11
16	1.33	0.80	0.288	0.176	---	0.11
17	1.42	0.80	0.288	0.176	---	0.11
18	1.50	0.80	0.288	0.176	---	0.11
19	1.58	0.80	0.288	0.176	---	0.11
20	1.67	0.80	0.288	0.176	---	0.11
21	1.75	0.80	0.288	0.176	---	0.11
22	1.83	0.80	0.288	0.176	---	0.11
23	1.92	0.80	0.288	0.176	---	0.11
24	2.00	0.90	0.324	0.176	---	0.15
25	2.08	0.80	0.288	0.176	---	0.11
26	2.17	0.90	0.324	0.176	---	0.15
27	2.25	0.90	0.324	0.176	---	0.15
28	2.33	0.90	0.324	0.176	---	0.15
29	2.42	0.90	0.324	0.176	---	0.15
30	2.50	0.90	0.324	0.176	---	0.15
31	2.58	0.90	0.324	0.176	---	0.15
32	2.67	0.90	0.324	0.176	---	0.15
33	2.75	1.00	0.360	0.176	---	0.18
34	2.83	1.00	0.360	0.176	---	0.18
35	2.92	1.00	0.360	0.176	---	0.18
36	3.00	1.00	0.360	0.176	---	0.18
37	3.08	1.00	0.360	0.176	---	0.18
38	3.17	1.10	0.396	0.176	---	0.22
39	3.25	1.10	0.396	0.176	---	0.22
40	3.33	1.10	0.396	0.176	---	0.22
41	3.42	1.20	0.432	0.176	---	0.26
42	3.50	1.30	0.468	0.176	---	0.29
43	3.58	1.40	0.504	0.176	---	0.33
44	3.67	1.40	0.504	0.176	---	0.33
45	3.75	1.50	0.540	0.176	---	0.36
46	3.83	1.50	0.540	0.176	---	0.36
47	3.92	1.60	0.576	0.176	---	0.40
48	4.00	1.60	0.576	0.176	---	0.40
49	4.08	1.70	0.612	0.176	---	0.44
50	4.17	1.80	0.648	0.176	---	0.47
51	4.25	1.90	0.684	0.176	---	0.51
52	4.33	2.00	0.720	0.176	---	0.54
53	4.42	2.10	0.756	0.176	---	0.58
54	4.50	2.10	0.756	0.176	---	0.58
55	4.58	2.20	0.792	0.176	---	0.62
56	4.67	2.30	0.828	0.176	---	0.65
57	4.75	2.40	0.864	0.176	---	0.69
58	4.83	2.40	0.864	0.176	---	0.69

59	4.92	2.50	0.900	0.176	---	0.72
60	5.00	2.60	0.936	0.176	---	0.76
61	5.08	3.10	1.116	0.176	---	0.94
62	5.17	3.60	1.296	0.176	---	1.12
63	5.25	3.90	1.404	0.176	---	1.23
64	5.33	4.20	1.512	0.176	---	1.34
65	5.42	4.70	1.692	0.176	---	1.52
66	5.50	5.60	2.016	0.176	---	1.84
67	5.58	1.90	0.684	0.176	---	0.51
68	5.67	0.90	0.324	0.176	---	0.15
69	5.75	0.60	0.216	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 2.6(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 1.379(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 113597.0 Cubic Feet
Total soil loss = 60089.0 Cubic Feet

Peak flow rate of this hydrograph = 24.609(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 7.5 15.0 22.5 30.0
0+ 5	0.0001	0.01	Q
0+10	0.0009	0.13	Q
0+15	0.0041	0.46	Q
0+20	0.0081	0.58	Q
0+25	0.0124	0.62	Q
0+30	0.0173	0.72	Q
0+35	0.0245	1.04	VQ
0+40	0.0324	1.16	VQ
0+45	0.0407	1.20	VQ
0+50	0.0491	1.22	VQ
0+55	0.0575	1.22	VQ
1+ 0	0.0665	1.31	|Q
1+ 5	0.0777	1.63	|VQ
1+10	0.0897	1.74	|VQ
1+15	0.1020	1.78	|VQ
1+20	0.1144	1.80	|VQ
1+25	0.1268	1.80	|VQ
1+30	0.1392	1.81	| Q
1+35	0.1517	1.81	| Q
1+40	0.1641	1.81	| Q
1+45	0.1766	1.81	| Q
1+50	0.1890	1.81	| Q
1+55	0.2014	1.81	| QV
2+ 0	0.2144	1.89	| QV
2+ 5	0.2291	2.13	| QV
2+10	0.2428	2.00	| QV
2+15	0.2583	2.25	| Q
2+20	0.2744	2.33	| QV
2+25	0.2907	2.37	| QV
2+30	0.3071	2.38	| QV
2+35	0.3235	2.38	| QV
2+40	0.3399	2.39	| Q V
2+45	0.3569	2.46	| Q V
2+50	0.3761	2.78	| Q V
2+55	0.3960	2.89	| Q V
3+ 0	0.4162	2.94	| Q V
3+ 5	0.4366	2.96	| Q V
3+10	0.4575	3.04	| Q V
3+15	0.4807	3.36	| Q V
3+20	0.5046	3.47	| Q V
3+25	0.5294	3.60	| Q V
3+30	0.5570	4.01	| Q V
3+35	0.5881	4.52	| Q V
3+40	0.6226	5.00	| Q V
3+45	0.6588	5.25	| Q V

sobonalt16100

3+50	0.6976	5.64	
3+55	0.7379	5.85	
4+ 0	0.7808	6.23	
4+ 5	0.8251	6.44	
4+10	0.8725	6.88	
4+15	0.9236	7.41	
4+20	0.9785	7.97	
4+25	1.0373	8.54	
4+30	1.0996	9.04	
4+35	1.1636	9.30	
4+40	1.2309	9.77	
4+45	1.3019	10.30	
4+50	1.3762	10.79	
4+55	1.4522	11.04	
5+ 0	1.5314	11.51	
5+ 5	1.6165	12.35	
5+10	1.7164	14.51	
5+15	1.8332	16.96	
5+20	1.9637	18.95	
5+25	2.1079	20.94	
5+30	2.2719	23.82	
5+35	2.4414	24.61	
5+40	2.5328	13.27	
5+45	2.5761	6.28	
5+50	2.5945	2.66	
5+55	2.6017	1.05	
6+ 0	2.6054	0.54	
6+ 5	2.6071	0.25	
6+10	2.6076	0.07	
6+15	2.6078	0.02	
6+20	2.6078	0.01	
6+25	2.6078	0.00	
6+30	2.6078	0.00	
6+35	2.6078	0.00	

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt124100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	2.25	35.89

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	6.00	95.70

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	86.00	0.000

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt124100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.156
2	0.167	194.180	55.366	8.900
3	0.250	291.271	18.995	3.053
4	0.333	388.361	7.769	1.249
5	0.417	485.451	2.779	0.447
6	0.500	582.541	0.892	0.143
7	0.583	679.631	0.599	0.096
8	0.667	776.721	0.191	0.031
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.130	0.01
47	3.92	0.20	0.144	0.258	0.130	0.01
48	4.00	0.20	0.144	0.257	0.130	0.01
49	4.08	0.20	0.144	0.256	0.130	0.01
50	4.17	0.20	0.144	0.255	0.130	0.01
51	4.25	0.20	0.144	0.254	0.130	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02

59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.130	0.01
62	5.17	0.20	0.144	0.242	0.130	0.01
63	5.25	0.20	0.144	0.241	0.130	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.08
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.16
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.384	0.201	---	0.18
104	8.67	0.53	0.384	0.200	---	0.18
105	8.75	0.53	0.384	0.199	---	0.18
106	8.83	0.57	0.408	0.198	---	0.21
107	8.92	0.57	0.408	0.197	---	0.21
108	9.00	0.57	0.408	0.196	---	0.21
109	9.08	0.63	0.456	0.195	---	0.26
110	9.17	0.63	0.456	0.195	---	0.26
111	9.25	0.63	0.456	0.194	---	0.26
112	9.33	0.67	0.480	0.193	---	0.29
113	9.42	0.67	0.480	0.192	---	0.29
114	9.50	0.67	0.480	0.191	---	0.29
115	9.58	0.70	0.504	0.190	---	0.31
116	9.67	0.70	0.504	0.189	---	0.31
117	9.75	0.70	0.504	0.188	---	0.32
118	9.83	0.73	0.528	0.187	---	0.34
119	9.92	0.73	0.528	0.186	---	0.34
120	10.00	0.73	0.528	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.18
122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.480	0.179	---	0.30
128	10.67	0.67	0.480	0.178	---	0.30
129	10.75	0.67	0.480	0.177	---	0.30
130	10.83	0.67	0.480	0.177	---	0.30
131	10.92	0.67	0.480	0.176	---	0.30
132	11.00	0.67	0.480	0.175	---	0.31
133	11.08	0.63	0.456	0.174	---	0.28
134	11.17	0.63	0.456	0.173	---	0.28
135	11.25	0.63	0.456	0.172	---	0.28
136	11.33	0.63	0.456	0.171	---	0.28
137	11.42	0.63	0.456	0.171	---	0.29

138	11.50	0.63	0.456	0.170	---	0.29
139	11.58	0.57	0.408	0.169	---	0.24
140	11.67	0.57	0.408	0.168	---	0.24
141	11.75	0.57	0.408	0.167	---	0.24
142	11.83	0.60	0.432	0.166	---	0.27
143	11.92	0.60	0.432	0.166	---	0.27
144	12.00	0.60	0.432	0.165	---	0.27
145	12.08	0.83	0.600	0.164	---	0.44
146	12.17	0.83	0.600	0.163	---	0.44
147	12.25	0.83	0.600	0.162	---	0.44
148	12.33	0.87	0.624	0.161	---	0.46
149	12.42	0.87	0.624	0.161	---	0.46
150	12.50	0.87	0.624	0.160	---	0.46
151	12.58	0.93	0.672	0.159	---	0.51
152	12.67	0.93	0.672	0.158	---	0.51
153	12.75	0.93	0.672	0.157	---	0.51
154	12.83	0.97	0.696	0.157	---	0.54
155	12.92	0.97	0.696	0.156	---	0.54
156	13.00	0.97	0.696	0.155	---	0.54
157	13.08	1.13	0.816	0.154	---	0.66
158	13.17	1.13	0.816	0.154	---	0.66
159	13.25	1.13	0.816	0.153	---	0.66
160	13.33	1.13	0.816	0.152	---	0.66
161	13.42	1.13	0.816	0.151	---	0.66
162	13.50	1.13	0.816	0.150	---	0.67
163	13.58	0.77	0.552	0.150	---	0.40
164	13.67	0.77	0.552	0.149	---	0.40
165	13.75	0.77	0.552	0.148	---	0.40
166	13.83	0.77	0.552	0.147	---	0.40
167	13.92	0.77	0.552	0.147	---	0.41
168	14.00	0.77	0.552	0.146	---	0.41
169	14.08	0.90	0.648	0.145	---	0.50
170	14.17	0.90	0.648	0.144	---	0.50
171	14.25	0.90	0.648	0.144	---	0.50
172	14.33	0.87	0.624	0.143	---	0.48
173	14.42	0.87	0.624	0.142	---	0.48
174	14.50	0.87	0.624	0.141	---	0.48
175	14.58	0.87	0.624	0.141	---	0.48
176	14.67	0.87	0.624	0.140	---	0.48
177	14.75	0.87	0.624	0.139	---	0.48
178	14.83	0.83	0.600	0.139	---	0.46
179	14.92	0.83	0.600	0.138	---	0.46
180	15.00	0.83	0.600	0.137	---	0.46
181	15.08	0.80	0.576	0.136	---	0.44
182	15.17	0.80	0.576	0.136	---	0.44
183	15.25	0.80	0.576	0.135	---	0.44
184	15.33	0.77	0.552	0.134	---	0.42
185	15.42	0.77	0.552	0.134	---	0.42
186	15.50	0.77	0.552	0.133	---	0.42
187	15.58	0.63	0.456	0.132	---	0.32
188	15.67	0.63	0.456	0.132	---	0.32
189	15.75	0.63	0.456	0.131	---	0.33
190	15.83	0.63	0.456	0.130	---	0.33
191	15.92	0.63	0.456	0.130	---	0.33
192	16.00	0.63	0.456	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01

217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00
Sum =		100.0			Sum =	36.9

Flood volume = Effective rainfall 3.08(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 4.1(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 3.885(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 178131.1 Cubic Feet

Total soil loss = 169249.1 Cubic Feet

Peak flow rate of this hydrograph = 10.672(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0001	0.01	Q
0+10	0.0004	0.05	Q
0+15	0.0009	0.07	Q
0+20	0.0014	0.08	Q
0+25	0.0022	0.10	Q
0+30	0.0029	0.11	Q
0+35	0.0037	0.11	Q
0+40	0.0045	0.12	Q
0+45	0.0053	0.12	Q
0+50	0.0061	0.12	Q
0+55	0.0071	0.14	Q
1+ 0	0.0081	0.15	Q
1+ 5	0.0091	0.15	Q
1+10	0.0100	0.13	Q
1+15	0.0108	0.12	Q
1+20	0.0117	0.12	Q
1+25	0.0125	0.12	Q
1+30	0.0133	0.12	Q
1+35	0.0141	0.12	Q
1+40	0.0149	0.12	Q
1+45	0.0157	0.12	Q
1+50	0.0165	0.12	Q
1+55	0.0175	0.14	Q
2+ 0	0.0185	0.15	Q
2+ 5	0.0195	0.15	Q
2+10	0.0206	0.15	Q
2+15	0.0217	0.15	Q
2+20	0.0227	0.15	Q
2+25	0.0238	0.15	Q
2+30	0.0249	0.15	Q
2+35	0.0260	0.16	Q
2+40	0.0272	0.18	Q
2+45	0.0285	0.19	Q
2+50	0.0298	0.19	Q
2+55	0.0311	0.19	Q
3+ 0	0.0325	0.19	Q
3+ 5	0.0338	0.19	Q
3+10	0.0351	0.19	Q
3+15	0.0365	0.19	Q
3+20	0.0378	0.19	Q
3+25	0.0391	0.19	Q
3+30	0.0404	0.19	Q
3+35	0.0418	0.19	Q
3+40	0.0431	0.19	Q
3+45	0.0444	0.19	Q
3+50	0.0458	0.20	Q
3+55	0.0473	0.22	Q
4+ 0	0.0489	0.23	Q
4+ 5	0.0505	0.23	Q
4+10	0.0520	0.23	Q
4+15	0.0536	0.23	Q
4+20	0.0553	0.24	Q
4+25	0.0570	0.26	Q
4+30	0.0589	0.27	Q
4+35	0.0607	0.27	Q
4+40	0.0626	0.27	Q
4+45	0.0644	0.27	Q
4+50	0.0663	0.28	Q
4+55	0.0684	0.30	Q
5+ 0	0.0705	0.30	Q
5+ 5	0.0725	0.30	Q
5+10	0.0743	0.26	Q
5+15	0.0759	0.24	Q
5+20	0.0776	0.24	Q
5+25	0.0794	0.26	Q
5+30	0.0812	0.27	Q

5+35	0.0831	0.27	Q
5+40	0.0851	0.30	Q
5+45	0.0872	0.30	Q
5+50	0.0893	0.31	Q
5+55	0.0915	0.31	Q
6+ 0	0.0936	0.31	Q
6+ 5	0.0957	0.31	Q
6+10	0.0980	0.34	Q
6+15	0.1004	0.34	Q
6+20	0.1028	0.35	QV
6+25	0.1052	0.35	QV
6+30	0.1076	0.35	QV
6+35	0.1099	0.33	QV
6+40	0.1118	0.28	QV
6+45	0.1137	0.27	QV
6+50	0.1156	0.28	QV
6+55	0.1176	0.29	QV
7+ 0	0.1197	0.31	QV
7+ 5	0.1219	0.32	QV
7+10	0.1243	0.34	QV
7+15	0.1267	0.35	QV
7+20	0.1296	0.42	QV
7+25	0.1341	0.65	Q
7+30	0.1392	0.74	Q
7+35	0.1450	0.84	Q
7+40	0.1524	1.08	VQ
7+45	0.1605	1.17	VQ
7+50	0.1692	1.27	VQ
7+55	0.1796	1.51	V Q
8+ 0	0.1907	1.60	V Q
8+ 5	0.2027	1.76	V Q
8+10	0.2180	2.21	V Q
8+15	0.2343	2.38	V Q
8+20	0.2512	2.45	V Q
8+25	0.2684	2.49	V Q
8+30	0.2857	2.51	V Q
8+35	0.3035	2.58	V Q
8+40	0.3229	2.81	V Q
8+45	0.3429	2.90	V Q
8+50	0.3635	3.00	V Q
8+55	0.3858	3.24	V Q
9+ 0	0.4088	3.33	V Q
9+ 5	0.4328	3.48	V Q
9+10	0.4599	3.94	V Q
9+15	0.4881	4.10	V Q
9+20	0.5173	4.23	V Q
9+25	0.5481	4.48	V Q
9+30	0.5796	4.58	V Q
9+35	0.6118	4.68	V Q
9+40	0.6457	4.92	V Q
9+45	0.6802	5.01	V Q
9+50	0.7154	5.11	V Q
9+55	0.7522	5.35	V Q
10+ 0	0.7897	5.44	V Q
10+ 5	0.8250	5.12	V Q
10+10	0.8501	3.65	QV
10+15	0.8719	3.16	Q V
10+20	0.8923	2.96	Q V
10+25	0.9123	2.90	Q V
10+30	0.9322	2.90	Q V
10+35	0.9540	3.15	Q V
10+40	0.9831	4.23	QV
10+45	1.0148	4.61	Q
10+50	1.0477	4.77	QV
10+55	1.0811	4.84	QV
11+ 0	1.1146	4.87	QV
11+ 5	1.1480	4.85	Q V
11+10	1.1800	4.65	Q V
11+15	1.2116	4.59	Q V
11+20	1.2431	4.57	Q V
11+25	1.2747	4.58	Q V
11+30	1.3063	4.59	Q V
11+35	1.3372	4.50	Q V
11+40	1.3653	4.08	Q V
11+45	1.3925	3.95	Q V
11+50	1.4197	3.95	Q V
11+55	1.4484	4.16	Q V
12+ 0	1.4776	4.24	Q V
12+ 5	1.5095	4.64	Q V

sobonalt124100

12+10	1.5519	6.16	
12+15	1.5980	6.69	
12+20	1.6460	6.97	
12+25	1.6960	7.27	
12+30	1.7468	7.38	
12+35	1.7988	7.54	
12+40	1.8539	8.00	
12+45	1.9101	8.16	
12+50	1.9671	8.29	
12+55	2.0259	8.54	
13+ 0	2.0853	8.63	
13+ 5	2.1469	8.93	
13+10	2.2159	10.03	
13+15	2.2876	10.41	
13+20	2.3605	10.58	
13+25	2.4338	10.64	
13+30	2.5073	10.67	
13+35	2.5770	10.13	
13+40	2.6307	7.79	
13+45	2.6789	7.00	
13+50	2.7249	6.68	
13+55	2.7701	6.57	
14+ 0	2.8152	6.55	
14+ 5	2.8617	6.74	
14+10	2.9140	7.60	
14+15	2.9685	7.91	
14+20	3.0235	7.99	
14+25	3.0774	7.83	
14+30	3.1310	7.78	
14+35	3.1845	7.77	
14+40	3.2380	7.77	
14+45	3.2916	7.78	
14+50	3.3449	7.74	
14+55	3.3968	7.54	
15+ 0	3.4483	7.48	
15+ 5	3.4993	7.40	
15+10	3.5489	7.19	
15+15	3.5979	7.13	
15+20	3.6465	7.05	
15+25	3.6936	6.84	
15+30	3.7403	6.77	
15+35	3.7853	6.55	
15+40	3.8245	5.69	
15+45	3.8618	5.40	
15+50	3.8982	5.29	
15+55	3.9344	5.26	
16+ 0	3.9706	5.26	
16+ 5	4.0021	4.57	
16+10	4.0142	1.75	
16+15	4.0195	0.78	
16+20	4.0221	0.38	
16+25	4.0238	0.24	
16+30	4.0251	0.19	
16+35	4.0262	0.16	
16+40	4.0271	0.13	
16+45	4.0279	0.12	
16+50	4.0288	0.12	
16+55	4.0296	0.12	
17+ 0	4.0304	0.12	
17+ 5	4.0312	0.13	
17+10	4.0324	0.17	
17+15	4.0335	0.16	
17+20	4.0339	0.06	
17+25	4.0342	0.04	
17+30	4.0344	0.03	
17+35	4.0347	0.04	
17+40	4.0350	0.04	
17+45	4.0353	0.05	
17+50	4.0358	0.07	
17+55	4.0367	0.12	
18+ 0	4.0377	0.14	
18+ 5	4.0387	0.15	
18+10	4.0398	0.15	
18+15	4.0408	0.15	
18+20	4.0419	0.15	
18+25	4.0429	0.15	
18+30	4.0440	0.15	
18+35	4.0450	0.15	
18+40	4.0459	0.13	

18+45	4.0467	0.12	Q				V
18+50	4.0475	0.11	Q				V
18+55	4.0481	0.09	Q				V
19+ 0	4.0487	0.08	Q				V
19+ 5	4.0493	0.08	Q				V
19+10	4.0500	0.10	Q				V
19+15	4.0508	0.11	Q				V
19+20	4.0516	0.12	Q				V
19+25	4.0526	0.14	Q				V
19+30	4.0536	0.15	Q				V
19+35	4.0546	0.15	Q				V
19+40	4.0555	0.13	Q				V
19+45	4.0563	0.12	Q				V
19+50	4.0571	0.11	Q				V
19+55	4.0577	0.09	Q				V
20+ 0	4.0583	0.08	Q				V
20+ 5	4.0589	0.08	Q				V
20+10	4.0596	0.10	Q				V
20+15	4.0603	0.11	Q				V
20+20	4.0611	0.11	Q				V
20+25	4.0619	0.12	Q				V
20+30	4.0627	0.12	Q				V
20+35	4.0635	0.12	Q				V
20+40	4.0643	0.12	Q				V
20+45	4.0651	0.12	Q				V
20+50	4.0659	0.11	Q				V
20+55	4.0665	0.09	Q				V
21+ 0	4.0670	0.08	Q				V
21+ 5	4.0676	0.08	Q				V
21+10	4.0683	0.10	Q				V
21+15	4.0691	0.11	Q				V
21+20	4.0699	0.11	Q				V
21+25	4.0705	0.09	Q				V
21+30	4.0710	0.08	Q				V
21+35	4.0716	0.08	Q				V
21+40	4.0723	0.10	Q				V
21+45	4.0731	0.11	Q				V
21+50	4.0739	0.11	Q				V
21+55	4.0745	0.09	Q				V
22+ 0	4.0750	0.08	Q				V
22+ 5	4.0756	0.08	Q				V
22+10	4.0763	0.10	Q				V
22+15	4.0771	0.11	Q				V
22+20	4.0778	0.11	Q				V
22+25	4.0784	0.09	Q				V
22+30	4.0790	0.08	Q				V
22+35	4.0796	0.08	Q				V
22+40	4.0801	0.08	Q				V
22+45	4.0806	0.08	Q				V
22+50	4.0812	0.08	Q				V
22+55	4.0817	0.08	Q				V
23+ 0	4.0822	0.08	Q				V
23+ 5	4.0827	0.08	Q				V
23+10	4.0833	0.08	Q				V
23+15	4.0838	0.08	Q				V
23+20	4.0843	0.08	Q				V
23+25	4.0849	0.08	Q				V
23+30	4.0854	0.08	Q				V
23+35	4.0859	0.08	Q				V
23+40	4.0865	0.08	Q				V
23+45	4.0870	0.08	Q				V
23+50	4.0875	0.08	Q				V
23+55	4.0881	0.08	Q				V
24+ 0	4.0886	0.08	Q				V
24+ 5	4.0891	0.07	Q				V
24+10	4.0892	0.02	Q				V
24+15	4.0893	0.01	Q				V
24+20	4.0893	0.00	Q				V
24+25	4.0893	0.00	Q				V
24+30	4.0893	0.00	Q				V
24+35	4.0893	0.00	Q				V

DEVELOPED CONDITION

sobonalt1d1100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt1d1100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	0.55	8.77

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	1.20	19.14

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
		Sum = 100.000	Sum=	16.075

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.071	---	0.53
2	0.17	4.30	0.619	0.071	---	0.55
3	0.25	5.00	0.720	0.071	---	0.65
4	0.33	5.00	0.720	0.071	---	0.65
5	0.42	5.80	0.835	0.071	---	0.76
6	0.50	6.50	0.936	0.071	---	0.87
7	0.58	7.40	1.065	0.071	---	0.99
8	0.67	8.60	1.238	0.071	---	1.17
9	0.75	12.30	1.771	0.071	---	1.70
10	0.83	29.10	4.190	0.071	---	4.12
11	0.92	6.80	0.979	0.071	---	0.91
12	1.00	5.00	0.720	0.071	---	0.65
Sum =		100.0			Sum =	13.5

Flood volume = Effective rainfall 1.13(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 1.5(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.094(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 65367.1 Cubic Feet
Total soil loss = 4101.1 Cubic Feet

Peak flow rate of this hydrograph = 42.579(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0243	3.53	V Q				
0+10	0.0792	7.96	V Q				
0+15	0.1436	9.36	V Q				
0+20	0.2145	10.30	V Q				
0+25	0.2915	11.18	VQ				
0+30	0.3797	12.80	Q				
0+35	0.4803	14.61	QV				
0+40	0.5970	16.94	Q V				
0+45	0.7488	22.04	Q V				
0+50	1.0421	42.58			V	Q	
0+55	1.3291	41.67				Q V	
1+ 0	1.4442	16.72	Q			V	
1+ 5	1.4934	7.14	Q			V	
1+10	1.4997	0.92	Q			V	
1+15	1.5006	0.13	Q			V	

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt1d3100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	0.90	14.36

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	2.10	33.49

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph

sobonalt1d3100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
			Sum = 100.000	Sum= 16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.071	---	0.26
2	0.17	1.30	0.328	0.071	---	0.26
3	0.25	1.10	0.277	0.071	---	0.21
4	0.33	1.50	0.378	0.071	---	0.31
5	0.42	1.50	0.378	0.071	---	0.31
6	0.50	1.80	0.454	0.071	---	0.38
7	0.58	1.50	0.378	0.071	---	0.31
8	0.67	1.80	0.454	0.071	---	0.38
9	0.75	1.80	0.454	0.071	---	0.38
10	0.83	1.50	0.378	0.071	---	0.31
11	0.92	1.60	0.403	0.071	---	0.33
12	1.00	1.80	0.454	0.071	---	0.38
13	1.08	2.20	0.554	0.071	---	0.48
14	1.17	2.20	0.554	0.071	---	0.48
15	1.25	2.20	0.554	0.071	---	0.48
16	1.33	2.00	0.504	0.071	---	0.43
17	1.42	2.60	0.655	0.071	---	0.58
18	1.50	2.70	0.680	0.071	---	0.61
19	1.58	2.40	0.605	0.071	---	0.53
20	1.67	2.70	0.680	0.071	---	0.61
21	1.75	3.30	0.832	0.071	---	0.76
22	1.83	3.10	0.781	0.071	---	0.71
23	1.92	2.90	0.731	0.071	---	0.66
24	2.00	3.00	0.756	0.071	---	0.69
25	2.08	3.10	0.781	0.071	---	0.71
26	2.17	4.20	1.058	0.071	---	0.99
27	2.25	5.00	1.260	0.071	---	1.19
28	2.33	3.50	0.882	0.071	---	0.81
29	2.42	6.80	1.713	0.071	---	1.64
30	2.50	7.30	1.839	0.071	---	1.77
31	2.58	8.20	2.066	0.071	---	2.00
32	2.67	5.90	1.487	0.071	---	1.42
33	2.75	2.00	0.504	0.071	---	0.43
34	2.83	1.80	0.454	0.071	---	0.38
35	2.92	1.80	0.454	0.071	---	0.38
36	3.00	0.60	0.151	0.071	---	0.08
Sum =		100.0				Sum = 22.6

Flood volume = Effective rainfall 1.89(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 2.5(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.282(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 109275.2 Cubic Feet
Total soil loss = 12303.2 Cubic Feet

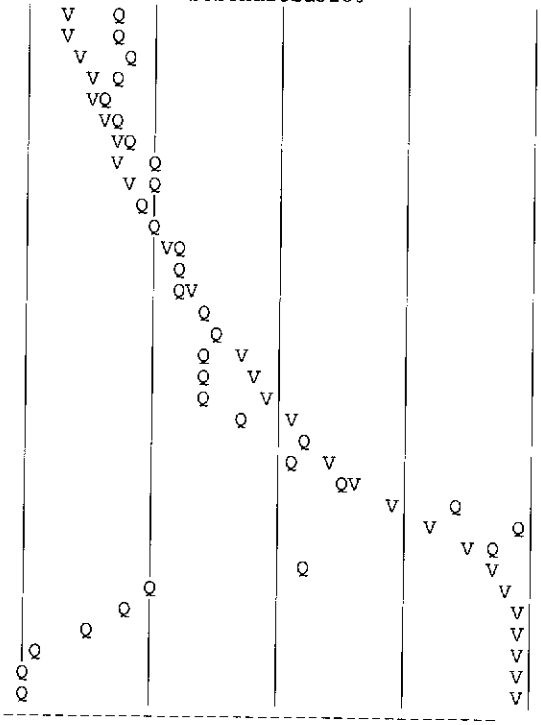
Peak flow rate of this hydrograph = 29.609(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0117	1.70	V Q				
0+10	0.0378	3.78	V Q				
0+15	0.0635	3.75	V Q				
0+20	0.0915	4.05	V Q				
0+25	0.1246	4.81	V Q				
0+30	0.1619	5.42	V Q				

sobonalt1d3100

0+35	0.2002	5.55	
0+40	0.2382	5.53	
0+45	0.2800	6.07	
0+50	0.3189	5.64	
0+55	0.3548	5.21	
1+ 0	0.3937	5.66	
1+ 5	0.4402	6.75	
1+10	0.4928	7.63	
1+15	0.5462	7.76	
1+20	0.5975	7.44	
1+25	0.6528	8.03	
1+30	0.7173	9.37	
1+35	0.7809	9.24	
1+40	0.8442	9.18	
1+45	0.9180	10.72	
1+50	0.9985	11.68	
1+55	1.0751	11.13	
2+ 0	1.1499	10.86	
2+ 5	1.2267	11.16	
2+10	1.3178	13.22	
2+15	1.4337	16.84	
2+20	1.5460	16.30	
2+25	1.6769	19.01	
2+30	1.8574	26.21	
2+35	2.0613	29.61	
2+40	2.2537	27.93	
2+45	2.3708	17.01	
2+50	2.4264	8.07	
2+55	2.4706	6.42	
3+ 0	2.4993	4.17	
3+ 5	2.5073	1.17	
3+10	2.5085	0.17	
3+15	2.5086	0.02	

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt1d6100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	1.40	22.33

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	3.00	47.85

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 3.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt1d6100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.071	---	0.11
2	0.17	0.60	0.216	0.071	---	0.15
3	0.25	0.60	0.216	0.071	---	0.15
4	0.33	0.60	0.216	0.071	---	0.15
5	0.42	0.60	0.216	0.071	---	0.15
6	0.50	0.70	0.252	0.071	---	0.18
7	0.58	0.70	0.252	0.071	---	0.18
8	0.67	0.70	0.252	0.071	---	0.18
9	0.75	0.70	0.252	0.071	---	0.18
10	0.83	0.70	0.252	0.071	---	0.18
11	0.92	0.70	0.252	0.071	---	0.18
12	1.00	0.80	0.288	0.071	---	0.22
13	1.08	0.80	0.288	0.071	---	0.22
14	1.17	0.80	0.288	0.071	---	0.22
15	1.25	0.80	0.288	0.071	---	0.22
16	1.33	0.80	0.288	0.071	---	0.22
17	1.42	0.80	0.288	0.071	---	0.22
18	1.50	0.80	0.288	0.071	---	0.22
19	1.58	0.80	0.288	0.071	---	0.22
20	1.67	0.80	0.288	0.071	---	0.22
21	1.75	0.80	0.288	0.071	---	0.22
22	1.83	0.80	0.288	0.071	---	0.22
23	1.92	0.80	0.288	0.071	---	0.22
24	2.00	0.90	0.324	0.071	---	0.25
25	2.08	0.80	0.288	0.071	---	0.22
26	2.17	0.90	0.324	0.071	---	0.25
27	2.25	0.90	0.324	0.071	---	0.25
28	2.33	0.90	0.324	0.071	---	0.25
29	2.42	0.90	0.324	0.071	---	0.25
30	2.50	0.90	0.324	0.071	---	0.25
31	2.58	0.90	0.324	0.071	---	0.25
32	2.67	0.90	0.324	0.071	---	0.25
33	2.75	1.00	0.360	0.071	---	0.29
34	2.83	1.00	0.360	0.071	---	0.29
35	2.92	1.00	0.360	0.071	---	0.29
36	3.00	1.00	0.360	0.071	---	0.29
37	3.08	1.00	0.360	0.071	---	0.29
38	3.17	1.10	0.396	0.071	---	0.33
39	3.25	1.10	0.396	0.071	---	0.33
40	3.33	1.10	0.396	0.071	---	0.33
41	3.42	1.20	0.432	0.071	---	0.36
42	3.50	1.30	0.468	0.071	---	0.40
43	3.58	1.40	0.504	0.071	---	0.43
44	3.67	1.40	0.504	0.071	---	0.43
45	3.75	1.50	0.540	0.071	---	0.47
46	3.83	1.50	0.540	0.071	---	0.47
47	3.92	1.60	0.576	0.071	---	0.51
48	4.00	1.60	0.576	0.071	---	0.51
49	4.08	1.70	0.612	0.071	---	0.54
50	4.17	1.80	0.648	0.071	---	0.58
51	4.25	1.90	0.684	0.071	---	0.61
52	4.33	2.00	0.720	0.071	---	0.65
53	4.42	2.10	0.756	0.071	---	0.69
54	4.50	2.10	0.756	0.071	---	0.69
55	4.58	2.20	0.792	0.071	---	0.72
56	4.67	2.30	0.828	0.071	---	0.76
57	4.75	2.40	0.864	0.071	---	0.79
58	4.83	2.40	0.864	0.071	---	0.79
59	4.92	2.50	0.900	0.071	---	0.83
60	5.00	2.60	0.936	0.071	---	0.87
61	5.08	3.10	1.116	0.071	---	1.05
62	5.17	3.60	1.296	0.071	---	1.23

63	5.25	3.90	1.404	0.071	---	1.33
64	5.33	4.20	1.512	0.071	---	1.44
65	5.42	4.70	1.692	0.071	---	1.62
66	5.50	5.60	2.016	0.071	---	1.95
67	5.58	1.90	0.684	0.071	---	0.61
68	5.67	0.90	0.324	0.071	---	0.25
69	5.75	0.60	0.216	0.071	---	0.15
70	5.83	0.50	0.180	0.071	---	0.11
71	5.92	0.30	0.108	0.071	---	0.04
72	6.00	0.20	0.072	0.071	---	0.00
Sum =		100.0			Sum =	30.9

Flood volume = Effective rainfall 2.57(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 3.4(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 0.565(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 149079.6 Cubic Feet
Total soil loss = 24606.4 Cubic Feet

Peak flow rate of this hydrograph = 27.950(CFS)

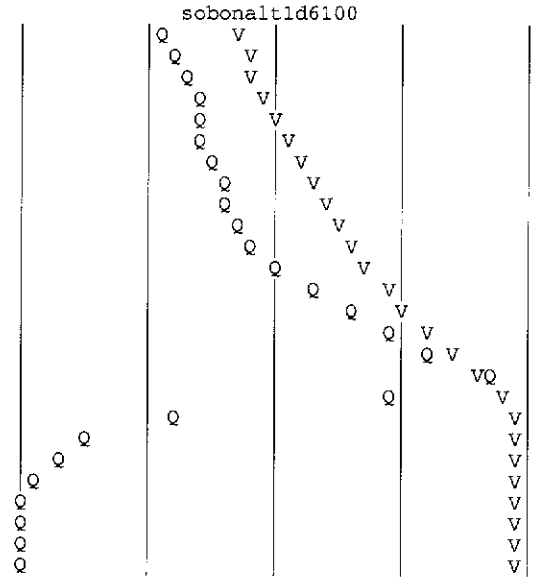
++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 7.5 15.0 22.5 30.0
0+ 5	0.0050	0.72	Q
0+10	0.0177	1.85	V Q
0+15	0.0333	2.26	V Q
0+20	0.0493	2.33	V Q
0+25	0.0654	2.33	V Q
0+30	0.0831	2.57	V Q
0+35	0.1028	2.87	V Q
0+40	0.1229	2.91	V Q
0+45	0.1429	2.91	V Q
0+50	0.1630	2.91	V Q
0+55	0.1831	2.91	VQ
1+ 0	0.2048	3.15	V Q
1+ 5	0.2285	3.44	V Q
1+10	0.2525	3.49	V Q
1+15	0.2765	3.49	VQ
1+20	0.3006	3.49	VQ
1+25	0.3246	3.49	VQ
1+30	0.3487	3.49	Q
1+35	0.3727	3.49	Q
1+40	0.3968	3.49	Q
1+45	0.4208	3.49	Q
1+50	0.4449	3.49	QV
1+55	0.4690	3.49	QV
2+ 0	0.4946	3.73	QV
2+ 5	0.5207	3.79	QV
2+10	0.5467	3.77	QV
2+15	0.5744	4.03	QV
2+20	0.6024	4.06	Q V
2+25	0.6305	4.07	Q V
2+30	0.6585	4.07	Q V
2+35	0.6866	4.07	Q V
2+40	0.7146	4.07	Q V
2+45	0.7443	4.31	Q V
2+50	0.7760	4.60	Q V
2+55	0.8079	4.64	Q V
3+ 0	0.8400	4.65	Q V
3+ 5	0.8720	4.65	Q V
3+10	0.9057	4.89	Q V
3+15	0.9413	5.18	Q V
3+20	0.9773	5.22	Q V
3+25	1.0150	5.47	Q V
3+30	1.0563	6.00	Q V
3+35	1.1015	6.57	Q V
3+40	1.1491	6.91	Q V
3+45	1.1987	7.20	Q V
3+50	1.2503	7.50	Q V
3+55	1.3039	7.78	Q V
4+ 0	1.3595	8.08	Q V
4+ 5	1.4170	8.35	Q V

sobonalt1d6100

4+10	1.4783	8.89	
4+15	1.5434	9.46	
4+20	1.6126	10.04	
4+25	1.6858	10.62	
4+30	1.7613	10.96	
4+35	1.8388	11.25	
4+40	1.9199	11.79	
4+45	2.0051	12.36	
4+50	2.0925	12.70	
4+55	2.1820	12.99	
5+ 0	2.2751	13.52	
5+ 5	2.3787	15.05	
5+10	2.5010	17.75	
5+15	2.6397	20.14	
5+20	2.7910	21.97	
5+25	2.9577	24.20	
5+30	3.1502	27.95	
5+35	3.3017	22.01	
5+40	3.3651	9.21	
5+45	3.3934	4.11	
5+50	3.4093	2.31	
5+55	3.4186	1.35	
6+ 0	3.4218	0.46	
6+ 5	3.4223	0.07	
6+10	3.4224	0.01	
6+15	3.4224	0.00	

sobonalt1d24100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt1d24100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	2.25	35.89

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	6.00	95.70

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

---

sobonalt1d24100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.126	0.009	0.04
2	0.17	0.07	0.048	0.125	0.009	0.04
3	0.25	0.07	0.048	0.125	0.009	0.04
4	0.33	0.10	0.072	0.124	0.013	0.06
5	0.42	0.10	0.072	0.124	0.013	0.06
6	0.50	0.10	0.072	0.123	0.013	0.06
7	0.58	0.10	0.072	0.123	0.013	0.06
8	0.67	0.10	0.072	0.122	0.013	0.06
9	0.75	0.10	0.072	0.122	0.013	0.06
10	0.83	0.13	0.096	0.121	0.017	0.08
11	0.92	0.13	0.096	0.121	0.017	0.08
12	1.00	0.13	0.096	0.120	0.017	0.08
13	1.08	0.10	0.072	0.120	0.013	0.06
14	1.17	0.10	0.072	0.119	0.013	0.06
15	1.25	0.10	0.072	0.119	0.013	0.06
16	1.33	0.10	0.072	0.118	0.013	0.06
17	1.42	0.10	0.072	0.118	0.013	0.06
18	1.50	0.10	0.072	0.117	0.013	0.06
19	1.58	0.10	0.072	0.117	0.013	0.06
20	1.67	0.10	0.072	0.117	0.013	0.06
21	1.75	0.10	0.072	0.116	0.013	0.06
22	1.83	0.13	0.096	0.116	0.017	0.08
23	1.92	0.13	0.096	0.115	0.017	0.08
24	2.00	0.13	0.096	0.115	0.017	0.08
25	2.08	0.13	0.096	0.114	0.017	0.08
26	2.17	0.13	0.096	0.114	0.017	0.08
27	2.25	0.13	0.096	0.113	0.017	0.08
28	2.33	0.13	0.096	0.113	0.017	0.08
29	2.42	0.13	0.096	0.112	0.017	0.08
30	2.50	0.13	0.096	0.112	0.017	0.08
31	2.58	0.17	0.120	0.111	---	0.01
32	2.67	0.17	0.120	0.111	---	0.01
33	2.75	0.17	0.120	0.110	---	0.01
34	2.83	0.17	0.120	0.110	---	0.01
35	2.92	0.17	0.120	0.110	---	0.01
36	3.00	0.17	0.120	0.109	---	0.01
37	3.08	0.17	0.120	0.109	---	0.01
38	3.17	0.17	0.120	0.108	---	0.01
39	3.25	0.17	0.120	0.108	---	0.01
40	3.33	0.17	0.120	0.107	---	0.01
41	3.42	0.17	0.120	0.107	---	0.01
42	3.50	0.17	0.120	0.106	---	0.01
43	3.58	0.17	0.120	0.106	---	0.01
44	3.67	0.17	0.120	0.106	---	0.01
45	3.75	0.17	0.120	0.105	---	0.01
46	3.83	0.20	0.144	0.105	---	0.04
47	3.92	0.20	0.144	0.104	---	0.04
48	4.00	0.20	0.144	0.104	---	0.04
49	4.08	0.20	0.144	0.103	---	0.04
50	4.17	0.20	0.144	0.103	---	0.04
51	4.25	0.20	0.144	0.102	---	0.04
52	4.33	0.23	0.168	0.102	---	0.07
53	4.42	0.23	0.168	0.102	---	0.07
54	4.50	0.23	0.168	0.101	---	0.07
55	4.58	0.23	0.168	0.101	---	0.07
56	4.67	0.23	0.168	0.100	---	0.07
57	4.75	0.23	0.168	0.100	---	0.07
58	4.83	0.27	0.192	0.099	---	0.09
59	4.92	0.27	0.192	0.099	---	0.09
60	5.00	0.27	0.192	0.099	---	0.09
61	5.08	0.20	0.144	0.098	---	0.05
62	5.17	0.20	0.144	0.098	---	0.05

63	5.25	0.20	0.144	0.097	---	0.05
64	5.33	0.23	0.168	0.097	---	0.07
65	5.42	0.23	0.168	0.096	---	0.07
66	5.50	0.23	0.168	0.096	---	0.07
67	5.58	0.27	0.192	0.096	---	0.10
68	5.67	0.27	0.192	0.095	---	0.10
69	5.75	0.27	0.192	0.095	---	0.10
70	5.83	0.27	0.192	0.094	---	0.10
71	5.92	0.27	0.192	0.094	---	0.10
72	6.00	0.27	0.192	0.093	---	0.10
73	6.08	0.30	0.216	0.093	---	0.12
74	6.17	0.30	0.216	0.093	---	0.12
75	6.25	0.30	0.216	0.092	---	0.12
76	6.33	0.30	0.216	0.092	---	0.12
77	6.42	0.30	0.216	0.091	---	0.12
78	6.50	0.30	0.216	0.091	---	0.12
79	6.58	0.33	0.240	0.091	---	0.15
80	6.67	0.33	0.240	0.090	---	0.15
81	6.75	0.33	0.240	0.090	---	0.15
82	6.83	0.33	0.240	0.089	---	0.15
83	6.92	0.33	0.240	0.089	---	0.15
84	7.00	0.33	0.240	0.089	---	0.15
85	7.08	0.33	0.240	0.088	---	0.15
86	7.17	0.33	0.240	0.088	---	0.15
87	7.25	0.33	0.240	0.087	---	0.15
88	7.33	0.37	0.264	0.087	---	0.18
89	7.42	0.37	0.264	0.087	---	0.18
90	7.50	0.37	0.264	0.086	---	0.18
91	7.58	0.40	0.288	0.086	---	0.20
92	7.67	0.40	0.288	0.085	---	0.20
93	7.75	0.40	0.288	0.085	---	0.20
94	7.83	0.43	0.312	0.085	---	0.23
95	7.92	0.43	0.312	0.084	---	0.23
96	8.00	0.43	0.312	0.084	---	0.23
97	8.08	0.50	0.360	0.083	---	0.28
98	8.17	0.50	0.360	0.083	---	0.28
99	8.25	0.50	0.360	0.083	---	0.28
100	8.33	0.50	0.360	0.082	---	0.28
101	8.42	0.50	0.360	0.082	---	0.28
102	8.50	0.50	0.360	0.082	---	0.28
103	8.58	0.53	0.384	0.081	---	0.30
104	8.67	0.53	0.384	0.081	---	0.30
105	8.75	0.53	0.384	0.080	---	0.30
106	8.83	0.57	0.408	0.080	---	0.33
107	8.92	0.57	0.408	0.080	---	0.33
108	9.00	0.57	0.408	0.079	---	0.33
109	9.08	0.63	0.456	0.079	---	0.38
110	9.17	0.63	0.456	0.078	---	0.38
111	9.25	0.63	0.456	0.078	---	0.38
112	9.33	0.67	0.480	0.078	---	0.40
113	9.42	0.67	0.480	0.077	---	0.40
114	9.50	0.67	0.480	0.077	---	0.40
115	9.58	0.70	0.504	0.077	---	0.43
116	9.67	0.70	0.504	0.076	---	0.43
117	9.75	0.70	0.504	0.076	---	0.43
118	9.83	0.73	0.528	0.076	---	0.45
119	9.92	0.73	0.528	0.075	---	0.45
120	10.00	0.73	0.528	0.075	---	0.45
121	10.08	0.50	0.360	0.074	---	0.29
122	10.17	0.50	0.360	0.074	---	0.29
123	10.25	0.50	0.360	0.074	---	0.29
124	10.33	0.50	0.360	0.073	---	0.29
125	10.42	0.50	0.360	0.073	---	0.29
126	10.50	0.50	0.360	0.073	---	0.29
127	10.58	0.67	0.480	0.072	---	0.41
128	10.67	0.67	0.480	0.072	---	0.41
129	10.75	0.67	0.480	0.072	---	0.41
130	10.83	0.67	0.480	0.071	---	0.41
131	10.92	0.67	0.480	0.071	---	0.41
132	11.00	0.67	0.480	0.071	---	0.41
133	11.08	0.63	0.456	0.070	---	0.39
134	11.17	0.63	0.456	0.070	---	0.39
135	11.25	0.63	0.456	0.069	---	0.39
136	11.33	0.63	0.456	0.069	---	0.39
137	11.42	0.63	0.456	0.069	---	0.39
138	11.50	0.63	0.456	0.068	---	0.39
139	11.58	0.57	0.408	0.068	---	0.34
140	11.67	0.57	0.408	0.068	---	0.34
141	11.75	0.57	0.408	0.067	---	0.34

142	11.83	0.60	0.432	0.067	---	0.36
143	11.92	0.60	0.432	0.067	---	0.37
144	12.00	0.60	0.432	0.066	---	0.37
145	12.08	0.83	0.600	0.066	---	0.53
146	12.17	0.83	0.600	0.066	---	0.53
147	12.25	0.83	0.600	0.065	---	0.53
148	12.33	0.87	0.624	0.065	---	0.56
149	12.42	0.87	0.624	0.065	---	0.56
150	12.50	0.87	0.624	0.064	---	0.56
151	12.58	0.93	0.672	0.064	---	0.61
152	12.67	0.93	0.672	0.064	---	0.61
153	12.75	0.93	0.672	0.064	---	0.61
154	12.83	0.97	0.696	0.063	---	0.63
155	12.92	0.97	0.696	0.063	---	0.63
156	13.00	0.97	0.696	0.063	---	0.63
157	13.08	1.13	0.816	0.062	---	0.75
158	13.17	1.13	0.816	0.062	---	0.75
159	13.25	1.13	0.816	0.062	---	0.75
160	13.33	1.13	0.816	0.061	---	0.75
161	13.42	1.13	0.816	0.061	---	0.75
162	13.50	1.13	0.816	0.061	---	0.76
163	13.58	0.77	0.552	0.060	---	0.49
164	13.67	0.77	0.552	0.060	---	0.49
165	13.75	0.77	0.552	0.060	---	0.49
166	13.83	0.77	0.552	0.059	---	0.49
167	13.92	0.77	0.552	0.059	---	0.49
168	14.00	0.77	0.552	0.059	---	0.49
169	14.08	0.90	0.648	0.059	---	0.59
170	14.17	0.90	0.648	0.058	---	0.59
171	14.25	0.90	0.648	0.058	---	0.59
172	14.33	0.87	0.624	0.058	---	0.57
173	14.42	0.87	0.624	0.057	---	0.57
174	14.50	0.87	0.624	0.057	---	0.57
175	14.58	0.87	0.624	0.057	---	0.57
176	14.67	0.87	0.624	0.056	---	0.57
177	14.75	0.87	0.624	0.056	---	0.57
178	14.83	0.83	0.600	0.056	---	0.54
179	14.92	0.83	0.600	0.056	---	0.54
180	15.00	0.83	0.600	0.055	---	0.54
181	15.08	0.80	0.576	0.055	---	0.52
182	15.17	0.80	0.576	0.055	---	0.52
183	15.25	0.80	0.576	0.054	---	0.52
184	15.33	0.77	0.552	0.054	---	0.50
185	15.42	0.77	0.552	0.054	---	0.50
186	15.50	0.77	0.552	0.054	---	0.50
187	15.58	0.63	0.456	0.053	---	0.40
188	15.67	0.63	0.456	0.053	---	0.40
189	15.75	0.63	0.456	0.053	---	0.40
190	15.83	0.63	0.456	0.053	---	0.40
191	15.92	0.63	0.456	0.052	---	0.40
192	16.00	0.63	0.456	0.052	---	0.40
193	16.08	0.13	0.096	0.052	---	0.04
194	16.17	0.13	0.096	0.051	---	0.04
195	16.25	0.13	0.096	0.051	---	0.04
196	16.33	0.13	0.096	0.051	---	0.05
197	16.42	0.13	0.096	0.051	---	0.05
198	16.50	0.13	0.096	0.050	---	0.05
199	16.58	0.10	0.072	0.050	---	0.02
200	16.67	0.10	0.072	0.050	---	0.02
201	16.75	0.10	0.072	0.050	---	0.02
202	16.83	0.10	0.072	0.049	---	0.02
203	16.92	0.10	0.072	0.049	---	0.02
204	17.00	0.10	0.072	0.049	---	0.02
205	17.08	0.17	0.120	0.049	---	0.07
206	17.17	0.17	0.120	0.048	---	0.07
207	17.25	0.17	0.120	0.048	---	0.07
208	17.33	0.17	0.120	0.048	---	0.07
209	17.42	0.17	0.120	0.048	---	0.07
210	17.50	0.17	0.120	0.047	---	0.07
211	17.58	0.17	0.120	0.047	---	0.07
212	17.67	0.17	0.120	0.047	---	0.07
213	17.75	0.17	0.120	0.047	---	0.07
214	17.83	0.13	0.096	0.047	---	0.05
215	17.92	0.13	0.096	0.046	---	0.05
216	18.00	0.13	0.096	0.046	---	0.05
217	18.08	0.13	0.096	0.046	---	0.05
218	18.17	0.13	0.096	0.046	---	0.05
219	18.25	0.13	0.096	0.045	---	0.05
220	18.33	0.13	0.096	0.045	---	0.05

221	18.42	0.13	0.096	0.045	---	0.05
222	18.50	0.13	0.096	0.045	---	0.05
223	18.58	0.10	0.072	0.045	---	0.03
224	18.67	0.10	0.072	0.044	---	0.03
225	18.75	0.10	0.072	0.044	---	0.03
226	18.83	0.07	0.048	0.044	---	0.00
227	18.92	0.07	0.048	0.044	---	0.00
228	19.00	0.07	0.048	0.043	---	0.00
229	19.08	0.10	0.072	0.043	---	0.03
230	19.17	0.10	0.072	0.043	---	0.03
231	19.25	0.10	0.072	0.043	---	0.03
232	19.33	0.13	0.096	0.043	---	0.05
233	19.42	0.13	0.096	0.042	---	0.05
234	19.50	0.13	0.096	0.042	---	0.05
235	19.58	0.10	0.072	0.042	---	0.03
236	19.67	0.10	0.072	0.042	---	0.03
237	19.75	0.10	0.072	0.042	---	0.03
238	19.83	0.07	0.048	0.041	---	0.01
239	19.92	0.07	0.048	0.041	---	0.01
240	20.00	0.07	0.048	0.041	---	0.01
241	20.08	0.10	0.072	0.041	---	0.03
242	20.17	0.10	0.072	0.041	---	0.03
243	20.25	0.10	0.072	0.041	---	0.03
244	20.33	0.10	0.072	0.040	---	0.03
245	20.42	0.10	0.072	0.040	---	0.03
246	20.50	0.10	0.072	0.040	---	0.03
247	20.58	0.10	0.072	0.040	---	0.03
248	20.67	0.10	0.072	0.040	---	0.03
249	20.75	0.10	0.072	0.040	---	0.03
250	20.83	0.07	0.048	0.039	---	0.01
251	20.92	0.07	0.048	0.039	---	0.01
252	21.00	0.07	0.048	0.039	---	0.01
253	21.08	0.10	0.072	0.039	---	0.03
254	21.17	0.10	0.072	0.039	---	0.03
255	21.25	0.10	0.072	0.039	---	0.03
256	21.33	0.07	0.048	0.038	---	0.01
257	21.42	0.07	0.048	0.038	---	0.01
258	21.50	0.07	0.048	0.038	---	0.01
259	21.58	0.10	0.072	0.038	---	0.03
260	21.67	0.10	0.072	0.038	---	0.03
261	21.75	0.10	0.072	0.038	---	0.03
262	21.83	0.07	0.048	0.038	---	0.01
263	21.92	0.07	0.048	0.038	---	0.01
264	22.00	0.07	0.048	0.037	---	0.01
265	22.08	0.10	0.072	0.037	---	0.03
266	22.17	0.10	0.072	0.037	---	0.03
267	22.25	0.10	0.072	0.037	---	0.03
268	22.33	0.07	0.048	0.037	---	0.01
269	22.42	0.07	0.048	0.037	---	0.01
270	22.50	0.07	0.048	0.037	---	0.01
271	22.58	0.07	0.048	0.037	---	0.01
272	22.67	0.07	0.048	0.036	---	0.01
273	22.75	0.07	0.048	0.036	---	0.01
274	22.83	0.07	0.048	0.036	---	0.01
275	22.92	0.07	0.048	0.036	---	0.01
276	23.00	0.07	0.048	0.036	---	0.01
277	23.08	0.07	0.048	0.036	---	0.01
278	23.17	0.07	0.048	0.036	---	0.01
279	23.25	0.07	0.048	0.036	---	0.01
280	23.33	0.07	0.048	0.036	---	0.01
281	23.42	0.07	0.048	0.036	---	0.01
282	23.50	0.07	0.048	0.036	---	0.01
283	23.58	0.07	0.048	0.036	---	0.01
284	23.67	0.07	0.048	0.036	---	0.01
285	23.75	0.07	0.048	0.036	---	0.01
286	23.83	0.07	0.048	0.035	---	0.01
287	23.92	0.07	0.048	0.035	---	0.01
288	24.00	0.07	0.048	0.035	---	0.01
Sum =		100.0			Sum =	54.7

Flood volume = Effective rainfall 4.56(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 6.1(Ac.Ft)
Total soil loss = 1.44(In)
Total soil loss = 1.914(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 264021.1 Cubic Feet
Total soil loss = 83359.1 Cubic Feet

Peak flow rate of this hydrograph = 12.144(CFS)

---

sobonalt1d24100

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0018	0.26	Q				
0+10	0.0058	0.58	VQ				
0+15	0.0101	0.63	VQ				
0+20	0.0153	0.76	VQ				
0+25	0.0217	0.92	VQ				
0+30	0.0282	0.95	VQ				
0+35	0.0348	0.95	VQ				
0+40	0.0413	0.95	VQ				
0+45	0.0478	0.95	VQ				
0+50	0.0553	1.08	V Q				
0+55	0.0638	1.24	V Q				
1+ 0	0.0725	1.26	V Q				
1+ 5	0.0803	1.14	V Q				
1+10	0.0870	0.98	VQ				
1+15	0.0936	0.95	VQ				
1+20	0.1002	0.95	VQ				
1+25	0.1067	0.95	VQ				
1+30	0.1132	0.95	VQ				
1+35	0.1198	0.95	VQ				
1+40	0.1263	0.95	VQ				
1+45	0.1328	0.95	VQ				
1+50	0.1403	1.08	V Q				
1+55	0.1488	1.24	V Q				
2+ 0	0.1575	1.26	VQ				
2+ 5	0.1662	1.27	VQ				
2+10	0.1749	1.27	VQ				
2+15	0.1837	1.27	VQ				
2+20	0.1924	1.27	VQ				
2+25	0.2011	1.27	VQ				
2+30	0.2098	1.27	VQ				
2+35	0.2154	0.80	Q				
2+40	0.2170	0.24	QV				
2+45	0.2181	0.16	QV				
2+50	0.2192	0.16	QV				
2+55	0.2203	0.16	QV				
3+ 0	0.2214	0.17	QV				
3+ 5	0.2227	0.18	QV				
3+10	0.2239	0.18	QV				
3+15	0.2252	0.19	QV				
3+20	0.2266	0.20	QV				
3+25	0.2280	0.21	QV				
3+30	0.2295	0.21	QV				
3+35	0.2310	0.22	QV				
3+40	0.2326	0.23	QV				
3+45	0.2342	0.23	QV				
3+50	0.2370	0.40	QV				
3+55	0.2411	0.60	Q				
4+ 0	0.2455	0.64	Q				
4+ 5	0.2500	0.65	Q				
4+10	0.2545	0.66	Q				
4+15	0.2591	0.66	Q				
4+20	0.2648	0.83	Q				
4+25	0.2719	1.03	VQ				
4+30	0.2792	1.07	VQ				
4+35	0.2866	1.08	VQ				
4+40	0.2941	1.08	VQ				
4+45	0.3016	1.09	VQ				
4+50	0.3103	1.26	Q				
4+55	0.3203	1.46	Q				
5+ 0	0.3306	1.49	Q				
5+ 5	0.3388	1.19	Q				
5+10	0.3443	0.80	QV				
5+15	0.3495	0.76	QV				
5+20	0.3558	0.91	QV				
5+25	0.3635	1.11	Q				
5+30	0.3714	1.15	Q				
5+35	0.3805	1.32	Q				
5+40	0.3909	1.52	VQ				
5+45	0.4016	1.55	VQ				
5+50	0.4124	1.57	VQ				

sobonalt1d24100

5+55	0.4233	1.57	VQ
6+ 0	0.4341	1.58	VQ
6+ 5	0.4461	1.74	VQ
6+10	0.4596	1.95	Q
6+15	0.4732	1.98	Q
6+20	0.4869	1.99	Q
6+25	0.5007	2.00	Q
6+30	0.5145	2.01	VQ
6+35	0.5294	2.17	VQ
6+40	0.5458	2.37	VQ
6+45	0.5624	2.41	VQ
6+50	0.5790	2.42	VQ
6+55	0.5957	2.42	VQ
7+ 0	0.6124	2.43	Q
7+ 5	0.6292	2.44	Q
7+10	0.6461	2.44	Q
7+15	0.6629	2.45	Q
7+20	0.6809	2.62	VQ
7+25	0.7003	2.82	VQ
7+30	0.7200	2.85	VQ
7+35	0.7408	3.02	V Q
7+40	0.7630	3.22	VQ
7+45	0.7854	3.26	VQ
7+50	0.8090	3.43	VQ
7+55	0.8339	3.63	V Q
8+ 0	0.8592	3.66	V Q
8+ 5	0.8866	3.99	V Q
8+10	0.9168	4.39	V Q
8+15	0.9474	4.45	V Q
8+20	0.9782	4.46	V Q
8+25	1.0090	4.47	V Q
8+30	1.0398	4.47	V Q
8+35	1.0717	4.64	V Q
8+40	1.1051	4.84	V Q
8+45	1.1386	4.87	V Q
8+50	1.1734	5.04	V Q
8+55	1.2095	5.24	V Q
9+ 0	1.2458	5.28	V Q
9+ 5	1.2845	5.61	V Q
9+10	1.3258	6.00	V Q
9+15	1.3676	6.06	V Q
9+20	1.4105	6.24	V Q
9+25	1.4549	6.44	V Q
9+30	1.4994	6.47	V Q
9+35	1.5452	6.64	V Q
9+40	1.5923	6.84	V Q
9+45	1.6397	6.88	V Q
9+50	1.6882	7.05	V Q
9+55	1.7381	7.25	V Q
10+ 0	1.7882	7.28	V Q
10+ 5	1.8308	6.18	Q
10+10	1.8640	4.82	Q V
10+15	1.8959	4.63	Q V
10+20	1.9276	4.61	Q V
10+25	1.9594	4.61	Q V
10+30	1.9912	4.62	Q V
10+35	2.0285	5.42	Q V
10+40	2.0725	6.40	QV
10+45	2.1176	6.54	Q
10+50	2.1628	6.57	QV
10+55	2.2081	6.58	QV
11+ 0	2.2534	6.58	QV
11+ 5	2.2977	6.43	Q V
11+10	2.3407	6.24	Q V
11+15	2.3835	6.22	Q V
11+20	2.4263	6.22	Q V
11+25	2.4692	6.22	Q V
11+30	2.5121	6.23	Q V
11+35	2.5528	5.92	Q V
11+40	2.5909	5.53	Q V
11+45	2.6287	5.48	Q V
11+50	2.6675	5.64	Q V
11+55	2.7077	5.84	Q V
12+ 0	2.7481	5.87	Q V
12+ 5	2.7963	6.99	Q V
12+10	2.8539	8.36	Q V
12+15	2.9128	8.56	Q V
12+20	2.9731	8.76	Q V
12+25	3.0348	8.96	Q V

sobonalt1d24100

12+30	3.0967	8.99	
12+35	3.1609	9.32	
12+40	3.2278	9.71	
12+45	3.2951	9.77	
12+50	3.3636	9.95	
12+55	3.4335	10.15	
13+ 0	3.5036	10.18	
13+ 5	3.5792	10.98	
13+10	3.6616	11.96	
13+15	3.7450	12.11	
13+20	3.8286	12.13	
13+25	3.9122	12.14	
13+30	3.9958	12.14	
13+35	4.0674	10.40	
13+40	4.1244	8.26	
13+45	4.1792	7.97	
13+50	4.2337	7.92	
13+55	4.2883	7.92	
14+ 0	4.3429	7.93	
14+ 5	4.4019	8.57	
14+10	4.4663	9.35	
14+15	4.5315	9.47	
14+20	4.5958	9.33	
14+25	4.6588	9.14	
14+30	4.7216	9.12	
14+35	4.7844	9.12	
14+40	4.8472	9.12	
14+45	4.9101	9.13	
14+50	4.9719	8.97	
14+55	5.0324	8.78	
15+ 0	5.0927	8.76	
15+ 5	5.1520	8.60	
15+10	5.2099	8.41	
15+15	5.2677	8.39	
15+20	5.3244	8.23	
15+25	5.3797	8.04	
15+30	5.4349	8.02	
15+35	5.4858	7.38	
15+40	5.5313	6.61	
15+45	5.5760	6.50	
15+50	5.6207	6.49	
15+55	5.6654	6.49	
16+ 0	5.7101	6.49	
16+ 5	5.7385	4.12	
16+10	5.7467	1.20	
16+15	5.7522	0.79	
16+20	5.7571	0.72	
16+25	5.7621	0.73	
16+30	5.7672	0.73	
16+35	5.7711	0.58	
16+40	5.7738	0.38	
16+45	5.7763	0.36	
16+50	5.7787	0.36	
16+55	5.7812	0.36	
17+ 0	5.7838	0.37	
17+ 5	5.7885	0.69	
17+10	5.7960	1.08	
17+15	5.8039	1.14	
17+20	5.8118	1.16	
17+25	5.8198	1.16	
17+30	5.8278	1.16	
17+35	5.8359	1.17	
17+40	5.8439	1.17	
17+45	5.8520	1.18	
17+50	5.8591	1.02	
17+55	5.8648	0.83	
18+ 0	5.8703	0.81	
18+ 5	5.8758	0.80	
18+10	5.8814	0.81	
18+15	5.8870	0.81	
18+20	5.8926	0.81	
18+25	5.8982	0.82	
18+30	5.9039	0.82	
18+35	5.9085	0.67	
18+40	5.9118	0.48	
18+45	5.9149	0.45	
18+50	5.9169	0.29	
18+55	5.9176	0.10	
19+ 0	5.9181	0.08	

soponalt1d24100

19+ 5	5.9197	0.23	Q				V
19+10	5.9227	0.43	Q				V
19+15	5.9258	0.46	Q				V
19+20	5.9302	0.63	Q				V
19+25	5.9359	0.83	Q				V
19+30	5.9418	0.86	Q				V
19+35	5.9466	0.71	Q				V
19+40	5.9502	0.51	Q				V
19+45	5.9536	0.49	Q				V
19+50	5.9558	0.33	Q				V
19+55	5.9568	0.14	Q				V
20+ 0	5.9576	0.11	Q				V
20+ 5	5.9594	0.27	Q				V
20+10	5.9626	0.47	Q				V
20+15	5.9661	0.50	Q				V
20+20	5.9696	0.51	Q				V
20+25	5.9731	0.51	Q				V
20+30	5.9766	0.51	Q				V
20+35	5.9801	0.51	Q				V
20+40	5.9837	0.52	Q				V
20+45	5.9873	0.52	Q				V
20+50	5.9898	0.36	Q				V
20+55	5.9909	0.17	Q				V
21+ 0	5.9919	0.15	Q				V
21+ 5	5.9940	0.30	Q				V
21+10	5.9975	0.50	Q				V
21+15	6.0011	0.53	Q				V
21+20	6.0037	0.38	Q				V
21+25	6.0050	0.19	Q				V
21+30	6.0061	0.16	Q				V
21+35	6.0083	0.32	Q				V
21+40	6.0118	0.51	Q				V
21+45	6.0156	0.54	Q				V
21+50	6.0183	0.39	Q				V
21+55	6.0197	0.20	Q				V
22+ 0	6.0209	0.17	Q				V
22+ 5	6.0231	0.33	Q				V
22+10	6.0268	0.53	Q				V
22+15	6.0306	0.56	Q				V
22+20	6.0334	0.40	Q				V
22+25	6.0348	0.21	Q				V
22+30	6.0361	0.19	Q				V
22+35	6.0374	0.18	Q				V
22+40	6.0386	0.18	Q				V
22+45	6.0399	0.19	Q				V
22+50	6.0412	0.19	Q				V
22+55	6.0425	0.19	Q				V
23+ 0	6.0438	0.19	Q				V
23+ 5	6.0451	0.19	Q				V
23+10	6.0465	0.19	Q				V
23+15	6.0478	0.19	Q				V
23+20	6.0491	0.20	Q				V
23+25	6.0505	0.20	Q				V
23+30	6.0519	0.20	Q				V
23+35	6.0532	0.20	Q				V
23+40	6.0546	0.20	Q				V
23+45	6.0560	0.20	Q				V
23+50	6.0574	0.20	Q				V
23+55	6.0587	0.20	Q				V
24+ 0	6.0601	0.20	Q				V
24+ 5	6.0610	0.12	Q				V
24+10	6.0611	0.02	Q				V
24+15	6.0611	0.00	Q				V

ALTERNATIVE NO. 2

UNDEVELOPED CONDITION

sobonalt21100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt21100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	0.55	7.04

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	1.20	15.36

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	86.00	0.000

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	1.730
2	0.167	194.180	55.366	7.142
3	0.250	291.271	18.995	2.450
4	0.333	388.361	7.769	1.002
5	0.417	485.451	2.779	0.359
6	0.500	582.541	0.892	0.115
7	0.583	679.631	0.599	0.077
8	0.667	776.721	0.191	0.025
		Sum =	100.000 Sum=	12.900

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.176	---	0.43
2	0.17	4.30	0.619	0.176	---	0.44
3	0.25	5.00	0.720	0.176	---	0.54
4	0.33	5.00	0.720	0.176	---	0.54
5	0.42	5.80	0.835	0.176	---	0.66
6	0.50	6.50	0.936	0.176	---	0.76
7	0.58	7.40	1.065	0.176	---	0.89
8	0.67	8.60	1.238	0.176	---	1.06
9	0.75	12.30	1.771	0.176	---	1.60
10	0.83	29.10	4.190	0.176	---	4.01
11	0.92	6.80	0.979	0.176	---	0.80
12	1.00	5.00	0.720	0.176	---	0.54
Sum =		100.0			Sum =	12.3

Flood volume = Effective rainfall 1.02(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.187(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 47591.3 Cubic Feet
Total soil loss = 8159.1 Cubic Feet

Peak flow rate of this hydrograph = 35.524(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0051	0.74	Q				
0+10	0.0315	3.83	V Q				
0+15	0.0671	5.16	V Q				
0+20	0.1108	6.35	V Q				
0+25	0.1588	6.96	VQ				
0+30	0.2147	8.12	VQ				
0+35	0.2795	9.42	QV				
0+40	0.3555	11.03	Q V				
0+45	0.4495	13.65	Q V				
0+50	0.6027	22.25	Q				
0+55	0.8474	35.52	V Q				
1+ 0	0.9760	18.68	Q V				
1+ 5	1.0495	10.67	Q V				
1+10	1.0761	3.87	Q V				
1+15	1.0861	1.45	Q V				
1+20	1.0905	0.64	Q V				
1+25	1.0920	0.22	Q V				
1+30	1.0925	0.06	Q V				
1+35	1.0925	0.01	Q V				

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt23100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	0.90	11.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	2.10	26.88

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	86.00	0.000

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	1.730
2	0.167	194.180	55.366	7.142
3	0.250	291.271	18.995	2.450
4	0.333	388.361	7.769	1.002
5	0.417	485.451	2.779	0.359
6	0.500	582.541	0.892	0.115
7	0.583	679.631	0.599	0.077
8	0.667	776.721	0.191	0.025
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.176	---	0.15
2	0.17	1.30	0.328	0.176	---	0.15
3	0.25	1.10	0.277	0.176	---	0.10
4	0.33	1.50	0.378	0.176	---	0.20
5	0.42	1.50	0.378	0.176	---	0.20
6	0.50	1.80	0.454	0.176	---	0.28
7	0.58	1.50	0.378	0.176	---	0.20
8	0.67	1.80	0.454	0.176	---	0.28
9	0.75	1.80	0.454	0.176	---	0.28
10	0.83	1.50	0.378	0.176	---	0.20
11	0.92	1.60	0.403	0.176	---	0.23
12	1.00	1.80	0.454	0.176	---	0.28
13	1.08	2.20	0.554	0.176	---	0.38
14	1.17	2.20	0.554	0.176	---	0.38
15	1.25	2.20	0.554	0.176	---	0.38
16	1.33	2.00	0.504	0.176	---	0.33
17	1.42	2.60	0.655	0.176	---	0.48
18	1.50	2.70	0.680	0.176	---	0.50
19	1.58	2.40	0.605	0.176	---	0.43
20	1.67	2.70	0.680	0.176	---	0.50
21	1.75	3.30	0.832	0.176	---	0.66
22	1.83	3.10	0.781	0.176	---	0.61
23	1.92	2.90	0.731	0.176	---	0.56
24	2.00	3.00	0.756	0.176	---	0.58
25	2.08	3.10	0.781	0.176	---	0.61
26	2.17	4.20	1.058	0.176	---	0.88
27	2.25	5.00	1.260	0.176	---	1.08
28	2.33	3.50	0.882	0.176	---	0.71
29	2.42	6.80	1.714	0.176	---	1.54
30	2.50	7.30	1.839	0.176	---	1.66
31	2.58	8.20	2.066	0.176	---	1.89
32	2.67	5.90	1.487	0.176	---	1.31
33	2.75	2.00	0.504	0.176	---	0.33
34	2.83	1.80	0.454	0.176	---	0.28
35	2.92	1.80	0.454	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.9

Flood volume = Effective rainfall 1.58(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 1.7(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 0.558(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 73244.8 Cubic Feet
Total soil loss = 24324.2 Cubic Feet

Peak flow rate of this hydrograph = 21.862(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0018	0.26	Q				
0+10	0.0111	1.35	VQ				

sobonalt23100

0+15	0.0224	1.63	V Q
0+20	0.0334	1.60	V Q
0+25	0.0489	2.25	V Q
0+30	0.0668	2.60	V Q
0+35	0.0881	3.10	V Q
0+40	0.1082	2.91	VQ
0+45	0.1313	3.35	VQ
0+50	0.1544	3.36	VQ
0+55	0.1746	2.93	QV
1+ 0	0.1955	3.03	Q
1+ 5	0.2199	3.56	QV
1+10	0.2503	4.40	Q
1+15	0.2827	4.70	Q
1+20	0.3152	4.73	QV
1+25	0.3474	4.68	Q V
1+30	0.3866	5.69	Q V
1+35	0.4285	6.07	Q V
1+40	0.4688	5.86	Q V
1+45	0.5139	6.55	Q V
1+50	0.5668	7.67	Q V
1+55	0.6195	7.66	Q V
2+ 0	0.6704	7.40	Q V
2+ 5	0.7221	7.50	Q V
2+10	0.7784	8.18	Q V
2+15	0.8513	10.58	Q V
2+20	0.9345	12.08	Q V
2+25	1.0143	11.59	Q V
2+30	1.1323	17.13	Q V
2+35	1.2714	20.19	Q V
2+40	1.4220	21.86	Q V
2+45	1.5389	16.98	Q V
2+50	1.5995	8.79	Q V
2+55	1.6380	5.59	Q V
3+ 0	1.6647	3.88	Q V
3+ 5	1.6752	1.52	Q V
3+10	1.6793	0.60	Q V
3+15	1.6807	0.20	Q V
3+20	1.6812	0.07	Q V
3+25	1.6814	0.03	Q V
3+30	1.6815	0.01	Q V
3+35	1.6815	0.00	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt26100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	1.40	17.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	3.00	38.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	86.00	0.000

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt26100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	1.730
2	0.167	194.180	55.366	7.142
3	0.250	291.271	18.995	2.450
4	0.333	388.361	7.769	1.002
5	0.417	485.451	2.779	0.359
6	0.500	582.541	0.892	0.115
7	0.583	679.631	0.599	0.077
8	0.667	776.721	0.191	0.025
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.216	0.176	---	0.04
3	0.25	0.60	0.216	0.176	---	0.04
4	0.33	0.60	0.216	0.176	---	0.04
5	0.42	0.60	0.216	0.176	---	0.04
6	0.50	0.70	0.252	0.176	---	0.08
7	0.58	0.70	0.252	0.176	---	0.08
8	0.67	0.70	0.252	0.176	---	0.08
9	0.75	0.70	0.252	0.176	---	0.08
10	0.83	0.70	0.252	0.176	---	0.08
11	0.92	0.70	0.252	0.176	---	0.08
12	1.00	0.80	0.288	0.176	---	0.11
13	1.08	0.80	0.288	0.176	---	0.11
14	1.17	0.80	0.288	0.176	---	0.11
15	1.25	0.80	0.288	0.176	---	0.11
16	1.33	0.80	0.288	0.176	---	0.11
17	1.42	0.80	0.288	0.176	---	0.11
18	1.50	0.80	0.288	0.176	---	0.11
19	1.58	0.80	0.288	0.176	---	0.11
20	1.67	0.80	0.288	0.176	---	0.11
21	1.75	0.80	0.288	0.176	---	0.11
22	1.83	0.80	0.288	0.176	---	0.11
23	1.92	0.80	0.288	0.176	---	0.11
24	2.00	0.90	0.324	0.176	---	0.15
25	2.08	0.80	0.288	0.176	---	0.11
26	2.17	0.90	0.324	0.176	---	0.15
27	2.25	0.90	0.324	0.176	---	0.15
28	2.33	0.90	0.324	0.176	---	0.15
29	2.42	0.90	0.324	0.176	---	0.15
30	2.50	0.90	0.324	0.176	---	0.15
31	2.58	0.90	0.324	0.176	---	0.15
32	2.67	0.90	0.324	0.176	---	0.15
33	2.75	1.00	0.360	0.176	---	0.18
34	2.83	1.00	0.360	0.176	---	0.18
35	2.92	1.00	0.360	0.176	---	0.18
36	3.00	1.00	0.360	0.176	---	0.18
37	3.08	1.00	0.360	0.176	---	0.18
38	3.17	1.10	0.396	0.176	---	0.22
39	3.25	1.10	0.396	0.176	---	0.22
40	3.33	1.10	0.396	0.176	---	0.22
41	3.42	1.20	0.432	0.176	---	0.26
42	3.50	1.30	0.468	0.176	---	0.29
43	3.58	1.40	0.504	0.176	---	0.33
44	3.67	1.40	0.504	0.176	---	0.33
45	3.75	1.50	0.540	0.176	---	0.36
46	3.83	1.50	0.540	0.176	---	0.36
47	3.92	1.60	0.576	0.176	---	0.40
48	4.00	1.60	0.576	0.176	---	0.40
49	4.08	1.70	0.612	0.176	---	0.44
50	4.17	1.80	0.648	0.176	---	0.47
51	4.25	1.90	0.684	0.176	---	0.51
52	4.33	2.00	0.720	0.176	---	0.54
53	4.42	2.10	0.756	0.176	---	0.58
54	4.50	2.10	0.756	0.176	---	0.58
55	4.58	2.20	0.792	0.176	---	0.62
56	4.67	2.30	0.828	0.176	---	0.65
57	4.75	2.40	0.864	0.176	---	0.69
58	4.83	2.40	0.864	0.176	---	0.69

59	4.92	2.50	0.900	0.176	---	0.72
60	5.00	2.60	0.936	0.176	---	0.76
61	5.08	3.10	1.116	0.176	---	0.94
62	5.17	3.60	1.296	0.176	---	1.12
63	5.25	3.90	1.404	0.176	---	1.23
64	5.33	4.20	1.512	0.176	---	1.34
65	5.42	4.70	1.692	0.176	---	1.52
66	5.50	5.60	2.016	0.176	---	1.84
67	5.58	1.90	0.684	0.176	---	0.51
68	5.67	0.90	0.324	0.176	---	0.15
69	5.75	0.60	0.216	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 2.1(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 1.107(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 91164.0 Cubic Feet
Total soil loss = 48221.9 Cubic Feet

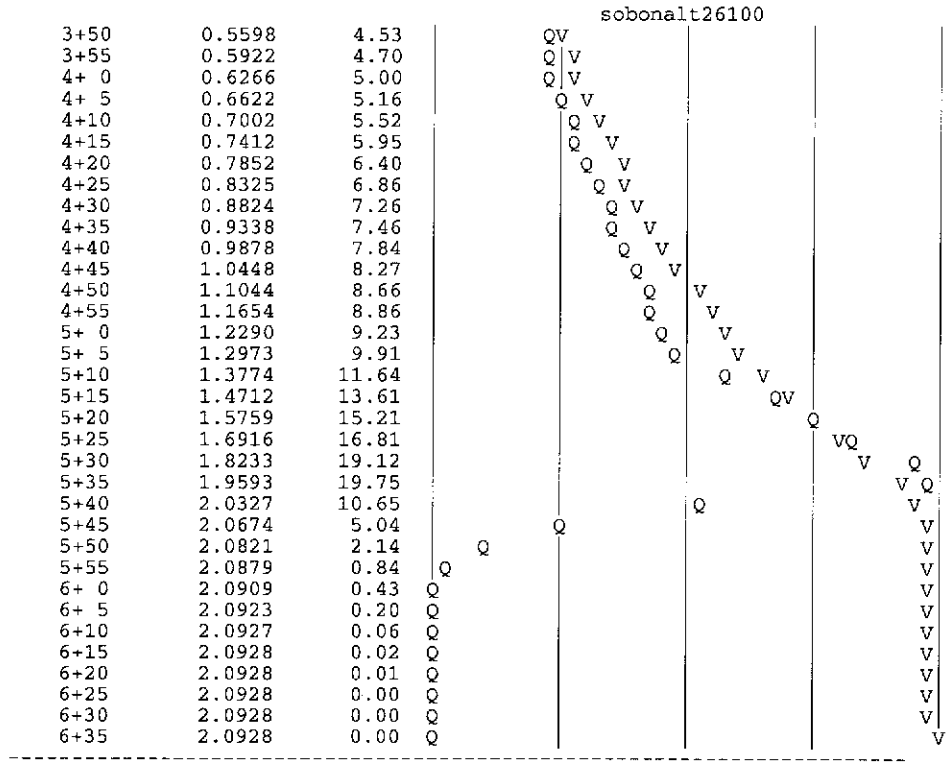
Peak flow rate of this hydrograph = 19.749(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0001	0.01	Q
0+10	0.0007	0.10	Q
0+15	0.0033	0.37	Q
0+20	0.0065	0.46	Q
0+25	0.0099	0.50	Q
0+30	0.0139	0.58	VQ
0+35	0.0196	0.84	VQ
0+40	0.0260	0.93	VQ
0+45	0.0327	0.97	VQ
0+50	0.0394	0.98	VQ
0+55	0.0462	0.98	VQ
1+ 0	0.0534	1.05	VQ
1+ 5	0.0624	1.31	VQ
1+10	0.0720	1.39	VQ
1+15	0.0818	1.43	VQ
1+20	0.0918	1.44	VQ
1+25	0.1017	1.45	VQ
1+30	0.1117	1.45	Q
1+35	0.1217	1.45	Q
1+40	0.1317	1.45	Q
1+45	0.1417	1.45	Q
1+50	0.1517	1.45	Q
1+55	0.1617	1.45	QV
2+ 0	0.1721	1.51	Q
2+ 5	0.1838	1.71	Q
2+10	0.1949	1.60	Q
2+15	0.2073	1.81	Q
2+20	0.2202	1.87	QV
2+25	0.2333	1.90	QV
2+30	0.2464	1.91	QV
2+35	0.2596	1.91	QV
2+40	0.2728	1.91	Q V
2+45	0.2864	1.98	Q V
2+50	0.3018	2.23	QV
2+55	0.3178	2.32	Q V
3+ 0	0.3340	2.36	Q V
3+ 5	0.3504	2.37	Q V
3+10	0.3672	2.44	Q V
3+15	0.3858	2.70	Q V
3+20	0.4050	2.79	Q V
3+25	0.4248	2.89	Q V
3+30	0.4470	3.22	Q V
3+35	0.4720	3.63	Q V
3+40	0.4996	4.01	QV
3+45	0.5287	4.22	Q V


sobonalt26100
3+50 0.5598 4.53
3+55 0.5922 4.70
4+ 0 0.6266 5.00
4+ 5 0.6622 5.16
4+10 0.7002 5.52
4+15 0.7412 5.95
4+20 0.7852 6.40
4+25 0.8325 6.86
4+30 0.8824 7.26
4+35 0.9338 7.46
4+40 0.9878 7.84
4+45 1.0448 8.27
4+50 1.1044 8.66
4+55 1.1654 8.86
5+ 0 1.2290 9.23
5+ 5 1.2973 9.91
5+10 1.3774 11.64
5+15 1.4712 13.61
5+20 1.5759 15.21
5+25 1.6916 16.81
5+30 1.8233 19.12
5+35 1.9593 19.75
5+40 2.0327 10.65
5+45 2.0674 5.04
5+50 2.0821 2.14
5+55 2.0879 0.84
6+ 0 2.0909 0.43
6+ 5 2.0923 0.20
6+10 2.0927 0.06
6+15 2.0928 0.02
6+20 2.0928 0.01
6+25 2.0928 0.00
6+30 2.0928 0.00
6+35 2.0928 0.00

sobonalt224100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt224100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	2.25	28.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	6.00	76.80

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	86.00	0.000

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	1.730
2	0.167	194.180	55.366	7.142
3	0.250	291.271	18.995	2.450
4	0.333	388.361	7.769	1.002
5	0.417	485.451	2.779	0.359
6	0.500	582.541	0.892	0.115
7	0.583	679.631	0.599	0.077
8	0.667	776.721	0.191	0.025
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.130	0.01
47	3.92	0.20	0.144	0.258	0.130	0.01
48	4.00	0.20	0.144	0.257	0.130	0.01
49	4.08	0.20	0.144	0.256	0.130	0.01
50	4.17	0.20	0.144	0.255	0.130	0.01
51	4.25	0.20	0.144	0.254	0.130	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02

59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.130	0.01
62	5.17	0.20	0.144	0.242	0.130	0.01
63	5.25	0.20	0.144	0.241	0.130	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.08
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.16
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.384	0.201	---	0.18
104	8.67	0.53	0.384	0.200	---	0.18
105	8.75	0.53	0.384	0.199	---	0.18
106	8.83	0.57	0.408	0.198	---	0.21
107	8.92	0.57	0.408	0.197	---	0.21
108	9.00	0.57	0.408	0.196	---	0.21
109	9.08	0.63	0.456	0.195	---	0.26
110	9.17	0.63	0.456	0.195	---	0.26
111	9.25	0.63	0.456	0.194	---	0.26
112	9.33	0.67	0.480	0.193	---	0.29
113	9.42	0.67	0.480	0.192	---	0.29
114	9.50	0.67	0.480	0.191	---	0.29
115	9.58	0.70	0.504	0.190	---	0.31
116	9.67	0.70	0.504	0.189	---	0.31
117	9.75	0.70	0.504	0.188	---	0.32
118	9.83	0.73	0.528	0.187	---	0.34
119	9.92	0.73	0.528	0.186	---	0.34
120	10.00	0.73	0.528	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.18
122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.480	0.179	---	0.30
128	10.67	0.67	0.480	0.178	---	0.30
129	10.75	0.67	0.480	0.177	---	0.30
130	10.83	0.67	0.480	0.177	---	0.30
131	10.92	0.67	0.480	0.176	---	0.30
132	11.00	0.67	0.480	0.175	---	0.31
133	11.08	0.63	0.456	0.174	---	0.28
134	11.17	0.63	0.456	0.173	---	0.28
135	11.25	0.63	0.456	0.172	---	0.28
136	11.33	0.63	0.456	0.171	---	0.28
137	11.42	0.63	0.456	0.171	---	0.29

138	11.50	0.63	0.456	0.170	---	0.29
139	11.58	0.57	0.408	0.169	---	0.24
140	11.67	0.57	0.408	0.168	---	0.24
141	11.75	0.57	0.408	0.167	---	0.24
142	11.83	0.60	0.432	0.166	---	0.27
143	11.92	0.60	0.432	0.166	---	0.27
144	12.00	0.60	0.432	0.165	---	0.27
145	12.08	0.83	0.600	0.164	---	0.44
146	12.17	0.83	0.600	0.163	---	0.44
147	12.25	0.83	0.600	0.162	---	0.44
148	12.33	0.87	0.624	0.161	---	0.46
149	12.42	0.87	0.624	0.161	---	0.46
150	12.50	0.87	0.624	0.160	---	0.46
151	12.58	0.93	0.672	0.159	---	0.51
152	12.67	0.93	0.672	0.158	---	0.51
153	12.75	0.93	0.672	0.157	---	0.51
154	12.83	0.97	0.696	0.157	---	0.54
155	12.92	0.97	0.696	0.156	---	0.54
156	13.00	0.97	0.696	0.155	---	0.54
157	13.08	1.13	0.816	0.154	---	0.66
158	13.17	1.13	0.816	0.154	---	0.66
159	13.25	1.13	0.816	0.153	---	0.66
160	13.33	1.13	0.816	0.152	---	0.66
161	13.42	1.13	0.816	0.151	---	0.66
162	13.50	1.13	0.816	0.150	---	0.67
163	13.58	0.77	0.552	0.150	---	0.40
164	13.67	0.77	0.552	0.149	---	0.40
165	13.75	0.77	0.552	0.148	---	0.40
166	13.83	0.77	0.552	0.147	---	0.40
167	13.92	0.77	0.552	0.147	---	0.41
168	14.00	0.77	0.552	0.146	---	0.41
169	14.08	0.90	0.648	0.145	---	0.50
170	14.17	0.90	0.648	0.144	---	0.50
171	14.25	0.90	0.648	0.144	---	0.50
172	14.33	0.87	0.624	0.143	---	0.48
173	14.42	0.87	0.624	0.142	---	0.48
174	14.50	0.87	0.624	0.141	---	0.48
175	14.58	0.87	0.624	0.141	---	0.48
176	14.67	0.87	0.624	0.140	---	0.48
177	14.75	0.87	0.624	0.139	---	0.48
178	14.83	0.83	0.600	0.139	---	0.46
179	14.92	0.83	0.600	0.138	---	0.46
180	15.00	0.83	0.600	0.137	---	0.46
181	15.08	0.80	0.576	0.136	---	0.44
182	15.17	0.80	0.576	0.136	---	0.44
183	15.25	0.80	0.576	0.135	---	0.44
184	15.33	0.77	0.552	0.134	---	0.42
185	15.42	0.77	0.552	0.134	---	0.42
186	15.50	0.77	0.552	0.133	---	0.42
187	15.58	0.63	0.456	0.132	---	0.32
188	15.67	0.63	0.456	0.132	---	0.32
189	15.75	0.63	0.456	0.131	---	0.33
190	15.83	0.63	0.456	0.130	---	0.33
191	15.92	0.63	0.456	0.130	---	0.33
192	16.00	0.63	0.456	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01

217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00
	Sum =	100.0			Sum =	36.9

Flood volume = Effective rainfall 3.08(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 3.3(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 3.118(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 142953.0 Cubic Feet

Total soil loss = 135824.1 Cubic Feet

Peak flow rate of this hydrograph = 8.564(CFS)

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0001	0.01	Q
0+10	0.0004	0.04	Q
0+15	0.0007	0.05	Q
0+20	0.0012	0.06	Q
0+25	0.0017	0.08	Q
0+30	0.0023	0.09	Q
0+35	0.0030	0.09	Q
0+40	0.0036	0.09	Q
0+45	0.0042	0.09	Q
0+50	0.0049	0.10	Q
0+55	0.0057	0.11	Q
1+ 0	0.0065	0.12	Q
1+ 5	0.0073	0.12	Q
1+10	0.0080	0.10	Q
1+15	0.0087	0.10	Q
1+20	0.0094	0.09	Q
1+25	0.0100	0.09	Q
1+30	0.0106	0.09	Q
1+35	0.0113	0.09	Q
1+40	0.0119	0.09	Q
1+45	0.0126	0.09	Q
1+50	0.0132	0.10	Q
1+55	0.0140	0.11	Q
2+ 0	0.0148	0.12	Q
2+ 5	0.0157	0.12	Q
2+10	0.0165	0.12	Q
2+15	0.0174	0.12	Q
2+20	0.0182	0.12	Q
2+25	0.0191	0.12	Q
2+30	0.0199	0.12	Q
2+35	0.0208	0.13	Q
2+40	0.0218	0.15	Q
2+45	0.0229	0.15	Q
2+50	0.0239	0.15	Q
2+55	0.0250	0.15	Q
3+ 0	0.0261	0.15	Q
3+ 5	0.0271	0.15	Q
3+10	0.0282	0.15	Q
3+15	0.0293	0.15	Q
3+20	0.0303	0.15	Q
3+25	0.0314	0.15	Q
3+30	0.0325	0.15	Q
3+35	0.0335	0.15	Q
3+40	0.0346	0.15	Q
3+45	0.0357	0.15	Q
3+50	0.0368	0.16	Q
3+55	0.0380	0.18	Q
4+ 0	0.0392	0.18	Q
4+ 5	0.0405	0.18	Q
4+10	0.0418	0.19	Q
4+15	0.0430	0.19	Q
4+20	0.0444	0.19	Q
4+25	0.0458	0.21	Q
4+30	0.0472	0.21	Q
4+35	0.0487	0.22	Q
4+40	0.0502	0.22	Q
4+45	0.0517	0.22	Q
4+50	0.0532	0.22	Q
4+55	0.0549	0.24	Q
5+ 0	0.0566	0.24	Q
5+ 5	0.0582	0.24	Q
5+10	0.0596	0.20	Q
5+15	0.0609	0.19	Q
5+20	0.0623	0.19	Q
5+25	0.0637	0.21	Q
5+30	0.0652	0.21	Q

5+35	0.0667	0.22	Q
5+40	0.0683	0.24	Q
5+45	0.0700	0.24	Q
5+50	0.0717	0.25	Q
5+55	0.0734	0.25	Q
6+ 0	0.0751	0.25	Q
6+ 5	0.0768	0.25	VQ
6+10	0.0787	0.27	VQ
6+15	0.0806	0.27	VQ
6+20	0.0825	0.28	|Q
6+25	0.0844	0.28	|Q
6+30	0.0863	0.28	|Q
6+35	0.0882	0.27	|Q
6+40	0.0897	0.23	QV
6+45	0.0912	0.22	QV
6+50	0.0928	0.22	QV
6+55	0.0944	0.23	QV
7+ 0	0.0961	0.25	QV
7+ 5	0.0979	0.26	|Q
7+10	0.0997	0.27	|Q
7+15	0.1017	0.28	|Q
7+20	0.1040	0.34	|Q
7+25	0.1076	0.52	|VQ
7+30	0.1117	0.59	|VQ
7+35	0.1163	0.67	|VQ
7+40	0.1223	0.87	|V Q
7+45	0.1288	0.94	|V Q
7+50	0.1358	1.02	|V Q
7+55	0.1441	1.21	|V Q
8+ 0	0.1530	1.29	|V Q
8+ 5	0.1627	1.41	|V Q
8+10	0.1749	1.77	| V Q
8+15	0.1880	1.91	| V Q
8+20	0.2016	1.97	| V Q
8+25	0.2154	2.00	| V Q
8+30	0.2293	2.02	| V Q
8+35	0.2435	2.07	| V Q
8+40	0.2591	2.26	| V Q
8+45	0.2751	2.33	| V Q
8+50	0.2917	2.41	| V Q
8+55	0.3096	2.60	| V Q
9+ 0	0.3281	2.67	| V Q
9+ 5	0.3473	2.79	| V Q
9+10	0.3691	3.16	| V Q
9+15	0.3917	3.29	| V Q
9+20	0.4151	3.39	| V Q
9+25	0.4399	3.60	| V Q
9+30	0.4652	3.67	| V Q
9+35	0.4910	3.75	| V Q
9+40	0.5182	3.95	| V Q
9+45	0.5459	4.02	| V Q
9+50	0.5741	4.10	| V Q
9+55	0.6037	4.29	| V Q
10+ 0	0.6337	4.36	| V Q
10+ 5	0.6621	4.11	| V Q
10+10	0.6822	2.93	| V |Q
10+15	0.6997	2.53	| V Q
10+20	0.7161	2.38	| VQ|
10+25	0.7321	2.33	| VQ|
10+30	0.7481	2.32	| Q|
10+35	0.7656	2.53	| VQ
10+40	0.7889	3.39	| V| Q
10+45	0.8144	3.70	| V| Q
10+50	0.8408	3.83	| V Q
10+55	0.8676	3.89	| V Q
11+ 0	0.8945	3.91	| V Q
11+ 5	0.9213	3.89	| V Q
11+10	0.9470	3.73	| V Q
11+15	0.9724	3.68	| V Q
11+20	0.9976	3.67	| V Q
11+25	1.0229	3.67	| V Q
11+30	1.0483	3.68	| V Q
11+35	1.0731	3.61	| VQ
11+40	1.0957	3.28	| Q
11+45	1.1175	3.17	| QV
11+50	1.1394	3.17	| QV
11+55	1.1624	3.34	| QV
12+ 0	1.1858	3.40	| QV
12+ 5	1.2114	3.72	| Q

sobonalt224100

12+10	1.2455	4.94	
12+15	1.2824	5.37	
12+20	1.3209	5.59	
12+25	1.3611	5.83	
12+30	1.4019	5.92	
12+35	1.4435	6.05	
12+40	1.4877	6.42	
12+45	1.5328	6.55	
12+50	1.5787	6.65	
12+55	1.6258	6.85	
13+ 0	1.6735	6.92	
13+ 5	1.7229	7.17	
13+10	1.7783	8.05	
13+15	1.8359	8.35	
13+20	1.8943	8.49	
13+25	1.9531	8.54	
13+30	2.0121	8.56	
13+35	2.0681	8.13	
13+40	2.1112	6.25	
13+45	2.1498	5.62	
13+50	2.1868	5.36	
13+55	2.2231	5.28	
14+ 0	2.2593	5.26	
14+ 5	2.2965	5.41	
14+10	2.3386	6.10	
14+15	2.3823	6.34	
14+20	2.4264	6.41	
14+25	2.4697	6.28	
14+30	2.5127	6.24	
14+35	2.5556	6.24	
14+40	2.5986	6.24	
14+45	2.6416	6.25	
14+50	2.6844	6.21	
14+55	2.7260	6.05	
15+ 0	2.7673	6.00	
15+ 5	2.8083	5.94	
15+10	2.8480	5.77	
15+15	2.8874	5.72	
15+20	2.9264	5.66	
15+25	2.9642	5.49	
15+30	3.0016	5.44	
15+35	3.0378	5.25	
15+40	3.0692	4.57	
15+45	3.0991	4.34	
15+50	3.1284	4.25	
15+55	3.1574	4.22	
16+ 0	3.1865	4.22	
16+ 5	3.2118	3.67	
16+10	3.2214	1.40	
16+15	3.2257	0.62	
16+20	3.2278	0.31	
16+25	3.2292	0.19	
16+30	3.2302	0.16	
16+35	3.2311	0.13	
16+40	3.2318	0.10	
16+45	3.2325	0.10	
16+50	3.2331	0.09	
16+55	3.2338	0.09	
17+ 0	3.2344	0.09	
17+ 5	3.2351	0.10	
17+10	3.2361	0.14	
17+15	3.2369	0.13	
17+20	3.2373	0.05	
17+25	3.2375	0.03	
17+30	3.2377	0.03	
17+35	3.2379	0.03	
17+40	3.2381	0.04	
17+45	3.2384	0.04	
17+50	3.2388	0.06	
17+55	3.2395	0.10	
18+ 0	3.2403	0.11	
18+ 5	3.2411	0.12	
18+10	3.2420	0.12	
18+15	3.2428	0.12	
18+20	3.2437	0.12	
18+25	3.2445	0.12	
18+30	3.2454	0.12	
18+35	3.2462	0.12	
18+40	3.2469	0.10	

18+45	3.2476	0.10	Q				V
18+50	3.2482	0.09	Q				V
18+55	3.2487	0.07	Q				V
19+ 0	3.2491	0.07	Q				V
19+ 5	3.2496	0.07	Q				V
19+10	3.2502	0.08	Q				V
19+15	3.2508	0.09	Q				V
19+20	3.2515	0.10	Q				V
19+25	3.2522	0.11	Q				V
19+30	3.2531	0.12	Q				V
19+35	3.2539	0.12	Q				V
19+40	3.2546	0.10	Q				V
19+45	3.2553	0.10	Q				V
19+50	3.2559	0.09	Q				V
19+55	3.2564	0.07	Q				V
20+ 0	3.2568	0.07	Q				V
20+ 5	3.2573	0.07	Q				V
20+10	3.2579	0.08	Q				V
20+15	3.2585	0.09	Q				V
20+20	3.2591	0.09	Q				V
20+25	3.2598	0.09	Q				V
20+30	3.2604	0.09	Q				V
20+35	3.2610	0.09	Q				V
20+40	3.2617	0.09	Q				V
20+45	3.2623	0.09	Q				V
20+50	3.2629	0.09	Q				V
20+55	3.2634	0.07	Q				V
21+ 0	3.2639	0.07	Q				V
21+ 5	3.2643	0.07	Q				V
21+10	3.2649	0.08	Q				V
21+15	3.2655	0.09	Q				V
21+20	3.2661	0.09	Q				V
21+25	3.2666	0.07	Q				V
21+30	3.2671	0.07	Q				V
21+35	3.2675	0.07	Q				V
21+40	3.2681	0.08	Q				V
21+45	3.2687	0.09	Q				V
21+50	3.2693	0.09	Q				V
21+55	3.2698	0.07	Q				V
22+ 0	3.2703	0.07	Q				V
22+ 5	3.2707	0.07	Q				V
22+10	3.2713	0.08	Q				V
22+15	3.2719	0.09	Q				V
22+20	3.2725	0.09	Q				V
22+25	3.2730	0.07	Q				V
22+30	3.2735	0.07	Q				V
22+35	3.2739	0.06	Q				V
22+40	3.2743	0.06	Q				V
22+45	3.2748	0.06	Q				V
22+50	3.2752	0.06	Q				V
22+55	3.2756	0.06	Q				V
23+ 0	3.2760	0.06	Q				V
23+ 5	3.2765	0.06	Q				V
23+10	3.2769	0.06	Q				V
23+15	3.2773	0.06	Q				V
23+20	3.2778	0.06	Q				V
23+25	3.2782	0.06	Q				V
23+30	3.2786	0.06	Q				V
23+35	3.2790	0.06	Q				V
23+40	3.2795	0.06	Q				V
23+45	3.2799	0.06	Q				V
23+50	3.2803	0.06	Q				V
23+55	3.2807	0.06	Q				V
24+ 0	3.2812	0.06	Q				V
24+ 5	3.2815	0.05	Q				V
24+10	3.2817	0.02	Q				V
24+15	3.2817	0.01	Q				V
24+20	3.2817	0.00	Q				V
24+25	3.2817	0.00	Q				V
24+30	3.2817	0.00	Q				V
24+35	3.2817	0.00	Q				V

DEVELOPED CONDITION

sobonalt2d1100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt2d1100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	0.55	7.04

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	1.20	15.36

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
		Sum = 100.000	Sum=	12.900

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)		Effective
(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1 0.08	4.20	0.605	0.071	---	0.53
2 0.17	4.30	0.619	0.071	---	0.55
3 0.25	5.00	0.720	0.071	---	0.65
4 0.33	5.00	0.720	0.071	---	0.65
5 0.42	5.80	0.835	0.071	---	0.76
6 0.50	6.50	0.936	0.071	---	0.87
7 0.58	7.40	1.065	0.071	---	0.99
8 0.67	8.60	1.238	0.071	---	1.17
9 0.75	12.30	1.771	0.071	---	1.70
10 0.83	29.10	4.190	0.071	---	4.12
11 0.92	6.80	0.979	0.071	---	0.91
12 1.00	5.00	0.720	0.071	---	0.65
Sum =	100.0			Sum =	13.5

Flood volume = Effective rainfall 1.13(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 1.2(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.076(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 52459.2 Cubic Feet
Total soil loss = 3291.1 Cubic Feet

Peak flow rate of this hydrograph = 34.171(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 10.0 20.0 30.0 40.0
0+ 5	0.0195	2.83	V Q
0+10	0.0635	6.39	V Q
0+15	0.1153	7.51	V Q
0+20	0.1722	8.27	V Q
0+25	0.2340	8.97	VQ
0+30	0.3047	10.27	Q
0+35	0.3855	11.73	QV
0+40	0.4791	13.60	Q V
0+45	0.6010	17.69	Q V
0+50	0.8363	34.17	V Q
0+55	1.0666	33.44	Q V
1+ 0	1.1590	13.42	Q V
1+ 5	1.1985	5.73	Q V
1+10	1.2036	0.74	Q V
1+15	1.2043	0.10	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt2d3100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	0.90	11.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	2.10	26.88

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt2d3100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	194.180	41.092		5.301
2	0.167	388.361	50.563		6.523
3	0.250	582.541	7.110		0.917
4	0.333	776.721	1.235		0.159
			Sum = 100.000	Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.071	---	0.26
2	0.17	1.30	0.328	0.071	---	0.26
3	0.25	1.10	0.277	0.071	---	0.21
4	0.33	1.50	0.378	0.071	---	0.31
5	0.42	1.50	0.378	0.071	---	0.31
6	0.50	1.80	0.454	0.071	---	0.38
7	0.58	1.50	0.378	0.071	---	0.31
8	0.67	1.80	0.454	0.071	---	0.38
9	0.75	1.80	0.454	0.071	---	0.38
10	0.83	1.50	0.378	0.071	---	0.31
11	0.92	1.60	0.403	0.071	---	0.33
12	1.00	1.80	0.454	0.071	---	0.38
13	1.08	2.20	0.554	0.071	---	0.48
14	1.17	2.20	0.554	0.071	---	0.48
15	1.25	2.20	0.554	0.071	---	0.48
16	1.33	2.00	0.504	0.071	---	0.43
17	1.42	2.60	0.655	0.071	---	0.58
18	1.50	2.70	0.680	0.071	---	0.61
19	1.58	2.40	0.605	0.071	---	0.53
20	1.67	2.70	0.680	0.071	---	0.61
21	1.75	3.30	0.832	0.071	---	0.76
22	1.83	3.10	0.781	0.071	---	0.71
23	1.92	2.90	0.731	0.071	---	0.66
24	2.00	3.00	0.756	0.071	---	0.69
25	2.08	3.10	0.781	0.071	---	0.71
26	2.17	4.20	1.058	0.071	---	0.99
27	2.25	5.00	1.260	0.071	---	1.19
28	2.33	3.50	0.882	0.071	---	0.81
29	2.42	6.80	1.714	0.071	---	1.64
30	2.50	7.30	1.839	0.071	---	1.77
31	2.58	8.20	2.066	0.071	---	2.00
32	2.67	5.90	1.487	0.071	---	1.42
33	2.75	2.00	0.504	0.071	---	0.43
34	2.83	1.80	0.454	0.071	---	0.38
35	2.92	1.80	0.454	0.071	---	0.38
36	3.00	0.60	0.151	0.071	---	0.08
Sum =		100.0			Sum =	22.6

Flood volume = Effective rainfall 1.89(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 2.0(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.227(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 87695.5 Cubic Feet
Total soil loss = 9873.4 Cubic Feet

Peak flow rate of this hydrograph = 23.762(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0094	1.36	VQ				
0+10	0.0303	3.04	V Q				
0+15	0.0510	3.01	V Q				
0+20	0.0734	3.25	V Q				
0+25	0.1000	3.86	V Q				
0+30	0.1300	4.35	V Q				

sobonalt2d3100

0+35	0.1607	4.46	V Q
0+40	0.1912	4.43	V Q
0+45	0.2247	4.87	V Q
0+50	0.2559	4.53	VQ
0+55	0.2847	4.18	Q
1+ 0	0.3160	4.54	Q
1+ 5	0.3533	5.42	Q
1+10	0.3955	6.12	VQ
1+15	0.4383	6.22	Q
1+20	0.4795	5.97	Q V
1+25	0.5239	6.45	Q V
1+30	0.5757	7.52	QV
1+35	0.6267	7.41	Q V
1+40	0.6775	7.37	Q V
1+45	0.7367	8.60	Q V
1+50	0.8013	9.38	Q V
1+55	0.8628	8.93	Q V
2+ 0	0.9228	8.71	Q V
2+ 5	0.9845	8.96	Q V
2+10	1.0575	10.61	Q V
2+15	1.1506	13.51	Q V
2+20	1.2407	13.08	Q V
2+25	1.3457	15.25	Q V
2+30	1.4906	21.03	QV
2+35	1.6543	23.76	QV
2+40	1.8086	22.42	Q V
2+45	1.9027	13.65	Q V
2+50	1.9472	6.47	Q V
2+55	1.9827	5.15	Q V
3+ 0	2.0057	3.34	Q V
3+ 5	2.0122	0.94	Q V
3+10	2.0131	0.13	Q V
3+15	2.0132	0.01	Q V

sobonalt2d6100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt2d6100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	1.40	17.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	3.00	38.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt2d6100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.071	---	0.11
2	0.17	0.60	0.216	0.071	---	0.15
3	0.25	0.60	0.216	0.071	---	0.15
4	0.33	0.60	0.216	0.071	---	0.15
5	0.42	0.60	0.216	0.071	---	0.15
6	0.50	0.70	0.252	0.071	---	0.18
7	0.58	0.70	0.252	0.071	---	0.18
8	0.67	0.70	0.252	0.071	---	0.18
9	0.75	0.70	0.252	0.071	---	0.18
10	0.83	0.70	0.252	0.071	---	0.18
11	0.92	0.70	0.252	0.071	---	0.18
12	1.00	0.80	0.288	0.071	---	0.22
13	1.08	0.80	0.288	0.071	---	0.22
14	1.17	0.80	0.288	0.071	---	0.22
15	1.25	0.80	0.288	0.071	---	0.22
16	1.33	0.80	0.288	0.071	---	0.22
17	1.42	0.80	0.288	0.071	---	0.22
18	1.50	0.80	0.288	0.071	---	0.22
19	1.58	0.80	0.288	0.071	---	0.22
20	1.67	0.80	0.288	0.071	---	0.22
21	1.75	0.80	0.288	0.071	---	0.22
22	1.83	0.80	0.288	0.071	---	0.22
23	1.92	0.80	0.288	0.071	---	0.22
24	2.00	0.90	0.324	0.071	---	0.25
25	2.08	0.80	0.288	0.071	---	0.22
26	2.17	0.90	0.324	0.071	---	0.25
27	2.25	0.90	0.324	0.071	---	0.25
28	2.33	0.90	0.324	0.071	---	0.25
29	2.42	0.90	0.324	0.071	---	0.25
30	2.50	0.90	0.324	0.071	---	0.25
31	2.58	0.90	0.324	0.071	---	0.25
32	2.67	0.90	0.324	0.071	---	0.25
33	2.75	1.00	0.360	0.071	---	0.29
34	2.83	1.00	0.360	0.071	---	0.29
35	2.92	1.00	0.360	0.071	---	0.29
36	3.00	1.00	0.360	0.071	---	0.29
37	3.08	1.00	0.360	0.071	---	0.29
38	3.17	1.10	0.396	0.071	---	0.33
39	3.25	1.10	0.396	0.071	---	0.33
40	3.33	1.10	0.396	0.071	---	0.33
41	3.42	1.20	0.432	0.071	---	0.36
42	3.50	1.30	0.468	0.071	---	0.40
43	3.58	1.40	0.504	0.071	---	0.43
44	3.67	1.40	0.504	0.071	---	0.43
45	3.75	1.50	0.540	0.071	---	0.47
46	3.83	1.50	0.540	0.071	---	0.47
47	3.92	1.60	0.576	0.071	---	0.51
48	4.00	1.60	0.576	0.071	---	0.51
49	4.08	1.70	0.612	0.071	---	0.54
50	4.17	1.80	0.648	0.071	---	0.58
51	4.25	1.90	0.684	0.071	---	0.61
52	4.33	2.00	0.720	0.071	---	0.65
53	4.42	2.10	0.756	0.071	---	0.69
54	4.50	2.10	0.756	0.071	---	0.69
55	4.58	2.20	0.792	0.071	---	0.72
56	4.67	2.30	0.828	0.071	---	0.76
57	4.75	2.40	0.864	0.071	---	0.79
58	4.83	2.40	0.864	0.071	---	0.79
59	4.92	2.50	0.900	0.071	---	0.83
60	5.00	2.60	0.936	0.071	---	0.87
61	5.08	3.10	1.116	0.071	---	1.05
62	5.17	3.60	1.296	0.071	---	1.23

63	5.25	3.90	1.404	0.071	---	1.33
64	5.33	4.20	1.512	0.071	---	1.44
65	5.42	4.70	1.692	0.071	---	1.62
66	5.50	5.60	2.016	0.071	---	1.95
67	5.58	1.90	0.684	0.071	---	0.61
68	5.67	0.90	0.324	0.071	---	0.25
69	5.75	0.60	0.216	0.071	---	0.15
70	5.83	0.50	0.180	0.071	---	0.11
71	5.92	0.30	0.108	0.071	---	0.04
72	6.00	0.20	0.072	0.071	---	0.00
Sum =		100.0			Sum =	30.9

Flood volume = Effective rainfall 2.57(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 2.7(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 0.453(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 119639.0 Cubic Feet
Total soil loss = 19746.8 Cubic Feet

Peak flow rate of this hydrograph = 22.430(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 7.5 15.0 22.5 30.0
0+ 5	0.0040	0.58	Q
0+10	0.0142	1.48	VQ
0+15	0.0267	1.82	V Q
0+20	0.0396	1.87	V Q
0+25	0.0525	1.87	V Q
0+30	0.0667	2.06	V Q
0+35	0.0825	2.30	V Q
0+40	0.0986	2.33	V Q
0+45	0.1147	2.34	V Q
0+50	0.1308	2.34	V Q
0+55	0.1469	2.34	VQ
1+ 0	0.1643	2.53	VQ
1+ 5	0.1834	2.76	VQ
1+10	0.2026	2.80	VQ
1+15	0.2219	2.80	Q
1+20	0.2412	2.80	Q
1+25	0.2605	2.80	Q
1+30	0.2798	2.80	QV
1+35	0.2991	2.80	QV
1+40	0.3184	2.80	QV
1+45	0.3377	2.80	QV
1+50	0.3570	2.80	Q V
1+55	0.3763	2.80	Q V
2+ 0	0.3970	2.99	Q V
2+ 5	0.4179	3.04	Q V
2+10	0.4387	3.03	Q V
2+15	0.4610	3.23	Q V
2+20	0.4835	3.26	Q V
2+25	0.5060	3.27	Q V
2+30	0.5285	3.27	Q V
2+35	0.5510	3.27	Q V
2+40	0.5735	3.27	Q V
2+45	0.5973	3.46	Q V
2+50	0.6227	3.69	Q V
2+55	0.6484	3.73	Q V
3+ 0	0.6741	3.73	Q V
3+ 5	0.6998	3.73	Q V
3+10	0.7268	3.92	Q V
3+15	0.7554	4.16	Q V
3+20	0.7843	4.19	Q V
3+25	0.8145	4.39	Q V
3+30	0.8477	4.81	Q V
3+35	0.8840	5.27	Q V
3+40	0.9222	5.55	Q V
3+45	0.9620	5.78	Q V
3+50	1.0034	6.02	Q V
3+55	1.0464	6.24	Q V
4+ 0	1.0910	6.48	Q V
4+ 5	1.1372	6.70	Q V

sobonalt2d6100

4+10	1.1863	7.14	
4+15	1.2386	7.60	
4+20	1.2942	8.06	
4+25	1.3529	8.52	
4+30	1.4135	8.80	
4+35	1.4756	9.03	
4+40	1.5408	9.46	
4+45	1.6091	9.92	
4+50	1.6793	10.19	
4+55	1.7511	10.42	
5+ 0	1.8258	10.85	
5+ 5	1.9090	12.08	
5+10	2.0071	14.24	
5+15	2.1184	16.16	
5+20	2.2398	17.63	
5+25	2.3736	19.42	
5+30	2.5281	22.43	
5+35	2.6497	17.66	
5+40	2.7006	7.39	
5+45	2.7233	3.29	
5+50	2.7361	1.86	
5+55	2.7435	1.08	
6+ 0	2.7461	0.37	
6+ 5	2.7465	0.06	
6+10	2.7465	0.01	
6+15	2.7465	0.00	

sobonalt2d24100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt2d24100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	2.25	28.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	6.00	76.80

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt2d24100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.126	0.009	0.04
2	0.17	0.07	0.048	0.125	0.009	0.04
3	0.25	0.07	0.048	0.125	0.009	0.04
4	0.33	0.10	0.072	0.124	0.013	0.06
5	0.42	0.10	0.072	0.124	0.013	0.06
6	0.50	0.10	0.072	0.123	0.013	0.06
7	0.58	0.10	0.072	0.123	0.013	0.06
8	0.67	0.10	0.072	0.122	0.013	0.06
9	0.75	0.10	0.072	0.122	0.013	0.06
10	0.83	0.13	0.096	0.121	0.017	0.08
11	0.92	0.13	0.096	0.121	0.017	0.08
12	1.00	0.13	0.096	0.120	0.017	0.08
13	1.08	0.10	0.072	0.120	0.013	0.06
14	1.17	0.10	0.072	0.119	0.013	0.06
15	1.25	0.10	0.072	0.119	0.013	0.06
16	1.33	0.10	0.072	0.118	0.013	0.06
17	1.42	0.10	0.072	0.118	0.013	0.06
18	1.50	0.10	0.072	0.117	0.013	0.06
19	1.58	0.10	0.072	0.117	0.013	0.06
20	1.67	0.10	0.072	0.117	0.013	0.06
21	1.75	0.10	0.072	0.116	0.013	0.06
22	1.83	0.13	0.096	0.116	0.017	0.08
23	1.92	0.13	0.096	0.115	0.017	0.08
24	2.00	0.13	0.096	0.115	0.017	0.08
25	2.08	0.13	0.096	0.114	0.017	0.08
26	2.17	0.13	0.096	0.114	0.017	0.08
27	2.25	0.13	0.096	0.113	0.017	0.08
28	2.33	0.13	0.096	0.113	0.017	0.08
29	2.42	0.13	0.096	0.112	0.017	0.08
30	2.50	0.13	0.096	0.112	0.017	0.08
31	2.58	0.17	0.120	0.111	---	0.01
32	2.67	0.17	0.120	0.111	---	0.01
33	2.75	0.17	0.120	0.110	---	0.01
34	2.83	0.17	0.120	0.110	---	0.01
35	2.92	0.17	0.120	0.110	---	0.01
36	3.00	0.17	0.120	0.109	---	0.01
37	3.08	0.17	0.120	0.109	---	0.01
38	3.17	0.17	0.120	0.108	---	0.01
39	3.25	0.17	0.120	0.108	---	0.01
40	3.33	0.17	0.120	0.107	---	0.01
41	3.42	0.17	0.120	0.107	---	0.01
42	3.50	0.17	0.120	0.106	---	0.01
43	3.58	0.17	0.120	0.106	---	0.01
44	3.67	0.17	0.120	0.106	---	0.01
45	3.75	0.17	0.120	0.105	---	0.01
46	3.83	0.20	0.144	0.105	---	0.04
47	3.92	0.20	0.144	0.104	---	0.04
48	4.00	0.20	0.144	0.104	---	0.04
49	4.08	0.20	0.144	0.103	---	0.04
50	4.17	0.20	0.144	0.103	---	0.04
51	4.25	0.20	0.144	0.102	---	0.04
52	4.33	0.23	0.168	0.102	---	0.07
53	4.42	0.23	0.168	0.102	---	0.07
54	4.50	0.23	0.168	0.101	---	0.07
55	4.58	0.23	0.168	0.101	---	0.07
56	4.67	0.23	0.168	0.100	---	0.07
57	4.75	0.23	0.168	0.100	---	0.07
58	4.83	0.27	0.192	0.099	---	0.09
59	4.92	0.27	0.192	0.099	---	0.09
60	5.00	0.27	0.192	0.099	---	0.09
61	5.08	0.20	0.144	0.098	---	0.05
62	5.17	0.20	0.144	0.098	---	0.05

63	5.25	0.20	0.144	0.097	---	0.05
64	5.33	0.23	0.168	0.097	---	0.07
65	5.42	0.23	0.168	0.096	---	0.07
66	5.50	0.23	0.168	0.096	---	0.07
67	5.58	0.27	0.192	0.096	---	0.10
68	5.67	0.27	0.192	0.095	---	0.10
69	5.75	0.27	0.192	0.095	---	0.10
70	5.83	0.27	0.192	0.094	---	0.10
71	5.92	0.27	0.192	0.094	---	0.10
72	6.00	0.27	0.192	0.093	---	0.10
73	6.08	0.30	0.216	0.093	---	0.12
74	6.17	0.30	0.216	0.093	---	0.12
75	6.25	0.30	0.216	0.092	---	0.12
76	6.33	0.30	0.216	0.092	---	0.12
77	6.42	0.30	0.216	0.091	---	0.12
78	6.50	0.30	0.216	0.091	---	0.12
79	6.58	0.33	0.240	0.091	---	0.15
80	6.67	0.33	0.240	0.090	---	0.15
81	6.75	0.33	0.240	0.090	---	0.15
82	6.83	0.33	0.240	0.089	---	0.15
83	6.92	0.33	0.240	0.089	---	0.15
84	7.00	0.33	0.240	0.089	---	0.15
85	7.08	0.33	0.240	0.088	---	0.15
86	7.17	0.33	0.240	0.088	---	0.15
87	7.25	0.33	0.240	0.087	---	0.15
88	7.33	0.37	0.264	0.087	---	0.18
89	7.42	0.37	0.264	0.087	---	0.18
90	7.50	0.37	0.264	0.086	---	0.18
91	7.58	0.40	0.288	0.086	---	0.20
92	7.67	0.40	0.288	0.085	---	0.20
93	7.75	0.40	0.288	0.085	---	0.20
94	7.83	0.43	0.312	0.085	---	0.23
95	7.92	0.43	0.312	0.084	---	0.23
96	8.00	0.43	0.312	0.084	---	0.23
97	8.08	0.50	0.360	0.083	---	0.28
98	8.17	0.50	0.360	0.083	---	0.28
99	8.25	0.50	0.360	0.083	---	0.28
100	8.33	0.50	0.360	0.082	---	0.28
101	8.42	0.50	0.360	0.082	---	0.28
102	8.50	0.50	0.360	0.082	---	0.28
103	8.58	0.53	0.384	0.081	---	0.30
104	8.67	0.53	0.384	0.081	---	0.30
105	8.75	0.53	0.384	0.080	---	0.30
106	8.83	0.57	0.408	0.080	---	0.33
107	8.92	0.57	0.408	0.080	---	0.33
108	9.00	0.57	0.408	0.079	---	0.33
109	9.08	0.63	0.456	0.079	---	0.38
110	9.17	0.63	0.456	0.078	---	0.38
111	9.25	0.63	0.456	0.078	---	0.38
112	9.33	0.67	0.480	0.078	---	0.40
113	9.42	0.67	0.480	0.077	---	0.40
114	9.50	0.67	0.480	0.077	---	0.40
115	9.58	0.70	0.504	0.077	---	0.43
116	9.67	0.70	0.504	0.076	---	0.43
117	9.75	0.70	0.504	0.076	---	0.43
118	9.83	0.73	0.528	0.076	---	0.45
119	9.92	0.73	0.528	0.075	---	0.45
120	10.00	0.73	0.528	0.075	---	0.45
121	10.08	0.50	0.360	0.074	---	0.29
122	10.17	0.50	0.360	0.074	---	0.29
123	10.25	0.50	0.360	0.074	---	0.29
124	10.33	0.50	0.360	0.073	---	0.29
125	10.42	0.50	0.360	0.073	---	0.29
126	10.50	0.50	0.360	0.073	---	0.29
127	10.58	0.67	0.480	0.072	---	0.41
128	10.67	0.67	0.480	0.072	---	0.41
129	10.75	0.67	0.480	0.072	---	0.41
130	10.83	0.67	0.480	0.071	---	0.41
131	10.92	0.67	0.480	0.071	---	0.41
132	11.00	0.67	0.480	0.071	---	0.41
133	11.08	0.63	0.456	0.070	---	0.39
134	11.17	0.63	0.456	0.070	---	0.39
135	11.25	0.63	0.456	0.069	---	0.39
136	11.33	0.63	0.456	0.069	---	0.39
137	11.42	0.63	0.456	0.069	---	0.39
138	11.50	0.63	0.456	0.068	---	0.39
139	11.58	0.57	0.408	0.068	---	0.34
140	11.67	0.57	0.408	0.068	---	0.34
141	11.75	0.57	0.408	0.067	---	0.34

142	11.83	0.60	0.432	0.067	---	0.36
143	11.92	0.60	0.432	0.067	---	0.37
144	12.00	0.60	0.432	0.066	---	0.37
145	12.08	0.83	0.600	0.066	---	0.53
146	12.17	0.83	0.600	0.066	---	0.53
147	12.25	0.83	0.600	0.065	---	0.53
148	12.33	0.87	0.624	0.065	---	0.56
149	12.42	0.87	0.624	0.065	---	0.56
150	12.50	0.87	0.624	0.064	---	0.56
151	12.58	0.93	0.672	0.064	---	0.61
152	12.67	0.93	0.672	0.064	---	0.61
153	12.75	0.93	0.672	0.064	---	0.61
154	12.83	0.97	0.696	0.063	---	0.63
155	12.92	0.97	0.696	0.063	---	0.63
156	13.00	0.97	0.696	0.063	---	0.63
157	13.08	1.13	0.816	0.062	---	0.75
158	13.17	1.13	0.816	0.062	---	0.75
159	13.25	1.13	0.816	0.062	---	0.75
160	13.33	1.13	0.816	0.061	---	0.75
161	13.42	1.13	0.816	0.061	---	0.76
162	13.50	1.13	0.816	0.061	---	0.76
163	13.58	0.77	0.552	0.060	---	0.49
164	13.67	0.77	0.552	0.060	---	0.49
165	13.75	0.77	0.552	0.060	---	0.49
166	13.83	0.77	0.552	0.059	---	0.49
167	13.92	0.77	0.552	0.059	---	0.49
168	14.00	0.77	0.552	0.059	---	0.49
169	14.08	0.90	0.648	0.059	---	0.59
170	14.17	0.90	0.648	0.058	---	0.59
171	14.25	0.90	0.648	0.058	---	0.59
172	14.33	0.87	0.624	0.058	---	0.57
173	14.42	0.87	0.624	0.057	---	0.57
174	14.50	0.87	0.624	0.057	---	0.57
175	14.58	0.87	0.624	0.057	---	0.57
176	14.67	0.87	0.624	0.056	---	0.57
177	14.75	0.87	0.624	0.056	---	0.57
178	14.83	0.83	0.600	0.056	---	0.54
179	14.92	0.83	0.600	0.056	---	0.54
180	15.00	0.83	0.600	0.055	---	0.54
181	15.08	0.80	0.576	0.055	---	0.52
182	15.17	0.80	0.576	0.055	---	0.52
183	15.25	0.80	0.576	0.054	---	0.52
184	15.33	0.77	0.552	0.054	---	0.50
185	15.42	0.77	0.552	0.054	---	0.50
186	15.50	0.77	0.552	0.054	---	0.50
187	15.58	0.63	0.456	0.053	---	0.40
188	15.67	0.63	0.456	0.053	---	0.40
189	15.75	0.63	0.456	0.053	---	0.40
190	15.83	0.63	0.456	0.053	---	0.40
191	15.92	0.63	0.456	0.052	---	0.40
192	16.00	0.63	0.456	0.052	---	0.40
193	16.08	0.13	0.096	0.052	---	0.04
194	16.17	0.13	0.096	0.051	---	0.04
195	16.25	0.13	0.096	0.051	---	0.04
196	16.33	0.13	0.096	0.051	---	0.05
197	16.42	0.13	0.096	0.051	---	0.05
198	16.50	0.13	0.096	0.050	---	0.05
199	16.58	0.10	0.072	0.050	---	0.02
200	16.67	0.10	0.072	0.050	---	0.02
201	16.75	0.10	0.072	0.050	---	0.02
202	16.83	0.10	0.072	0.049	---	0.02
203	16.92	0.10	0.072	0.049	---	0.02
204	17.00	0.10	0.072	0.049	---	0.02
205	17.08	0.17	0.120	0.049	---	0.07
206	17.17	0.17	0.120	0.048	---	0.07
207	17.25	0.17	0.120	0.048	---	0.07
208	17.33	0.17	0.120	0.048	---	0.07
209	17.42	0.17	0.120	0.048	---	0.07
210	17.50	0.17	0.120	0.047	---	0.07
211	17.58	0.17	0.120	0.047	---	0.07
212	17.67	0.17	0.120	0.047	---	0.07
213	17.75	0.17	0.120	0.047	---	0.07
214	17.83	0.13	0.096	0.047	---	0.05
215	17.92	0.13	0.096	0.046	---	0.05
216	18.00	0.13	0.096	0.046	---	0.05
217	18.08	0.13	0.096	0.046	---	0.05
218	18.17	0.13	0.096	0.046	---	0.05
219	18.25	0.13	0.096	0.045	---	0.05
220	18.33	0.13	0.096	0.045	---	0.05

221	18.42	0.13	0.096	0.045	---	0.05
222	18.50	0.13	0.096	0.045	---	0.05
223	18.58	0.10	0.072	0.045	---	0.03
224	18.67	0.10	0.072	0.044	---	0.03
225	18.75	0.10	0.072	0.044	---	0.03
226	18.83	0.07	0.048	0.044	---	0.00
227	18.92	0.07	0.048	0.044	---	0.00
228	19.00	0.07	0.048	0.043	---	0.00
229	19.08	0.10	0.072	0.043	---	0.03
230	19.17	0.10	0.072	0.043	---	0.03
231	19.25	0.10	0.072	0.043	---	0.03
232	19.33	0.13	0.096	0.043	---	0.05
233	19.42	0.13	0.096	0.042	---	0.05
234	19.50	0.13	0.096	0.042	---	0.05
235	19.58	0.10	0.072	0.042	---	0.03
236	19.67	0.10	0.072	0.042	---	0.03
237	19.75	0.10	0.072	0.042	---	0.03
238	19.83	0.07	0.048	0.041	---	0.01
239	19.92	0.07	0.048	0.041	---	0.01
240	20.00	0.07	0.048	0.041	---	0.01
241	20.08	0.10	0.072	0.041	---	0.03
242	20.17	0.10	0.072	0.041	---	0.03
243	20.25	0.10	0.072	0.041	---	0.03
244	20.33	0.10	0.072	0.040	---	0.03
245	20.42	0.10	0.072	0.040	---	0.03
246	20.50	0.10	0.072	0.040	---	0.03
247	20.58	0.10	0.072	0.040	---	0.03
248	20.67	0.10	0.072	0.040	---	0.03
249	20.75	0.10	0.072	0.040	---	0.03
250	20.83	0.07	0.048	0.039	---	0.01
251	20.92	0.07	0.048	0.039	---	0.01
252	21.00	0.07	0.048	0.039	---	0.01
253	21.08	0.10	0.072	0.039	---	0.03
254	21.17	0.10	0.072	0.039	---	0.03
255	21.25	0.10	0.072	0.039	---	0.03
256	21.33	0.07	0.048	0.038	---	0.01
257	21.42	0.07	0.048	0.038	---	0.01
258	21.50	0.07	0.048	0.038	---	0.01
259	21.58	0.10	0.072	0.038	---	0.03
260	21.67	0.10	0.072	0.038	---	0.03
261	21.75	0.10	0.072	0.038	---	0.03
262	21.83	0.07	0.048	0.038	---	0.01
263	21.92	0.07	0.048	0.038	---	0.01
264	22.00	0.07	0.048	0.037	---	0.01
265	22.08	0.10	0.072	0.037	---	0.03
266	22.17	0.10	0.072	0.037	---	0.03
267	22.25	0.10	0.072	0.037	---	0.03
268	22.33	0.07	0.048	0.037	---	0.01
269	22.42	0.07	0.048	0.037	---	0.01
270	22.50	0.07	0.048	0.037	---	0.01
271	22.58	0.07	0.048	0.037	---	0.01
272	22.67	0.07	0.048	0.036	---	0.01
273	22.75	0.07	0.048	0.036	---	0.01
274	22.83	0.07	0.048	0.036	---	0.01
275	22.92	0.07	0.048	0.036	---	0.01
276	23.00	0.07	0.048	0.036	---	0.01
277	23.08	0.07	0.048	0.036	---	0.01
278	23.17	0.07	0.048	0.036	---	0.01
279	23.25	0.07	0.048	0.036	---	0.01
280	23.33	0.07	0.048	0.036	---	0.01
281	23.42	0.07	0.048	0.036	---	0.01
282	23.50	0.07	0.048	0.036	---	0.01
283	23.58	0.07	0.048	0.036	---	0.01
284	23.67	0.07	0.048	0.036	---	0.01
285	23.75	0.07	0.048	0.036	---	0.01
286	23.83	0.07	0.048	0.035	---	0.01
287	23.92	0.07	0.048	0.035	---	0.01
288	24.00	0.07	0.048	0.035	---	0.01
Sum =		100.0			Sum =	54.7

Flood volume = Effective rainfall 4.56(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 4.9(Ac.Ft)
Total soil loss = 1.44(In)
Total soil loss = 1.536(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 211880.7 Cubic Feet
Total soil loss = 66896.3 Cubic Feet

Peak flow rate of this hydrograph = 9.746(CFS)

---

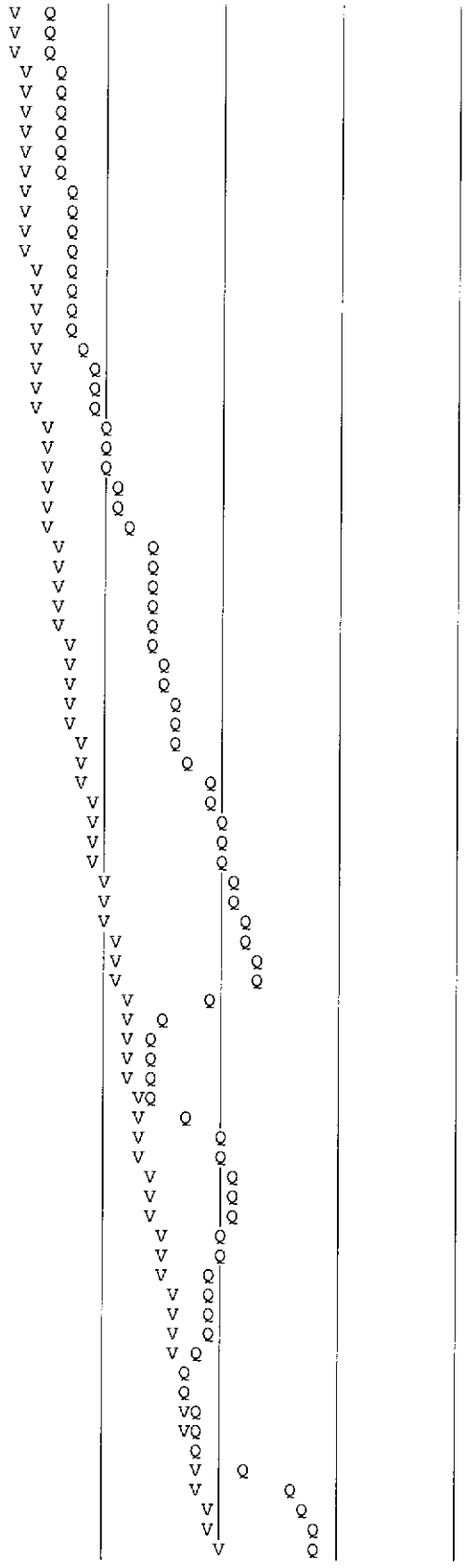
sobonalt2d24100

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

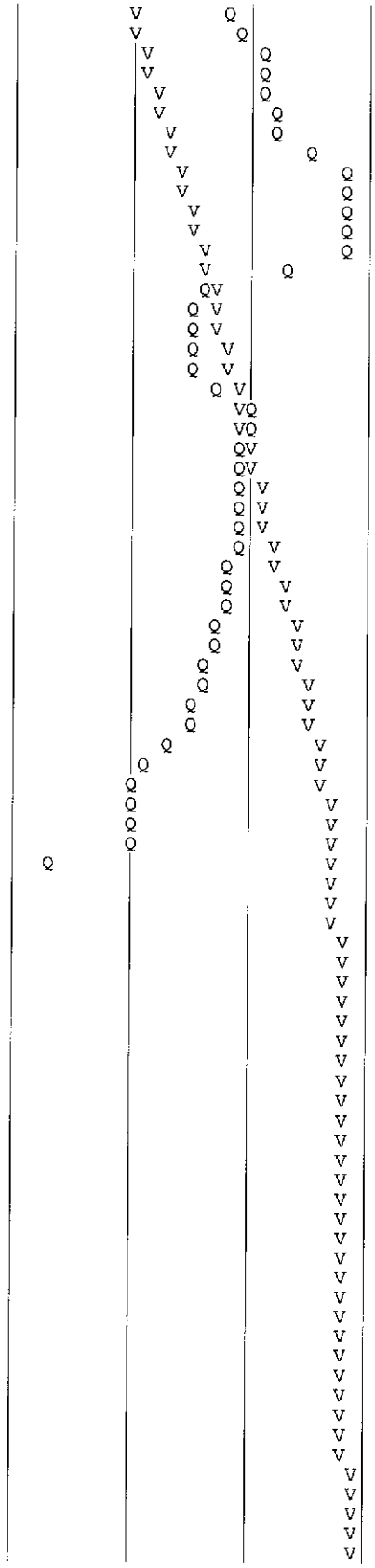
Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0014	0.21	Q
0+10	0.0046	0.47	VQ
0+15	0.0081	0.50	V Q
0+20	0.0123	0.61	V Q
0+25	0.0174	0.74	V Q
0+30	0.0226	0.76	V Q
0+35	0.0279	0.76	V Q
0+40	0.0331	0.76	V Q
0+45	0.0384	0.76	V Q
0+50	0.0444	0.87	V Q
0+55	0.0512	0.99	V Q
1+ 0	0.0582	1.01	V Q
1+ 5	0.0645	0.91	V Q
1+10	0.0699	0.78	V Q
1+15	0.0751	0.77	V Q
1+20	0.0804	0.76	V Q
1+25	0.0856	0.76	V Q
1+30	0.0909	0.76	V Q
1+35	0.0961	0.76	V Q
1+40	0.1014	0.76	V Q
1+45	0.1066	0.76	V Q
1+50	0.1126	0.87	V Q
1+55	0.1194	0.99	V Q
2+ 0	0.1264	1.01	V Q
2+ 5	0.1334	1.02	V Q
2+10	0.1404	1.02	V Q
2+15	0.1474	1.02	V Q
2+20	0.1544	1.02	V Q
2+25	0.1614	1.02	V Q
2+30	0.1684	1.02	V Q
2+35	0.1728	0.64	VQ
2+40	0.1741	0.19	QV
2+45	0.1750	0.13	QV
2+50	0.1759	0.12	QV
2+55	0.1768	0.13	QV
3+ 0	0.1777	0.14	QV
3+ 5	0.1787	0.14	QV
3+10	0.1797	0.15	QV
3+15	0.1808	0.15	QV
3+20	0.1819	0.16	QV
3+25	0.1830	0.17	QV
3+30	0.1842	0.17	QV
3+35	0.1854	0.18	QV
3+40	0.1867	0.18	QV
3+45	0.1880	0.19	QV
3+50	0.1902	0.32	Q
3+55	0.1935	0.48	Q
4+ 0	0.1970	0.51	VQ
4+ 5	0.2006	0.52	VQ
4+10	0.2042	0.53	VQ
4+15	0.2079	0.53	VQ
4+20	0.2125	0.67	VQ
4+25	0.2182	0.83	V Q
4+30	0.2241	0.86	V Q
4+35	0.2300	0.86	V Q
4+40	0.2360	0.87	V Q
4+45	0.2420	0.88	V Q
4+50	0.2490	1.01	V Q
4+55	0.2571	1.17	V Q
5+ 0	0.2653	1.20	V Q
5+ 5	0.2719	0.95	VQ
5+10	0.2763	0.65	Q
5+15	0.2805	0.61	Q
5+20	0.2855	0.73	Q
5+25	0.2917	0.89	VQ
5+30	0.2980	0.92	VQ
5+35	0.3053	1.06	V Q
5+40	0.3137	1.22	V Q
5+45	0.3223	1.25	V Q
5+50	0.3310	1.26	V Q

sobonait2d24100

5+55	0.3397	1.26	
6+ 0	0.3484	1.27	
6+ 5	0.3580	1.40	
6+10	0.3688	1.56	
6+15	0.3797	1.59	
6+20	0.3908	1.60	
6+25	0.4018	1.60	
6+30	0.4129	1.61	
6+35	0.4249	1.74	
6+40	0.4380	1.90	
6+45	0.4513	1.93	
6+50	0.4647	1.94	
6+55	0.4781	1.95	
7+ 0	0.4915	1.95	
7+ 5	0.5050	1.96	
7+10	0.5185	1.96	
7+15	0.5320	1.97	
7+20	0.5465	2.10	
7+25	0.5620	2.26	
7+30	0.5778	2.29	
7+35	0.5945	2.42	
7+40	0.6123	2.59	
7+45	0.6303	2.61	
7+50	0.6492	2.75	
7+55	0.6693	2.91	
8+ 0	0.6895	2.94	
8+ 5	0.7115	3.20	
8+10	0.7358	3.52	
8+15	0.7603	3.57	
8+20	0.7850	3.58	
8+25	0.8097	3.59	
8+30	0.8344	3.59	
8+35	0.8601	3.72	
8+40	0.8868	3.88	
8+45	0.9138	3.91	
8+50	0.9416	4.05	
8+55	0.9706	4.21	
9+ 0	0.9998	4.24	
9+ 5	1.0308	4.50	
9+10	1.0640	4.82	
9+15	1.0975	4.87	
9+20	1.1320	5.01	
9+25	1.1675	5.17	
9+30	1.2033	5.19	
9+35	1.2400	5.33	
9+40	1.2779	5.49	
9+45	1.3159	5.52	
9+50	1.3548	5.65	
9+55	1.3948	5.82	
10+ 0	1.4351	5.84	
10+ 5	1.4692	4.96	
10+10	1.4959	3.87	
10+15	1.5215	3.72	
10+20	1.5469	3.70	
10+25	1.5724	3.70	
10+30	1.5980	3.71	
10+35	1.6279	4.35	
10+40	1.6632	5.13	
10+45	1.6994	5.25	
10+50	1.7357	5.27	
10+55	1.7720	5.28	
11+ 0	1.8084	5.28	
11+ 5	1.8440	5.16	
11+10	1.8784	5.01	
11+15	1.9128	4.99	
11+20	1.9472	4.99	
11+25	1.9816	4.99	
11+30	2.0160	5.00	
11+35	2.0487	4.75	
11+40	2.0793	4.44	
11+45	2.1096	4.40	
11+50	2.1407	4.52	
11+55	2.1730	4.68	
12+ 0	2.2054	4.71	
12+ 5	2.2441	5.61	
12+10	2.2903	6.71	
12+15	2.3376	6.87	
12+20	2.3860	7.03	
12+25	2.4355	7.19	

sobonalt2d24100

12+30	2.4852	7.21	
12+35	2.5367	7.48	
12+40	2.5904	7.79	
12+45	2.6444	7.84	
12+50	2.6993	7.98	
12+55	2.7554	8.14	
13+ 0	2.8117	8.17	
13+ 5	2.8724	8.81	
13+10	2.9385	9.60	
13+15	3.0054	9.71	
13+20	3.0725	9.74	
13+25	3.1396	9.74	
13+30	3.2067	9.75	
13+35	3.2642	8.35	
13+40	3.3099	6.63	
13+45	3.3539	6.39	
13+50	3.3976	6.35	
13+55	3.4414	6.36	
14+ 0	3.4852	6.36	
14+ 5	3.5326	6.88	
14+10	3.5843	7.51	
14+15	3.6366	7.60	
14+20	3.6882	7.49	
14+25	3.7387	7.34	
14+30	3.7891	7.32	
14+35	3.8395	7.32	
14+40	3.8900	7.32	
14+45	3.9404	7.33	
14+50	3.9900	7.20	
14+55	4.0386	7.05	
15+ 0	4.0870	7.03	
15+ 5	4.1345	6.90	
15+10	4.1810	6.75	
15+15	4.2274	6.73	
15+20	4.2729	6.60	
15+25	4.3173	6.45	
15+30	4.3616	6.43	
15+35	4.4024	5.92	
15+40	4.4389	5.30	
15+45	4.4748	5.22	
15+50	4.5107	5.20	
15+55	4.5466	5.21	
16+ 0	4.5825	5.21	
16+ 5	4.6052	3.31	
16+10	4.6118	0.96	
16+15	4.6162	0.63	
16+20	4.6202	0.58	
16+25	4.6242	0.58	
16+30	4.6282	0.59	
16+35	4.6314	0.46	
16+40	4.6335	0.31	
16+45	4.6355	0.29	
16+50	4.6375	0.29	
16+55	4.6395	0.29	
17+ 0	4.6416	0.30	
17+ 5	4.6454	0.55	
17+10	4.6514	0.87	
17+15	4.6577	0.92	
17+20	4.6641	0.93	
17+25	4.6705	0.93	
17+30	4.6769	0.93	
17+35	4.6834	0.94	
17+40	4.6898	0.94	
17+45	4.6963	0.94	
17+50	4.7020	0.82	
17+55	4.7066	0.67	
18+ 0	4.7110	0.65	
18+ 5	4.7154	0.65	
18+10	4.7199	0.65	
18+15	4.7244	0.65	
18+20	4.7289	0.65	
18+25	4.7334	0.66	
18+30	4.7380	0.66	
18+35	4.7417	0.54	
18+40	4.7443	0.38	
18+45	4.7468	0.36	
18+50	4.7484	0.23	
18+55	4.7489	0.08	
19+ 0	4.7494	0.06	



sobonalt2d24100

19+ 5	4.7506	0.19	Q
19+10	4.7530	0.35	Q
19+15	4.7556	0.37	Q
19+20	4.7590	0.50	Q
19+25	4.7636	0.66	Q
19+30	4.7684	0.69	Q
19+35	4.7723	0.57	Q
19+40	4.7751	0.41	Q
19+45	4.7778	0.39	Q
19+50	4.7796	0.26	Q
19+55	4.7804	0.11	Q
20+ 0	4.7810	0.09	Q
20+ 5	4.7825	0.22	Q
20+10	4.7851	0.38	Q
20+15	4.7879	0.40	Q
20+20	4.7906	0.41	Q
20+25	4.7935	0.41	Q
20+30	4.7963	0.41	Q
20+35	4.7991	0.41	Q
20+40	4.8020	0.41	Q
20+45	4.8049	0.42	Q
20+50	4.8069	0.29	Q
20+55	4.8078	0.14	Q
21+ 0	4.8086	0.12	Q
21+ 5	4.8103	0.24	Q
21+10	4.8131	0.40	Q
21+15	4.8160	0.43	Q
21+20	4.8181	0.30	Q
21+25	4.8191	0.15	Q
21+30	4.8200	0.13	Q
21+35	4.8218	0.25	Q
21+40	4.8246	0.41	Q
21+45	4.8276	0.44	Q
21+50	4.8298	0.31	Q
21+55	4.8309	0.16	Q
22+ 0	4.8318	0.14	Q
22+ 5	4.8337	0.26	Q
22+10	4.8366	0.42	Q
22+15	4.8396	0.45	Q
22+20	4.8419	0.32	Q
22+25	4.8430	0.17	Q
22+30	4.8441	0.15	Q
22+35	4.8451	0.15	Q
22+40	4.8461	0.15	Q
22+45	4.8471	0.15	Q
22+50	4.8481	0.15	Q
22+55	4.8492	0.15	Q
23+ 0	4.8502	0.15	Q
23+ 5	4.8513	0.15	Q
23+10	4.8524	0.15	Q
23+15	4.8534	0.16	Q
23+20	4.8545	0.16	Q
23+25	4.8556	0.16	Q
23+30	4.8567	0.16	Q
23+35	4.8578	0.16	Q
23+40	4.8589	0.16	Q
23+45	4.8600	0.16	Q
23+50	4.8611	0.16	Q
23+55	4.8622	0.16	Q
24+ 0	4.8633	0.16	Q
24+ 5	4.8640	0.10	Q
24+10	4.8641	0.01	Q
24+15	4.8641	0.00	Q

ALTERNATIVE NO. 3

UNDEVELOPED CONDITION

sobonalt31100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt31100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	0.55	3.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	1.20	7.08

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	86.00	0.000

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	0.797
2	0.167	194.180	55.366	3.292
3	0.250	291.271	18.995	1.129
4	0.333	388.361	7.769	0.462
5	0.417	485.451	2.779	0.165
6	0.500	582.541	0.892	0.053
7	0.583	679.631	0.599	0.036
8	0.667	776.721	0.191	0.011
		Sum = 100.000	Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.176	---	0.43
2	0.17	4.30	0.619	0.176	---	0.44
3	0.25	5.00	0.720	0.176	---	0.54
4	0.33	5.00	0.720	0.176	---	0.54
5	0.42	5.80	0.835	0.176	---	0.66
6	0.50	6.50	0.936	0.176	---	0.76
7	0.58	7.40	1.066	0.176	---	0.89
8	0.67	8.60	1.238	0.176	---	1.06
9	0.75	12.30	1.771	0.176	---	1.60
10	0.83	29.10	4.190	0.176	---	4.01
11	0.92	6.80	0.979	0.176	---	0.80
12	1.00	5.00	0.720	0.176	---	0.54
Sum =		100.0			Sum =	12.3

Flood volume = Effective rainfall 1.02(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.086(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 21938.2 Cubic Feet
Total soil loss = 3760.8 Cubic Feet

Peak flow rate of this hydrograph = 16.376(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0024	0.34	Q
0+10	0.0145	1.77	V Q
0+15	0.0309	2.38	V Q
0+20	0.0511	2.93	VQ
0+25	0.0732	3.21	VQ
0+30	0.0990	3.74	Q
0+35	0.1289	4.34	Q V
0+40	0.1639	5.08	Q V
0+45	0.2072	6.29	Q V
0+50	0.2778	10.26	Q V
0+55	0.3906	16.38	VQ
1+ 0	0.4499	8.61	Q V
1+ 5	0.4838	4.92	Q V
1+10	0.4961	1.78	Q V
1+15	0.5007	0.67	Q V
1+20	0.5027	0.29	Q V
1+25	0.5034	0.10	Q V
1+30	0.5036	0.03	Q V
1+35	0.5036	0.01	Q V

sobonalt33100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt33100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	0.90	5.31

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	2.10	12.39

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	86.00	0.000

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	0.797
2	0.167	194.180	55.366	3.292
3	0.250	291.271	18.995	1.129
4	0.333	388.361	7.769	0.462
5	0.417	485.451	2.779	0.165
6	0.500	582.541	0.892	0.053
7	0.583	679.631	0.599	0.036
8	0.667	776.721	0.191	0.011
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.176	---	0.15
2	0.17	1.30	0.328	0.176	---	0.15
3	0.25	1.10	0.277	0.176	---	0.10
4	0.33	1.50	0.378	0.176	---	0.20
5	0.42	1.50	0.378	0.176	---	0.20
6	0.50	1.80	0.454	0.176	---	0.28
7	0.58	1.50	0.378	0.176	---	0.20
8	0.67	1.80	0.454	0.176	---	0.28
9	0.75	1.80	0.454	0.176	---	0.28
10	0.83	1.50	0.378	0.176	---	0.20
11	0.92	1.60	0.403	0.176	---	0.23
12	1.00	1.80	0.454	0.176	---	0.28
13	1.08	2.20	0.554	0.176	---	0.38
14	1.17	2.20	0.554	0.176	---	0.38
15	1.25	2.20	0.554	0.176	---	0.38
16	1.33	2.00	0.504	0.176	---	0.33
17	1.42	2.60	0.655	0.176	---	0.48
18	1.50	2.70	0.680	0.176	---	0.50
19	1.58	2.40	0.605	0.176	---	0.43
20	1.67	2.70	0.680	0.176	---	0.50
21	1.75	3.30	0.832	0.176	---	0.66
22	1.83	3.10	0.781	0.176	---	0.61
23	1.92	2.90	0.731	0.176	---	0.56
24	2.00	3.00	0.756	0.176	---	0.58
25	2.08	3.10	0.781	0.176	---	0.61
26	2.17	4.20	1.058	0.176	---	0.88
27	2.25	5.00	1.260	0.176	---	1.08
28	2.33	3.50	0.882	0.176	---	0.71
29	2.42	6.80	1.714	0.176	---	1.54
30	2.50	7.30	1.840	0.176	---	1.66
31	2.58	8.20	2.066	0.176	---	1.89
32	2.67	5.90	1.487	0.176	---	1.31
33	2.75	2.00	0.504	0.176	---	0.33
34	2.83	1.80	0.454	0.176	---	0.28
35	2.92	1.80	0.454	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.9

Flood volume = Effective rainfall 1.58(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 0.257(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 33762.6 Cubic Feet
Total soil loss = 11211.9 Cubic Feet

Peak flow rate of this hydrograph = 10.078(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0008	0.12	Q				
0+10	0.0051	0.62	VQ				

sobonalt33100

0+15	0.0103	0.75	VQ
0+20	0.0154	0.74	VQ
0+25	0.0225	1.04	VQ
0+30	0.0308	1.20	VQ
0+35	0.0406	1.43	Q
0+40	0.0499	1.34	Q
0+45	0.0605	1.54	Q
0+50	0.0712	1.55	Q
0+55	0.0805	1.35	Q V
1+ 0	0.0901	1.40	Q V
1+ 5	0.1014	1.64	Q V
1+10	0.1154	2.03	QV
1+15	0.1303	2.17	Q V
1+20	0.1453	2.18	Q V
1+25	0.1602	2.16	Q V
1+30	0.1782	2.62	Q V
1+35	0.1975	2.80	Q V
1+40	0.2161	2.70	Q V
1+45	0.2369	3.02	Q V
1+50	0.2613	3.54	Q V
1+55	0.2856	3.53	Q V
2+ 0	0.3090	3.41	Q V
2+ 5	0.3329	3.46	Q V
2+10	0.3588	3.77	Q V
2+15	0.3924	4.88	Q V
2+20	0.4308	5.57	Q V
2+25	0.4676	5.34	Q V
2+30	0.5220	7.90	Q V
2+35	0.5861	9.31	Q V
2+40	0.6555	10.08	Q V
2+45	0.7094	7.83	Q V
2+50	0.7373	4.05	Q V
2+55	0.7550	2.58	Q V
3+ 0	0.7674	1.79	Q V
3+ 5	0.7722	0.70	Q V
3+10	0.7741	0.28	Q V
3+15	0.7747	0.09	Q V
3+20	0.7750	0.03	Q V
3+25	0.7751	0.01	Q V
3+30	0.7751	0.00	Q V
3+35	0.7751	0.00	Q V

sobonalt36100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt36100.out

++++++

sobonalt36100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	0.797
2	0.167	194.180	55.366	3.292
3	0.250	291.271	18.995	1.129
4	0.333	388.361	7.769	0.462
5	0.417	485.451	2.779	0.165
6	0.500	582.541	0.892	0.053
7	0.583	679.631	0.599	0.036
8	0.667	776.721	0.191	0.011
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.216	0.176	---	0.04
3	0.25	0.60	0.216	0.176	---	0.04
4	0.33	0.60	0.216	0.176	---	0.04
5	0.42	0.60	0.216	0.176	---	0.04
6	0.50	0.70	0.252	0.176	---	0.08
7	0.58	0.70	0.252	0.176	---	0.08
8	0.67	0.70	0.252	0.176	---	0.08
9	0.75	0.70	0.252	0.176	---	0.08
10	0.83	0.70	0.252	0.176	---	0.08
11	0.92	0.70	0.252	0.176	---	0.08
12	1.00	0.80	0.288	0.176	---	0.11
13	1.08	0.80	0.288	0.176	---	0.11
14	1.17	0.80	0.288	0.176	---	0.11
15	1.25	0.80	0.288	0.176	---	0.11
16	1.33	0.80	0.288	0.176	---	0.11
17	1.42	0.80	0.288	0.176	---	0.11
18	1.50	0.80	0.288	0.176	---	0.11
19	1.58	0.80	0.288	0.176	---	0.11
20	1.67	0.80	0.288	0.176	---	0.11
21	1.75	0.80	0.288	0.176	---	0.11
22	1.83	0.80	0.288	0.176	---	0.11
23	1.92	0.80	0.288	0.176	---	0.11
24	2.00	0.90	0.324	0.176	---	0.15
25	2.08	0.80	0.288	0.176	---	0.11
26	2.17	0.90	0.324	0.176	---	0.15
27	2.25	0.90	0.324	0.176	---	0.15
28	2.33	0.90	0.324	0.176	---	0.15
29	2.42	0.90	0.324	0.176	---	0.15
30	2.50	0.90	0.324	0.176	---	0.15
31	2.58	0.90	0.324	0.176	---	0.15
32	2.67	0.90	0.324	0.176	---	0.15
33	2.75	1.00	0.360	0.176	---	0.18
34	2.83	1.00	0.360	0.176	---	0.18
35	2.92	1.00	0.360	0.176	---	0.18
36	3.00	1.00	0.360	0.176	---	0.18
37	3.08	1.00	0.360	0.176	---	0.18
38	3.17	1.10	0.396	0.176	---	0.22
39	3.25	1.10	0.396	0.176	---	0.22
40	3.33	1.10	0.396	0.176	---	0.22
41	3.42	1.20	0.432	0.176	---	0.26
42	3.50	1.30	0.468	0.176	---	0.29
43	3.58	1.40	0.504	0.176	---	0.33
44	3.67	1.40	0.504	0.176	---	0.33
45	3.75	1.50	0.540	0.176	---	0.36
46	3.83	1.50	0.540	0.176	---	0.36
47	3.92	1.60	0.576	0.176	---	0.40
48	4.00	1.60	0.576	0.176	---	0.40
49	4.08	1.70	0.612	0.176	---	0.44
50	4.17	1.80	0.648	0.176	---	0.47
51	4.25	1.90	0.684	0.176	---	0.51
52	4.33	2.00	0.720	0.176	---	0.54
53	4.42	2.10	0.756	0.176	---	0.58
54	4.50	2.10	0.756	0.176	---	0.58
55	4.58	2.20	0.792	0.176	---	0.62
56	4.67	2.30	0.828	0.176	---	0.65
57	4.75	2.40	0.864	0.176	---	0.69
58	4.83	2.40	0.864	0.176	---	0.69

59	4.92	2.50	0.900	0.176	---	0.72
60	5.00	2.60	0.936	0.176	---	0.76
61	5.08	3.10	1.116	0.176	---	0.94
62	5.17	3.60	1.296	0.176	---	1.12
63	5.25	3.90	1.404	0.176	---	1.23
64	5.33	4.20	1.512	0.176	---	1.34
65	5.42	4.70	1.692	0.176	---	1.52
66	5.50	5.60	2.016	0.176	---	1.84
67	5.58	1.90	0.684	0.176	---	0.51
68	5.67	0.90	0.324	0.176	---	0.15
69	5.75	0.60	0.216	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 0.510(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 42022.4 Cubic Feet
Total soil loss = 22227.3 Cubic Feet

Peak flow rate of this hydrograph = 9.103(CFS)

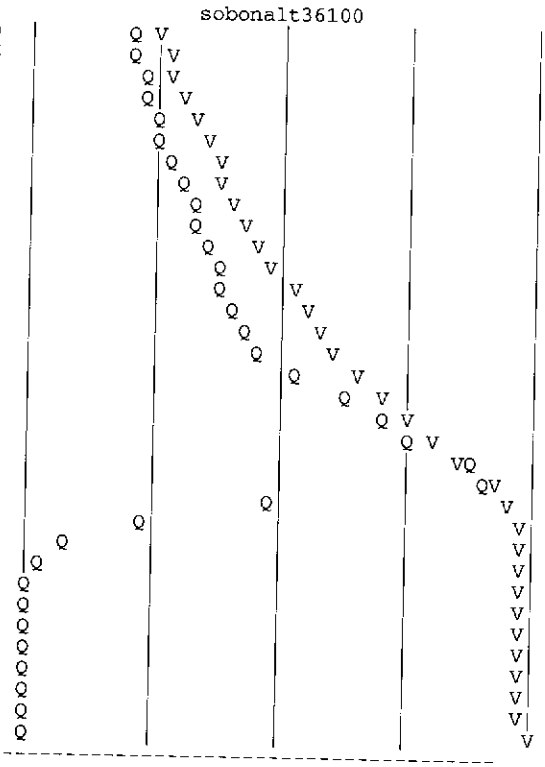
++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0000	0.00	Q
0+10	0.0003	0.05	Q
0+15	0.0015	0.17	Q
0+20	0.0030	0.21	Q
0+25	0.0046	0.23	Q
0+30	0.0064	0.27	VQ
0+35	0.0091	0.39	VQ
0+40	0.0120	0.43	VQ
0+45	0.0151	0.44	VQ
0+50	0.0182	0.45	VQ
0+55	0.0213	0.45	VQ
1+ 0	0.0246	0.48	Q
1+ 5	0.0288	0.60	VQ
1+10	0.0332	0.64	VQ
1+15	0.0377	0.66	VQ
1+20	0.0423	0.67	VQ
1+25	0.0469	0.67	VQ
1+30	0.0515	0.67	Q
1+35	0.0561	0.67	Q
1+40	0.0607	0.67	Q
1+45	0.0653	0.67	Q
1+50	0.0699	0.67	Q
1+55	0.0745	0.67	QV
2+ 0	0.0793	0.70	QV
2+ 5	0.0847	0.79	Q
2+10	0.0898	0.74	QV
2+15	0.0956	0.83	Q
2+20	0.1015	0.86	QV
2+25	0.1075	0.88	QV
2+30	0.1136	0.88	QV
2+35	0.1197	0.88	QV
2+40	0.1257	0.88	Q V
2+45	0.1320	0.91	Q V
2+50	0.1391	1.03	QV
2+55	0.1465	1.07	Q V
3+ 0	0.1540	1.09	Q V
3+ 5	0.1615	1.09	Q V
3+10	0.1693	1.12	Q V
3+15	0.1778	1.24	Q V
3+20	0.1867	1.28	Q V
3+25	0.1958	1.33	Q V
3+30	0.2060	1.48	Q V
3+35	0.2176	1.67	Q V
3+40	0.2303	1.85	Q V
3+45	0.2437	1.94	Q V

3+50	0.2581	2.09	
3+55	0.2730	2.16	
4+ 0	0.2888	2.30	
4+ 5	0.3052	2.38	
4+10	0.3228	2.55	
4+15	0.3417	2.74	
4+20	0.3620	2.95	
4+25	0.3837	3.16	
4+30	0.4068	3.34	
4+35	0.4305	3.44	
4+40	0.4554	3.61	
4+45	0.4816	3.81	
4+50	0.5091	3.99	
4+55	0.5372	4.08	
5+ 0	0.5665	4.26	
5+ 5	0.5980	4.57	
5+10	0.6349	5.37	
5+15	0.6781	6.27	
5+20	0.7264	7.01	
5+25	0.7798	7.75	
5+30	0.8405	8.81	
5+35	0.9031	9.10	
5+40	0.9370	4.91	
5+45	0.9530	2.32	
5+50	0.9598	0.99	
5+55	0.9624	0.39	
6+ 0	0.9638	0.20	
6+ 5	0.9644	0.09	
6+10	0.9646	0.03	
6+15	0.9647	0.01	
6+20	0.9647	0.00	
6+25	0.9647	0.00	
6+30	0.9647	0.00	
6+35	0.9647	0.00	



sobonalt324100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt324100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	2.25	13.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	6.00	35.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	86.00	0.000

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt324100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	0.797
2	0.167	194.180	55.366	3.292
3	0.250	291.271	18.995	1.129
4	0.333	388.361	7.769	0.462
5	0.417	485.451	2.779	0.165
6	0.500	582.541	0.892	0.053
7	0.583	679.631	0.599	0.036
8	0.667	776.721	0.191	0.011
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.130	0.01
47	3.92	0.20	0.144	0.258	0.130	0.01
48	4.00	0.20	0.144	0.257	0.130	0.01
49	4.08	0.20	0.144	0.256	0.130	0.01
50	4.17	0.20	0.144	0.255	0.130	0.01
51	4.25	0.20	0.144	0.254	0.130	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02

59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.130	0.01
62	5.17	0.20	0.144	0.242	0.130	0.01
63	5.25	0.20	0.144	0.241	0.130	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.08
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.16
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.384	0.201	---	0.18
104	8.67	0.53	0.384	0.200	---	0.18
105	8.75	0.53	0.384	0.199	---	0.18
106	8.83	0.57	0.408	0.198	---	0.21
107	8.92	0.57	0.408	0.197	---	0.21
108	9.00	0.57	0.408	0.196	---	0.21
109	9.08	0.63	0.456	0.195	---	0.26
110	9.17	0.63	0.456	0.195	---	0.26
111	9.25	0.63	0.456	0.194	---	0.26
112	9.33	0.67	0.480	0.193	---	0.29
113	9.42	0.67	0.480	0.192	---	0.29
114	9.50	0.67	0.480	0.191	---	0.29
115	9.58	0.70	0.504	0.190	---	0.31
116	9.67	0.70	0.504	0.189	---	0.31
117	9.75	0.70	0.504	0.188	---	0.32
118	9.83	0.73	0.528	0.187	---	0.34
119	9.92	0.73	0.528	0.186	---	0.34
120	10.00	0.73	0.528	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.18
122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.480	0.179	---	0.30
128	10.67	0.67	0.480	0.178	---	0.30
129	10.75	0.67	0.480	0.177	---	0.30
130	10.83	0.67	0.480	0.177	---	0.30
131	10.92	0.67	0.480	0.176	---	0.30
132	11.00	0.67	0.480	0.175	---	0.31
133	11.08	0.63	0.456	0.174	---	0.28
134	11.17	0.63	0.456	0.173	---	0.28
135	11.25	0.63	0.456	0.172	---	0.28
136	11.33	0.63	0.456	0.171	---	0.28
137	11.42	0.63	0.456	0.171	---	0.29

138	11.50	0.63	0.456	0.170	---	0.29
139	11.58	0.57	0.408	0.169	---	0.24
140	11.67	0.57	0.408	0.168	---	0.24
141	11.75	0.57	0.408	0.167	---	0.24
142	11.83	0.60	0.432	0.166	---	0.27
143	11.92	0.60	0.432	0.166	---	0.27
144	12.00	0.60	0.432	0.165	---	0.27
145	12.08	0.83	0.600	0.164	---	0.44
146	12.17	0.83	0.600	0.163	---	0.44
147	12.25	0.83	0.600	0.162	---	0.44
148	12.33	0.87	0.624	0.161	---	0.46
149	12.42	0.87	0.624	0.161	---	0.46
150	12.50	0.87	0.624	0.160	---	0.46
151	12.58	0.93	0.672	0.159	---	0.51
152	12.67	0.93	0.672	0.158	---	0.51
153	12.75	0.93	0.672	0.157	---	0.51
154	12.83	0.97	0.696	0.157	---	0.54
155	12.92	0.97	0.696	0.156	---	0.54
156	13.00	0.97	0.696	0.155	---	0.54
157	13.08	1.13	0.816	0.154	---	0.66
158	13.17	1.13	0.816	0.154	---	0.66
159	13.25	1.13	0.816	0.153	---	0.66
160	13.33	1.13	0.816	0.152	---	0.66
161	13.42	1.13	0.816	0.151	---	0.66
162	13.50	1.13	0.816	0.150	---	0.67
163	13.58	0.77	0.552	0.150	---	0.40
164	13.67	0.77	0.552	0.149	---	0.40
165	13.75	0.77	0.552	0.148	---	0.40
166	13.83	0.77	0.552	0.147	---	0.40
167	13.92	0.77	0.552	0.147	---	0.41
168	14.00	0.77	0.552	0.146	---	0.41
169	14.08	0.90	0.648	0.145	---	0.50
170	14.17	0.90	0.648	0.144	---	0.50
171	14.25	0.90	0.648	0.144	---	0.50
172	14.33	0.87	0.624	0.143	---	0.48
173	14.42	0.87	0.624	0.142	---	0.48
174	14.50	0.87	0.624	0.141	---	0.48
175	14.58	0.87	0.624	0.141	---	0.48
176	14.67	0.87	0.624	0.140	---	0.48
177	14.75	0.87	0.624	0.139	---	0.48
178	14.83	0.83	0.600	0.139	---	0.46
179	14.92	0.83	0.600	0.138	---	0.46
180	15.00	0.83	0.600	0.137	---	0.46
181	15.08	0.80	0.576	0.136	---	0.44
182	15.17	0.80	0.576	0.136	---	0.44
183	15.25	0.80	0.576	0.135	---	0.44
184	15.33	0.77	0.552	0.134	---	0.42
185	15.42	0.77	0.552	0.134	---	0.42
186	15.50	0.77	0.552	0.133	---	0.42
187	15.58	0.63	0.456	0.132	---	0.32
188	15.67	0.63	0.456	0.132	---	0.32
189	15.75	0.63	0.456	0.131	---	0.33
190	15.83	0.63	0.456	0.130	---	0.33
191	15.92	0.63	0.456	0.130	---	0.33
192	16.00	0.63	0.456	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01

217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00
Sum =		100.0			Sum =	36.9

Flood volume = Effective rainfall 3.08(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 1.5(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 1.437(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 65893.8 Cubic Feet

Total soil loss = 62606.8 Cubic Feet

Peak flow rate of this hydrograph = 3.948(CFS)

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

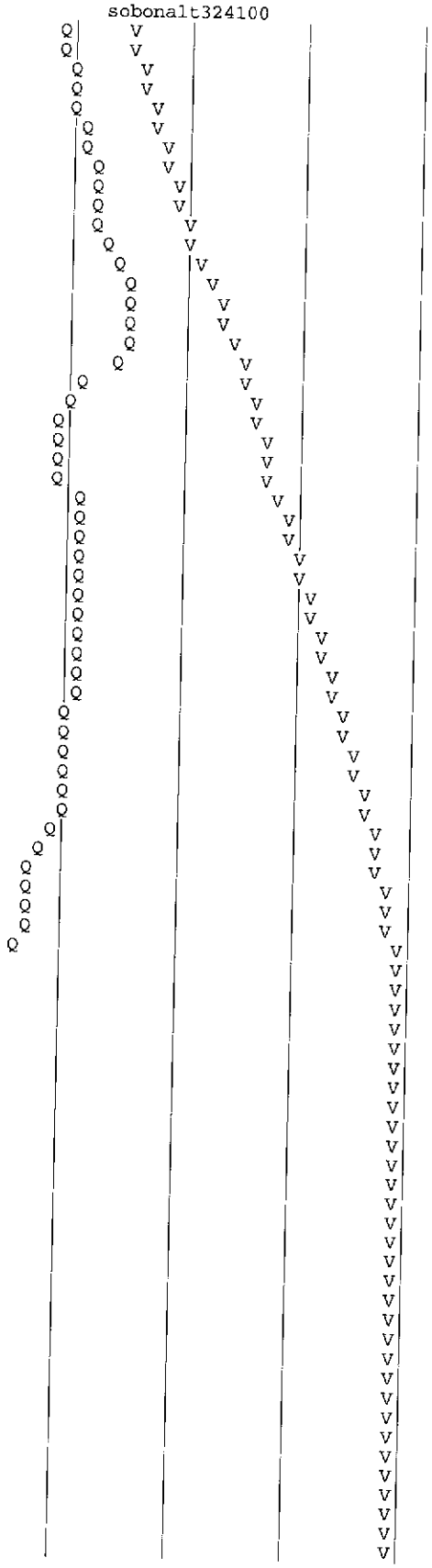
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0002	0.02	Q				
0+15	0.0003	0.03	Q				
0+20	0.0005	0.03	Q				
0+25	0.0008	0.04	Q				
0+30	0.0011	0.04	Q				
0+35	0.0014	0.04	Q				
0+40	0.0017	0.04	Q				
0+45	0.0020	0.04	Q				
0+50	0.0023	0.04	Q				
0+55	0.0026	0.05	Q				
1+ 0	0.0030	0.06	Q				
1+ 5	0.0034	0.05	Q				
1+10	0.0037	0.05	Q				
1+15	0.0040	0.04	Q				
1+20	0.0043	0.04	Q				
1+25	0.0046	0.04	Q				
1+30	0.0049	0.04	Q				
1+35	0.0052	0.04	Q				
1+40	0.0055	0.04	Q				
1+45	0.0058	0.04	Q				
1+50	0.0061	0.04	Q				
1+55	0.0065	0.05	Q				
2+ 0	0.0068	0.06	Q				
2+ 5	0.0072	0.06	Q				
2+10	0.0076	0.06	Q				
2+15	0.0080	0.06	Q				
2+20	0.0084	0.06	Q				
2+25	0.0088	0.06	Q				
2+30	0.0092	0.06	Q				
2+35	0.0096	0.06	Q				
2+40	0.0101	0.07	Q				
2+45	0.0105	0.07	Q				
2+50	0.0110	0.07	Q				
2+55	0.0115	0.07	Q				
3+ 0	0.0120	0.07	Q				
3+ 5	0.0125	0.07	Q				
3+10	0.0130	0.07	Q				
3+15	0.0135	0.07	Q				
3+20	0.0140	0.07	Q				
3+25	0.0145	0.07	Q				
3+30	0.0150	0.07	Q				
3+35	0.0155	0.07	Q				
3+40	0.0159	0.07	Q				
3+45	0.0164	0.07	Q				
3+50	0.0169	0.07	Q				
3+55	0.0175	0.08	Q				
4+ 0	0.0181	0.08	Q				
4+ 5	0.0187	0.09	Q				
4+10	0.0193	0.09	Q				
4+15	0.0198	0.09	Q				
4+20	0.0204	0.09	Q				
4+25	0.0211	0.10	Q				
4+30	0.0218	0.10	Q				
4+35	0.0225	0.10	Q				
4+40	0.0231	0.10	Q				
4+45	0.0238	0.10	Q				
4+50	0.0245	0.10	Q				
4+55	0.0253	0.11	Q				
5+ 0	0.0261	0.11	Q				
5+ 5	0.0268	0.11	Q				
5+10	0.0275	0.09	Q				
5+15	0.0281	0.09	Q				
5+20	0.0287	0.09	Q				
5+25	0.0294	0.10	Q				
5+30	0.0300	0.10	Q				

5+35	0.0307	0.10	Q
5+40	0.0315	0.11	Q
5+45	0.0323	0.11	Q
5+50	0.0330	0.11	Q
5+55	0.0338	0.11	Q
6+ 0	0.0346	0.11	Q
6+ 5	0.0354	0.12	Q
6+10	0.0363	0.12	Q
6+15	0.0371	0.13	Q
6+20	0.0380	0.13	QV
6+25	0.0389	0.13	QV
6+30	0.0398	0.13	QV
6+35	0.0406	0.12	QV
6+40	0.0414	0.10	QV
6+45	0.0421	0.10	QV
6+50	0.0428	0.10	QV
6+55	0.0435	0.11	QV
7+ 0	0.0443	0.11	QV
7+ 5	0.0451	0.12	QV
7+10	0.0460	0.13	QV
7+15	0.0469	0.13	QV
7+20	0.0479	0.16	QV
7+25	0.0496	0.24	QV
7+30	0.0515	0.27	Q
7+35	0.0536	0.31	Q
7+40	0.0564	0.40	Q
7+45	0.0594	0.43	Q
7+50	0.0626	0.47	Q
7+55	0.0664	0.56	VQ
8+ 0	0.0705	0.59	VQ
8+ 5	0.0750	0.65	VQ
8+10	0.0806	0.82	VQ
8+15	0.0867	0.88	VQ
8+20	0.0929	0.91	VQ
8+25	0.0993	0.92	VQ
8+30	0.1057	0.93	VQ
8+35	0.1123	0.96	VQ
8+40	0.1194	1.04	VQ
8+45	0.1268	1.07	VQ
8+50	0.1345	1.11	VQ
8+55	0.1427	1.20	VQ
9+ 0	0.1512	1.23	VQ
9+ 5	0.1601	1.29	VQ
9+10	0.1701	1.46	VQ
9+15	0.1806	1.52	V Q
9+20	0.1913	1.56	VQ
9+25	0.2028	1.66	VQ
9+30	0.2144	1.69	VQ
9+35	0.2263	1.73	VQ
9+40	0.2389	1.82	VQ
9+45	0.2516	1.85	VQ
9+50	0.2646	1.89	VQ
9+55	0.2783	1.98	Q
10+ 0	0.2921	2.01	VQ
10+ 5	0.3052	1.90	QV
10+10	0.3145	1.35	Q V
10+15	0.3225	1.17	Q V
10+20	0.3301	1.10	Q V
10+25	0.3375	1.07	Q V
10+30	0.3449	1.07	Q V
10+35	0.3529	1.17	Q V
10+40	0.3637	1.56	Q V
10+45	0.3754	1.71	Q V
10+50	0.3876	1.77	Q V
10+55	0.3999	1.79	Q V
11+ 0	0.4123	1.80	Q V
11+ 5	0.4247	1.79	Q V
11+10	0.4365	1.72	Q V
11+15	0.4482	1.70	Q V
11+20	0.4599	1.69	Q V
11+25	0.4715	1.69	Q V
11+30	0.4832	1.70	Q V
11+35	0.4947	1.66	Q V
11+40	0.5051	1.51	Q V
11+45	0.5151	1.46	Q V
11+50	0.5252	1.46	Q V
11+55	0.5358	1.54	Q V
12+ 0	0.5466	1.57	Q V
12+ 5	0.5584	1.72	Q V

sobonalt324100

12+10	0.5741	2.28
12+15	0.5911	2.47
12+20	0.6089	2.58
12+25	0.6274	2.69
12+30	0.6462	2.73
12+35	0.6654	2.79
12+40	0.6858	2.96
12+45	0.7066	3.02
12+50	0.7277	3.07
12+55	0.7494	3.16
13+ 0	0.7714	3.19
13+ 5	0.7942	3.31
13+10	0.8197	3.71
13+15	0.8462	3.85
13+20	0.8732	3.91
13+25	0.9003	3.94
13+30	0.9275	3.95
13+35	0.9533	3.75
13+40	0.9731	2.88
13+45	0.9910	2.59
13+50	1.0080	2.47
13+55	1.0247	2.43
14+ 0	1.0414	2.42
14+ 5	1.0586	2.49
14+10	1.0780	2.81
14+15	1.0981	2.92
14+20	1.1184	2.95
14+25	1.1384	2.90
14+30	1.1582	2.88
14+35	1.1780	2.87
14+40	1.1978	2.88
14+45	1.2176	2.88
14+50	1.2373	2.86
14+55	1.2566	2.79
15+ 0	1.2756	2.77
15+ 5	1.2945	2.74
15+10	1.3128	2.66
15+15	1.3309	2.64
15+20	1.3489	2.61
15+25	1.3663	2.53
15+30	1.3836	2.51
15+35	1.4003	2.42
15+40	1.4148	2.10
15+45	1.4285	2.00
15+50	1.4420	1.96
15+55	1.4554	1.95
16+ 0	1.4688	1.94
16+ 5	1.4805	1.69
16+10	1.4849	0.65
16+15	1.4869	0.29
16+20	1.4879	0.14
16+25	1.4885	0.09
16+30	1.4890	0.07
16+35	1.4894	0.06
16+40	1.4897	0.05
16+45	1.4900	0.04
16+50	1.4903	0.04
16+55	1.4906	0.04
17+ 0	1.4909	0.04
17+ 5	1.4912	0.05
17+10	1.4916	0.06
17+15	1.4921	0.06
17+20	1.4922	0.02
17+25	1.4923	0.01
17+30	1.4924	0.01
17+35	1.4925	0.01
17+40	1.4926	0.02
17+45	1.4927	0.02
17+50	1.4929	0.03
17+55	1.4932	0.05
18+ 0	1.4936	0.05
18+ 5	1.4940	0.06
18+10	1.4944	0.06
18+15	1.4948	0.06
18+20	1.4952	0.06
18+25	1.4956	0.06
18+30	1.4959	0.06
18+35	1.4963	0.06
18+40	1.4967	0.05



18+45	1.4970	0.04	Q				V
18+50	1.4972	0.04	Q				V
18+55	1.4975	0.03	Q				V
19+ 0	1.4977	0.03	Q				V
19+ 5	1.4979	0.03	Q				V
19+10	1.4982	0.04	Q				V
19+15	1.4985	0.04	Q				V
19+20	1.4988	0.04	Q				V
19+25	1.4991	0.05	Q				V
19+30	1.4995	0.06	Q				V
19+35	1.4999	0.05	Q				V
19+40	1.5002	0.05	Q				V
19+45	1.5005	0.04	Q				V
19+50	1.5008	0.04	Q				V
19+55	1.5010	0.03	Q				V
20+ 0	1.5012	0.03	Q				V
20+ 5	1.5014	0.03	Q				V
20+10	1.5017	0.04	Q				V
20+15	1.5020	0.04	Q				V
20+20	1.5023	0.04	Q				V
20+25	1.5026	0.04	Q				V
20+30	1.5029	0.04	Q				V
20+35	1.5032	0.04	Q				V
20+40	1.5035	0.04	Q				V
20+45	1.5038	0.04	Q				V
20+50	1.5040	0.04	Q				V
20+55	1.5043	0.03	Q				V
21+ 0	1.5045	0.03	Q				V
21+ 5	1.5047	0.03	Q				V
21+10	1.5050	0.04	Q				V
21+15	1.5052	0.04	Q				V
21+20	1.5055	0.04	Q				V
21+25	1.5057	0.03	Q				V
21+30	1.5059	0.03	Q				V
21+35	1.5062	0.03	Q				V
21+40	1.5064	0.04	Q				V
21+45	1.5067	0.04	Q				V
21+50	1.5070	0.04	Q				V
21+55	1.5072	0.03	Q				V
22+ 0	1.5074	0.03	Q				V
22+ 5	1.5076	0.03	Q				V
22+10	1.5079	0.04	Q				V
22+15	1.5082	0.04	Q				V
22+20	1.5085	0.04	Q				V
22+25	1.5087	0.03	Q				V
22+30	1.5089	0.03	Q				V
22+35	1.5091	0.03	Q				V
22+40	1.5093	0.03	Q				V
22+45	1.5095	0.03	Q				V
22+50	1.5097	0.03	Q				V
22+55	1.5099	0.03	Q				V
23+ 0	1.5101	0.03	Q				V
23+ 5	1.5103	0.03	Q				V
23+10	1.5105	0.03	Q				V
23+15	1.5107	0.03	Q				V
23+20	1.5109	0.03	Q				V
23+25	1.5111	0.03	Q				V
23+30	1.5113	0.03	Q				V
23+35	1.5115	0.03	Q				V
23+40	1.5117	0.03	Q				V
23+45	1.5119	0.03	Q				V
23+50	1.5120	0.03	Q				V
23+55	1.5122	0.03	Q				V
24+ 0	1.5124	0.03	Q				V
24+ 5	1.5126	0.02	Q				V
24+10	1.5127	0.01	Q				V
24+15	1.5127	0.00	Q				V
24+20	1.5127	0.00	Q				V
24+25	1.5127	0.00	Q				V
24+30	1.5127	0.00	Q				V
24+35	1.5127	0.00	Q				V

DEVELOPED CONDITION

sobonalt3d1100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt3d1100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	0.55	3.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	1.20	7.08

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	2.443
2	0.167	388.361	50.563	3.006
3	0.250	582.541	7.110	0.423
4	0.333	776.721	1.235	0.073
			Sum = 100.000 Sum=	5.946

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.071	---	0.53
2	0.17	4.30	0.619	0.071	---	0.55
3	0.25	5.00	0.720	0.071	---	0.65
4	0.33	5.00	0.720	0.071	---	0.65
5	0.42	5.80	0.835	0.071	---	0.76
6	0.50	6.50	0.936	0.071	---	0.87
7	0.58	7.40	1.066	0.071	---	0.99
8	0.67	8.60	1.238	0.071	---	1.17
9	0.75	12.30	1.771	0.071	---	1.70
10	0.83	29.10	4.190	0.071	---	4.12
11	0.92	6.80	0.979	0.071	---	0.91
12	1.00	5.00	0.720	0.071	---	0.65
Sum =		100.0			Sum =	13.5

Flood volume = Effective rainfall 1.13(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.035(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 24182.0 Cubic Feet
Total soil loss = 1517.0 Cubic Feet

Peak flow rate of this hydrograph = 15.752(CFS)

++

1 - HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0090	1.31	V Q
0+10	0.0293	2.95	V Q
0+15	0.0531	3.46	V Q
0+20	0.0794	3.81	V Q
0+25	0.1079	4.14	VQ
0+30	0.1405	4.74	QV
0+35	0.1777	5.41	Q V
0+40	0.2209	6.27	Q V
0+45	0.2770	8.15	Q V
0+50	0.3855	15.75	V Q
0+55	0.4917	15.42	Q V
1+ 0	0.5343	6.19	Q V
1+ 5	0.5525	2.64	Q V
1+10	0.5548	0.34	Q V
1+15	0.5551	0.05	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt3d3100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	0.90	5.31

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	2.10	12.39

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	2.443
2	0.167	388.361	50.563	3.006
3	0.250	582.541	7.110	0.423
4	0.333	776.721	1.235	0.073
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.071	---	0.26
2	0.17	1.30	0.328	0.071	---	0.26
3	0.25	1.10	0.277	0.071	---	0.21
4	0.33	1.50	0.378	0.071	---	0.31
5	0.42	1.50	0.378	0.071	---	0.31
6	0.50	1.80	0.454	0.071	---	0.38
7	0.58	1.50	0.378	0.071	---	0.31
8	0.67	1.80	0.454	0.071	---	0.38
9	0.75	1.80	0.454	0.071	---	0.38
10	0.83	1.50	0.378	0.071	---	0.31
11	0.92	1.60	0.403	0.071	---	0.33
12	1.00	1.80	0.454	0.071	---	0.38
13	1.08	2.20	0.554	0.071	---	0.48
14	1.17	2.20	0.554	0.071	---	0.48
15	1.25	2.20	0.554	0.071	---	0.48
16	1.33	2.00	0.504	0.071	---	0.43
17	1.42	2.60	0.655	0.071	---	0.58
18	1.50	2.70	0.680	0.071	---	0.61
19	1.58	2.40	0.605	0.071	---	0.53
20	1.67	2.70	0.680	0.071	---	0.61
21	1.75	3.30	0.832	0.071	---	0.76
22	1.83	3.10	0.781	0.071	---	0.71
23	1.92	2.90	0.731	0.071	---	0.66
24	2.00	3.00	0.756	0.071	---	0.69
25	2.08	3.10	0.781	0.071	---	0.71
26	2.17	4.20	1.058	0.071	---	0.99
27	2.25	5.00	1.260	0.071	---	1.19
28	2.33	3.50	0.882	0.071	---	0.81
29	2.42	6.80	1.714	0.071	---	1.64
30	2.50	7.30	1.840	0.071	---	1.77
31	2.58	8.20	2.066	0.071	---	2.00
32	2.67	5.90	1.487	0.071	---	1.42
33	2.75	2.00	0.504	0.071	---	0.43
34	2.83	1.80	0.454	0.071	---	0.38
35	2.92	1.80	0.454	0.071	---	0.38
36	3.00	0.60	0.151	0.071	---	0.08
Sum =		100.0			Sum =	22.6

Flood volume = Effective rainfall 1.89(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.104(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 40423.5 Cubic Feet
Total soil loss = 4551.0 Cubic Feet

Peak flow rate of this hydrograph = 10.953(CFS)

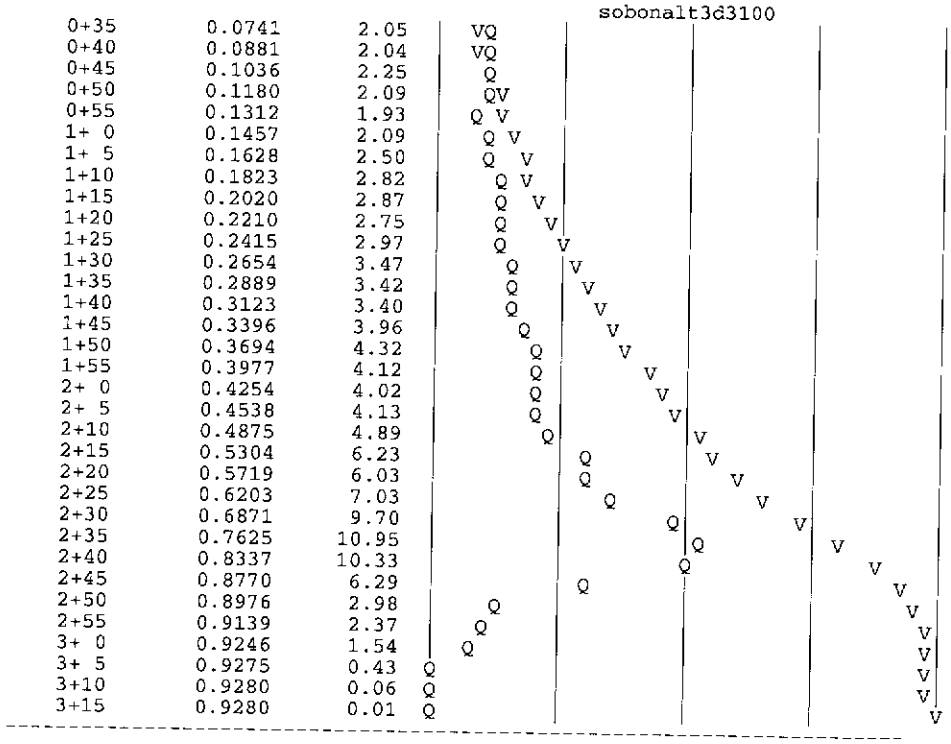
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0043	0.63	VQ				
0+10	0.0140	1.40	V Q				
0+15	0.0235	1.39	VQ				
0+20	0.0338	1.50	VQ				
0+25	0.0461	1.78	V Q				
0+30	0.0599	2.00	V Q				

sobonalt3d3100

0+35	0.0741	2.05	
0+40	0.0881	2.04	
0+45	0.1036	2.25	
0+50	0.1180	2.09	
0+55	0.1312	1.93	
1+ 0	0.1457	2.09	
1+ 5	0.1628	2.50	
1+10	0.1823	2.82	
1+15	0.2020	2.87	
1+20	0.2210	2.75	
1+25	0.2415	2.97	
1+30	0.2654	3.47	
1+35	0.2889	3.42	
1+40	0.3123	3.40	
1+45	0.3396	3.96	
1+50	0.3694	4.32	
1+55	0.3977	4.12	
2+ 0	0.4254	4.02	
2+ 5	0.4538	4.13	
2+10	0.4875	4.89	
2+15	0.5304	6.23	
2+20	0.5719	6.03	
2+25	0.6203	7.03	
2+30	0.6871	9.70	
2+35	0.7625	10.95	
2+40	0.8337	10.33	
2+45	0.8770	6.29	
2+50	0.8976	2.98	
2+55	0.9139	2.37	
3+ 0	0.9246	1.54	
3+ 5	0.9275	0.43	
3+10	0.9280	0.06	
3+15	0.9280	0.01	



U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt3d6100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	1.40	8.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	3.00	17.70

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt3d6100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	2.443
2	0.167	388.361	50.563	3.006
3	0.250	582.541	7.110	0.423
4	0.333	776.721	1.235	0.073
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.071	---	0.11
2	0.17	0.60	0.216	0.071	---	0.15
3	0.25	0.60	0.216	0.071	---	0.15
4	0.33	0.60	0.216	0.071	---	0.15
5	0.42	0.60	0.216	0.071	---	0.15
6	0.50	0.70	0.252	0.071	---	0.18
7	0.58	0.70	0.252	0.071	---	0.18
8	0.67	0.70	0.252	0.071	---	0.18
9	0.75	0.70	0.252	0.071	---	0.18
10	0.83	0.70	0.252	0.071	---	0.18
11	0.92	0.70	0.252	0.071	---	0.18
12	1.00	0.80	0.288	0.071	---	0.22
13	1.08	0.80	0.288	0.071	---	0.22
14	1.17	0.80	0.288	0.071	---	0.22
15	1.25	0.80	0.288	0.071	---	0.22
16	1.33	0.80	0.288	0.071	---	0.22
17	1.42	0.80	0.288	0.071	---	0.22
18	1.50	0.80	0.288	0.071	---	0.22
19	1.58	0.80	0.288	0.071	---	0.22
20	1.67	0.80	0.288	0.071	---	0.22
21	1.75	0.80	0.288	0.071	---	0.22
22	1.83	0.80	0.288	0.071	---	0.22
23	1.92	0.80	0.288	0.071	---	0.22
24	2.00	0.90	0.324	0.071	---	0.25
25	2.08	0.80	0.288	0.071	---	0.22
26	2.17	0.90	0.324	0.071	---	0.25
27	2.25	0.90	0.324	0.071	---	0.25
28	2.33	0.90	0.324	0.071	---	0.25
29	2.42	0.90	0.324	0.071	---	0.25
30	2.50	0.90	0.324	0.071	---	0.25
31	2.58	0.90	0.324	0.071	---	0.25
32	2.67	0.90	0.324	0.071	---	0.25
33	2.75	1.00	0.360	0.071	---	0.29
34	2.83	1.00	0.360	0.071	---	0.29
35	2.92	1.00	0.360	0.071	---	0.29
36	3.00	1.00	0.360	0.071	---	0.29
37	3.08	1.00	0.360	0.071	---	0.29
38	3.17	1.10	0.396	0.071	---	0.33
39	3.25	1.10	0.396	0.071	---	0.33
40	3.33	1.10	0.396	0.071	---	0.33
41	3.42	1.20	0.432	0.071	---	0.36
42	3.50	1.30	0.468	0.071	---	0.40
43	3.58	1.40	0.504	0.071	---	0.43
44	3.67	1.40	0.504	0.071	---	0.43
45	3.75	1.50	0.540	0.071	---	0.47
46	3.83	1.50	0.540	0.071	---	0.47
47	3.92	1.60	0.576	0.071	---	0.51
48	4.00	1.60	0.576	0.071	---	0.51
49	4.08	1.70	0.612	0.071	---	0.54
50	4.17	1.80	0.648	0.071	---	0.58
51	4.25	1.90	0.684	0.071	---	0.61
52	4.33	2.00	0.720	0.071	---	0.65
53	4.42	2.10	0.756	0.071	---	0.69
54	4.50	2.10	0.756	0.071	---	0.69
55	4.58	2.20	0.792	0.071	---	0.72
56	4.67	2.30	0.828	0.071	---	0.76
57	4.75	2.40	0.864	0.071	---	0.79
58	4.83	2.40	0.864	0.071	---	0.79
59	4.92	2.50	0.900	0.071	---	0.83
60	5.00	2.60	0.936	0.071	---	0.87
61	5.08	3.10	1.116	0.071	---	1.05
62	5.17	3.60	1.296	0.071	---	1.23

63	5.25	3.90	1.404	0.071	---	1.33
64	5.33	4.20	1.512	0.071	---	1.44
65	5.42	4.70	1.692	0.071	---	1.62
66	5.50	5.60	2.016	0.071	---	1.95
67	5.58	1.90	0.684	0.071	---	0.61
68	5.67	0.90	0.324	0.071	---	0.25
69	5.75	0.60	0.216	0.071	---	0.15
70	5.83	0.50	0.180	0.071	---	0.11
71	5.92	0.30	0.108	0.071	---	0.04
72	6.00	0.20	0.072	0.071	---	0.00
Sum =		100.0			Sum =	30.9

Flood volume = Effective rainfall 2.57(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 1.3(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 0.209(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 55147.6 Cubic Feet
Total soil loss = 9102.1 Cubic Feet

Peak flow rate of this hydrograph = 10.339(CFS)

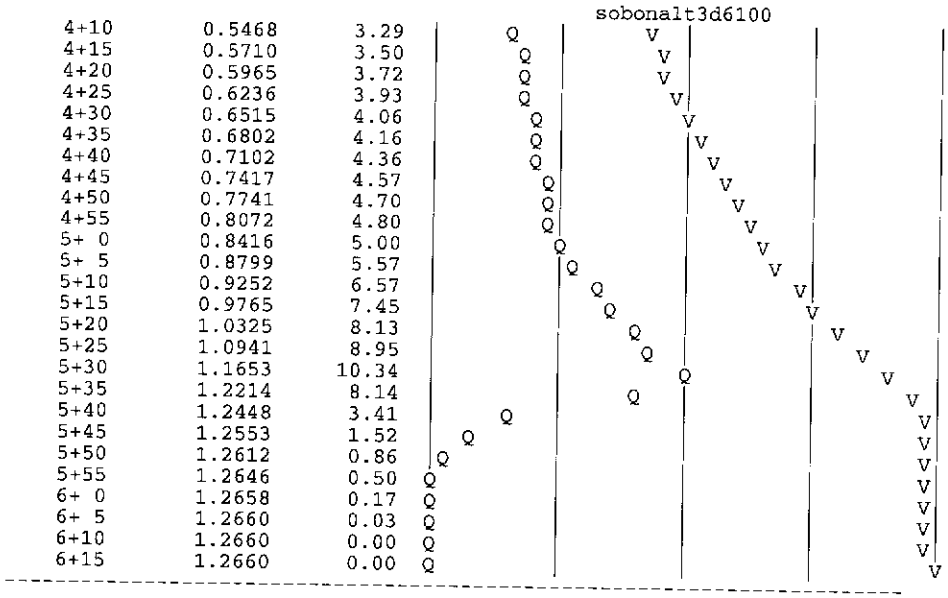
++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0018	0.27	Q
0+10	0.0065	0.68	VQ
0+15	0.0123	0.84	VQ
0+20	0.0182	0.86	VQ
0+25	0.0242	0.86	VQ
0+30	0.0307	0.95	VQ
0+35	0.0380	1.06	VQ
0+40	0.0454	1.08	VQ
0+45	0.0529	1.08	VQ
0+50	0.0603	1.08	VQ
0+55	0.0677	1.08	Q
1+ 0	0.0757	1.17	Q
1+ 5	0.0845	1.27	Q
1+10	0.0934	1.29	Q
1+15	0.1023	1.29	QV
1+20	0.1112	1.29	QV
1+25	0.1201	1.29	QV
1+30	0.1290	1.29	Q V
1+35	0.1379	1.29	Q V
1+40	0.1468	1.29	Q V
1+45	0.1557	1.29	Q V
1+50	0.1646	1.29	Q V
1+55	0.1735	1.29	Q V
2+ 0	0.1830	1.38	Q V
2+ 5	0.1926	1.40	Q V
2+10	0.2022	1.40	Q V
2+15	0.2125	1.49	Q V
2+20	0.2229	1.50	Q V
2+25	0.2332	1.51	Q V
2+30	0.2436	1.51	Q V
2+35	0.2540	1.51	Q V
2+40	0.2643	1.51	Q V
2+45	0.2753	1.59	Q V
2+50	0.2870	1.70	Q V
2+55	0.2989	1.72	Q V
3+ 0	0.3107	1.72	Q V
3+ 5	0.3226	1.72	Q V
3+10	0.3350	1.81	Q V
3+15	0.3482	1.92	Q V
3+20	0.3615	1.93	Q V
3+25	0.3755	2.02	Q V
3+30	0.3907	2.22	Q V
3+35	0.4075	2.43	Q V
3+40	0.4251	2.56	Q V
3+45	0.4434	2.66	Q V
3+50	0.4625	2.77	Q V
3+55	0.4823	2.88	Q V
4+ 0	0.5029	2.99	Q V
4+ 5	0.5242	3.09	Q V

4+10	0.5468	3.29	
4+15	0.5710	3.50	
4+20	0.5965	3.72	
4+25	0.6236	3.93	
4+30	0.6515	4.06	
4+35	0.6802	4.16	
4+40	0.7102	4.36	
4+45	0.7417	4.57	
4+50	0.7741	4.70	
4+55	0.8072	4.80	
5+ 0	0.8416	5.00	
5+ 5	0.8799	5.57	
5+10	0.9252	6.57	
5+15	0.9765	7.45	
5+20	1.0325	8.13	
5+25	1.0941	8.95	
5+30	1.1653	10.34	
5+35	1.2214	8.14	
5+40	1.2448	3.41	
5+45	1.2553	1.52	
5+50	1.2612	0.86	
5+55	1.2646	0.50	
6+ 0	1.2658	0.17	
6+ 5	1.2660	0.03	
6+10	1.2660	0.00	
6+15	1.2660	0.00	



U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt3d24100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	2.25	13.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	6.00	35.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt3d24100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	194.180	41.092		2.443
2	0.167	388.361	50.563		3.006
3	0.250	582.541	7.110		0.423
4	0.333	776.721	1.235		0.073
			Sum = 100.000	Sum=	5.946

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.126	0.009	0.04
2	0.17	0.07	0.048	0.125	0.009	0.04
3	0.25	0.07	0.048	0.125	0.009	0.04
4	0.33	0.10	0.072	0.124	0.013	0.06
5	0.42	0.10	0.072	0.124	0.013	0.06
6	0.50	0.10	0.072	0.123	0.013	0.06
7	0.58	0.10	0.072	0.123	0.013	0.06
8	0.67	0.10	0.072	0.122	0.013	0.06
9	0.75	0.10	0.072	0.122	0.013	0.06
10	0.83	0.13	0.096	0.121	0.017	0.08
11	0.92	0.13	0.096	0.121	0.017	0.08
12	1.00	0.13	0.096	0.120	0.017	0.08
13	1.08	0.10	0.072	0.120	0.013	0.06
14	1.17	0.10	0.072	0.119	0.013	0.06
15	1.25	0.10	0.072	0.119	0.013	0.06
16	1.33	0.10	0.072	0.118	0.013	0.06
17	1.42	0.10	0.072	0.118	0.013	0.06
18	1.50	0.10	0.072	0.117	0.013	0.06
19	1.58	0.10	0.072	0.117	0.013	0.06
20	1.67	0.10	0.072	0.117	0.013	0.06
21	1.75	0.10	0.072	0.116	0.013	0.06
22	1.83	0.13	0.096	0.116	0.017	0.08
23	1.92	0.13	0.096	0.115	0.017	0.08
24	2.00	0.13	0.096	0.115	0.017	0.08
25	2.08	0.13	0.096	0.114	0.017	0.08
26	2.17	0.13	0.096	0.114	0.017	0.08
27	2.25	0.13	0.096	0.113	0.017	0.08
28	2.33	0.13	0.096	0.113	0.017	0.08
29	2.42	0.13	0.096	0.112	0.017	0.08
30	2.50	0.13	0.096	0.112	0.017	0.08
31	2.58	0.17	0.120	0.111	---	0.01
32	2.67	0.17	0.120	0.111	---	0.01
33	2.75	0.17	0.120	0.110	---	0.01
34	2.83	0.17	0.120	0.110	---	0.01
35	2.92	0.17	0.120	0.110	---	0.01
36	3.00	0.17	0.120	0.109	---	0.01
37	3.08	0.17	0.120	0.109	---	0.01
38	3.17	0.17	0.120	0.108	---	0.01
39	3.25	0.17	0.120	0.108	---	0.01
40	3.33	0.17	0.120	0.107	---	0.01
41	3.42	0.17	0.120	0.107	---	0.01
42	3.50	0.17	0.120	0.106	---	0.01
43	3.58	0.17	0.120	0.106	---	0.01
44	3.67	0.17	0.120	0.106	---	0.01
45	3.75	0.17	0.120	0.105	---	0.01
46	3.83	0.20	0.144	0.105	---	0.04
47	3.92	0.20	0.144	0.104	---	0.04
48	4.00	0.20	0.144	0.104	---	0.04
49	4.08	0.20	0.144	0.103	---	0.04
50	4.17	0.20	0.144	0.103	---	0.04
51	4.25	0.20	0.144	0.102	---	0.04
52	4.33	0.23	0.168	0.102	---	0.07
53	4.42	0.23	0.168	0.102	---	0.07
54	4.50	0.23	0.168	0.101	---	0.07
55	4.58	0.23	0.168	0.101	---	0.07
56	4.67	0.23	0.168	0.100	---	0.07
57	4.75	0.23	0.168	0.100	---	0.07
58	4.83	0.27	0.192	0.099	---	0.09
59	4.92	0.27	0.192	0.099	---	0.09
60	5.00	0.27	0.192	0.099	---	0.09
61	5.08	0.20	0.144	0.098	---	0.05
62	5.17	0.20	0.144	0.098	---	0.05

63	5.25	0.20	0.144	0.097	---	0.05
64	5.33	0.23	0.168	0.097	---	0.07
65	5.42	0.23	0.168	0.096	---	0.07
66	5.50	0.23	0.168	0.096	---	0.07
67	5.58	0.27	0.192	0.096	---	0.10
68	5.67	0.27	0.192	0.095	---	0.10
69	5.75	0.27	0.192	0.095	---	0.10
70	5.83	0.27	0.192	0.094	---	0.10
71	5.92	0.27	0.192	0.094	---	0.10
72	6.00	0.27	0.192	0.093	---	0.10
73	6.08	0.30	0.216	0.093	---	0.12
74	6.17	0.30	0.216	0.093	---	0.12
75	6.25	0.30	0.216	0.092	---	0.12
76	6.33	0.30	0.216	0.092	---	0.12
77	6.42	0.30	0.216	0.091	---	0.12
78	6.50	0.30	0.216	0.091	---	0.12
79	6.58	0.33	0.240	0.091	---	0.15
80	6.67	0.33	0.240	0.090	---	0.15
81	6.75	0.33	0.240	0.090	---	0.15
82	6.83	0.33	0.240	0.089	---	0.15
83	6.92	0.33	0.240	0.089	---	0.15
84	7.00	0.33	0.240	0.089	---	0.15
85	7.08	0.33	0.240	0.088	---	0.15
86	7.17	0.33	0.240	0.088	---	0.15
87	7.25	0.33	0.240	0.087	---	0.15
88	7.33	0.37	0.264	0.087	---	0.18
89	7.42	0.37	0.264	0.087	---	0.18
90	7.50	0.37	0.264	0.086	---	0.18
91	7.58	0.40	0.288	0.086	---	0.20
92	7.67	0.40	0.288	0.085	---	0.20
93	7.75	0.40	0.288	0.085	---	0.20
94	7.83	0.43	0.312	0.085	---	0.23
95	7.92	0.43	0.312	0.084	---	0.23
96	8.00	0.43	0.312	0.084	---	0.23
97	8.08	0.50	0.360	0.083	---	0.28
98	8.17	0.50	0.360	0.083	---	0.28
99	8.25	0.50	0.360	0.083	---	0.28
100	8.33	0.50	0.360	0.082	---	0.28
101	8.42	0.50	0.360	0.082	---	0.28
102	8.50	0.50	0.360	0.082	---	0.28
103	8.58	0.53	0.384	0.081	---	0.30
104	8.67	0.53	0.384	0.081	---	0.30
105	8.75	0.53	0.384	0.080	---	0.30
106	8.83	0.57	0.408	0.080	---	0.33
107	8.92	0.57	0.408	0.080	---	0.33
108	9.00	0.57	0.408	0.079	---	0.33
109	9.08	0.63	0.456	0.079	---	0.38
110	9.17	0.63	0.456	0.078	---	0.38
111	9.25	0.63	0.456	0.078	---	0.38
112	9.33	0.67	0.480	0.078	---	0.40
113	9.42	0.67	0.480	0.077	---	0.40
114	9.50	0.67	0.480	0.077	---	0.40
115	9.58	0.70	0.504	0.077	---	0.43
116	9.67	0.70	0.504	0.076	---	0.43
117	9.75	0.70	0.504	0.076	---	0.43
118	9.83	0.73	0.528	0.076	---	0.45
119	9.92	0.73	0.528	0.075	---	0.45
120	10.00	0.73	0.528	0.075	---	0.45
121	10.08	0.50	0.360	0.074	---	0.29
122	10.17	0.50	0.360	0.074	---	0.29
123	10.25	0.50	0.360	0.074	---	0.29
124	10.33	0.50	0.360	0.073	---	0.29
125	10.42	0.50	0.360	0.073	---	0.29
126	10.50	0.50	0.360	0.073	---	0.29
127	10.58	0.67	0.480	0.072	---	0.41
128	10.67	0.67	0.480	0.072	---	0.41
129	10.75	0.67	0.480	0.072	---	0.41
130	10.83	0.67	0.480	0.071	---	0.41
131	10.92	0.67	0.480	0.071	---	0.41
132	11.00	0.67	0.480	0.071	---	0.41
133	11.08	0.63	0.456	0.070	---	0.39
134	11.17	0.63	0.456	0.070	---	0.39
135	11.25	0.63	0.456	0.069	---	0.39
136	11.33	0.63	0.456	0.069	---	0.39
137	11.42	0.63	0.456	0.069	---	0.39
138	11.50	0.63	0.456	0.068	---	0.39
139	11.58	0.57	0.408	0.068	---	0.34
140	11.67	0.57	0.408	0.068	---	0.34
141	11.75	0.57	0.408	0.067	---	0.34

142	11.83	0.60	0.432	0.067	---	0.36
143	11.92	0.60	0.432	0.067	---	0.37
144	12.00	0.60	0.432	0.066	---	0.37
145	12.08	0.83	0.600	0.066	---	0.53
146	12.17	0.83	0.600	0.066	---	0.53
147	12.25	0.83	0.600	0.065	---	0.53
148	12.33	0.87	0.624	0.065	---	0.56
149	12.42	0.87	0.624	0.065	---	0.56
150	12.50	0.87	0.624	0.064	---	0.56
151	12.58	0.93	0.672	0.064	---	0.61
152	12.67	0.93	0.672	0.064	---	0.61
153	12.75	0.93	0.672	0.064	---	0.61
154	12.83	0.97	0.696	0.063	---	0.63
155	12.92	0.97	0.696	0.063	---	0.63
156	13.00	0.97	0.696	0.063	---	0.63
157	13.08	1.13	0.816	0.062	---	0.75
158	13.17	1.13	0.816	0.062	---	0.75
159	13.25	1.13	0.816	0.062	---	0.75
160	13.33	1.13	0.816	0.061	---	0.75
161	13.42	1.13	0.816	0.061	---	0.76
162	13.50	1.13	0.816	0.061	---	0.76
163	13.58	0.77	0.552	0.060	---	0.49
164	13.67	0.77	0.552	0.060	---	0.49
165	13.75	0.77	0.552	0.060	---	0.49
166	13.83	0.77	0.552	0.059	---	0.49
167	13.92	0.77	0.552	0.059	---	0.49
168	14.00	0.77	0.552	0.059	---	0.49
169	14.08	0.90	0.648	0.059	---	0.59
170	14.17	0.90	0.648	0.058	---	0.59
171	14.25	0.90	0.648	0.058	---	0.59
172	14.33	0.87	0.624	0.058	---	0.57
173	14.42	0.87	0.624	0.057	---	0.57
174	14.50	0.87	0.624	0.057	---	0.57
175	14.58	0.87	0.624	0.057	---	0.57
176	14.67	0.87	0.624	0.056	---	0.57
177	14.75	0.87	0.624	0.056	---	0.57
178	14.83	0.83	0.600	0.056	---	0.54
179	14.92	0.83	0.600	0.056	---	0.54
180	15.00	0.83	0.600	0.055	---	0.54
181	15.08	0.80	0.576	0.055	---	0.52
182	15.17	0.80	0.576	0.055	---	0.52
183	15.25	0.80	0.576	0.054	---	0.52
184	15.33	0.77	0.552	0.054	---	0.50
185	15.42	0.77	0.552	0.054	---	0.50
186	15.50	0.77	0.552	0.054	---	0.50
187	15.58	0.63	0.456	0.053	---	0.40
188	15.67	0.63	0.456	0.053	---	0.40
189	15.75	0.63	0.456	0.053	---	0.40
190	15.83	0.63	0.456	0.053	---	0.40
191	15.92	0.63	0.456	0.052	---	0.40
192	16.00	0.63	0.456	0.052	---	0.40
193	16.08	0.13	0.096	0.052	---	0.04
194	16.17	0.13	0.096	0.051	---	0.04
195	16.25	0.13	0.096	0.051	---	0.04
196	16.33	0.13	0.096	0.051	---	0.05
197	16.42	0.13	0.096	0.051	---	0.05
198	16.50	0.13	0.096	0.050	---	0.05
199	16.58	0.10	0.072	0.050	---	0.02
200	16.67	0.10	0.072	0.050	---	0.02
201	16.75	0.10	0.072	0.050	---	0.02
202	16.83	0.10	0.072	0.049	---	0.02
203	16.92	0.10	0.072	0.049	---	0.02
204	17.00	0.10	0.072	0.049	---	0.02
205	17.08	0.17	0.120	0.049	---	0.07
206	17.17	0.17	0.120	0.048	---	0.07
207	17.25	0.17	0.120	0.048	---	0.07
208	17.33	0.17	0.120	0.048	---	0.07
209	17.42	0.17	0.120	0.048	---	0.07
210	17.50	0.17	0.120	0.047	---	0.07
211	17.58	0.17	0.120	0.047	---	0.07
212	17.67	0.17	0.120	0.047	---	0.07
213	17.75	0.17	0.120	0.047	---	0.07
214	17.83	0.13	0.096	0.047	---	0.05
215	17.92	0.13	0.096	0.046	---	0.05
216	18.00	0.13	0.096	0.046	---	0.05
217	18.08	0.13	0.096	0.046	---	0.05
218	18.17	0.13	0.096	0.046	---	0.05
219	18.25	0.13	0.096	0.045	---	0.05
220	18.33	0.13	0.096	0.045	---	0.05

221	18.42	0.13	0.096	0.045	---	0.05
222	18.50	0.13	0.096	0.045	---	0.05
223	18.58	0.10	0.072	0.045	---	0.03
224	18.67	0.10	0.072	0.044	---	0.03
225	18.75	0.10	0.072	0.044	---	0.03
226	18.83	0.07	0.048	0.044	---	0.00
227	18.92	0.07	0.048	0.044	---	0.00
228	19.00	0.07	0.048	0.043	---	0.00
229	19.08	0.10	0.072	0.043	---	0.03
230	19.17	0.10	0.072	0.043	---	0.03
231	19.25	0.10	0.072	0.043	---	0.03
232	19.33	0.13	0.096	0.043	---	0.05
233	19.42	0.13	0.096	0.042	---	0.05
234	19.50	0.13	0.096	0.042	---	0.05
235	19.58	0.10	0.072	0.042	---	0.03
236	19.67	0.10	0.072	0.042	---	0.03
237	19.75	0.10	0.072	0.042	---	0.03
238	19.83	0.07	0.048	0.041	---	0.01
239	19.92	0.07	0.048	0.041	---	0.01
240	20.00	0.07	0.048	0.041	---	0.01
241	20.08	0.10	0.072	0.041	---	0.03
242	20.17	0.10	0.072	0.041	---	0.03
243	20.25	0.10	0.072	0.041	---	0.03
244	20.33	0.10	0.072	0.040	---	0.03
245	20.42	0.10	0.072	0.040	---	0.03
246	20.50	0.10	0.072	0.040	---	0.03
247	20.58	0.10	0.072	0.040	---	0.03
248	20.67	0.10	0.072	0.040	---	0.03
249	20.75	0.10	0.072	0.040	---	0.03
250	20.83	0.07	0.048	0.039	---	0.01
251	20.92	0.07	0.048	0.039	---	0.01
252	21.00	0.07	0.048	0.039	---	0.01
253	21.08	0.10	0.072	0.039	---	0.03
254	21.17	0.10	0.072	0.039	---	0.03
255	21.25	0.10	0.072	0.039	---	0.03
256	21.33	0.07	0.048	0.038	---	0.01
257	21.42	0.07	0.048	0.038	---	0.01
258	21.50	0.07	0.048	0.038	---	0.01
259	21.58	0.10	0.072	0.038	---	0.03
260	21.67	0.10	0.072	0.038	---	0.03
261	21.75	0.10	0.072	0.038	---	0.03
262	21.83	0.07	0.048	0.038	---	0.01
263	21.92	0.07	0.048	0.038	---	0.01
264	22.00	0.07	0.048	0.037	---	0.01
265	22.08	0.10	0.072	0.037	---	0.03
266	22.17	0.10	0.072	0.037	---	0.03
267	22.25	0.10	0.072	0.037	---	0.03
268	22.33	0.07	0.048	0.037	---	0.01
269	22.42	0.07	0.048	0.037	---	0.01
270	22.50	0.07	0.048	0.037	---	0.01
271	22.58	0.07	0.048	0.037	---	0.01
272	22.67	0.07	0.048	0.036	---	0.01
273	22.75	0.07	0.048	0.036	---	0.01
274	22.83	0.07	0.048	0.036	---	0.01
275	22.92	0.07	0.048	0.036	---	0.01
276	23.00	0.07	0.048	0.036	---	0.01
277	23.08	0.07	0.048	0.036	---	0.01
278	23.17	0.07	0.048	0.036	---	0.01
279	23.25	0.07	0.048	0.036	---	0.01
280	23.33	0.07	0.048	0.036	---	0.01
281	23.42	0.07	0.048	0.036	---	0.01
282	23.50	0.07	0.048	0.036	---	0.01
283	23.58	0.07	0.048	0.036	---	0.01
284	23.67	0.07	0.048	0.036	---	0.01
285	23.75	0.07	0.048	0.036	---	0.01
286	23.83	0.07	0.048	0.035	---	0.01
287	23.92	0.07	0.048	0.035	---	0.01
288	24.00	0.07	0.048	0.035	---	0.01
Sum =		100.0			Sum =	54.7

Flood volume = Effective rainfall 4.56(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 2.2(Ac.Ft)
Total soil loss = 1.44(In)
Total soil loss = 0.708(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 97665.5 Cubic Feet
Total soil loss = 30835.0 Cubic Feet

Peak flow rate of this hydrograph = 4.492(CFS)

---

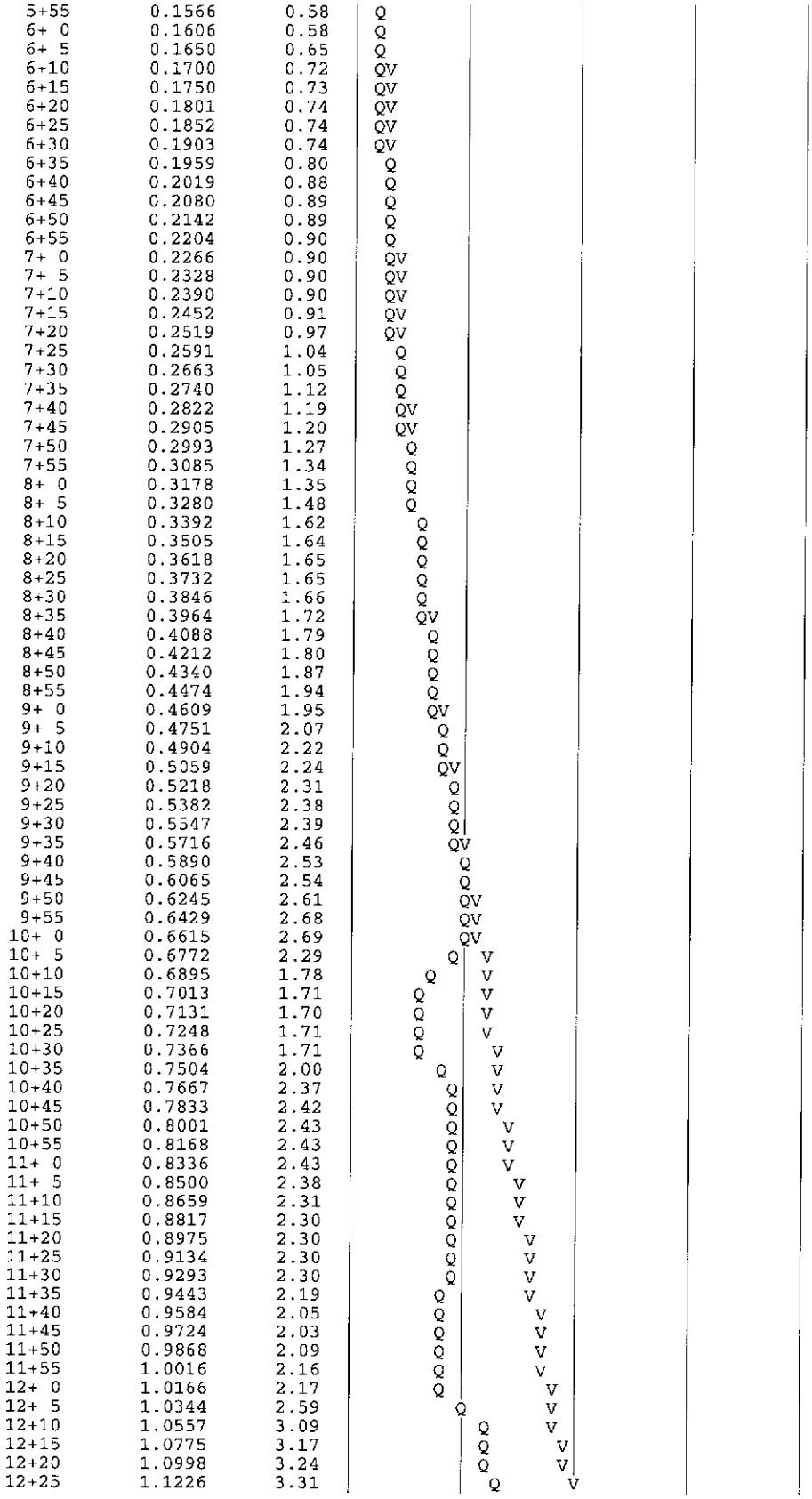
sobonalt3d24100

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

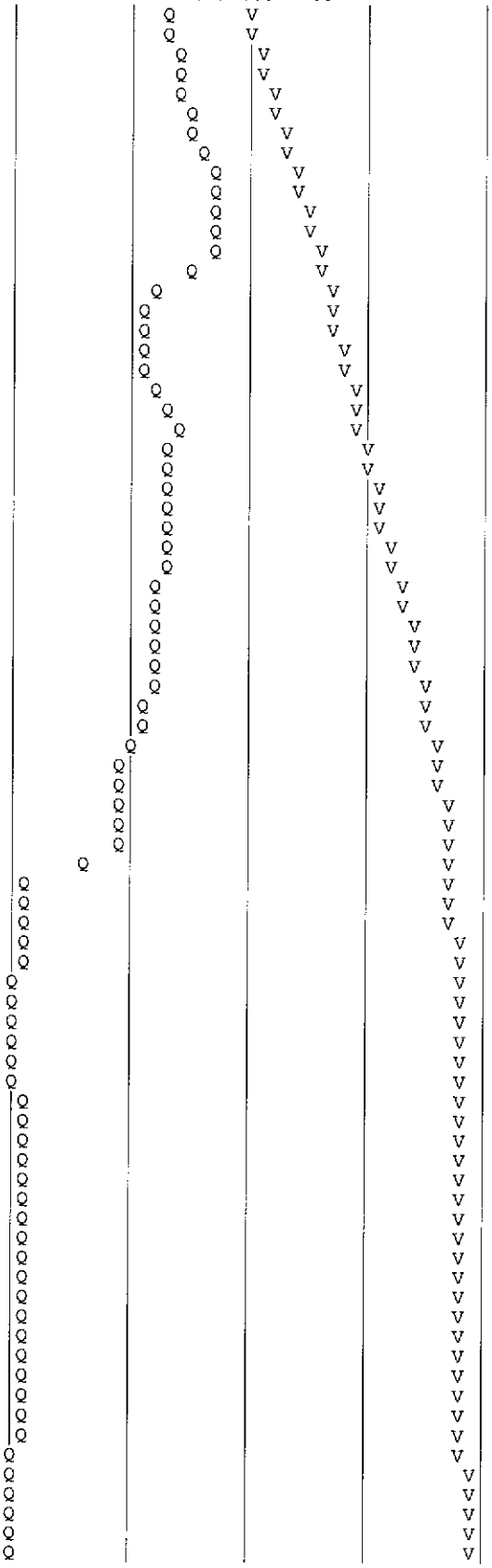
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0007	0.10	Q				
0+10	0.0021	0.21	Q				
0+15	0.0037	0.23	Q				
0+20	0.0057	0.28	VQ				
0+25	0.0080	0.34	VQ				
0+30	0.0104	0.35	VQ				
0+35	0.0129	0.35	VQ				
0+40	0.0153	0.35	VQ				
0+45	0.0177	0.35	VQ				
0+50	0.0204	0.40	VQ				
0+55	0.0236	0.46	VQ				
1+ 0	0.0268	0.47	VQ				
1+ 5	0.0297	0.42	VQ				
1+10	0.0322	0.36	VQ				
1+15	0.0346	0.35	VQ				
1+20	0.0370	0.35	VQ				
1+25	0.0395	0.35	VQ				
1+30	0.0419	0.35	VQ				
1+35	0.0443	0.35	VQ				
1+40	0.0467	0.35	VQ				
1+45	0.0491	0.35	VQ				
1+50	0.0519	0.40	VQ				
1+55	0.0551	0.46	VQ				
2+ 0	0.0583	0.47	Q				
2+ 5	0.0615	0.47	Q				
2+10	0.0647	0.47	Q				
2+15	0.0679	0.47	Q				
2+20	0.0712	0.47	Q				
2+25	0.0744	0.47	Q				
2+30	0.0776	0.47	Q				
2+35	0.0797	0.30	Q				
2+40	0.0803	0.09	QV				
2+45	0.0807	0.06	QV				
2+50	0.0811	0.06	QV				
2+55	0.0815	0.06	QV				
3+ 0	0.0819	0.06	QV				
3+ 5	0.0824	0.07	QV				
3+10	0.0828	0.07	QV				
3+15	0.0833	0.07	QV				
3+20	0.0838	0.07	QV				
3+25	0.0844	0.08	QV				
3+30	0.0849	0.08	QV				
3+35	0.0855	0.08	QV				
3+40	0.0860	0.08	QV				
3+45	0.0866	0.09	QV				
3+50	0.0877	0.15	QV				
3+55	0.0892	0.22	QV				
4+ 0	0.0908	0.24	QV				
4+ 5	0.0925	0.24	QV				
4+10	0.0941	0.24	QV				
4+15	0.0958	0.25	QV				
4+20	0.0979	0.31	Q				
4+25	0.1006	0.38	Q				
4+30	0.1033	0.39	Q				
4+35	0.1060	0.40	Q				
4+40	0.1088	0.40	Q				
4+45	0.1116	0.40	Q				
4+50	0.1148	0.46	QV				
4+55	0.1185	0.54	Q				
5+ 0	0.1223	0.55	Q				
5+ 5	0.1253	0.44	QV				
5+10	0.1274	0.30	QV				
5+15	0.1293	0.28	QV				
5+20	0.1316	0.34	QV				
5+25	0.1345	0.41	QV				
5+30	0.1374	0.42	QV				
5+35	0.1407	0.49	QV				
5+40	0.1446	0.56	Q				
5+45	0.1486	0.58	Q				
5+50	0.1526	0.58	Q				



5+55	0.1566	0.58	Q
6+ 0	0.1606	0.58	Q
6+ 5	0.1650	0.65	Q
6+10	0.1700	0.72	QV
6+15	0.1750	0.73	QV
6+20	0.1801	0.74	QV
6+25	0.1852	0.74	QV
6+30	0.1903	0.74	QV
6+35	0.1959	0.80	Q
6+40	0.2019	0.88	Q
6+45	0.2080	0.89	Q
6+50	0.2142	0.89	Q
6+55	0.2204	0.90	Q
7+ 0	0.2266	0.90	QV
7+ 5	0.2328	0.90	QV
7+10	0.2390	0.90	QV
7+15	0.2452	0.91	QV
7+20	0.2519	0.97	QV
7+25	0.2591	1.04	Q
7+30	0.2663	1.05	Q
7+35	0.2740	1.12	Q
7+40	0.2822	1.19	QV
7+45	0.2905	1.20	QV
7+50	0.2993	1.27	Q
7+55	0.3085	1.34	Q
8+ 0	0.3178	1.35	Q
8+ 5	0.3280	1.48	Q
8+10	0.3392	1.62	Q
8+15	0.3505	1.64	Q
8+20	0.3618	1.65	Q
8+25	0.3732	1.65	Q
8+30	0.3846	1.66	Q
8+35	0.3964	1.72	QV
8+40	0.4088	1.79	Q
8+45	0.4212	1.80	Q
8+50	0.4340	1.87	Q
8+55	0.4474	1.94	Q
9+ 0	0.4609	1.95	QV
9+ 5	0.4751	2.07	Q
9+10	0.4904	2.22	Q
9+15	0.5059	2.24	QV
9+20	0.5218	2.31	Q
9+25	0.5382	2.38	Q
9+30	0.5547	2.39	Q
9+35	0.5716	2.46	QV
9+40	0.5890	2.53	Q
9+45	0.6065	2.54	Q
9+50	0.6245	2.61	QV
9+55	0.6429	2.68	QV
10+ 0	0.6615	2.69	QV
10+ 5	0.6772	2.29	Q V
10+10	0.6895	1.78	Q V
10+15	0.7013	1.71	Q V
10+20	0.7131	1.70	Q V
10+25	0.7248	1.71	Q V
10+30	0.7366	1.71	Q V
10+35	0.7504	2.00	Q V
10+40	0.7667	2.37	Q V
10+45	0.7833	2.42	Q V
10+50	0.8001	2.43	Q V
10+55	0.8168	2.43	Q V
11+ 0	0.8336	2.43	Q V
11+ 5	0.8500	2.38	Q V
11+10	0.8659	2.31	Q V
11+15	0.8817	2.30	Q V
11+20	0.8975	2.30	Q V
11+25	0.9134	2.30	Q V
11+30	0.9293	2.30	Q V
11+35	0.9443	2.19	Q V
11+40	0.9584	2.05	Q V
11+45	0.9724	2.03	Q V
11+50	0.9868	2.09	Q V
11+55	1.0016	2.16	Q V
12+ 0	1.0166	2.17	Q V
12+ 5	1.0344	2.59	Q V
12+10	1.0557	3.09	Q V
12+15	1.0775	3.17	Q V
12+20	1.0998	3.24	Q V
12+25	1.1226	3.31	Q V

sobonalt3d24100

12+30	1.1455	3.33	
12+35	1.1693	3.45	
12+40	1.1940	3.59	
12+45	1.2189	3.62	
12+50	1.2443	3.68	
12+55	1.2701	3.75	
13+ 0	1.2960	3.77	
13+ 5	1.3240	4.06	
13+10	1.3545	4.43	
13+15	1.3853	4.48	
13+20	1.4162	4.49	
13+25	1.4472	4.49	
13+30	1.4781	4.49	
13+35	1.5046	3.85	
13+40	1.5257	3.06	
13+45	1.5460	2.95	
13+50	1.5661	2.93	
13+55	1.5863	2.93	
14+ 0	1.6065	2.93	
14+ 5	1.6283	3.17	
14+10	1.6522	3.46	
14+15	1.6763	3.50	
14+20	1.7001	3.45	
14+25	1.7233	3.38	
14+30	1.7466	3.37	
14+35	1.7698	3.37	
14+40	1.7931	3.38	
14+45	1.8163	3.38	
14+50	1.8392	3.32	
14+55	1.8616	3.25	
15+ 0	1.8839	3.24	
15+ 5	1.9058	3.18	
15+10	1.9272	3.11	
15+15	1.9486	3.10	
15+20	1.9696	3.04	
15+25	1.9900	2.97	
15+30	2.0105	2.97	
15+35	2.0293	2.73	
15+40	2.0461	2.44	
15+45	2.0627	2.40	
15+50	2.0792	2.40	
15+55	2.0957	2.40	
16+ 0	2.1123	2.40	
16+ 5	2.1228	1.52	
16+10	2.1258	0.44	
16+15	2.1278	0.29	
16+20	2.1296	0.27	
16+25	2.1315	0.27	
16+30	2.1334	0.27	
16+35	2.1348	0.21	
16+40	2.1358	0.14	
16+45	2.1367	0.13	
16+50	2.1376	0.13	
16+55	2.1386	0.13	
17+ 0	2.1395	0.14	
17+ 5	2.1413	0.26	
17+10	2.1440	0.40	
17+15	2.1469	0.42	
17+20	2.1499	0.43	
17+25	2.1528	0.43	
17+30	2.1558	0.43	
17+35	2.1588	0.43	
17+40	2.1618	0.43	
17+45	2.1648	0.43	
17+50	2.1674	0.38	
17+55	2.1695	0.31	
18+ 0	2.1715	0.30	
18+ 5	2.1736	0.30	
18+10	2.1756	0.30	
18+15	2.1777	0.30	
18+20	2.1798	0.30	
18+25	2.1819	0.30	
18+30	2.1839	0.30	
18+35	2.1856	0.25	
18+40	2.1869	0.18	
18+45	2.1880	0.17	
18+50	2.1887	0.11	
18+55	2.1890	0.04	
19+ 0	2.1892	0.03	

19+ 5	2.1898	0.09	Q				V
19+10	2.1909	0.16	Q				V
19+15	2.1921	0.17	Q				V
19+20	2.1937	0.23	Q				V
19+25	2.1958	0.31	Q				V
19+30	2.1979	0.32	Q				V
19+35	2.1997	0.26	Q				V
19+40	2.2011	0.19	Q				V
19+45	2.2023	0.18	Q				V
19+50	2.2031	0.12	Q				V
19+55	2.2035	0.05	Q				V
20+ 0	2.2038	0.04	Q				V
20+ 5	2.2045	0.10	Q				V
20+10	2.2057	0.17	Q				V
20+15	2.2069	0.18	Q				V
20+20	2.2082	0.19	Q				V
20+25	2.2095	0.19	Q				V
20+30	2.2108	0.19	Q				V
20+35	2.2121	0.19	Q				V
20+40	2.2135	0.19	Q				V
20+45	2.2148	0.19	Q				V
20+50	2.2157	0.13	Q				V
20+55	2.2161	0.06	Q				V
21+ 0	2.2165	0.05	Q				V
21+ 5	2.2173	0.11	Q				V
21+10	2.2186	0.19	Q				V
21+15	2.2199	0.20	Q				V
21+20	2.2209	0.14	Q				V
21+25	2.2213	0.07	Q				V
21+30	2.2218	0.06	Q				V
21+35	2.2226	0.12	Q				V
21+40	2.2239	0.19	Q				V
21+45	2.2253	0.20	Q				V
21+50	2.2263	0.15	Q				V
21+55	2.2268	0.07	Q				V
22+ 0	2.2272	0.06	Q				V
22+ 5	2.2281	0.12	Q				V
22+10	2.2294	0.19	Q				V
22+15	2.2308	0.21	Q				V
22+20	2.2318	0.15	Q				V
22+25	2.2324	0.08	Q				V
22+30	2.2328	0.07	Q				V
22+35	2.2333	0.07	Q				V
22+40	2.2338	0.07	Q				V
22+45	2.2343	0.07	Q				V
22+50	2.2347	0.07	Q				V
22+55	2.2352	0.07	Q				V
23+ 0	2.2357	0.07	Q				V
23+ 5	2.2362	0.07	Q				V
23+10	2.2367	0.07	Q				V
23+15	2.2372	0.07	Q				V
23+20	2.2377	0.07	Q				V
23+25	2.2382	0.07	Q				V
23+30	2.2387	0.07	Q				V
23+35	2.2392	0.07	Q				V
23+40	2.2397	0.07	Q				V
23+45	2.2402	0.07	Q				V
23+50	2.2407	0.07	Q				V
23+55	2.2412	0.07	Q				V
24+ 0	2.2417	0.07	Q				V
24+ 5	2.2420	0.04	Q				V
24+10	2.2421	0.01	Q				V
24+15	2.2421	0.00	Q				V

ALTERATIVE NO. 4
(PREFERRED ALTERNATIVE)

UNDEVELOPED CONDITION

sobonalt41100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt41100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	0.55	8.97

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	1.20	19.56

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	86.00	0.000

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.203
2	0.167	194.180	55.366	9.095
3	0.250	291.271	18.995	3.120
4	0.333	388.361	7.769	1.276
5	0.417	485.451	2.779	0.457
6	0.500	582.541	0.892	0.146
7	0.583	679.631	0.599	0.098
8	0.667	776.721	0.191	0.031
			Sum = 100.000	Sum= 16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.176	---	0.43
2	0.17	4.30	0.619	0.176	---	0.44
3	0.25	5.00	0.720	0.176	---	0.54
4	0.33	5.00	0.720	0.176	---	0.54
5	0.42	5.80	0.835	0.176	---	0.66
6	0.50	6.50	0.936	0.176	---	0.76
7	0.58	7.40	1.065	0.176	---	0.89
8	0.67	8.60	1.238	0.176	---	1.06
9	0.75	12.30	1.771	0.176	---	1.60
10	0.83	29.10	4.190	0.176	---	4.01
11	0.92	6.80	0.979	0.176	---	0.80
12	1.00	5.00	0.720	0.176	---	0.54
Sum =		100.0			Sum =	12.3

Flood volume = Effective rainfall 1.02(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.239(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 60602.2 Cubic Feet
Total soil loss = 10390.1 Cubic Feet

Peak flow rate of this hydrograph = 45.236(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 12.5 25.0 37.5 50.0
0+ 5	0.0065	0.95	Q
0+10	0.0401	4.88	V Q
0+15	0.0854	6.58	V Q
0+20	0.1411	8.09	V Q
0+25	0.2022	8.87	V Q
0+30	0.2734	10.34	VQ
0+35	0.3559	11.99	QV
0+40	0.4526	14.04	Q V
0+45	0.5724	17.38	Q V
0+50	0.7675	28.33	Q
0+55	1.0790	45.24	V Q
1+ 0	1.2429	23.79	Q V
1+ 5	1.3364	13.58	Q V
1+10	1.3703	4.93	Q V
1+15	1.3830	1.84	Q V
1+20	1.3886	0.81	Q V
1+25	1.3906	0.28	Q V
1+30	1.3911	0.08	Q V
1+35	1.3912	0.02	Q V

sobonalt43100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt43100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	0.90	14.67

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	2.10	34.23

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	86.00	0.000

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.203
2	0.167	194.180	55.366	9.095
3	0.250	291.271	18.995	3.120
4	0.333	388.361	7.769	1.276
5	0.417	485.451	2.779	0.457
6	0.500	582.541	0.892	0.146
7	0.583	679.631	0.599	0.098
8	0.667	776.721	0.191	0.031
			Sum = 100.000	Sum= 16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.176	---	0.15
2	0.17	1.30	0.328	0.176	---	0.15
3	0.25	1.10	0.277	0.176	---	0.10
4	0.33	1.50	0.378	0.176	---	0.20
5	0.42	1.50	0.378	0.176	---	0.20
6	0.50	1.80	0.454	0.176	---	0.28
7	0.58	1.50	0.378	0.176	---	0.20
8	0.67	1.80	0.454	0.176	---	0.28
9	0.75	1.80	0.454	0.176	---	0.28
10	0.83	1.50	0.378	0.176	---	0.20
11	0.92	1.60	0.403	0.176	---	0.23
12	1.00	1.80	0.454	0.176	---	0.28
13	1.08	2.20	0.554	0.176	---	0.38
14	1.17	2.20	0.554	0.176	---	0.38
15	1.25	2.20	0.554	0.176	---	0.38
16	1.33	2.00	0.504	0.176	---	0.33
17	1.42	2.60	0.655	0.176	---	0.48
18	1.50	2.70	0.680	0.176	---	0.50
19	1.58	2.40	0.605	0.176	---	0.43
20	1.67	2.70	0.680	0.176	---	0.50
21	1.75	3.30	0.832	0.176	---	0.66
22	1.83	3.10	0.781	0.176	---	0.61
23	1.92	2.90	0.731	0.176	---	0.56
24	2.00	3.00	0.756	0.176	---	0.58
25	2.08	3.10	0.781	0.176	---	0.61
26	2.17	4.20	1.058	0.176	---	0.88
27	2.25	5.00	1.260	0.176	---	1.08
28	2.33	3.50	0.882	0.176	---	0.71
29	2.42	6.80	1.713	0.176	---	1.54
30	2.50	7.30	1.839	0.176	---	1.66
31	2.58	8.20	2.066	0.176	---	1.89
32	2.67	5.90	1.487	0.176	---	1.31
33	2.75	2.00	0.504	0.176	---	0.33
34	2.83	1.80	0.454	0.176	---	0.28
35	2.92	1.80	0.454	0.176	---	0.28
36	3.00	0.60	0.151	0.176	0.136	0.02
Sum =		100.0			Sum =	18.9

Flood volume = Effective rainfall 1.58(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 2.1(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 0.711(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 93270.7 Cubic Feet
Total soil loss = 30975.3 Cubic Feet

Peak flow rate of this hydrograph = 27.840(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0023	0.33	Q				
0+10	0.0141	1.72	V Q				

sobonalt43100

0+15	0.0285	2.08	V Q
0+20	0.0425	2.04	V Q
0+25	0.0623	2.87	V Q
0+30	0.0850	3.31	V Q
0+35	0.1122	3.95	V Q
0+40	0.1378	3.71	V Q
0+45	0.1672	4.27	V Q
0+50	0.1966	4.28	V Q
0+55	0.2223	3.73	Q
1+ 0	0.2489	3.86	VQ
1+ 5	0.2801	4.53	VQ
1+10	0.3187	5.61	V Q
1+15	0.3599	5.99	VQ
1+20	0.4014	6.03	VQ
1+25	0.4424	5.95	QV
1+30	0.4924	7.25	Q
1+35	0.5456	7.73	Q
1+40	0.5970	7.46	Q V
1+45	0.6544	8.34	QV
1+50	0.7217	9.77	Q
1+55	0.7889	9.75	QV
2+ 0	0.8537	9.42	Q V
2+ 5	0.9195	9.55	Q V
2+10	0.9913	10.41	Q V
2+15	1.0841	13.48	Q V
2+20	1.1900	15.38	Q V
2+25	1.2917	14.76	Q V
2+30	1.4419	21.82	V Q
2+35	1.6190	25.71	V Q
2+40	1.8108	27.84	V Q
2+45	1.9597	21.62	Q V
2+50	2.0368	11.20	Q V
2+55	2.0858	7.12	Q V
3+ 0	2.1198	4.94	Q V
3+ 5	2.1332	1.94	Q V
3+10	2.1385	0.77	Q V
3+15	2.1403	0.26	Q V
3+20	2.1409	0.09	Q V
3+25	2.1411	0.04	Q V
3+30	2.1412	0.01	Q V
3+35	2.1412	0.00	Q V

sobonalt46100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt46100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	1.40	22.82

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	3.00	48.90

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 3.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	86.00	0.000

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt46100
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.203
2	0.167	194.180	55.366	9.095
3	0.250	291.271	18.995	3.120
4	0.333	388.361	7.769	1.276
5	0.417	485.451	2.779	0.457
6	0.500	582.541	0.892	0.146
7	0.583	679.631	0.599	0.098
8	0.667	776.721	0.191	0.031
			Sum = 100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.176	---	0.00
2	0.17	0.60	0.216	0.176	---	0.04
3	0.25	0.60	0.216	0.176	---	0.04
4	0.33	0.60	0.216	0.176	---	0.04
5	0.42	0.60	0.216	0.176	---	0.04
6	0.50	0.70	0.252	0.176	---	0.08
7	0.58	0.70	0.252	0.176	---	0.08
8	0.67	0.70	0.252	0.176	---	0.08
9	0.75	0.70	0.252	0.176	---	0.08
10	0.83	0.70	0.252	0.176	---	0.08
11	0.92	0.70	0.252	0.176	---	0.08
12	1.00	0.80	0.288	0.176	---	0.11
13	1.08	0.80	0.288	0.176	---	0.11
14	1.17	0.80	0.288	0.176	---	0.11
15	1.25	0.80	0.288	0.176	---	0.11
16	1.33	0.80	0.288	0.176	---	0.11
17	1.42	0.80	0.288	0.176	---	0.11
18	1.50	0.80	0.288	0.176	---	0.11
19	1.58	0.80	0.288	0.176	---	0.11
20	1.67	0.80	0.288	0.176	---	0.11
21	1.75	0.80	0.288	0.176	---	0.11
22	1.83	0.80	0.288	0.176	---	0.11
23	1.92	0.80	0.288	0.176	---	0.11
24	2.00	0.90	0.324	0.176	---	0.15
25	2.08	0.80	0.288	0.176	---	0.11
26	2.17	0.90	0.324	0.176	---	0.15
27	2.25	0.90	0.324	0.176	---	0.15
28	2.33	0.90	0.324	0.176	---	0.15
29	2.42	0.90	0.324	0.176	---	0.15
30	2.50	0.90	0.324	0.176	---	0.15
31	2.58	0.90	0.324	0.176	---	0.15
32	2.67	0.90	0.324	0.176	---	0.15
33	2.75	1.00	0.360	0.176	---	0.18
34	2.83	1.00	0.360	0.176	---	0.18
35	2.92	1.00	0.360	0.176	---	0.18
36	3.00	1.00	0.360	0.176	---	0.18
37	3.08	1.00	0.360	0.176	---	0.18
38	3.17	1.10	0.396	0.176	---	0.22
39	3.25	1.10	0.396	0.176	---	0.22
40	3.33	1.10	0.396	0.176	---	0.22
41	3.42	1.20	0.432	0.176	---	0.26
42	3.50	1.30	0.468	0.176	---	0.29
43	3.58	1.40	0.504	0.176	---	0.33
44	3.67	1.40	0.504	0.176	---	0.33
45	3.75	1.50	0.540	0.176	---	0.36
46	3.83	1.50	0.540	0.176	---	0.36
47	3.92	1.60	0.576	0.176	---	0.40
48	4.00	1.60	0.576	0.176	---	0.40
49	4.08	1.70	0.612	0.176	---	0.44
50	4.17	1.80	0.648	0.176	---	0.47
51	4.25	1.90	0.684	0.176	---	0.51
52	4.33	2.00	0.720	0.176	---	0.54
53	4.42	2.10	0.756	0.176	---	0.58
54	4.50	2.10	0.756	0.176	---	0.58
55	4.58	2.20	0.792	0.176	---	0.62
56	4.67	2.30	0.828	0.176	---	0.65
57	4.75	2.40	0.864	0.176	---	0.69
58	4.83	2.40	0.864	0.176	---	0.69

59	4.92	2.50	0.900	0.176	---	0.72
60	5.00	2.60	0.936	0.176	---	0.76
61	5.08	3.10	1.116	0.176	---	0.94
62	5.17	3.60	1.296	0.176	---	1.12
63	5.25	3.90	1.404	0.176	---	1.23
64	5.33	4.20	1.512	0.176	---	1.34
65	5.42	4.70	1.692	0.176	---	1.52
66	5.50	5.60	2.016	0.176	---	1.84
67	5.58	1.90	0.684	0.176	---	0.51
68	5.67	0.90	0.324	0.176	---	0.15
69	5.75	0.60	0.216	0.176	---	0.04
70	5.83	0.50	0.180	0.176	---	0.00
71	5.92	0.30	0.108	0.176	0.097	0.01
72	6.00	0.20	0.072	0.176	0.065	0.01
Sum =		100.0			Sum =	23.5

Flood volume = Effective rainfall 1.96(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 2.7(Ac.Ft)
Total soil loss = 1.04(In)
Total soil loss = 1.410(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 116089.5 Cubic Feet
Total soil loss = 61407.5 Cubic Feet

Peak flow rate of this hydrograph = 25.149(CFS)

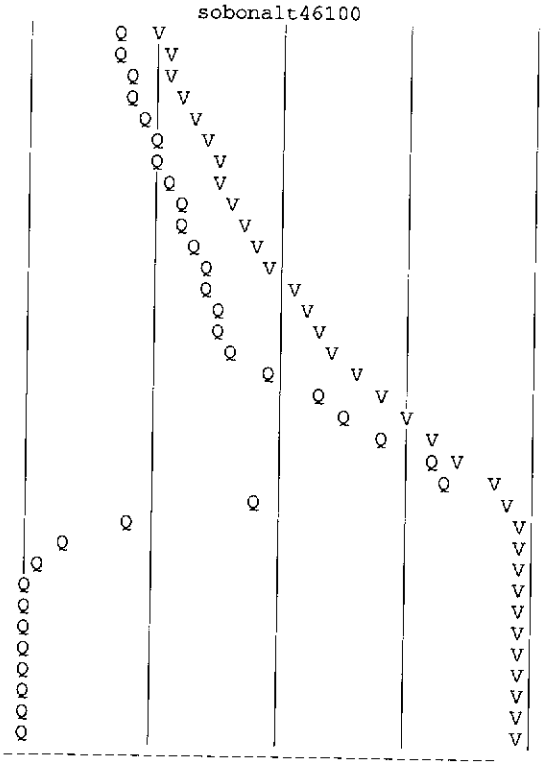
++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 7.5 15.0 22.5 30.0
0+ 5	0.0001	0.01	Q
0+10	0.0010	0.13	Q
0+15	0.0042	0.47	Q
0+20	0.0082	0.59	Q
0+25	0.0126	0.64	Q
0+30	0.0177	0.73	Q
0+35	0.0250	1.07	VQ
0+40	0.0332	1.18	VQ
0+45	0.0416	1.23	VQ
0+50	0.0502	1.25	VQ
0+55	0.0588	1.25	VQ
1+ 0	0.0680	1.33	Q
1+ 5	0.0794	1.66	VQ
1+10	0.0917	1.77	VQ
1+15	0.1042	1.82	VQ
1+20	0.1169	1.84	VQ
1+25	0.1295	1.84	VQ
1+30	0.1423	1.85	Q
1+35	0.1550	1.85	Q
1+40	0.1677	1.85	Q
1+45	0.1804	1.85	Q
1+50	0.1931	1.85	Q
1+55	0.2059	1.85	QV
2+ 0	0.2191	1.93	QV
2+ 5	0.2341	2.17	QV
2+10	0.2482	2.04	QV
2+15	0.2640	2.30	Q
2+20	0.2804	2.38	QV
2+25	0.2971	2.42	QV
2+30	0.3138	2.43	QV
2+35	0.3306	2.44	QV
2+40	0.3474	2.44	Q V
2+45	0.3647	2.52	Q V
2+50	0.3843	2.85	Q V
2+55	0.4047	2.96	Q V
3+ 0	0.4254	3.00	Q V
3+ 5	0.4462	3.02	Q V
3+10	0.4676	3.11	Q V
3+15	0.4912	3.44	Q V
3+20	0.5157	3.55	Q V
3+25	0.5410	3.68	Q V
3+30	0.5692	4.10	Q V
3+35	0.6010	4.62	Q V
3+40	0.6363	5.11	Q V
3+45	0.6732	5.37	Q V

sobonalt46100

3+50	0.7129	5.76	
3+55	0.7541	5.98	
4+ 0	0.7979	6.36	
4+ 5	0.8432	6.58	
4+10	0.8917	7.04	
4+15	0.9438	7.57	
4+20	0.9999	8.15	
4+25	1.0601	8.73	
4+30	1.1237	9.24	
4+35	1.1892	9.50	
4+40	1.2579	9.98	
4+45	1.3304	10.53	
4+50	1.4064	11.02	
4+55	1.4841	11.28	
5+ 0	1.5650	11.76	
5+ 5	1.6520	12.62	
5+10	1.7541	14.82	
5+15	1.8734	17.33	
5+20	2.0068	19.36	
5+25	2.1542	21.40	
5+30	2.3218	24.34	
5+35	2.4950	25.15	
5+40	2.5884	13.56	
5+45	2.6326	6.42	
5+50	2.6514	2.72	
5+55	2.6588	1.07	
6+ 0	2.6626	0.55	
6+ 5	2.6643	0.25	
6+10	2.6648	0.07	
6+15	2.6650	0.02	
6+20	2.6650	0.01	
6+25	2.6650	0.00	
6+30	2.6650	0.00	
6+35	2.6650	0.00	

sobonalt424100

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt424100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	2.25	36.68

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	6.00	97.80

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	86.00	0.000

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

sobonalt424100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.203
2	0.167	194.180	55.366	9.095
3	0.250	291.271	18.995	3.120
4	0.333	388.361	7.769	1.276
5	0.417	485.451	2.779	0.457
6	0.500	582.541	0.892	0.146
7	0.583	679.631	0.599	0.098
8	0.667	776.721	0.191	0.031
			Sum = 100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.311	0.043	0.00
2	0.17	0.07	0.048	0.310	0.043	0.00
3	0.25	0.07	0.048	0.309	0.043	0.00
4	0.33	0.10	0.072	0.308	0.065	0.01
5	0.42	0.10	0.072	0.306	0.065	0.01
6	0.50	0.10	0.072	0.305	0.065	0.01
7	0.58	0.10	0.072	0.304	0.065	0.01
8	0.67	0.10	0.072	0.303	0.065	0.01
9	0.75	0.10	0.072	0.302	0.065	0.01
10	0.83	0.13	0.096	0.301	0.086	0.01
11	0.92	0.13	0.096	0.299	0.086	0.01
12	1.00	0.13	0.096	0.298	0.086	0.01
13	1.08	0.10	0.072	0.297	0.065	0.01
14	1.17	0.10	0.072	0.296	0.065	0.01
15	1.25	0.10	0.072	0.295	0.065	0.01
16	1.33	0.10	0.072	0.293	0.065	0.01
17	1.42	0.10	0.072	0.292	0.065	0.01
18	1.50	0.10	0.072	0.291	0.065	0.01
19	1.58	0.10	0.072	0.290	0.065	0.01
20	1.67	0.10	0.072	0.289	0.065	0.01
21	1.75	0.10	0.072	0.288	0.065	0.01
22	1.83	0.13	0.096	0.287	0.086	0.01
23	1.92	0.13	0.096	0.285	0.086	0.01
24	2.00	0.13	0.096	0.284	0.086	0.01
25	2.08	0.13	0.096	0.283	0.086	0.01
26	2.17	0.13	0.096	0.282	0.086	0.01
27	2.25	0.13	0.096	0.281	0.086	0.01
28	2.33	0.13	0.096	0.280	0.086	0.01
29	2.42	0.13	0.096	0.278	0.086	0.01
30	2.50	0.13	0.096	0.277	0.086	0.01
31	2.58	0.17	0.120	0.276	0.108	0.01
32	2.67	0.17	0.120	0.275	0.108	0.01
33	2.75	0.17	0.120	0.274	0.108	0.01
34	2.83	0.17	0.120	0.273	0.108	0.01
35	2.92	0.17	0.120	0.272	0.108	0.01
36	3.00	0.17	0.120	0.271	0.108	0.01
37	3.08	0.17	0.120	0.269	0.108	0.01
38	3.17	0.17	0.120	0.268	0.108	0.01
39	3.25	0.17	0.120	0.267	0.108	0.01
40	3.33	0.17	0.120	0.266	0.108	0.01
41	3.42	0.17	0.120	0.265	0.108	0.01
42	3.50	0.17	0.120	0.264	0.108	0.01
43	3.58	0.17	0.120	0.263	0.108	0.01
44	3.67	0.17	0.120	0.262	0.108	0.01
45	3.75	0.17	0.120	0.261	0.108	0.01
46	3.83	0.20	0.144	0.259	0.130	0.01
47	3.92	0.20	0.144	0.258	0.130	0.01
48	4.00	0.20	0.144	0.257	0.130	0.01
49	4.08	0.20	0.144	0.256	0.130	0.01
50	4.17	0.20	0.144	0.255	0.130	0.01
51	4.25	0.20	0.144	0.254	0.130	0.01
52	4.33	0.23	0.168	0.253	0.151	0.02
53	4.42	0.23	0.168	0.252	0.151	0.02
54	4.50	0.23	0.168	0.251	0.151	0.02
55	4.58	0.23	0.168	0.250	0.151	0.02
56	4.67	0.23	0.168	0.249	0.151	0.02
57	4.75	0.23	0.168	0.248	0.151	0.02
58	4.83	0.27	0.192	0.246	0.173	0.02

59	4.92	0.27	0.192	0.245	0.173	0.02
60	5.00	0.27	0.192	0.244	0.173	0.02
61	5.08	0.20	0.144	0.243	0.130	0.01
62	5.17	0.20	0.144	0.242	0.130	0.01
63	5.25	0.20	0.144	0.241	0.130	0.01
64	5.33	0.23	0.168	0.240	0.151	0.02
65	5.42	0.23	0.168	0.239	0.151	0.02
66	5.50	0.23	0.168	0.238	0.151	0.02
67	5.58	0.27	0.192	0.237	0.173	0.02
68	5.67	0.27	0.192	0.236	0.173	0.02
69	5.75	0.27	0.192	0.235	0.173	0.02
70	5.83	0.27	0.192	0.234	0.173	0.02
71	5.92	0.27	0.192	0.233	0.173	0.02
72	6.00	0.27	0.192	0.232	0.173	0.02
73	6.08	0.30	0.216	0.231	0.194	0.02
74	6.17	0.30	0.216	0.230	0.194	0.02
75	6.25	0.30	0.216	0.229	0.194	0.02
76	6.33	0.30	0.216	0.228	0.194	0.02
77	6.42	0.30	0.216	0.227	0.194	0.02
78	6.50	0.30	0.216	0.226	0.194	0.02
79	6.58	0.33	0.240	0.225	---	0.02
80	6.67	0.33	0.240	0.224	---	0.02
81	6.75	0.33	0.240	0.223	---	0.02
82	6.83	0.33	0.240	0.222	---	0.02
83	6.92	0.33	0.240	0.221	---	0.02
84	7.00	0.33	0.240	0.220	---	0.02
85	7.08	0.33	0.240	0.219	---	0.02
86	7.17	0.33	0.240	0.218	---	0.02
87	7.25	0.33	0.240	0.217	---	0.02
88	7.33	0.37	0.264	0.216	---	0.05
89	7.42	0.37	0.264	0.215	---	0.05
90	7.50	0.37	0.264	0.214	---	0.05
91	7.58	0.40	0.288	0.213	---	0.08
92	7.67	0.40	0.288	0.212	---	0.08
93	7.75	0.40	0.288	0.211	---	0.08
94	7.83	0.43	0.312	0.210	---	0.10
95	7.92	0.43	0.312	0.209	---	0.10
96	8.00	0.43	0.312	0.208	---	0.10
97	8.08	0.50	0.360	0.207	---	0.15
98	8.17	0.50	0.360	0.206	---	0.15
99	8.25	0.50	0.360	0.205	---	0.16
100	8.33	0.50	0.360	0.204	---	0.16
101	8.42	0.50	0.360	0.203	---	0.16
102	8.50	0.50	0.360	0.202	---	0.16
103	8.58	0.53	0.384	0.201	---	0.18
104	8.67	0.53	0.384	0.200	---	0.18
105	8.75	0.53	0.384	0.199	---	0.18
106	8.83	0.57	0.408	0.198	---	0.21
107	8.92	0.57	0.408	0.197	---	0.21
108	9.00	0.57	0.408	0.196	---	0.21
109	9.08	0.63	0.456	0.195	---	0.26
110	9.17	0.63	0.456	0.195	---	0.26
111	9.25	0.63	0.456	0.194	---	0.26
112	9.33	0.67	0.480	0.193	---	0.29
113	9.42	0.67	0.480	0.192	---	0.29
114	9.50	0.67	0.480	0.191	---	0.29
115	9.58	0.70	0.504	0.190	---	0.31
116	9.67	0.70	0.504	0.189	---	0.31
117	9.75	0.70	0.504	0.188	---	0.32
118	9.83	0.73	0.528	0.187	---	0.34
119	9.92	0.73	0.528	0.186	---	0.34
120	10.00	0.73	0.528	0.185	---	0.34
121	10.08	0.50	0.360	0.185	---	0.18
122	10.17	0.50	0.360	0.184	---	0.18
123	10.25	0.50	0.360	0.183	---	0.18
124	10.33	0.50	0.360	0.182	---	0.18
125	10.42	0.50	0.360	0.181	---	0.18
126	10.50	0.50	0.360	0.180	---	0.18
127	10.58	0.67	0.480	0.179	---	0.30
128	10.67	0.67	0.480	0.178	---	0.30
129	10.75	0.67	0.480	0.177	---	0.30
130	10.83	0.67	0.480	0.177	---	0.30
131	10.92	0.67	0.480	0.176	---	0.30
132	11.00	0.67	0.480	0.175	---	0.31
133	11.08	0.63	0.456	0.174	---	0.28
134	11.17	0.63	0.456	0.173	---	0.28
135	11.25	0.63	0.456	0.172	---	0.28
136	11.33	0.63	0.456	0.171	---	0.28
137	11.42	0.63	0.456	0.171	---	0.29

138	11.50	0.63	0.456	0.170	---	0.29
139	11.58	0.57	0.408	0.169	---	0.24
140	11.67	0.57	0.408	0.168	---	0.24
141	11.75	0.57	0.408	0.167	---	0.24
142	11.83	0.60	0.432	0.166	---	0.27
143	11.92	0.60	0.432	0.166	---	0.27
144	12.00	0.60	0.432	0.165	---	0.27
145	12.08	0.83	0.600	0.164	---	0.44
146	12.17	0.83	0.600	0.163	---	0.44
147	12.25	0.83	0.600	0.162	---	0.44
148	12.33	0.87	0.624	0.161	---	0.46
149	12.42	0.87	0.624	0.161	---	0.46
150	12.50	0.87	0.624	0.160	---	0.46
151	12.58	0.93	0.672	0.159	---	0.51
152	12.67	0.93	0.672	0.158	---	0.51
153	12.75	0.93	0.672	0.157	---	0.51
154	12.83	0.97	0.696	0.157	---	0.54
155	12.92	0.97	0.696	0.156	---	0.54
156	13.00	0.97	0.696	0.155	---	0.54
157	13.08	1.13	0.816	0.154	---	0.66
158	13.17	1.13	0.816	0.154	---	0.66
159	13.25	1.13	0.816	0.153	---	0.66
160	13.33	1.13	0.816	0.152	---	0.66
161	13.42	1.13	0.816	0.151	---	0.66
162	13.50	1.13	0.816	0.150	---	0.67
163	13.58	0.77	0.552	0.150	---	0.40
164	13.67	0.77	0.552	0.149	---	0.40
165	13.75	0.77	0.552	0.148	---	0.40
166	13.83	0.77	0.552	0.147	---	0.40
167	13.92	0.77	0.552	0.147	---	0.41
168	14.00	0.77	0.552	0.146	---	0.41
169	14.08	0.90	0.648	0.145	---	0.50
170	14.17	0.90	0.648	0.144	---	0.50
171	14.25	0.90	0.648	0.144	---	0.50
172	14.33	0.87	0.624	0.143	---	0.48
173	14.42	0.87	0.624	0.142	---	0.48
174	14.50	0.87	0.624	0.141	---	0.48
175	14.58	0.87	0.624	0.141	---	0.48
176	14.67	0.87	0.624	0.140	---	0.48
177	14.75	0.87	0.624	0.139	---	0.48
178	14.83	0.83	0.600	0.139	---	0.46
179	14.92	0.83	0.600	0.138	---	0.46
180	15.00	0.83	0.600	0.137	---	0.46
181	15.08	0.80	0.576	0.136	---	0.44
182	15.17	0.80	0.576	0.136	---	0.44
183	15.25	0.80	0.576	0.135	---	0.44
184	15.33	0.77	0.552	0.134	---	0.42
185	15.42	0.77	0.552	0.134	---	0.42
186	15.50	0.77	0.552	0.133	---	0.42
187	15.58	0.63	0.456	0.132	---	0.32
188	15.67	0.63	0.456	0.132	---	0.32
189	15.75	0.63	0.456	0.131	---	0.33
190	15.83	0.63	0.456	0.130	---	0.33
191	15.92	0.63	0.456	0.130	---	0.33
192	16.00	0.63	0.456	0.129	---	0.33
193	16.08	0.13	0.096	0.128	0.086	0.01
194	16.17	0.13	0.096	0.128	0.086	0.01
195	16.25	0.13	0.096	0.127	0.086	0.01
196	16.33	0.13	0.096	0.126	0.086	0.01
197	16.42	0.13	0.096	0.126	0.086	0.01
198	16.50	0.13	0.096	0.125	0.086	0.01
199	16.58	0.10	0.072	0.124	0.065	0.01
200	16.67	0.10	0.072	0.124	0.065	0.01
201	16.75	0.10	0.072	0.123	0.065	0.01
202	16.83	0.10	0.072	0.123	0.065	0.01
203	16.92	0.10	0.072	0.122	0.065	0.01
204	17.00	0.10	0.072	0.121	0.065	0.01
205	17.08	0.17	0.120	0.121	0.108	0.01
206	17.17	0.17	0.120	0.120	0.108	0.01
207	17.25	0.17	0.120	0.119	---	0.00
208	17.33	0.17	0.120	0.119	---	0.00
209	17.42	0.17	0.120	0.118	---	0.00
210	17.50	0.17	0.120	0.118	---	0.00
211	17.58	0.17	0.120	0.117	---	0.00
212	17.67	0.17	0.120	0.117	---	0.00
213	17.75	0.17	0.120	0.116	---	0.00
214	17.83	0.13	0.096	0.115	0.086	0.01
215	17.92	0.13	0.096	0.115	0.086	0.01
216	18.00	0.13	0.096	0.114	0.086	0.01

217	18.08	0.13	0.096	0.114	0.086	0.01
218	18.17	0.13	0.096	0.113	0.086	0.01
219	18.25	0.13	0.096	0.113	0.086	0.01
220	18.33	0.13	0.096	0.112	0.086	0.01
221	18.42	0.13	0.096	0.111	0.086	0.01
222	18.50	0.13	0.096	0.111	0.086	0.01
223	18.58	0.10	0.072	0.110	0.065	0.01
224	18.67	0.10	0.072	0.110	0.065	0.01
225	18.75	0.10	0.072	0.109	0.065	0.01
226	18.83	0.07	0.048	0.109	0.043	0.00
227	18.92	0.07	0.048	0.108	0.043	0.00
228	19.00	0.07	0.048	0.108	0.043	0.00
229	19.08	0.10	0.072	0.107	0.065	0.01
230	19.17	0.10	0.072	0.107	0.065	0.01
231	19.25	0.10	0.072	0.106	0.065	0.01
232	19.33	0.13	0.096	0.106	0.086	0.01
233	19.42	0.13	0.096	0.105	0.086	0.01
234	19.50	0.13	0.096	0.105	0.086	0.01
235	19.58	0.10	0.072	0.104	0.065	0.01
236	19.67	0.10	0.072	0.104	0.065	0.01
237	19.75	0.10	0.072	0.103	0.065	0.01
238	19.83	0.07	0.048	0.103	0.043	0.00
239	19.92	0.07	0.048	0.102	0.043	0.00
240	20.00	0.07	0.048	0.102	0.043	0.00
241	20.08	0.10	0.072	0.102	0.065	0.01
242	20.17	0.10	0.072	0.101	0.065	0.01
243	20.25	0.10	0.072	0.101	0.065	0.01
244	20.33	0.10	0.072	0.100	0.065	0.01
245	20.42	0.10	0.072	0.100	0.065	0.01
246	20.50	0.10	0.072	0.099	0.065	0.01
247	20.58	0.10	0.072	0.099	0.065	0.01
248	20.67	0.10	0.072	0.099	0.065	0.01
249	20.75	0.10	0.072	0.098	0.065	0.01
250	20.83	0.07	0.048	0.098	0.043	0.00
251	20.92	0.07	0.048	0.097	0.043	0.00
252	21.00	0.07	0.048	0.097	0.043	0.00
253	21.08	0.10	0.072	0.097	0.065	0.01
254	21.17	0.10	0.072	0.096	0.065	0.01
255	21.25	0.10	0.072	0.096	0.065	0.01
256	21.33	0.07	0.048	0.095	0.043	0.00
257	21.42	0.07	0.048	0.095	0.043	0.00
258	21.50	0.07	0.048	0.095	0.043	0.00
259	21.58	0.10	0.072	0.094	0.065	0.01
260	21.67	0.10	0.072	0.094	0.065	0.01
261	21.75	0.10	0.072	0.094	0.065	0.01
262	21.83	0.07	0.048	0.093	0.043	0.00
263	21.92	0.07	0.048	0.093	0.043	0.00
264	22.00	0.07	0.048	0.093	0.043	0.00
265	22.08	0.10	0.072	0.092	0.065	0.01
266	22.17	0.10	0.072	0.092	0.065	0.01
267	22.25	0.10	0.072	0.092	0.065	0.01
268	22.33	0.07	0.048	0.092	0.043	0.00
269	22.42	0.07	0.048	0.091	0.043	0.00
270	22.50	0.07	0.048	0.091	0.043	0.00
271	22.58	0.07	0.048	0.091	0.043	0.00
272	22.67	0.07	0.048	0.090	0.043	0.00
273	22.75	0.07	0.048	0.090	0.043	0.00
274	22.83	0.07	0.048	0.090	0.043	0.00
275	22.92	0.07	0.048	0.090	0.043	0.00
276	23.00	0.07	0.048	0.090	0.043	0.00
277	23.08	0.07	0.048	0.089	0.043	0.00
278	23.17	0.07	0.048	0.089	0.043	0.00
279	23.25	0.07	0.048	0.089	0.043	0.00
280	23.33	0.07	0.048	0.089	0.043	0.00
281	23.42	0.07	0.048	0.089	0.043	0.00
282	23.50	0.07	0.048	0.088	0.043	0.00
283	23.58	0.07	0.048	0.088	0.043	0.00
284	23.67	0.07	0.048	0.088	0.043	0.00
285	23.75	0.07	0.048	0.088	0.043	0.00
286	23.83	0.07	0.048	0.088	0.043	0.00
287	23.92	0.07	0.048	0.088	0.043	0.00
288	24.00	0.07	0.048	0.088	0.043	0.00
Sum =		100.0			Sum =	36.9

Flood volume = Effective rainfall 3.08(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 4.2(Ac.Ft)
Total soil loss = 2.92(In)
Total soil loss = 3.971(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 182039.7 Cubic Feet

Total soil loss = 172963.0 Cubic Feet

Peak flow rate of this hydrograph = 10.906(CFS)

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0001	0.01	Q				
0+10	0.0004	0.05	Q				
0+15	0.0009	0.07	Q				
0+20	0.0015	0.08	Q				
0+25	0.0022	0.10	Q				
0+30	0.0030	0.11	Q				
0+35	0.0038	0.12	Q				
0+40	0.0046	0.12	Q				
0+45	0.0054	0.12	Q				
0+50	0.0063	0.12	Q				
0+55	0.0073	0.15	Q				
1+ 0	0.0083	0.15	Q				
1+ 5	0.0093	0.15	Q				
1+10	0.0102	0.13	Q				
1+15	0.0111	0.12	Q				
1+20	0.0119	0.12	Q				
1+25	0.0127	0.12	Q				
1+30	0.0136	0.12	Q				
1+35	0.0144	0.12	Q				
1+40	0.0152	0.12	Q				
1+45	0.0160	0.12	Q				
1+50	0.0168	0.12	Q				
1+55	0.0178	0.15	Q				
2+ 0	0.0189	0.15	Q				
2+ 5	0.0200	0.16	Q				
2+10	0.0211	0.16	Q				
2+15	0.0221	0.16	Q				
2+20	0.0232	0.16	Q				
2+25	0.0243	0.16	Q				
2+30	0.0254	0.16	Q				
2+35	0.0265	0.16	Q				
2+40	0.0278	0.18	Q				
2+45	0.0291	0.19	Q				
2+50	0.0305	0.20	Q				
2+55	0.0318	0.20	Q				
3+ 0	0.0332	0.20	Q				
3+ 5	0.0345	0.20	Q				
3+10	0.0359	0.20	Q				
3+15	0.0373	0.20	Q				
3+20	0.0386	0.20	Q				
3+25	0.0400	0.20	Q				
3+30	0.0413	0.20	Q				
3+35	0.0427	0.20	Q				
3+40	0.0440	0.20	Q				
3+45	0.0454	0.20	Q				
3+50	0.0468	0.20	Q				
3+55	0.0483	0.22	Q				
4+ 0	0.0499	0.23	Q				
4+ 5	0.0516	0.23	Q				
4+10	0.0532	0.24	Q				
4+15	0.0548	0.24	Q				
4+20	0.0565	0.24	Q				
4+25	0.0583	0.26	Q				
4+30	0.0602	0.27	Q				
4+35	0.0621	0.27	Q				
4+40	0.0640	0.28	Q				
4+45	0.0658	0.28	Q				
4+50	0.0678	0.28	Q				
4+55	0.0699	0.30	Q				
5+ 0	0.0720	0.31	Q				
5+ 5	0.0741	0.30	Q				
5+10	0.0759	0.26	Q				
5+15	0.0776	0.25	Q				
5+20	0.0793	0.25	Q				
5+25	0.0811	0.27	Q				
5+30	0.0830	0.27	Q				

5+35	0.0849	0.28	Q
5+40	0.0870	0.30	Q
5+45	0.0891	0.31	Q
5+50	0.0913	0.31	Q
5+55	0.0935	0.31	Q
6+ 0	0.0956	0.32	Q
6+ 5	0.0978	0.32	Q
6+10	0.1002	0.34	Q
6+15	0.1026	0.35	Q
6+20	0.1050	0.35	QV
6+25	0.1075	0.35	QV
6+30	0.1099	0.35	QV
6+35	0.1123	0.34	QV
6+40	0.1143	0.29	QV
6+45	0.1162	0.28	QV
6+50	0.1181	0.29	QV
6+55	0.1202	0.30	QV
7+ 0	0.1223	0.31	QV
7+ 5	0.1246	0.33	QV
7+10	0.1270	0.35	QV
7+15	0.1295	0.36	QV
7+20	0.1324	0.43	QV
7+25	0.1370	0.67	|Q
7+30	0.1422	0.76	|Q
7+35	0.1481	0.86	|Q
7+40	0.1557	1.10	|VQ
7+45	0.1640	1.20	|VQ
7+50	0.1729	1.30	|VQ
7+55	0.1836	1.54	|V Q
8+ 0	0.1948	1.64	|V Q
8+ 5	0.2072	1.79	|V Q
8+10	0.2227	2.26	| V Q
8+15	0.2395	2.43	| V Q
8+20	0.2567	2.51	| V Q
8+25	0.2743	2.55	| V Q
8+30	0.2919	2.57	| V Q
8+35	0.3101	2.64	| V Q
8+40	0.3299	2.88	| V Q
8+45	0.3504	2.97	| V Q
8+50	0.3715	3.07	| V Q
8+55	0.3943	3.31	| V Q
9+ 0	0.4177	3.40	| V Q
9+ 5	0.4423	3.56	| V Q
9+10	0.4700	4.02	| V Q
9+15	0.4988	4.19	| V Q
9+20	0.5286	4.32	| V Q
9+25	0.5601	4.58	| V Q
9+30	0.5923	4.68	| V Q
9+35	0.6253	4.78	| V Q
9+40	0.6599	5.03	| V Q
9+45	0.6951	5.12	| V Q
9+50	0.7311	5.22	| V Q
9+55	0.7687	5.47	| V Q
10+ 0	0.8070	5.56	| V |Q
10+ 5	0.8431	5.24	| V Q
10+10	0.8688	3.73	| QV |
10+15	0.8910	3.23	| Q V |
10+20	0.9119	3.03	| Q V |
10+25	0.9323	2.97	| Q V |
10+30	0.9527	2.96	| Q V |
10+35	0.9749	3.22	| Q V |
10+40	1.0046	4.32	| QV|
10+45	1.0371	4.71	| Q|
10+50	1.0707	4.88	| QV
10+55	1.1048	4.95	| QV
11+ 0	1.1391	4.98	| QV
11+ 5	1.1732	4.95	| Q|V
11+10	1.2059	4.75	| Q|V
11+15	1.2382	4.69	| Q|V
11+20	1.2704	4.68	| Q| V
11+25	1.3026	4.68	| Q| V
11+30	1.3349	4.69	| Q| V
11+35	1.3666	4.59	| Q| V
11+40	1.3953	4.17	| Q| V
11+45	1.4231	4.03	| Q| V
11+50	1.4509	4.04	| Q| V
11+55	1.4802	4.25	| Q| V
12+ 0	1.5100	4.33	| Q| V
12+ 5	1.5427	4.74	| Q| V

sobonalt424100

12+10	1.5860	6.29	
12+15	1.6331	6.83	
12+20	1.6821	7.12	
12+25	1.7332	7.43	
12+30	1.7852	7.54	
12+35	1.8382	7.71	
12+40	1.8945	8.17	
12+45	1.9520	8.34	
12+50	2.0103	8.47	
12+55	2.0704	8.72	
13+ 0	2.1311	8.82	
13+ 5	2.1940	9.13	
13+10	2.2646	10.25	
13+15	2.3378	10.64	
13+20	2.4123	10.81	
13+25	2.4872	10.88	
13+30	2.5623	10.91	
13+35	2.6336	10.35	
13+40	2.6884	7.96	
13+45	2.7376	7.15	
13+50	2.7847	6.83	
13+55	2.8309	6.72	
14+ 0	2.8770	6.69	
14+ 5	2.9245	6.89	
14+10	2.9780	7.77	
14+15	3.0336	8.08	
14+20	3.0898	8.16	
14+25	3.1449	8.00	
14+30	3.1997	7.95	
14+35	3.2544	7.94	
14+40	3.3091	7.94	
14+45	3.3639	7.95	
14+50	3.4183	7.91	
14+55	3.4714	7.70	
15+ 0	3.5240	7.64	
15+ 5	3.5761	7.57	
15+10	3.6267	7.35	
15+15	3.6769	7.28	
15+20	3.7265	7.21	
15+25	3.7747	6.99	
15+30	3.8223	6.92	
15+35	3.8684	6.69	
15+40	3.9085	5.82	
15+45	3.9465	5.52	
15+50	3.9837	5.41	
15+55	4.0208	5.38	
16+ 0	4.0578	5.37	
16+ 5	4.0899	4.67	
16+10	4.1022	1.78	
16+15	4.1077	0.80	
16+20	4.1104	0.39	
16+25	4.1121	0.25	
16+30	4.1135	0.20	
16+35	4.1146	0.16	
16+40	4.1155	0.13	
16+45	4.1163	0.12	
16+50	4.1172	0.12	
16+55	4.1180	0.12	
17+ 0	4.1188	0.12	
17+ 5	4.1197	0.13	
17+10	4.1209	0.17	
17+15	4.1220	0.16	
17+20	4.1224	0.07	
17+25	4.1227	0.04	
17+30	4.1229	0.03	
17+35	4.1232	0.04	
17+40	4.1235	0.05	
17+45	4.1239	0.05	
17+50	4.1244	0.07	
17+55	4.1253	0.13	
18+ 0	4.1263	0.15	
18+ 5	4.1273	0.15	
18+10	4.1284	0.16	
18+15	4.1295	0.16	
18+20	4.1306	0.16	
18+25	4.1317	0.16	
18+30	4.1327	0.16	
18+35	4.1338	0.15	
18+40	4.1347	0.13	

18+45	4.1355	0.12	Q				V
18+50	4.1363	0.11	Q				V
18+55	4.1370	0.09	Q				V
19+ 0	4.1375	0.08	Q				V
19+ 5	4.1381	0.09	Q				V
19+10	4.1389	0.11	Q				V
19+15	4.1397	0.11	Q				V
19+20	4.1405	0.12	Q				V
19+25	4.1415	0.14	Q				V
19+30	4.1425	0.15	Q				V
19+35	4.1436	0.15	Q				V
19+40	4.1445	0.13	Q				V
19+45	4.1453	0.12	Q				V
19+50	4.1461	0.11	Q				V
19+55	4.1467	0.09	Q				V
20+ 0	4.1473	0.08	Q				V
20+ 5	4.1479	0.09	Q				V
20+10	4.1487	0.11	Q				V
20+15	4.1494	0.11	Q				V
20+20	4.1502	0.12	Q				V
20+25	4.1510	0.12	Q				V
20+30	4.1519	0.12	Q				V
20+35	4.1527	0.12	Q				V
20+40	4.1535	0.12	Q				V
20+45	4.1543	0.12	Q				V
20+50	4.1551	0.11	Q				V
20+55	4.1557	0.09	Q				V
21+ 0	4.1563	0.08	Q				V
21+ 5	4.1569	0.09	Q				V
21+10	4.1576	0.11	Q				V
21+15	4.1584	0.11	Q				V
21+20	4.1592	0.11	Q				V
21+25	4.1598	0.09	Q				V
21+30	4.1604	0.08	Q				V
21+35	4.1610	0.09	Q				V
21+40	4.1617	0.11	Q				V
21+45	4.1625	0.11	Q				V
21+50	4.1632	0.11	Q				V
21+55	4.1639	0.09	Q				V
22+ 0	4.1644	0.08	Q				V
22+ 5	4.1650	0.09	Q				V
22+10	4.1658	0.11	Q				V
22+15	4.1665	0.11	Q				V
22+20	4.1673	0.11	Q				V
22+25	4.1679	0.09	Q				V
22+30	4.1685	0.08	Q				V
22+35	4.1691	0.08	Q				V
22+40	4.1696	0.08	Q				V
22+45	4.1702	0.08	Q				V
22+50	4.1707	0.08	Q				V
22+55	4.1712	0.08	Q				V
23+ 0	4.1718	0.08	Q				V
23+ 5	4.1723	0.08	Q				V
23+10	4.1729	0.08	Q				V
23+15	4.1734	0.08	Q				V
23+20	4.1740	0.08	Q				V
23+25	4.1745	0.08	Q				V
23+30	4.1751	0.08	Q				V
23+35	4.1756	0.08	Q				V
23+40	4.1761	0.08	Q				V
23+45	4.1767	0.08	Q				V
23+50	4.1772	0.08	Q				V
23+55	4.1778	0.08	Q				V
24+ 0	4.1783	0.08	Q				V
24+ 5	4.1788	0.07	Q				V
24+10	4.1790	0.02	Q				V
24+15	4.1790	0.01	Q				V
24+20	4.1790	0.00	Q				V
24+25	4.1791	0.00	Q				V
24+30	4.1791	0.00	Q				V
24+35	4.1791	0.00	Q				V

DEVELOPED CONDITION

sobonalt4d1100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt4d1100.out

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	0.55	8.97

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	1.20	19.56

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.200(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
		Sum = 100.000	Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.605	0.071	---	0.53
2	0.17	4.30	0.619	0.071	---	0.55
3	0.25	5.00	0.720	0.071	---	0.65
4	0.33	5.00	0.720	0.071	---	0.65
5	0.42	5.80	0.835	0.071	---	0.76
6	0.50	6.50	0.936	0.071	---	0.87
7	0.58	7.40	1.065	0.071	---	0.99
8	0.67	8.60	1.238	0.071	---	1.17
9	0.75	12.30	1.771	0.071	---	1.70
10	0.83	29.10	4.190	0.071	---	4.12
11	0.92	6.80	0.979	0.071	---	0.91
12	1.00	5.00	0.720	0.071	---	0.65
Sum =		100.0			Sum =	13.5

Flood volume = Effective rainfall 1.13(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 1.5(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.096(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 66801.3 Cubic Feet
Total soil loss = 4191.1 Cubic Feet

Peak flow rate of this hydrograph = 43.513(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 12.5 25.0 37.5 50.0
0+ 5	0.0248	3.61	V Q
0+10	0.0809	8.14	V Q
0+15	0.1468	9.56	V Q
0+20	0.2193	10.53	V Q
0+25	0.2979	11.43	V Q
0+30	0.3881	13.08	Q
0+35	0.4909	14.93	QV
0+40	0.6101	17.32	Q V
0+45	0.7652	22.52	QV
0+50	1.0649	43.51	V Q
0+55	1.3582	42.59	QV
1+ 0	1.4759	17.09	Q V
1+ 5	1.5261	7.29	Q V
1+10	1.5326	0.94	Q V
1+15	1.5335	0.13	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt4d3100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	0.90	14.67

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	2.10	34.23

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 2.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt4d3100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
			Sum = 100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.328	0.071	---	0.26
2	0.17	1.30	0.328	0.071	---	0.26
3	0.25	1.10	0.277	0.071	---	0.21
4	0.33	1.50	0.378	0.071	---	0.31
5	0.42	1.50	0.378	0.071	---	0.31
6	0.50	1.80	0.454	0.071	---	0.38
7	0.58	1.50	0.378	0.071	---	0.31
8	0.67	1.80	0.454	0.071	---	0.38
9	0.75	1.80	0.454	0.071	---	0.38
10	0.83	1.50	0.378	0.071	---	0.31
11	0.92	1.60	0.403	0.071	---	0.33
12	1.00	1.80	0.454	0.071	---	0.38
13	1.08	2.20	0.554	0.071	---	0.48
14	1.17	2.20	0.554	0.071	---	0.48
15	1.25	2.20	0.554	0.071	---	0.48
16	1.33	2.00	0.504	0.071	---	0.43
17	1.42	2.60	0.655	0.071	---	0.58
18	1.50	2.70	0.680	0.071	---	0.61
19	1.58	2.40	0.605	0.071	---	0.53
20	1.67	2.70	0.680	0.071	---	0.61
21	1.75	3.30	0.832	0.071	---	0.76
22	1.83	3.10	0.781	0.071	---	0.71
23	1.92	2.90	0.731	0.071	---	0.66
24	2.00	3.00	0.756	0.071	---	0.69
25	2.08	3.10	0.781	0.071	---	0.71
26	2.17	4.20	1.058	0.071	---	0.99
27	2.25	5.00	1.260	0.071	---	1.19
28	2.33	3.50	0.882	0.071	---	0.81
29	2.42	6.80	1.713	0.071	---	1.64
30	2.50	7.30	1.839	0.071	---	1.77
31	2.58	8.20	2.066	0.071	---	2.00
32	2.67	5.90	1.487	0.071	---	1.42
33	2.75	2.00	0.504	0.071	---	0.43
34	2.83	1.80	0.454	0.071	---	0.38
35	2.92	1.80	0.454	0.071	---	0.38
36	3.00	0.60	0.151	0.071	---	0.08
Sum =		100.0			Sum =	22.6

Flood volume = Effective rainfall 1.89(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 2.6(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.289(Ac.Ft)
Total rainfall = 2.10(In)
Flood volume = 111672.9 Cubic Feet
Total soil loss = 12573.2 Cubic Feet

Peak flow rate of this hydrograph = 30.259(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0119	1.73	VQ				
0+10	0.0386	3.87	V Q				
0+15	0.0649	3.83	V Q				
0+20	0.0935	4.14	V Q				
0+25	0.1273	4.92	V Q				
0+30	0.1655	5.54	V Q				

sobonalt4d3100

0+35	0.2046	5.68	V Q
0+40	0.2435	5.65	V Q
0+45	0.2862	6.20	V Q
0+50	0.3259	5.76	Q
0+55	0.3625	5.32	Q
1+ 0	0.4024	5.78	QV
1+ 5	0.4499	6.90	QV
1+10	0.5036	7.80	Q
1+15	0.5582	7.93	QV
1+20	0.6106	7.61	Q V
1+25	0.6671	8.21	Q V
1+30	0.7331	9.58	Q V
1+35	0.7981	9.44	Q V
1+40	0.8627	9.38	Q V
1+45	0.9381	10.95	Q V
1+50	1.0204	11.94	Q V
1+55	1.0987	11.37	Q V
2+ 0	1.1751	11.10	Q V
2+ 5	1.2537	11.41	Q V
2+10	1.3467	13.51	Q V
2+15	1.4652	17.21	Q V
2+20	1.5799	16.66	Q V
2+25	1.7137	19.42	Q V
2+30	1.8982	26.79	Q V
2+35	2.1066	30.26	Q V
2+40	2.3032	28.55	Q V
2+45	2.4229	17.38	Q V
2+50	2.4796	8.24	Q V
2+55	2.5248	6.56	Q V
3+ 0	2.5541	4.26	Q V
3+ 5	2.5624	1.19	Q V
3+10	2.5635	0.17	Q V
3+15	2.5637	0.02	Q V

sobonalt4d6100

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt4d6100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	1.40	22.82

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	3.00	48.90

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 3.000(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 3.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt4d6100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
			Sum = 100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.180	0.071	---	0.11
2	0.17	0.60	0.216	0.071	---	0.15
3	0.25	0.60	0.216	0.071	---	0.15
4	0.33	0.60	0.216	0.071	---	0.15
5	0.42	0.60	0.216	0.071	---	0.15
6	0.50	0.70	0.252	0.071	---	0.18
7	0.58	0.70	0.252	0.071	---	0.18
8	0.67	0.70	0.252	0.071	---	0.18
9	0.75	0.70	0.252	0.071	---	0.18
10	0.83	0.70	0.252	0.071	---	0.18
11	0.92	0.70	0.252	0.071	---	0.18
12	1.00	0.80	0.288	0.071	---	0.22
13	1.08	0.80	0.288	0.071	---	0.22
14	1.17	0.80	0.288	0.071	---	0.22
15	1.25	0.80	0.288	0.071	---	0.22
16	1.33	0.80	0.288	0.071	---	0.22
17	1.42	0.80	0.288	0.071	---	0.22
18	1.50	0.80	0.288	0.071	---	0.22
19	1.58	0.80	0.288	0.071	---	0.22
20	1.67	0.80	0.288	0.071	---	0.22
21	1.75	0.80	0.288	0.071	---	0.22
22	1.83	0.80	0.288	0.071	---	0.22
23	1.92	0.80	0.288	0.071	---	0.22
24	2.00	0.90	0.324	0.071	---	0.25
25	2.08	0.80	0.288	0.071	---	0.22
26	2.17	0.90	0.324	0.071	---	0.25
27	2.25	0.90	0.324	0.071	---	0.25
28	2.33	0.90	0.324	0.071	---	0.25
29	2.42	0.90	0.324	0.071	---	0.25
30	2.50	0.90	0.324	0.071	---	0.25
31	2.58	0.90	0.324	0.071	---	0.25
32	2.67	0.90	0.324	0.071	---	0.25
33	2.75	1.00	0.360	0.071	---	0.29
34	2.83	1.00	0.360	0.071	---	0.29
35	2.92	1.00	0.360	0.071	---	0.29
36	3.00	1.00	0.360	0.071	---	0.29
37	3.08	1.00	0.360	0.071	---	0.29
38	3.17	1.10	0.396	0.071	---	0.33
39	3.25	1.10	0.396	0.071	---	0.33
40	3.33	1.10	0.396	0.071	---	0.33
41	3.42	1.20	0.432	0.071	---	0.36
42	3.50	1.30	0.468	0.071	---	0.40
43	3.58	1.40	0.504	0.071	---	0.43
44	3.67	1.40	0.504	0.071	---	0.43
45	3.75	1.50	0.540	0.071	---	0.47
46	3.83	1.50	0.540	0.071	---	0.47
47	3.92	1.60	0.576	0.071	---	0.51
48	4.00	1.60	0.576	0.071	---	0.51
49	4.08	1.70	0.612	0.071	---	0.54
50	4.17	1.80	0.648	0.071	---	0.58
51	4.25	1.90	0.684	0.071	---	0.61
52	4.33	2.00	0.720	0.071	---	0.65
53	4.42	2.10	0.756	0.071	---	0.69
54	4.50	2.10	0.756	0.071	---	0.69
55	4.58	2.20	0.792	0.071	---	0.72
56	4.67	2.30	0.828	0.071	---	0.76
57	4.75	2.40	0.864	0.071	---	0.79
58	4.83	2.40	0.864	0.071	---	0.79
59	4.92	2.50	0.900	0.071	---	0.83
60	5.00	2.60	0.936	0.071	---	0.87
61	5.08	3.10	1.116	0.071	---	1.05
62	5.17	3.60	1.296	0.071	---	1.23

63	5.25	3.90	1.404	0.071	---	1.33
64	5.33	4.20	1.512	0.071	---	1.44
65	5.42	4.70	1.692	0.071	---	1.62
66	5.50	5.60	2.016	0.071	---	1.95
67	5.58	1.90	0.684	0.071	---	0.61
68	5.67	0.90	0.324	0.071	---	0.25
69	5.75	0.60	0.216	0.071	---	0.15
70	5.83	0.50	0.180	0.071	---	0.11
71	5.92	0.30	0.108	0.071	---	0.04
72	6.00	0.20	0.072	0.071	---	0.00
Sum =		100.0			Sum =	30.9

Flood volume = Effective rainfall 2.57(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 3.5(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 0.577(Ac.Ft)
Total rainfall = 3.00(In)
Flood volume = 152350.7 Cubic Feet
Total soil loss = 25146.4 Cubic Feet

Peak flow rate of this hydrograph = 28.563(CFS)

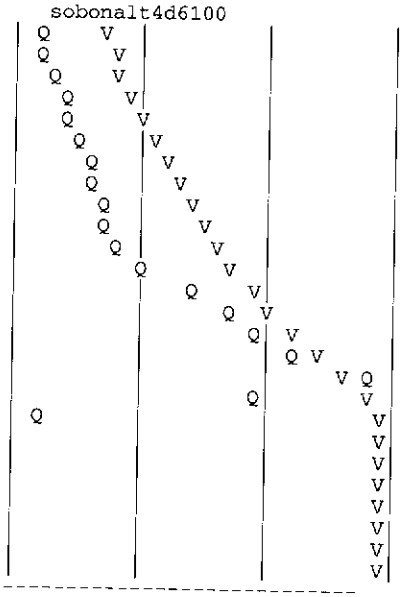
++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0051	0.74	Q				
0+10	0.0181	1.89	V Q				
0+15	0.0340	2.31	V Q				
0+20	0.0504	2.38	V Q				
0+25	0.0668	2.39	V Q				
0+30	0.0849	2.63	V Q				
0+35	0.1051	2.93	V Q				
0+40	0.1256	2.97	V Q				
0+45	0.1461	2.98	V Q				
0+50	0.1666	2.98	V Q				
0+55	0.1871	2.98	VQ				
1+ 0	0.2092	3.22	V Q				
1+ 5	0.2335	3.52	V Q				
1+10	0.2580	3.56	V Q				
1+15	0.2826	3.57	VQ				
1+20	0.3072	3.57	VQ				
1+25	0.3318	3.57	VQ				
1+30	0.3563	3.57	Q				
1+35	0.3809	3.57	Q				
1+40	0.4055	3.57	Q				
1+45	0.4301	3.57	Q				
1+50	0.4547	3.57	QV				
1+55	0.4792	3.57	QV				
2+ 0	0.5055	3.81	Q				
2+ 5	0.5321	3.87	QV				
2+10	0.5587	3.85	QV				
2+15	0.5870	4.12	QV				
2+20	0.6157	4.15	Q V				
2+25	0.6443	4.16	Q V				
2+30	0.6730	4.16	Q V				
2+35	0.7016	4.16	Q V				
2+40	0.7303	4.16	Q V				
2+45	0.7606	4.40	Q V				
2+50	0.7930	4.70	Q V				
2+55	0.8257	4.75	Q V				
3+ 0	0.8584	4.75	Q V				
3+ 5	0.8911	4.75	Q V				
3+10	0.9255	5.00	Q V				
3+15	0.9620	5.29	Q V				
3+20	0.9988	5.34	Q V				
3+25	1.0372	5.59	Q V				
3+30	1.0794	6.13	Q V				
3+35	1.1257	6.71	Q V				
3+40	1.1743	7.06	Q V				
3+45	1.2250	7.35	Q V				
3+50	1.2777	7.66	Q V				
3+55	1.3325	7.95	Q V				
4+ 0	1.3893	8.25	Q V				
4+ 5	1.4481	8.54	Q V				

4+10	1.5107	9.09	
4+15	1.5773	9.67	
4+20	1.6480	10.26	
4+25	1.7228	10.86	
4+30	1.7999	11.20	
4+35	1.8791	11.50	
4+40	1.9621	12.05	
4+45	2.0490	12.63	
4+50	2.1384	12.98	
4+55	2.2298	13.27	
5+ 0	2.3250	13.82	
5+ 5	2.4309	15.38	
5+10	2.5558	18.14	
5+15	2.6976	20.58	
5+20	2.8522	22.46	
5+25	3.0226	24.73	
5+30	3.2193	28.56	
5+35	3.3742	22.49	
5+40	3.4390	9.41	
5+45	3.4679	4.20	
5+50	3.4841	2.36	
5+55	3.4936	1.38	
6+ 0	3.4969	0.47	
6+ 5	3.4974	0.08	
6+10	3.4975	0.01	
6+15	3.4975	0.00	



U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt4d24100.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	2.25	36.68

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	6.00	97.80

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 6.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 6.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt4d24100

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
			Sum = 100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.048	0.126	0.009	0.04
2	0.17	0.07	0.048	0.125	0.009	0.04
3	0.25	0.07	0.048	0.125	0.009	0.04
4	0.33	0.10	0.072	0.124	0.013	0.06
5	0.42	0.10	0.072	0.124	0.013	0.06
6	0.50	0.10	0.072	0.123	0.013	0.06
7	0.58	0.10	0.072	0.123	0.013	0.06
8	0.67	0.10	0.072	0.122	0.013	0.06
9	0.75	0.10	0.072	0.122	0.013	0.06
10	0.83	0.13	0.096	0.121	0.017	0.08
11	0.92	0.13	0.096	0.121	0.017	0.08
12	1.00	0.13	0.096	0.120	0.017	0.08
13	1.08	0.10	0.072	0.120	0.013	0.06
14	1.17	0.10	0.072	0.119	0.013	0.06
15	1.25	0.10	0.072	0.119	0.013	0.06
16	1.33	0.10	0.072	0.118	0.013	0.06
17	1.42	0.10	0.072	0.118	0.013	0.06
18	1.50	0.10	0.072	0.117	0.013	0.06
19	1.58	0.10	0.072	0.117	0.013	0.06
20	1.67	0.10	0.072	0.117	0.013	0.06
21	1.75	0.10	0.072	0.116	0.013	0.06
22	1.83	0.13	0.096	0.116	0.017	0.08
23	1.92	0.13	0.096	0.115	0.017	0.08
24	2.00	0.13	0.096	0.115	0.017	0.08
25	2.08	0.13	0.096	0.114	0.017	0.08
26	2.17	0.13	0.096	0.114	0.017	0.08
27	2.25	0.13	0.096	0.113	0.017	0.08
28	2.33	0.13	0.096	0.113	0.017	0.08
29	2.42	0.13	0.096	0.112	0.017	0.08
30	2.50	0.13	0.096	0.112	0.017	0.08
31	2.58	0.17	0.120	0.111	---	0.01
32	2.67	0.17	0.120	0.111	---	0.01
33	2.75	0.17	0.120	0.110	---	0.01
34	2.83	0.17	0.120	0.110	---	0.01
35	2.92	0.17	0.120	0.110	---	0.01
36	3.00	0.17	0.120	0.109	---	0.01
37	3.08	0.17	0.120	0.109	---	0.01
38	3.17	0.17	0.120	0.108	---	0.01
39	3.25	0.17	0.120	0.108	---	0.01
40	3.33	0.17	0.120	0.107	---	0.01
41	3.42	0.17	0.120	0.107	---	0.01
42	3.50	0.17	0.120	0.106	---	0.01
43	3.58	0.17	0.120	0.106	---	0.01
44	3.67	0.17	0.120	0.106	---	0.01
45	3.75	0.17	0.120	0.105	---	0.01
46	3.83	0.20	0.144	0.105	---	0.04
47	3.92	0.20	0.144	0.104	---	0.04
48	4.00	0.20	0.144	0.104	---	0.04
49	4.08	0.20	0.144	0.103	---	0.04
50	4.17	0.20	0.144	0.103	---	0.04
51	4.25	0.20	0.144	0.102	---	0.04
52	4.33	0.23	0.168	0.102	---	0.07
53	4.42	0.23	0.168	0.102	---	0.07
54	4.50	0.23	0.168	0.101	---	0.07
55	4.58	0.23	0.168	0.101	---	0.07
56	4.67	0.23	0.168	0.100	---	0.07
57	4.75	0.23	0.168	0.100	---	0.07
58	4.83	0.27	0.192	0.099	---	0.09
59	4.92	0.27	0.192	0.099	---	0.09
60	5.00	0.27	0.192	0.099	---	0.09
61	5.08	0.20	0.144	0.098	---	0.05
62	5.17	0.20	0.144	0.098	---	0.05

63	5.25	0.20	0.144	0.097	---	0.05
64	5.33	0.23	0.168	0.097	---	0.07
65	5.42	0.23	0.168	0.096	---	0.07
66	5.50	0.23	0.168	0.096	---	0.07
67	5.58	0.27	0.192	0.096	---	0.10
68	5.67	0.27	0.192	0.095	---	0.10
69	5.75	0.27	0.192	0.095	---	0.10
70	5.83	0.27	0.192	0.094	---	0.10
71	5.92	0.27	0.192	0.094	---	0.10
72	6.00	0.27	0.192	0.093	---	0.10
73	6.08	0.30	0.216	0.093	---	0.12
74	6.17	0.30	0.216	0.093	---	0.12
75	6.25	0.30	0.216	0.092	---	0.12
76	6.33	0.30	0.216	0.092	---	0.12
77	6.42	0.30	0.216	0.091	---	0.12
78	6.50	0.30	0.216	0.091	---	0.12
79	6.58	0.33	0.240	0.091	---	0.15
80	6.67	0.33	0.240	0.090	---	0.15
81	6.75	0.33	0.240	0.090	---	0.15
82	6.83	0.33	0.240	0.089	---	0.15
83	6.92	0.33	0.240	0.089	---	0.15
84	7.00	0.33	0.240	0.089	---	0.15
85	7.08	0.33	0.240	0.088	---	0.15
86	7.17	0.33	0.240	0.088	---	0.15
87	7.25	0.33	0.240	0.087	---	0.15
88	7.33	0.37	0.264	0.087	---	0.18
89	7.42	0.37	0.264	0.087	---	0.18
90	7.50	0.37	0.264	0.086	---	0.18
91	7.58	0.40	0.288	0.086	---	0.20
92	7.67	0.40	0.288	0.085	---	0.20
93	7.75	0.40	0.288	0.085	---	0.20
94	7.83	0.43	0.312	0.085	---	0.23
95	7.92	0.43	0.312	0.084	---	0.23
96	8.00	0.43	0.312	0.084	---	0.23
97	8.08	0.50	0.360	0.083	---	0.28
98	8.17	0.50	0.360	0.083	---	0.28
99	8.25	0.50	0.360	0.083	---	0.28
100	8.33	0.50	0.360	0.082	---	0.28
101	8.42	0.50	0.360	0.082	---	0.28
102	8.50	0.50	0.360	0.082	---	0.28
103	8.58	0.53	0.384	0.081	---	0.30
104	8.67	0.53	0.384	0.081	---	0.30
105	8.75	0.53	0.384	0.080	---	0.30
106	8.83	0.57	0.408	0.080	---	0.33
107	8.92	0.57	0.408	0.080	---	0.33
108	9.00	0.57	0.408	0.079	---	0.33
109	9.08	0.63	0.456	0.079	---	0.38
110	9.17	0.63	0.456	0.078	---	0.38
111	9.25	0.63	0.456	0.078	---	0.38
112	9.33	0.67	0.480	0.078	---	0.40
113	9.42	0.67	0.480	0.077	---	0.40
114	9.50	0.67	0.480	0.077	---	0.40
115	9.58	0.70	0.504	0.077	---	0.43
116	9.67	0.70	0.504	0.076	---	0.43
117	9.75	0.70	0.504	0.076	---	0.43
118	9.83	0.73	0.528	0.076	---	0.45
119	9.92	0.73	0.528	0.075	---	0.45
120	10.00	0.73	0.528	0.075	---	0.45
121	10.08	0.50	0.360	0.074	---	0.29
122	10.17	0.50	0.360	0.074	---	0.29
123	10.25	0.50	0.360	0.074	---	0.29
124	10.33	0.50	0.360	0.073	---	0.29
125	10.42	0.50	0.360	0.073	---	0.29
126	10.50	0.50	0.360	0.073	---	0.29
127	10.58	0.67	0.480	0.072	---	0.41
128	10.67	0.67	0.480	0.072	---	0.41
129	10.75	0.67	0.480	0.072	---	0.41
130	10.83	0.67	0.480	0.071	---	0.41
131	10.92	0.67	0.480	0.071	---	0.41
132	11.00	0.67	0.480	0.071	---	0.41
133	11.08	0.63	0.456	0.070	---	0.39
134	11.17	0.63	0.456	0.070	---	0.39
135	11.25	0.63	0.456	0.069	---	0.39
136	11.33	0.63	0.456	0.069	---	0.39
137	11.42	0.63	0.456	0.069	---	0.39
138	11.50	0.63	0.456	0.068	---	0.39
139	11.58	0.57	0.408	0.068	---	0.34
140	11.67	0.57	0.408	0.068	---	0.34
141	11.75	0.57	0.408	0.067	---	0.34

142	11.83	0.60	0.432	0.067	---	0.36
143	11.92	0.60	0.432	0.067	---	0.37
144	12.00	0.60	0.432	0.066	---	0.37
145	12.08	0.83	0.600	0.066	---	0.53
146	12.17	0.83	0.600	0.066	---	0.53
147	12.25	0.83	0.600	0.065	---	0.53
148	12.33	0.87	0.624	0.065	---	0.56
149	12.42	0.87	0.624	0.065	---	0.56
150	12.50	0.87	0.624	0.064	---	0.56
151	12.58	0.93	0.672	0.064	---	0.61
152	12.67	0.93	0.672	0.064	---	0.61
153	12.75	0.93	0.672	0.064	---	0.61
154	12.83	0.97	0.696	0.063	---	0.63
155	12.92	0.97	0.696	0.063	---	0.63
156	13.00	0.97	0.696	0.063	---	0.63
157	13.08	1.13	0.816	0.062	---	0.75
158	13.17	1.13	0.816	0.062	---	0.75
159	13.25	1.13	0.816	0.062	---	0.75
160	13.33	1.13	0.816	0.061	---	0.75
161	13.42	1.13	0.816	0.061	---	0.75
162	13.50	1.13	0.816	0.061	---	0.76
163	13.58	0.77	0.552	0.060	---	0.49
164	13.67	0.77	0.552	0.060	---	0.49
165	13.75	0.77	0.552	0.060	---	0.49
166	13.83	0.77	0.552	0.059	---	0.49
167	13.92	0.77	0.552	0.059	---	0.49
168	14.00	0.77	0.552	0.059	---	0.49
169	14.08	0.90	0.648	0.059	---	0.59
170	14.17	0.90	0.648	0.058	---	0.59
171	14.25	0.90	0.648	0.058	---	0.59
172	14.33	0.87	0.624	0.058	---	0.57
173	14.42	0.87	0.624	0.057	---	0.57
174	14.50	0.87	0.624	0.057	---	0.57
175	14.58	0.87	0.624	0.057	---	0.57
176	14.67	0.87	0.624	0.056	---	0.57
177	14.75	0.87	0.624	0.056	---	0.57
178	14.83	0.83	0.600	0.056	---	0.54
179	14.92	0.83	0.600	0.056	---	0.54
180	15.00	0.83	0.600	0.055	---	0.54
181	15.08	0.80	0.576	0.055	---	0.52
182	15.17	0.80	0.576	0.055	---	0.52
183	15.25	0.80	0.576	0.054	---	0.52
184	15.33	0.77	0.552	0.054	---	0.50
185	15.42	0.77	0.552	0.054	---	0.50
186	15.50	0.77	0.552	0.054	---	0.50
187	15.58	0.63	0.456	0.053	---	0.40
188	15.67	0.63	0.456	0.053	---	0.40
189	15.75	0.63	0.456	0.053	---	0.40
190	15.83	0.63	0.456	0.053	---	0.40
191	15.92	0.63	0.456	0.052	---	0.40
192	16.00	0.63	0.456	0.052	---	0.40
193	16.08	0.13	0.096	0.052	---	0.04
194	16.17	0.13	0.096	0.051	---	0.04
195	16.25	0.13	0.096	0.051	---	0.04
196	16.33	0.13	0.096	0.051	---	0.05
197	16.42	0.13	0.096	0.051	---	0.05
198	16.50	0.13	0.096	0.050	---	0.05
199	16.58	0.10	0.072	0.050	---	0.02
200	16.67	0.10	0.072	0.050	---	0.02
201	16.75	0.10	0.072	0.050	---	0.02
202	16.83	0.10	0.072	0.049	---	0.02
203	16.92	0.10	0.072	0.049	---	0.02
204	17.00	0.10	0.072	0.049	---	0.02
205	17.08	0.17	0.120	0.049	---	0.07
206	17.17	0.17	0.120	0.048	---	0.07
207	17.25	0.17	0.120	0.048	---	0.07
208	17.33	0.17	0.120	0.048	---	0.07
209	17.42	0.17	0.120	0.048	---	0.07
210	17.50	0.17	0.120	0.047	---	0.07
211	17.58	0.17	0.120	0.047	---	0.07
212	17.67	0.17	0.120	0.047	---	0.07
213	17.75	0.17	0.120	0.047	---	0.07
214	17.83	0.13	0.096	0.047	---	0.05
215	17.92	0.13	0.096	0.046	---	0.05
216	18.00	0.13	0.096	0.046	---	0.05
217	18.08	0.13	0.096	0.046	---	0.05
218	18.17	0.13	0.096	0.046	---	0.05
219	18.25	0.13	0.096	0.045	---	0.05
220	18.33	0.13	0.096	0.045	---	0.05

221	18.42	0.13	0.096	0.045	---	0.05
222	18.50	0.13	0.096	0.045	---	0.05
223	18.58	0.10	0.072	0.045	---	0.03
224	18.67	0.10	0.072	0.044	---	0.03
225	18.75	0.10	0.072	0.044	---	0.03
226	18.83	0.07	0.048	0.044	---	0.00
227	18.92	0.07	0.048	0.044	---	0.00
228	19.00	0.07	0.048	0.043	---	0.00
229	19.08	0.10	0.072	0.043	---	0.03
230	19.17	0.10	0.072	0.043	---	0.03
231	19.25	0.10	0.072	0.043	---	0.03
232	19.33	0.13	0.096	0.043	---	0.05
233	19.42	0.13	0.096	0.042	---	0.05
234	19.50	0.13	0.096	0.042	---	0.05
235	19.58	0.10	0.072	0.042	---	0.03
236	19.67	0.10	0.072	0.042	---	0.03
237	19.75	0.10	0.072	0.042	---	0.03
238	19.83	0.07	0.048	0.041	---	0.01
239	19.92	0.07	0.048	0.041	---	0.01
240	20.00	0.07	0.048	0.041	---	0.01
241	20.08	0.10	0.072	0.041	---	0.03
242	20.17	0.10	0.072	0.041	---	0.03
243	20.25	0.10	0.072	0.041	---	0.03
244	20.33	0.10	0.072	0.040	---	0.03
245	20.42	0.10	0.072	0.040	---	0.03
246	20.50	0.10	0.072	0.040	---	0.03
247	20.58	0.10	0.072	0.040	---	0.03
248	20.67	0.10	0.072	0.040	---	0.03
249	20.75	0.10	0.072	0.040	---	0.03
250	20.83	0.07	0.048	0.039	---	0.01
251	20.92	0.07	0.048	0.039	---	0.01
252	21.00	0.07	0.048	0.039	---	0.01
253	21.08	0.10	0.072	0.039	---	0.03
254	21.17	0.10	0.072	0.039	---	0.03
255	21.25	0.10	0.072	0.039	---	0.03
256	21.33	0.07	0.048	0.038	---	0.01
257	21.42	0.07	0.048	0.038	---	0.01
258	21.50	0.07	0.048	0.038	---	0.01
259	21.58	0.10	0.072	0.038	---	0.03
260	21.67	0.10	0.072	0.038	---	0.03
261	21.75	0.10	0.072	0.038	---	0.03
262	21.83	0.07	0.048	0.038	---	0.01
263	21.92	0.07	0.048	0.038	---	0.01
264	22.00	0.07	0.048	0.037	---	0.01
265	22.08	0.10	0.072	0.037	---	0.03
266	22.17	0.10	0.072	0.037	---	0.03
267	22.25	0.10	0.072	0.037	---	0.03
268	22.33	0.07	0.048	0.037	---	0.01
269	22.42	0.07	0.048	0.037	---	0.01
270	22.50	0.07	0.048	0.037	---	0.01
271	22.58	0.07	0.048	0.037	---	0.01
272	22.67	0.07	0.048	0.036	---	0.01
273	22.75	0.07	0.048	0.036	---	0.01
274	22.83	0.07	0.048	0.036	---	0.01
275	22.92	0.07	0.048	0.036	---	0.01
276	23.00	0.07	0.048	0.036	---	0.01
277	23.08	0.07	0.048	0.036	---	0.01
278	23.17	0.07	0.048	0.036	---	0.01
279	23.25	0.07	0.048	0.036	---	0.01
280	23.33	0.07	0.048	0.036	---	0.01
281	23.42	0.07	0.048	0.036	---	0.01
282	23.50	0.07	0.048	0.036	---	0.01
283	23.58	0.07	0.048	0.036	---	0.01
284	23.67	0.07	0.048	0.036	---	0.01
285	23.75	0.07	0.048	0.036	---	0.01
286	23.83	0.07	0.048	0.035	---	0.01
287	23.92	0.07	0.048	0.035	---	0.01
288	24.00	0.07	0.048	0.035	---	0.01
Sum =		100.0			Sum =	54.7

Flood volume = Effective rainfall 4.56(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 6.2(Ac.Ft)
Total soil loss = 1.44(In)
Total soil loss = 1.956(Ac.Ft)
Total rainfall = 6.00(In)
Flood volume = 269814.4 Cubic Feet
Total soil loss = 85188.3 Cubic Feet

Peak flow rate of this hydrograph = 12.411(CFS)

---

sobonalt4d24100

++

24 - H O U R S T O R M

R u n o f f H y d r o g r a p h

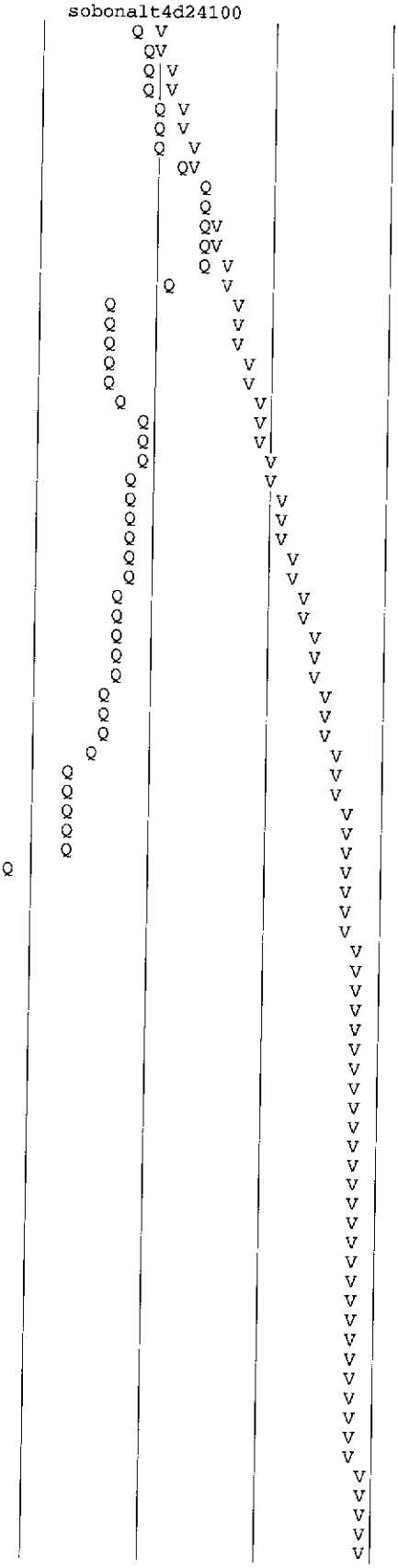
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0018	0.27	Q
0+10	0.0059	0.59	VQ
0+15	0.0103	0.64	VQ
0+20	0.0157	0.78	VQ
0+25	0.0222	0.94	VQ
0+30	0.0288	0.97	VQ
0+35	0.0355	0.97	VQ
0+40	0.0422	0.97	VQ
0+45	0.0489	0.97	VQ
0+50	0.0565	1.10	V Q
0+55	0.0652	1.27	V Q
1+ 0	0.0741	1.29	V Q
1+ 5	0.0821	1.16	V Q
1+10	0.0890	1.00	VQ
1+15	0.0957	0.97	VQ
1+20	0.1023	0.97	VQ
1+25	0.1090	0.97	VQ
1+30	0.1157	0.97	VQ
1+35	0.1224	0.97	VQ
1+40	0.1291	0.97	VQ
1+45	0.1358	0.97	VQ
1+50	0.1434	1.10	V Q
1+55	0.1521	1.27	V Q
2+ 0	0.1610	1.29	VQ
2+ 5	0.1699	1.29	VQ
2+10	0.1788	1.29	VQ
2+15	0.1877	1.29	VQ
2+20	0.1966	1.29	VQ
2+25	0.2055	1.29	VQ
2+30	0.2144	1.29	VQ
2+35	0.2201	0.82	Q
2+40	0.2217	0.24	QV
2+45	0.2229	0.17	QV
2+50	0.2240	0.16	QV
2+55	0.2251	0.17	QV
3+ 0	0.2263	0.17	QV
3+ 5	0.2275	0.18	QV
3+10	0.2288	0.19	QV
3+15	0.2302	0.20	QV
3+20	0.2316	0.20	QV
3+25	0.2330	0.21	QV
3+30	0.2345	0.22	QV
3+35	0.2361	0.23	QV
3+40	0.2377	0.23	QV
3+45	0.2393	0.24	QV
3+50	0.2422	0.41	QV
3+55	0.2464	0.62	Q
4+ 0	0.2509	0.65	Q
4+ 5	0.2555	0.66	Q
4+10	0.2601	0.67	Q
4+15	0.2647	0.68	Q
4+20	0.2706	0.85	Q
4+25	0.2778	1.05	VQ
4+30	0.2853	1.09	VQ
4+35	0.2929	1.10	VQ
4+40	0.3005	1.11	VQ
4+45	0.3082	1.12	VQ
4+50	0.3171	1.28	Q
4+55	0.3273	1.49	Q
5+ 0	0.3378	1.53	VQ
5+ 5	0.3462	1.21	Q
5+10	0.3519	0.82	QV
5+15	0.3572	0.77	QV
5+20	0.3636	0.93	QV
5+25	0.3714	1.14	Q
5+30	0.3795	1.17	Q
5+35	0.3888	1.35	Q
5+40	0.3995	1.55	VQ
5+45	0.4104	1.59	VQ
5+50	0.4215	1.60	VQ

5+55	0.4325	1.61	VQ
6+ 0	0.4437	1.61	VQ
6+ 5	0.4559	1.78	VQ
6+10	0.4696	1.99	Q
6+15	0.4836	2.02	VQ
6+20	0.4976	2.04	VQ
6+25	0.5117	2.04	VQ
6+30	0.5258	2.05	VQ
6+35	0.5411	2.22	VQ
6+40	0.5578	2.42	VQ
6+45	0.5747	2.46	VQ
6+50	0.5917	2.47	VQ
6+55	0.6088	2.48	VQ
7+ 0	0.6259	2.48	Q
7+ 5	0.6430	2.49	Q
7+10	0.6602	2.50	Q
7+15	0.6775	2.50	VQ
7+20	0.6959	2.67	VQ
7+25	0.7157	2.88	VQ
7+30	0.7358	2.91	VQ
7+35	0.7570	3.09	V Q
7+40	0.7797	3.29	VQ
7+45	0.8026	3.33	VQ
7+50	0.8267	3.50	V Q
7+55	0.8522	3.71	V Q
8+ 0	0.8780	3.74	V Q
8+ 5	0.9061	4.08	V Q
8+10	0.9369	4.48	V Q
8+15	0.9682	4.54	V Q
8+20	0.9996	4.56	V Q
8+25	1.0311	4.57	V Q
8+30	1.0626	4.57	V Q
8+35	1.0952	4.74	V Q
8+40	1.1293	4.95	V Q
8+45	1.1636	4.98	V Q
8+50	1.1991	5.15	V Q
8+55	1.2360	5.36	V Q
9+ 0	1.2732	5.39	V Q
9+ 5	1.3126	5.73	V Q
9+10	1.3549	6.13	V Q
9+15	1.3976	6.20	V Q
9+20	1.4415	6.37	V Q
9+25	1.4868	6.58	V Q
9+30	1.5323	6.61	V Q
9+35	1.5791	6.79	V Q
9+40	1.6272	6.99	V Q
9+45	1.6756	7.03	V Q
9+50	1.7252	7.20	V Q
9+55	1.7762	7.41	V Q
10+ 0	1.8275	7.44	V Q
10+ 5	1.8710	6.32	Q
10+10	1.9049	4.93	Q V
10+15	1.9375	4.74	Q V
10+20	1.9699	4.71	Q V
10+25	2.0024	4.71	Q V
10+30	2.0349	4.72	Q V
10+35	2.0730	5.53	Q V
10+40	2.1180	6.54	Q
10+45	2.1641	6.68	Q
10+50	2.2103	6.71	QV
10+55	2.2566	6.72	QV
11+ 0	2.3029	6.73	QV
11+ 5	2.3481	6.57	Q V
11+10	2.3920	6.38	Q V
11+15	2.4358	6.35	Q V
11+20	2.4796	6.35	Q V
11+25	2.5234	6.36	Q V
11+30	2.5672	6.37	Q V
11+35	2.6088	6.05	Q V
11+40	2.6478	5.65	Q V
11+45	2.6864	5.60	Q V
11+50	2.7260	5.76	Q V
11+55	2.7671	5.97	Q V
12+ 0	2.8084	6.00	Q V
12+ 5	2.8576	7.14	Q V
12+10	2.9165	8.55	QV
12+15	2.9767	8.75	Q V
12+20	3.0384	8.95	Q V
12+25	3.1014	9.15	Q V

sobonalt4d24100

12+30	3.1647	9.19
12+35	3.2303	9.52
12+40	3.2986	9.93
12+45	3.3674	9.99
12+50	3.4374	10.16
12+55	3.5088	10.37
13+ 0	3.5805	10.40
13+ 5	3.6578	11.22
13+10	3.7420	12.23
13+15	3.8272	12.37
13+20	3.9126	12.40
13+25	3.9980	12.41
13+30	4.0835	12.41
13+35	4.1567	10.63
13+40	4.2149	8.44
13+45	4.2709	8.14
13+50	4.3266	8.09
13+55	4.3824	8.10
14+ 0	4.4382	8.10
14+ 5	4.4985	8.76
14+10	4.5643	9.56
14+15	4.6310	9.67
14+20	4.6966	9.54
14+25	4.7610	9.34
14+30	4.8252	9.32
14+35	4.8894	9.32
14+40	4.9536	9.32
14+45	5.0178	9.33
14+50	5.0810	9.17
14+55	5.1428	8.98
15+ 0	5.2045	8.95
15+ 5	5.2650	8.79
15+10	5.3242	8.60
15+15	5.3833	8.57
15+20	5.4412	8.41
15+25	5.4978	8.22
15+30	5.5542	8.19
15+35	5.6062	7.54
15+40	5.6526	6.75
15+45	5.6984	6.64
15+50	5.7440	6.63
15+55	5.7897	6.63
16+ 0	5.8354	6.64
16+ 5	5.8644	4.21
16+10	5.8728	1.22
16+15	5.8784	0.81
16+20	5.8835	0.74
16+25	5.8886	0.74
16+30	5.8937	0.75
16+35	5.8978	0.59
16+40	5.9005	0.39
16+45	5.9030	0.37
16+50	5.9055	0.37
16+55	5.9081	0.37
17+ 0	5.9107	0.38
17+ 5	5.9155	0.70
17+10	5.9232	1.11
17+15	5.9312	1.17
17+20	5.9393	1.18
17+25	5.9475	1.19
17+30	5.9557	1.19
17+35	5.9639	1.19
17+40	5.9722	1.20
17+45	5.9804	1.20
17+50	5.9876	1.04
17+55	5.9935	0.85
18+ 0	5.9991	0.82
18+ 5	6.0048	0.82
18+10	6.0105	0.83
18+15	6.0162	0.83
18+20	6.0219	0.83
18+25	6.0277	0.84
18+30	6.0335	0.84
18+35	6.0381	0.68
18+40	6.0415	0.49
18+45	6.0447	0.46
18+50	6.0467	0.30
18+55	6.0474	0.10
19+ 0	6.0480	0.08



19+ 5	6.0496	0.24	Q
19+10	6.0526	0.44	Q
19+15	6.0559	0.47	Q
19+20	6.0603	0.64	|Q
19+25	6.0661	0.84	|Q
19+30	6.0721	0.88	|Q
19+35	6.0771	0.72	|Q
19+40	6.0807	0.53	|Q
19+45	6.0842	0.50	|Q
19+50	6.0865	0.34	Q
19+55	6.0875	0.14	Q
20+ 0	6.0883	0.12	Q
20+ 5	6.0902	0.28	Q
20+10	6.0935	0.48	Q
20+15	6.0970	0.51	|Q
20+20	6.1005	0.52	|Q
20+25	6.1041	0.52	|Q
20+30	6.1077	0.52	|Q
20+35	6.1113	0.53	|Q
20+40	6.1150	0.53	|Q
20+45	6.1186	0.53	|Q
20+50	6.1212	0.37	Q
20+55	6.1224	0.17	Q
21+ 0	6.1234	0.15	Q
21+ 5	6.1256	0.31	Q
21+10	6.1291	0.51	|Q
21+15	6.1328	0.54	|Q
21+20	6.1355	0.39	Q
21+25	6.1368	0.19	Q
21+30	6.1379	0.16	Q
21+35	6.1401	0.32	Q
21+40	6.1438	0.53	|Q
21+45	6.1476	0.56	|Q
21+50	6.1504	0.40	Q
21+55	6.1518	0.20	Q
22+ 0	6.1530	0.18	Q
22+ 5	6.1553	0.34	Q
22+10	6.1590	0.54	|Q
22+15	6.1629	0.57	|Q
22+20	6.1658	0.41	Q
22+25	6.1673	0.22	Q
22+30	6.1686	0.19	Q
22+35	6.1698	0.19	Q
22+40	6.1711	0.19	Q
22+45	6.1724	0.19	Q
22+50	6.1738	0.19	Q
22+55	6.1751	0.19	Q
23+ 0	6.1764	0.19	Q
23+ 5	6.1778	0.20	Q
23+10	6.1791	0.20	Q
23+15	6.1805	0.20	Q
23+20	6.1819	0.20	Q
23+25	6.1833	0.20	Q
23+30	6.1846	0.20	Q
23+35	6.1860	0.20	Q
23+40	6.1874	0.20	Q
23+45	6.1889	0.20	Q
23+50	6.1903	0.21	Q
23+55	6.1917	0.21	Q
24+ 0	6.1931	0.21	Q
24+ 5	6.1940	0.12	Q
24+10	6.1941	0.02	Q
24+15	6.1941	0.00	Q

ONSITE HYDROLOGY
10-YEAR STORM EVENT

ONSITE HYDROLOGY 10-YEAR STORM EVENT								
UNDEVELOPED CONDITION								
STORM DURATION	**Alt. No. 1 A = 15.95**		**Alt. No. 2 A = 12.8**		**Alt. No. 3 A = 5.9**		**Alt. No. 4 A = 16.3 Pref. Alt.**	
	Vol. $_{100}$	**Q_{100}**	**Vol. $_{100}$**	**Q_{100}**	**Vol. $_{100}$**	**Q_{100}**	**Vol. $_{100}$**	**Q_{100}**
24-Hour	1.9	5.9	1.5	4.7	0.7	2.2	2.0	6.0
6-Hour	1.4	16.0	1.1	12.8	0.5	5.9	1.4	16.3
3-Hour	1.2	17.1	0.9	13.7	0.4	6.3	1.2	17.5
1-Hour	0.9	29.3	0.7	23.5	0.3	10.8	0.9	29.9
DEVELOPED CONDITION								
STORM DURATION	**Alt. No. 1 A = 15.95**		**Alt. No. 2 A = 12.8**		**Alt. No. 3 A = 5.9**		**Alt. No. 4 A = 16.3 Pref. Alt.**	
24-Hour	3.7	7.3	2.8	5.9	1.3	2.7	3.6	7.5
6-Hour	2.2	18.8	1.7	15.1	0.8	7.0	2.2	19.2
3-Hour	1.6	19.3	1.3	15.5	0.6	7.1	1.6	19.7
1-Hour	1.0	28.7	0.8	23.0	0.4	10.6	1.0	29.3

ALTERATIVE NO. 1

UNDEVELOPED CONDITION

sobonalt1110

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt1110.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	0.55	8.77

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	1.20	19.14

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.817(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.817(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	86.00	0.000

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.156
2	0.167	194.180	55.366	8.900
3	0.250	291.271	18.995	3.053
4	0.333	388.361	7.769	1.249
5	0.417	485.451	2.779	0.447
6	0.500	582.541	0.892	0.143
7	0.583	679.631	0.599	0.096
8	0.667	776.721	0.191	0.031
			Sum = 100.000	Sum= 16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.412	0.176	---	0.24
2	0.17	4.30	0.422	0.176	---	0.25
3	0.25	5.00	0.490	0.176	---	0.31
4	0.33	5.00	0.490	0.176	---	0.31
5	0.42	5.80	0.569	0.176	---	0.39
6	0.50	6.50	0.637	0.176	---	0.46
7	0.58	7.40	0.726	0.176	---	0.55
8	0.67	8.60	0.843	0.176	---	0.67
9	0.75	12.30	1.206	0.176	---	1.03
10	0.83	29.10	2.854	0.176	---	2.68
11	0.92	6.80	0.667	0.176	---	0.49
12	1.00	5.00	0.490	0.176	---	0.31
Sum =		100.0			Sum =	7.7

Flood volume = Effective rainfall 0.64(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.233(Ac.Ft)
Total rainfall = 0.82(In)
Flood volume = 37153.3 Cubic Feet
Total soil loss = 10167.0 Cubic Feet

Peak flow rate of this hydrograph = 29.252(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0035	0.51	Q				
0+10	0.0217	2.64	V Q				
0+15	0.0464	3.59	V Q				
0+20	0.0776	4.53	V Q				
0+25	0.1122	5.03	VQ				
0+30	0.1535	6.00	Q				
0+35	0.2024	7.09	Q				
0+40	0.2606	8.46	QV				
0+45	0.3342	10.69	QV				
0+50	0.4581	17.98	V Q				
0+55	0.6595	29.25	V Q				
1+ 0	0.7625	14.96	Q			V	Q
1+ 5	0.8195	8.27	Q			V	V
1+10	0.8402	3.00	Q				V
1+15	0.8479	1.12	Q				V
1+20	0.8513	0.50	Q				V
1+25	0.8525	0.17	Q				V
1+30	0.8529	0.05	Q				V
1+35	0.8529	0.01	Q				V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt1310.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	0.90	14.36

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	2.10	33.49

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 1.394(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.394(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	86.00	0.000

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.156
2	0.167	194.180	55.366	8.900
3	0.250	291.271	18.995	3.053
4	0.333	388.361	7.769	1.249
5	0.417	485.451	2.779	0.447
6	0.500	582.541	0.892	0.143
7	0.583	679.631	0.599	0.096
8	0.667	776.721	0.191	0.031
			Sum = 100.000	Sum= 16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.217	0.176	---	0.04
2	0.17	1.30	0.217	0.176	---	0.04
3	0.25	1.10	0.184	0.176	---	0.01
4	0.33	1.50	0.251	0.176	---	0.08
5	0.42	1.50	0.251	0.176	---	0.08
6	0.50	1.80	0.301	0.176	---	0.13
7	0.58	1.50	0.251	0.176	---	0.08
8	0.67	1.80	0.301	0.176	---	0.13
9	0.75	1.80	0.301	0.176	---	0.13
10	0.83	1.50	0.251	0.176	---	0.08
11	0.92	1.60	0.268	0.176	---	0.09
12	1.00	1.80	0.301	0.176	---	0.13
13	1.08	2.20	0.368	0.176	---	0.19
14	1.17	2.20	0.368	0.176	---	0.19
15	1.25	2.20	0.368	0.176	---	0.19
16	1.33	2.00	0.334	0.176	---	0.16
17	1.42	2.60	0.435	0.176	---	0.26
18	1.50	2.70	0.452	0.176	---	0.28
19	1.58	2.40	0.401	0.176	---	0.23
20	1.67	2.70	0.452	0.176	---	0.28
21	1.75	3.30	0.552	0.176	---	0.38
22	1.83	3.10	0.518	0.176	---	0.34
23	1.92	2.90	0.485	0.176	---	0.31
24	2.00	3.00	0.502	0.176	---	0.33
25	2.08	3.10	0.518	0.176	---	0.34
26	2.17	4.20	0.702	0.176	---	0.53
27	2.25	5.00	0.836	0.176	---	0.66
28	2.33	3.50	0.585	0.176	---	0.41
29	2.42	6.80	1.137	0.176	---	0.96
30	2.50	7.30	1.221	0.176	---	1.05
31	2.58	8.20	1.371	0.176	---	1.20
32	2.67	5.90	0.987	0.176	---	0.81
33	2.75	2.00	0.334	0.176	---	0.16
34	2.83	1.80	0.301	0.176	---	0.13
35	2.92	1.80	0.301	0.176	---	0.13
36	3.00	0.60	0.100	0.176	0.090	0.01
Sum =		100.0			Sum =	10.5

Flood volume = Effective rainfall 0.87(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 1.2(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 0.691(Ac.Ft)
Total rainfall = 1.39(In)
Flood volume = 50597.5 Cubic Feet
Total soil loss = 30089.4 Cubic Feet

Peak flow rate of this hydrograph = 17.130(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0006	0.09	Q				
0+10	0.0038	0.46	Q				

sobonalt1310

0+15	0.0074	0.52	VQ
0+20	0.0102	0.42	Q
0+25	0.0166	0.93	VQ
0+30	0.0249	1.21	V Q
0+35	0.0361	1.62	V Q
0+40	0.0461	1.46	VQ
0+45	0.0587	1.82	VQ
0+50	0.0713	1.83	VQ
0+55	0.0814	1.47	Q
1+ 0	0.0921	1.56	Q
1+ 5	0.1058	1.99	Q
1+10	0.1244	2.69	VQ
1+15	0.1446	2.94	VQ
1+20	0.1650	2.96	Q
1+25	0.1851	2.92	QV
1+30	0.2110	3.76	Q
1+35	0.2390	4.07	Q
1+40	0.2658	3.90	Q V
1+45	0.2966	4.47	Q V
1+50	0.3337	5.40	QV
1+55	0.3708	5.38	Q V
2+ 0	0.4064	5.17	Q V
2+ 5	0.4426	5.25	Q V
2+10	0.4826	5.81	Q V
2+15	0.5364	7.80	Q V
2+20	0.5986	9.04	Q V
2+25	0.6581	8.64	Q V
2+30	0.7491	13.22	VQ
2+35	0.8576	15.75	V Q
2+40	0.9756	17.13	VQ
2+45	1.0657	13.09	Q V
2+50	1.1093	6.32	Q V
2+55	1.1346	3.68	Q V
3+ 0	1.1510	2.38	Q V
3+ 5	1.1576	0.96	Q V
3+10	1.1603	0.38	Q V
3+15	1.1611	0.13	Q V
3+20	1.1614	0.04	Q V
3+25	1.1615	0.02	Q V
3+30	1.1616	0.00	Q V
3+35	1.1616	0.00	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt1610.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	1.40	22.33

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	3.00	47.85

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 2.058(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.058(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	86.00	0.000

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt1610

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.156
2	0.167	194.180	55.366	8.900
3	0.250	291.271	18.995	3.053
4	0.333	388.361	7.769	1.249
5	0.417	485.451	2.779	0.447
6	0.500	582.541	0.892	0.143
7	0.583	679.631	0.599	0.096
8	0.667	776.721	0.191	0.031
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.123	0.176	0.111	0.01
2	0.17	0.60	0.148	0.176	0.133	0.01
3	0.25	0.60	0.148	0.176	0.133	0.01
4	0.33	0.60	0.148	0.176	0.133	0.01
5	0.42	0.60	0.148	0.176	0.133	0.01
6	0.50	0.70	0.173	0.176	0.156	0.02
7	0.58	0.70	0.173	0.176	0.156	0.02
8	0.67	0.70	0.173	0.176	0.156	0.02
9	0.75	0.70	0.173	0.176	0.156	0.02
10	0.83	0.70	0.173	0.176	0.156	0.02
11	0.92	0.70	0.173	0.176	0.156	0.02
12	1.00	0.80	0.198	0.176	---	0.02
13	1.08	0.80	0.198	0.176	---	0.02
14	1.17	0.80	0.198	0.176	---	0.02
15	1.25	0.80	0.198	0.176	---	0.02
16	1.33	0.80	0.198	0.176	---	0.02
17	1.42	0.80	0.198	0.176	---	0.02
18	1.50	0.80	0.198	0.176	---	0.02
19	1.58	0.80	0.198	0.176	---	0.02
20	1.67	0.80	0.198	0.176	---	0.02
21	1.75	0.80	0.198	0.176	---	0.02
22	1.83	0.80	0.198	0.176	---	0.02
23	1.92	0.80	0.198	0.176	---	0.02
24	2.00	0.90	0.222	0.176	---	0.05
25	2.08	0.80	0.198	0.176	---	0.02
26	2.17	0.90	0.222	0.176	---	0.05
27	2.25	0.90	0.222	0.176	---	0.05
28	2.33	0.90	0.222	0.176	---	0.05
29	2.42	0.90	0.222	0.176	---	0.05
30	2.50	0.90	0.222	0.176	---	0.05
31	2.58	0.90	0.222	0.176	---	0.05
32	2.67	0.90	0.222	0.176	---	0.05
33	2.75	1.00	0.247	0.176	---	0.07
34	2.83	1.00	0.247	0.176	---	0.07
35	2.92	1.00	0.247	0.176	---	0.07
36	3.00	1.00	0.247	0.176	---	0.07
37	3.08	1.00	0.247	0.176	---	0.07
38	3.17	1.10	0.272	0.176	---	0.10
39	3.25	1.10	0.272	0.176	---	0.10
40	3.33	1.10	0.272	0.176	---	0.10
41	3.42	1.20	0.296	0.176	---	0.12
42	3.50	1.30	0.321	0.176	---	0.15
43	3.58	1.40	0.346	0.176	---	0.17
44	3.67	1.40	0.346	0.176	---	0.17
45	3.75	1.50	0.370	0.176	---	0.19
46	3.83	1.50	0.370	0.176	---	0.19
47	3.92	1.60	0.395	0.176	---	0.22
48	4.00	1.60	0.395	0.176	---	0.22
49	4.08	1.70	0.420	0.176	---	0.24
50	4.17	1.80	0.445	0.176	---	0.27
51	4.25	1.90	0.469	0.176	---	0.29
52	4.33	2.00	0.494	0.176	---	0.32
53	4.42	2.10	0.519	0.176	---	0.34
54	4.50	2.10	0.519	0.176	---	0.34
55	4.58	2.20	0.543	0.176	---	0.37
56	4.67	2.30	0.568	0.176	---	0.39
57	4.75	2.40	0.593	0.176	---	0.42
58	4.83	2.40	0.593	0.176	---	0.42

59	4.92	2.50	0.617	0.176	---	0.44
60	5.00	2.60	0.642	0.176	---	0.47
61	5.08	3.10	0.766	0.176	---	0.59
62	5.17	3.60	0.889	0.176	---	0.71
63	5.25	3.90	0.963	0.176	---	0.79
64	5.33	4.20	1.037	0.176	---	0.86
65	5.42	4.70	1.161	0.176	---	0.99
66	5.50	5.60	1.383	0.176	---	1.21
67	5.58	1.90	0.469	0.176	---	0.29
68	5.67	0.90	0.222	0.176	---	0.05
69	5.75	0.60	0.148	0.176	0.133	0.01
70	5.83	0.50	0.123	0.176	0.111	0.01
71	5.92	0.30	0.074	0.176	0.067	0.01
72	6.00	0.20	0.049	0.176	0.044	0.00
Sum =		100.0			Sum =	12.8

Flood volume = Effective rainfall 1.06(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 1.00(In)
Total soil loss = 1.323(Ac.Ft)
Total rainfall = 2.06(In)
Flood volume = 61539.6 Cubic Feet
Total soil loss = 57623.6 Cubic Feet

Peak flow rate of this hydrograph = 15.997(CFS)

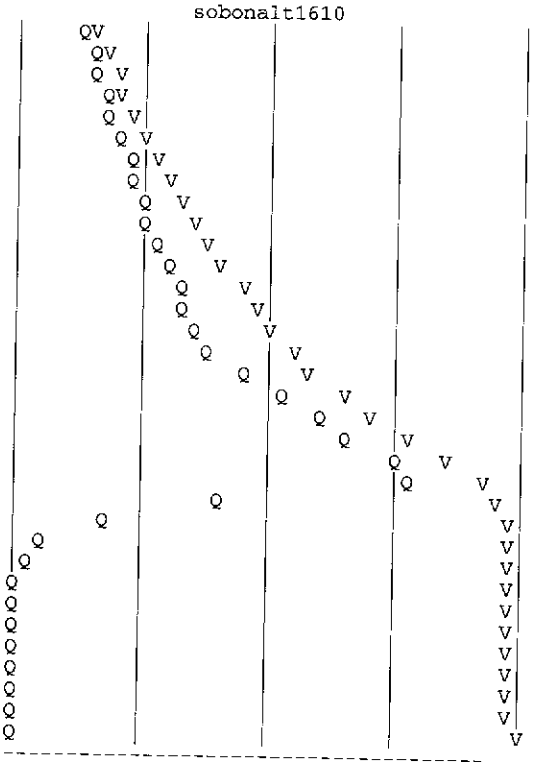
++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0002	0.03	Q
0+10	0.0012	0.14	Q
0+15	0.0025	0.20	Q
0+20	0.0041	0.22	Q
0+25	0.0057	0.23	Q
0+30	0.0074	0.24	Q
0+35	0.0092	0.26	Q
0+40	0.0111	0.27	Q
0+45	0.0130	0.28	Q
0+50	0.0149	0.28	Q
0+55	0.0168	0.28	Q
1+ 0	0.0188	0.29	Q
1+ 5	0.0211	0.33	Q
1+10	0.0234	0.34	Q
1+15	0.0258	0.35	Q
1+20	0.0283	0.35	Q
1+25	0.0307	0.35	Q
1+30	0.0331	0.35	Q
1+35	0.0356	0.35	QV
1+40	0.0380	0.35	QV
1+45	0.0404	0.35	QV
1+50	0.0429	0.35	QV
1+55	0.0453	0.35	QV
2+ 0	0.0481	0.41	QV
2+ 5	0.0521	0.57	Q
2+10	0.0554	0.48	QV
2+15	0.0599	0.66	Q
2+20	0.0648	0.71	Q
2+25	0.0699	0.74	Q
2+30	0.0750	0.75	QV
2+35	0.0802	0.75	QV
2+40	0.0853	0.75	QV
2+45	0.0909	0.80	QV
2+50	0.0979	1.02	Q
2+55	0.1055	1.10	Q
3+ 0	0.1133	1.13	QV
3+ 5	0.1211	1.14	QV
3+10	0.1294	1.20	QV
3+15	0.1392	1.42	QV
3+20	0.1495	1.50	Q V
3+25	0.1604	1.58	QV
3+30	0.1732	1.86	QV
3+35	0.1885	2.22	QV
3+40	0.2060	2.55	Q
3+45	0.2247	2.72	QV

3+50	0.2453	2.98	
3+55	0.2668	3.13	
4+ 0	0.2901	3.39	
4+ 5	0.3144	3.53	
4+10	0.3409	3.84	
4+15	0.3698	4.20	
4+20	0.4013	4.58	
4+25	0.4356	4.98	
4+30	0.4722	5.32	
4+35	0.5101	5.49	
4+40	0.5501	5.82	
4+45	0.5927	6.18	
4+50	0.6376	6.51	
4+55	0.6836	6.69	
5+ 0	0.7319	7.01	
5+ 5	0.7841	7.59	
5+10	0.8466	9.07	
5+15	0.9206	10.75	
5+20	1.0040	12.11	
5+25	1.0968	13.48	
5+30	1.2033	15.46	
5+35	1.3135	16.00	
5+40	1.3701	8.22	
5+45	1.3943	3.52	
5+50	1.4043	1.46	
5+55	1.4088	0.66	
6+ 0	1.4112	0.34	
6+ 5	1.4123	0.16	
6+10	1.4126	0.05	
6+15	1.4127	0.01	
6+20	1.4127	0.00	
6+25	1.4127	0.00	
6+30	1.4128	0.00	
6+35	1.4128	0.00	



Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt12410.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	2.25	35.89

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	6.00	95.70

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 3.793(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.793(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	86.00	0.000

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

sobonalt12410

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.156
2	0.167	194.180	55.366	8.900
3	0.250	291.271	18.995	3.053
4	0.333	388.361	7.769	1.249
5	0.417	485.451	2.779	0.447
6	0.500	582.541	0.892	0.143
7	0.583	679.631	0.599	0.096
8	0.667	776.721	0.191	0.031
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	0.311	0.027	0.00
2	0.17	0.07	0.030	0.310	0.027	0.00
3	0.25	0.07	0.030	0.309	0.027	0.00
4	0.33	0.10	0.046	0.308	0.041	0.00
5	0.42	0.10	0.046	0.306	0.041	0.00
6	0.50	0.10	0.046	0.305	0.041	0.00
7	0.58	0.10	0.046	0.304	0.041	0.00
8	0.67	0.10	0.046	0.303	0.041	0.00
9	0.75	0.10	0.046	0.302	0.041	0.00
10	0.83	0.13	0.061	0.301	0.055	0.01
11	0.92	0.13	0.061	0.299	0.055	0.01
12	1.00	0.13	0.061	0.298	0.055	0.01
13	1.08	0.10	0.046	0.297	0.041	0.00
14	1.17	0.10	0.046	0.296	0.041	0.00
15	1.25	0.10	0.046	0.295	0.041	0.00
16	1.33	0.10	0.046	0.293	0.041	0.00
17	1.42	0.10	0.046	0.292	0.041	0.00
18	1.50	0.10	0.046	0.291	0.041	0.00
19	1.58	0.10	0.046	0.290	0.041	0.00
20	1.67	0.10	0.046	0.289	0.041	0.00
21	1.75	0.10	0.046	0.288	0.041	0.00
22	1.83	0.13	0.061	0.287	0.055	0.01
23	1.92	0.13	0.061	0.285	0.055	0.01
24	2.00	0.13	0.061	0.284	0.055	0.01
25	2.08	0.13	0.061	0.283	0.055	0.01
26	2.17	0.13	0.061	0.282	0.055	0.01
27	2.25	0.13	0.061	0.281	0.055	0.01
28	2.33	0.13	0.061	0.280	0.055	0.01
29	2.42	0.13	0.061	0.278	0.055	0.01
30	2.50	0.13	0.061	0.277	0.055	0.01
31	2.58	0.17	0.076	0.276	0.068	0.01
32	2.67	0.17	0.076	0.275	0.068	0.01
33	2.75	0.17	0.076	0.274	0.068	0.01
34	2.83	0.17	0.076	0.273	0.068	0.01
35	2.92	0.17	0.076	0.272	0.068	0.01
36	3.00	0.17	0.076	0.271	0.068	0.01
37	3.08	0.17	0.076	0.269	0.068	0.01
38	3.17	0.17	0.076	0.268	0.068	0.01
39	3.25	0.17	0.076	0.267	0.068	0.01
40	3.33	0.17	0.076	0.266	0.068	0.01
41	3.42	0.17	0.076	0.265	0.068	0.01
42	3.50	0.17	0.076	0.264	0.068	0.01
43	3.58	0.17	0.076	0.263	0.068	0.01
44	3.67	0.17	0.076	0.262	0.068	0.01
45	3.75	0.17	0.076	0.261	0.068	0.01
46	3.83	0.20	0.091	0.259	0.082	0.01
47	3.92	0.20	0.091	0.258	0.082	0.01
48	4.00	0.20	0.091	0.257	0.082	0.01
49	4.08	0.20	0.091	0.256	0.082	0.01
50	4.17	0.20	0.091	0.255	0.082	0.01
51	4.25	0.20	0.091	0.254	0.082	0.01
52	4.33	0.23	0.106	0.253	0.096	0.01
53	4.42	0.23	0.106	0.252	0.096	0.01
54	4.50	0.23	0.106	0.251	0.096	0.01
55	4.58	0.23	0.106	0.250	0.096	0.01
56	4.67	0.23	0.106	0.249	0.096	0.01
57	4.75	0.23	0.106	0.248	0.096	0.01
58	4.83	0.27	0.121	0.246	0.109	0.01

59	4.92	0.27	0.121	0.245	0.109	0.01
60	5.00	0.27	0.121	0.244	0.109	0.01
61	5.08	0.20	0.091	0.243	0.082	0.01
62	5.17	0.20	0.091	0.242	0.082	0.01
63	5.25	0.20	0.091	0.241	0.082	0.01
64	5.33	0.23	0.106	0.240	0.096	0.01
65	5.42	0.23	0.106	0.239	0.096	0.01
66	5.50	0.23	0.106	0.238	0.096	0.01
67	5.58	0.27	0.121	0.237	0.109	0.01
68	5.67	0.27	0.121	0.236	0.109	0.01
69	5.75	0.27	0.121	0.235	0.109	0.01
70	5.83	0.27	0.121	0.234	0.109	0.01
71	5.92	0.27	0.121	0.233	0.109	0.01
72	6.00	0.27	0.121	0.232	0.109	0.01
73	6.08	0.30	0.137	0.231	0.123	0.01
74	6.17	0.30	0.137	0.230	0.123	0.01
75	6.25	0.30	0.137	0.229	0.123	0.01
76	6.33	0.30	0.137	0.228	0.123	0.01
77	6.42	0.30	0.137	0.227	0.123	0.01
78	6.50	0.30	0.137	0.226	0.123	0.01
79	6.58	0.33	0.152	0.225	0.137	0.02
80	6.67	0.33	0.152	0.224	0.137	0.02
81	6.75	0.33	0.152	0.223	0.137	0.02
82	6.83	0.33	0.152	0.222	0.137	0.02
83	6.92	0.33	0.152	0.221	0.137	0.02
84	7.00	0.33	0.152	0.220	0.137	0.02
85	7.08	0.33	0.152	0.219	0.137	0.02
86	7.17	0.33	0.152	0.218	0.137	0.02
87	7.25	0.33	0.152	0.217	0.137	0.02
88	7.33	0.37	0.167	0.216	0.150	0.02
89	7.42	0.37	0.167	0.215	0.150	0.02
90	7.50	0.37	0.167	0.214	0.150	0.02
91	7.58	0.40	0.182	0.213	0.164	0.02
92	7.67	0.40	0.182	0.212	0.164	0.02
93	7.75	0.40	0.182	0.211	0.164	0.02
94	7.83	0.43	0.197	0.210	0.177	0.02
95	7.92	0.43	0.197	0.209	0.177	0.02
96	8.00	0.43	0.197	0.208	0.177	0.02
97	8.08	0.50	0.228	0.207	---	0.02
98	8.17	0.50	0.228	0.206	---	0.02
99	8.25	0.50	0.228	0.205	---	0.02
100	8.33	0.50	0.228	0.204	---	0.02
101	8.42	0.50	0.228	0.203	---	0.02
102	8.50	0.50	0.228	0.202	---	0.03
103	8.58	0.53	0.243	0.201	---	0.04
104	8.67	0.53	0.243	0.200	---	0.04
105	8.75	0.53	0.243	0.199	---	0.04
106	8.83	0.57	0.258	0.198	---	0.06
107	8.92	0.57	0.258	0.197	---	0.06
108	9.00	0.57	0.258	0.196	---	0.06
109	9.08	0.63	0.288	0.195	---	0.09
110	9.17	0.63	0.288	0.195	---	0.09
111	9.25	0.63	0.288	0.194	---	0.09
112	9.33	0.67	0.303	0.193	---	0.11
113	9.42	0.67	0.303	0.192	---	0.11
114	9.50	0.67	0.303	0.191	---	0.11
115	9.58	0.70	0.319	0.190	---	0.13
116	9.67	0.70	0.319	0.189	---	0.13
117	9.75	0.70	0.319	0.188	---	0.13
118	9.83	0.73	0.334	0.187	---	0.15
119	9.92	0.73	0.334	0.186	---	0.15
120	10.00	0.73	0.334	0.185	---	0.15
121	10.08	0.50	0.228	0.185	---	0.04
122	10.17	0.50	0.228	0.184	---	0.04
123	10.25	0.50	0.228	0.183	---	0.04
124	10.33	0.50	0.228	0.182	---	0.05
125	10.42	0.50	0.228	0.181	---	0.05
126	10.50	0.50	0.228	0.180	---	0.05
127	10.58	0.67	0.303	0.179	---	0.12
128	10.67	0.67	0.303	0.178	---	0.13
129	10.75	0.67	0.303	0.177	---	0.13
130	10.83	0.67	0.303	0.177	---	0.13
131	10.92	0.67	0.303	0.176	---	0.13
132	11.00	0.67	0.303	0.175	---	0.13
133	11.08	0.63	0.288	0.174	---	0.11
134	11.17	0.63	0.288	0.173	---	0.12
135	11.25	0.63	0.288	0.172	---	0.12
136	11.33	0.63	0.288	0.171	---	0.12
137	11.42	0.63	0.288	0.171	---	0.12

138	11.50	0.63	0.288	0.170	---	0.12
139	11.58	0.57	0.258	0.169	---	0.09
140	11.67	0.57	0.258	0.168	---	0.09
141	11.75	0.57	0.258	0.167	---	0.09
142	11.83	0.60	0.273	0.166	---	0.11
143	11.92	0.60	0.273	0.166	---	0.11
144	12.00	0.60	0.273	0.165	---	0.11
145	12.08	0.83	0.379	0.164	---	0.22
146	12.17	0.83	0.379	0.163	---	0.22
147	12.25	0.83	0.379	0.162	---	0.22
148	12.33	0.87	0.394	0.161	---	0.23
149	12.42	0.87	0.394	0.161	---	0.23
150	12.50	0.87	0.394	0.160	---	0.23
151	12.58	0.93	0.425	0.159	---	0.27
152	12.67	0.93	0.425	0.158	---	0.27
153	12.75	0.93	0.425	0.157	---	0.27
154	12.83	0.97	0.440	0.157	---	0.28
155	12.92	0.97	0.440	0.156	---	0.28
156	13.00	0.97	0.440	0.155	---	0.28
157	13.08	1.13	0.516	0.154	---	0.36
158	13.17	1.13	0.516	0.154	---	0.36
159	13.25	1.13	0.516	0.153	---	0.36
160	13.33	1.13	0.516	0.152	---	0.36
161	13.42	1.13	0.516	0.151	---	0.36
162	13.50	1.13	0.516	0.150	---	0.37
163	13.58	0.77	0.349	0.150	---	0.20
164	13.67	0.77	0.349	0.149	---	0.20
165	13.75	0.77	0.349	0.148	---	0.20
166	13.83	0.77	0.349	0.147	---	0.20
167	13.92	0.77	0.349	0.147	---	0.20
168	14.00	0.77	0.349	0.146	---	0.20
169	14.08	0.90	0.410	0.145	---	0.26
170	14.17	0.90	0.410	0.144	---	0.27
171	14.25	0.90	0.410	0.144	---	0.27
172	14.33	0.87	0.394	0.143	---	0.25
173	14.42	0.87	0.394	0.142	---	0.25
174	14.50	0.87	0.394	0.141	---	0.25
175	14.58	0.87	0.394	0.141	---	0.25
176	14.67	0.87	0.394	0.140	---	0.25
177	14.75	0.87	0.394	0.139	---	0.26
178	14.83	0.83	0.379	0.139	---	0.24
179	14.92	0.83	0.379	0.138	---	0.24
180	15.00	0.83	0.379	0.137	---	0.24
181	15.08	0.80	0.364	0.136	---	0.23
182	15.17	0.80	0.364	0.136	---	0.23
183	15.25	0.80	0.364	0.135	---	0.23
184	15.33	0.77	0.349	0.134	---	0.21
185	15.42	0.77	0.349	0.134	---	0.22
186	15.50	0.77	0.349	0.133	---	0.22
187	15.58	0.63	0.288	0.132	---	0.16
188	15.67	0.63	0.288	0.132	---	0.16
189	15.75	0.63	0.288	0.131	---	0.16
190	15.83	0.63	0.288	0.130	---	0.16
191	15.92	0.63	0.288	0.130	---	0.16
192	16.00	0.63	0.288	0.129	---	0.16
193	16.08	0.13	0.061	0.128	0.055	0.01
194	16.17	0.13	0.061	0.128	0.055	0.01
195	16.25	0.13	0.061	0.127	0.055	0.01
196	16.33	0.13	0.061	0.126	0.055	0.01
197	16.42	0.13	0.061	0.126	0.055	0.01
198	16.50	0.13	0.061	0.125	0.055	0.01
199	16.58	0.10	0.046	0.124	0.041	0.00
200	16.67	0.10	0.046	0.124	0.041	0.00
201	16.75	0.10	0.046	0.123	0.041	0.00
202	16.83	0.10	0.046	0.123	0.041	0.00
203	16.92	0.10	0.046	0.122	0.041	0.00
204	17.00	0.10	0.046	0.121	0.041	0.00
205	17.08	0.17	0.076	0.121	0.068	0.01
206	17.17	0.17	0.076	0.120	0.068	0.01
207	17.25	0.17	0.076	0.119	0.068	0.01
208	17.33	0.17	0.076	0.119	0.068	0.01
209	17.42	0.17	0.076	0.118	0.068	0.01
210	17.50	0.17	0.076	0.118	0.068	0.01
211	17.58	0.17	0.076	0.117	0.068	0.01
212	17.67	0.17	0.076	0.117	0.068	0.01
213	17.75	0.17	0.076	0.116	0.068	0.01
214	17.83	0.13	0.061	0.115	0.055	0.01
215	17.92	0.13	0.061	0.115	0.055	0.01
216	18.00	0.13	0.061	0.114	0.055	0.01

217	18.08	0.13	0.061	0.114	0.055	0.01
218	18.17	0.13	0.061	0.113	0.055	0.01
219	18.25	0.13	0.061	0.113	0.055	0.01
220	18.33	0.13	0.061	0.112	0.055	0.01
221	18.42	0.13	0.061	0.111	0.055	0.01
222	18.50	0.13	0.061	0.111	0.055	0.01
223	18.58	0.10	0.046	0.110	0.041	0.00
224	18.67	0.10	0.046	0.110	0.041	0.00
225	18.75	0.10	0.046	0.109	0.041	0.00
226	18.83	0.07	0.030	0.109	0.027	0.00
227	18.92	0.07	0.030	0.108	0.027	0.00
228	19.00	0.07	0.030	0.108	0.027	0.00
229	19.08	0.10	0.046	0.107	0.041	0.00
230	19.17	0.10	0.046	0.107	0.041	0.00
231	19.25	0.10	0.046	0.106	0.041	0.00
232	19.33	0.13	0.061	0.106	0.055	0.01
233	19.42	0.13	0.061	0.105	0.055	0.01
234	19.50	0.13	0.061	0.105	0.055	0.01
235	19.58	0.10	0.046	0.104	0.041	0.00
236	19.67	0.10	0.046	0.104	0.041	0.00
237	19.75	0.10	0.046	0.103	0.041	0.00
238	19.83	0.07	0.030	0.103	0.027	0.00
239	19.92	0.07	0.030	0.102	0.027	0.00
240	20.00	0.07	0.030	0.102	0.027	0.00
241	20.08	0.10	0.046	0.102	0.041	0.00
242	20.17	0.10	0.046	0.101	0.041	0.00
243	20.25	0.10	0.046	0.101	0.041	0.00
244	20.33	0.10	0.046	0.100	0.041	0.00
245	20.42	0.10	0.046	0.100	0.041	0.00
246	20.50	0.10	0.046	0.099	0.041	0.00
247	20.58	0.10	0.046	0.099	0.041	0.00
248	20.67	0.10	0.046	0.099	0.041	0.00
249	20.75	0.10	0.046	0.098	0.041	0.00
250	20.83	0.07	0.030	0.098	0.027	0.00
251	20.92	0.07	0.030	0.097	0.027	0.00
252	21.00	0.07	0.030	0.097	0.027	0.00
253	21.08	0.10	0.046	0.097	0.041	0.00
254	21.17	0.10	0.046	0.096	0.041	0.00
255	21.25	0.10	0.046	0.096	0.041	0.00
256	21.33	0.07	0.030	0.095	0.027	0.00
257	21.42	0.07	0.030	0.095	0.027	0.00
258	21.50	0.07	0.030	0.095	0.027	0.00
259	21.58	0.10	0.046	0.094	0.041	0.00
260	21.67	0.10	0.046	0.094	0.041	0.00
261	21.75	0.10	0.046	0.094	0.041	0.00
262	21.83	0.07	0.030	0.093	0.027	0.00
263	21.92	0.07	0.030	0.093	0.027	0.00
264	22.00	0.07	0.030	0.093	0.027	0.00
265	22.08	0.10	0.046	0.092	0.041	0.00
266	22.17	0.10	0.046	0.092	0.041	0.00
267	22.25	0.10	0.046	0.092	0.041	0.00
268	22.33	0.07	0.030	0.092	0.027	0.00
269	22.42	0.07	0.030	0.091	0.027	0.00
270	22.50	0.07	0.030	0.091	0.027	0.00
271	22.58	0.07	0.030	0.091	0.027	0.00
272	22.67	0.07	0.030	0.090	0.027	0.00
273	22.75	0.07	0.030	0.090	0.027	0.00
274	22.83	0.07	0.030	0.090	0.027	0.00
275	22.92	0.07	0.030	0.090	0.027	0.00
276	23.00	0.07	0.030	0.090	0.027	0.00
277	23.08	0.07	0.030	0.089	0.027	0.00
278	23.17	0.07	0.030	0.089	0.027	0.00
279	23.25	0.07	0.030	0.089	0.027	0.00
280	23.33	0.07	0.030	0.089	0.027	0.00
281	23.42	0.07	0.030	0.089	0.027	0.00
282	23.50	0.07	0.030	0.088	0.027	0.00
283	23.58	0.07	0.030	0.088	0.027	0.00
284	23.67	0.07	0.030	0.088	0.027	0.00
285	23.75	0.07	0.030	0.088	0.027	0.00
286	23.83	0.07	0.030	0.088	0.027	0.00
287	23.92	0.07	0.030	0.088	0.027	0.00
288	24.00	0.07	0.030	0.088	0.027	0.00
	Sum =	100.0			Sum =	17.3

Flood volume = Effective rainfall 1.44(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 1.9(Ac.Ft)
Total soil loss = 2.35(In)
Total soil loss = 3.126(Ac.Ft)
Total rainfall = 3.79(In)
Flood volume = 83425.4 Cubic Feet

Total soil loss = 136164.1 Cubic Feet

Peak flow rate of this hydrograph = 5.850(CFS)

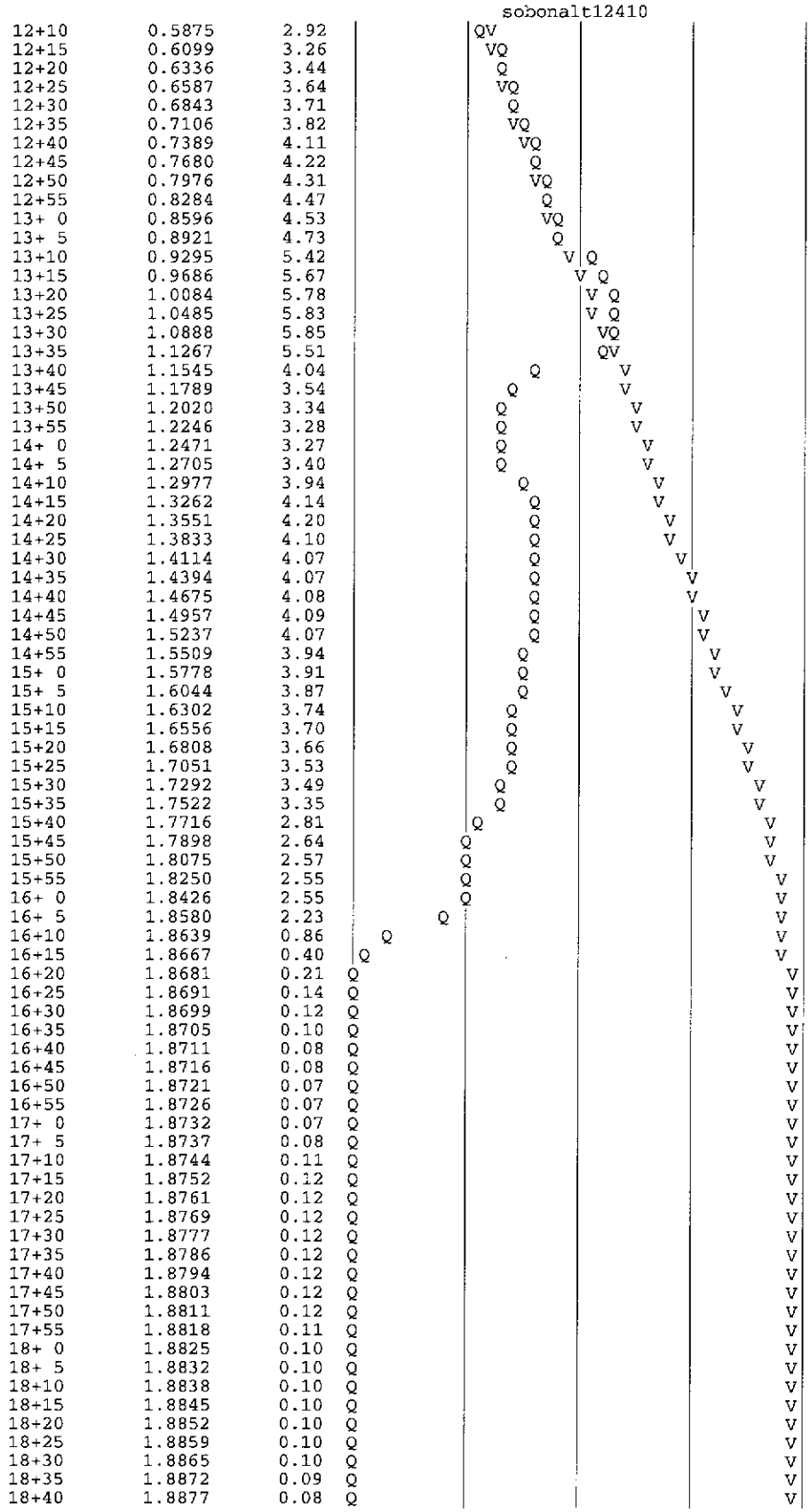
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.01	Q				
0+10	0.0003	0.03	Q				
0+15	0.0006	0.04	Q				
0+20	0.0009	0.05	Q				
0+25	0.0014	0.06	Q				
0+30	0.0018	0.07	Q				
0+35	0.0023	0.07	Q				
0+40	0.0028	0.07	Q				
0+45	0.0033	0.07	Q				
0+50	0.0039	0.08	Q				
0+55	0.0045	0.09	Q				
1+ 0	0.0051	0.09	Q				
1+ 5	0.0058	0.09	Q				
1+10	0.0063	0.08	Q				
1+15	0.0069	0.08	Q				
1+20	0.0074	0.07	Q				
1+25	0.0079	0.07	Q				
1+30	0.0084	0.07	Q				
1+35	0.0089	0.07	Q				
1+40	0.0094	0.07	Q				
1+45	0.0099	0.07	Q				
1+50	0.0104	0.08	Q				
1+55	0.0110	0.09	Q				
2+ 0	0.0117	0.09	Q				
2+ 5	0.0124	0.10	Q				
2+10	0.0130	0.10	Q				
2+15	0.0137	0.10	Q				
2+20	0.0144	0.10	Q				
2+25	0.0150	0.10	Q				
2+30	0.0157	0.10	Q				
2+35	0.0164	0.10	Q				
2+40	0.0172	0.11	Q				
2+45	0.0180	0.12	Q				
2+50	0.0188	0.12	Q				
2+55	0.0197	0.12	Q				
3+ 0	0.0205	0.12	Q				
3+ 5	0.0214	0.12	Q				
3+10	0.0222	0.12	Q				
3+15	0.0230	0.12	Q				
3+20	0.0239	0.12	Q				
3+25	0.0247	0.12	Q				
3+30	0.0256	0.12	Q				
3+35	0.0264	0.12	Q				
3+40	0.0272	0.12	Q				
3+45	0.0281	0.12	Q				
3+50	0.0289	0.13	Q				
3+55	0.0299	0.14	Q				
4+ 0	0.0309	0.14	Q				
4+ 5	0.0319	0.15	Q				
4+10	0.0329	0.15	Q				
4+15	0.0339	0.15	Q				
4+20	0.0349	0.15	Q				
4+25	0.0361	0.16	Q				
4+30	0.0372	0.17	Q				
4+35	0.0384	0.17	Q				
4+40	0.0396	0.17	Q				
4+45	0.0407	0.17	Q				
4+50	0.0419	0.17	Q				
4+55	0.0432	0.19	Q				
5+ 0	0.0445	0.19	Q				
5+ 5	0.0458	0.19	Q				
5+10	0.0469	0.16	Q				
5+15	0.0480	0.15	QV				
5+20	0.0490	0.15	QV				
5+25	0.0502	0.16	QV				
5+30	0.0513	0.17	QV				

5+35	0.0525	0.17	QV
5+40	0.0538	0.19	QV
5+45	0.0551	0.19	QV
5+50	0.0565	0.19	QV
5+55	0.0578	0.19	QV
6+ 0	0.0592	0.19	QV
6+ 5	0.0605	0.20	QV
6+10	0.0620	0.21	QV
6+15	0.0635	0.22	QV
6+20	0.0650	0.22	QV
6+25	0.0665	0.22	QV
6+30	0.0680	0.22	QV
6+35	0.0695	0.22	QV
6+40	0.0712	0.24	QV
6+45	0.0728	0.24	QV
6+50	0.0745	0.24	QV
6+55	0.0762	0.24	QV
7+ 0	0.0778	0.24	QV
7+ 5	0.0795	0.24	QV
7+10	0.0812	0.24	QV
7+15	0.0829	0.24	QV
7+20	0.0846	0.25	QV
7+25	0.0864	0.26	Q
7+30	0.0882	0.27	Q
7+35	0.0901	0.27	Q
7+40	0.0920	0.28	Q
7+45	0.0940	0.29	Q
7+50	0.0961	0.29	QV
7+55	0.0982	0.31	QV
8+ 0	0.1004	0.31	QV
8+ 5	0.1025	0.32	QV
8+10	0.1048	0.33	QV
8+15	0.1072	0.34	QV
8+20	0.1097	0.36	QV
8+25	0.1122	0.37	QV
8+30	0.1149	0.39	QV
8+35	0.1179	0.44	QV
8+40	0.1220	0.59	Q
8+45	0.1264	0.65	Q
8+50	0.1314	0.72	Q
8+55	0.1374	0.87	VQ
9+ 0	0.1438	0.94	Q
9+ 5	0.1510	1.04	VQ
9+10	0.1601	1.33	V Q
9+15	0.1700	1.44	V Q
9+20	0.1806	1.53	V Q
9+25	0.1922	1.69	V Q
9+30	0.2043	1.76	V Q
9+35	0.2169	1.83	V Q
9+40	0.2305	1.98	V Q
9+45	0.2446	2.05	V Q
9+50	0.2592	2.11	V Q
9+55	0.2748	2.27	V Q
10+ 0	0.2909	2.33	V Q
10+ 5	0.3056	2.14	V Q
10+10	0.3140	1.22	Q V
10+15	0.3202	0.91	Q V
10+20	0.3257	0.79	Q V
10+25	0.3309	0.76	Q V
10+30	0.3361	0.76	Q V
10+35	0.3425	0.92	Q V
10+40	0.3536	1.61	QV
10+45	0.3664	1.86	Q
10+50	0.3799	1.97	Q
10+55	0.3938	2.01	Q
11+ 0	0.4078	2.04	Q
11+ 5	0.4218	2.03	Q
11+10	0.4349	1.91	Q V
11+15	0.4478	1.88	Q V
11+20	0.4607	1.87	Q V
11+25	0.4737	1.88	Q V
11+30	0.4867	1.89	Q V
11+35	0.4993	1.84	Q V
11+40	0.5102	1.58	Q V
11+45	0.5205	1.50	Q V
11+50	0.5309	1.51	Q V
11+55	0.5422	1.64	Q V
12+ 0	0.5539	1.70	Q V
12+ 5	0.5674	1.96	Q V

sobonalt12410



12+10	0.5875	2.92
12+15	0.6099	3.26
12+20	0.6336	3.44
12+25	0.6587	3.64
12+30	0.6843	3.71
12+35	0.7106	3.82
12+40	0.7389	4.11
12+45	0.7680	4.22
12+50	0.7976	4.31
12+55	0.8284	4.47
13+ 0	0.8596	4.53
13+ 5	0.8921	4.73
13+10	0.9295	5.42
13+15	0.9686	5.67
13+20	1.0084	5.78
13+25	1.0485	5.83
13+30	1.0888	5.85
13+35	1.1267	5.51
13+40	1.1545	4.04
13+45	1.1789	3.54
13+50	1.2020	3.34
13+55	1.2246	3.28
14+ 0	1.2471	3.27
14+ 5	1.2705	3.40
14+10	1.2977	3.94
14+15	1.3262	4.14
14+20	1.3551	4.20
14+25	1.3833	4.10
14+30	1.4114	4.07
14+35	1.4394	4.07
14+40	1.4675	4.08
14+45	1.4957	4.09
14+50	1.5237	4.07
14+55	1.5509	3.94
15+ 0	1.5778	3.91
15+ 5	1.6044	3.87
15+10	1.6302	3.74
15+15	1.6556	3.70
15+20	1.6808	3.66
15+25	1.7051	3.53
15+30	1.7292	3.49
15+35	1.7522	3.35
15+40	1.7716	2.81
15+45	1.7898	2.64
15+50	1.8075	2.57
15+55	1.8250	2.55
16+ 0	1.8426	2.55
16+ 5	1.8580	2.23
16+10	1.8639	0.86
16+15	1.8667	0.40
16+20	1.8681	0.21
16+25	1.8691	0.14
16+30	1.8699	0.12
16+35	1.8705	0.10
16+40	1.8711	0.08
16+45	1.8716	0.08
16+50	1.8721	0.07
16+55	1.8726	0.07
17+ 0	1.8732	0.07
17+ 5	1.8737	0.08
17+10	1.8744	0.11
17+15	1.8752	0.12
17+20	1.8761	0.12
17+25	1.8769	0.12
17+30	1.8777	0.12
17+35	1.8786	0.12
17+40	1.8794	0.12
17+45	1.8803	0.12
17+50	1.8811	0.12
17+55	1.8818	0.11
18+ 0	1.8825	0.10
18+ 5	1.8832	0.10
18+10	1.8838	0.10
18+15	1.8845	0.10
18+20	1.8852	0.10
18+25	1.8859	0.10
18+30	1.8865	0.10
18+35	1.8872	0.09
18+40	1.8877	0.08

18+45	1.8883	0.08	Q				V
18+50	1.8888	0.07	Q				V
18+55	1.8891	0.06	Q				V
19+ 0	1.8895	0.05	Q				V
19+ 5	1.8899	0.05	Q				V
19+10	1.8903	0.07	Q				V
19+15	1.8908	0.07	Q				V
19+20	1.8913	0.08	Q				V
19+25	1.8919	0.09	Q				V
19+30	1.8926	0.09	Q				V
19+35	1.8932	0.09	Q				V
19+40	1.8938	0.08	Q				V
19+45	1.8943	0.08	Q				V
19+50	1.8948	0.07	Q				V
19+55	1.8952	0.06	Q				V
20+ 0	1.8956	0.05	Q				V
20+ 5	1.8959	0.05	Q				V
20+10	1.8964	0.07	Q				V
20+15	1.8969	0.07	Q				V
20+20	1.8974	0.07	Q				V
20+25	1.8979	0.07	Q				V
20+30	1.8984	0.07	Q				V
20+35	1.8989	0.07	Q				V
20+40	1.8994	0.07	Q				V
20+45	1.8999	0.07	Q				V
20+50	1.9004	0.07	Q				V
20+55	1.9007	0.06	Q				V
21+ 0	1.9011	0.05	Q				V
21+ 5	1.9015	0.05	Q				V
21+10	1.9019	0.07	Q				V
21+15	1.9024	0.07	Q				V
21+20	1.9029	0.07	Q				V
21+25	1.9033	0.06	Q				V
21+30	1.9036	0.05	Q				V
21+35	1.9040	0.05	Q				V
21+40	1.9044	0.07	Q				V
21+45	1.9049	0.07	Q				V
21+50	1.9054	0.07	Q				V
21+55	1.9058	0.06	Q				V
22+ 0	1.9061	0.05	Q				V
22+ 5	1.9065	0.05	Q				V
22+10	1.9070	0.07	Q				V
22+15	1.9074	0.07	Q				V
22+20	1.9079	0.07	Q				V
22+25	1.9083	0.06	Q				V
22+30	1.9087	0.05	Q				V
22+35	1.9090	0.05	Q				V
22+40	1.9093	0.05	Q				V
22+45	1.9097	0.05	Q				V
22+50	1.9100	0.05	Q				V
22+55	1.9104	0.05	Q				V
23+ 0	1.9107	0.05	Q				V
23+ 5	1.9110	0.05	Q				V
23+10	1.9114	0.05	Q				V
23+15	1.9117	0.05	Q				V
23+20	1.9120	0.05	Q				V
23+25	1.9124	0.05	Q				V
23+30	1.9127	0.05	Q				V
23+35	1.9130	0.05	Q				V
23+40	1.9134	0.05	Q				V
23+45	1.9137	0.05	Q				V
23+50	1.9140	0.05	Q				V
23+55	1.9144	0.05	Q				V
24+ 0	1.9147	0.05	Q				V
24+ 5	1.9150	0.04	Q				V
24+10	1.9151	0.02	Q				V
24+15	1.9152	0.01	Q				V
24+20	1.9152	0.00	Q				V
24+25	1.9152	0.00	Q				V
24+30	1.9152	0.00	Q				V
24+35	1.9152	0.00	Q				V

DEVELOPED CONDITION

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt1d110.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	0.55	8.77

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	1.20	19.14

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.817(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.817(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
		Sum = 100.000	Sum=	16.075

Unit Time		Pattern	Storm Rain	Loss rate(In./Hr)		Effective
	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	4.20	0.412	0.071	---	0.34
2	0.17	4.30	0.422	0.071	---	0.35
3	0.25	5.00	0.490	0.071	---	0.42
4	0.33	5.00	0.490	0.071	---	0.42
5	0.42	5.80	0.569	0.071	---	0.50
6	0.50	6.50	0.637	0.071	---	0.57
7	0.58	7.40	0.726	0.071	---	0.65
8	0.67	8.60	0.843	0.071	---	0.77
9	0.75	12.30	1.206	0.071	---	1.14
10	0.83	29.10	2.854	0.071	---	2.78
11	0.92	6.80	0.667	0.071	---	0.60
12	1.00	5.00	0.490	0.071	---	0.42
Sum =		100.0			Sum =	9.0

Flood volume = Effective rainfall 0.75(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.094(Ac.Ft)
Total rainfall = 0.82(In)
Flood volume = 43219.2 Cubic Feet
Total soil loss = 4101.1 Cubic Feet

Peak flow rate of this hydrograph = 28.641(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0155	2.25	V Q				
0+10	0.0506	5.09	V Q				
0+15	0.0920	6.02	V Q				
0+20	0.1379	6.65	V Q				
0+25	0.1878	7.25	V Q				
0+30	0.2454	8.36	V Q				
0+35	0.3114	9.59	Q				
0+40	0.3884	11.18	QV				
0+45	0.4893	14.65	Q				
0+50	0.6865	28.64	V			Q	
0+55	0.8795	28.02	V Q				
1+ 0	0.9555	11.03	Q			V	
1+ 5	0.9875	4.65	Q			V	
1+10	0.9916	0.60	Q			V	
1+15	0.9922	0.08	Q			V	

sobonalt1d310

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt1d310.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	0.90	14.36

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	2.10	33.49

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 1.394(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.394(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.217	0.071	---	0.15
2	0.17	1.30	0.217	0.071	---	0.15
3	0.25	1.10	0.184	0.071	---	0.11
4	0.33	1.50	0.251	0.071	---	0.18
5	0.42	1.50	0.251	0.071	---	0.18
6	0.50	1.80	0.301	0.071	---	0.23
7	0.58	1.50	0.251	0.071	---	0.18
8	0.67	1.80	0.301	0.071	---	0.23
9	0.75	1.80	0.301	0.071	---	0.23
10	0.83	1.50	0.251	0.071	---	0.18
11	0.92	1.60	0.268	0.071	---	0.20
12	1.00	1.80	0.301	0.071	---	0.23
13	1.08	2.20	0.368	0.071	---	0.30
14	1.17	2.20	0.368	0.071	---	0.30
15	1.25	2.20	0.368	0.071	---	0.30
16	1.33	2.00	0.334	0.071	---	0.26
17	1.42	2.60	0.435	0.071	---	0.36
18	1.50	2.70	0.452	0.071	---	0.38
19	1.58	2.40	0.401	0.071	---	0.33
20	1.67	2.70	0.452	0.071	---	0.38
21	1.75	3.30	0.552	0.071	---	0.48
22	1.83	3.10	0.518	0.071	---	0.45
23	1.92	2.90	0.485	0.071	---	0.41
24	2.00	3.00	0.502	0.071	---	0.43
25	2.08	3.10	0.518	0.071	---	0.45
26	2.17	4.20	0.702	0.071	---	0.63
27	2.25	5.00	0.836	0.071	---	0.77
28	2.33	3.50	0.585	0.071	---	0.51
29	2.42	6.80	1.137	0.071	---	1.07
30	2.50	7.30	1.221	0.071	---	1.15
31	2.58	8.20	1.371	0.071	---	1.30
32	2.67	5.90	0.987	0.071	---	0.92
33	2.75	2.00	0.334	0.071	---	0.26
34	2.83	1.80	0.301	0.071	---	0.23
35	2.92	1.80	0.301	0.071	---	0.23
36	3.00	0.60	0.100	0.071	---	0.03
Sum =		100.0			Sum =	14.2

Flood volume = Effective rainfall 1.18(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 1.6(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.282(Ac.Ft)
Total rainfall = 1.39(In)
Flood volume = 68383.7 Cubic Feet
Total soil loss = 12303.2 Cubic Feet

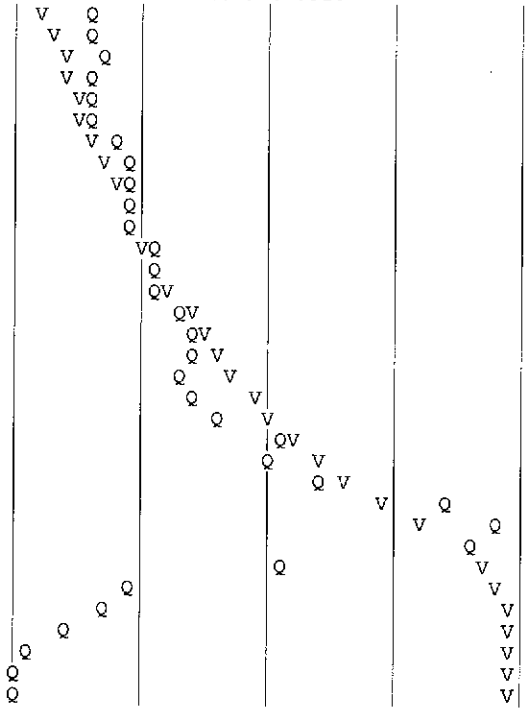
Peak flow rate of this hydrograph = 19.267(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0067	0.97	VQ
0+10	0.0216	2.16	V Q
0+15	0.0361	2.11	V Q
0+20	0.0519	2.31	V Q
0+25	0.0713	2.81	V Q
0+30	0.0934	3.21	V Q

sobonalt1d310

0+35	0.1162	3.30	
0+40	0.1388	3.28	
0+45	0.1639	3.64	
0+50	0.1871	3.36	
0+55	0.2082	3.07	
1+ 0	0.2314	3.37	
1+ 5	0.2597	4.10	
1+10	0.2919	4.68	
1+15	0.3247	4.76	
1+20	0.3561	4.56	
1+25	0.3902	4.95	
1+30	0.4304	5.84	
1+35	0.4700	5.75	
1+40	0.5093	5.71	
1+45	0.5556	6.73	
1+50	0.6064	7.37	
1+55	0.6546	7.00	
2+ 0	0.7016	6.82	
2+ 5	0.7500	7.02	
2+10	0.8078	8.39	
2+15	0.8821	10.79	
2+20	0.9539	10.43	
2+25	1.0382	12.23	
2+30	1.1553	17.01	
2+35	1.2880	19.27	
2+40	1.4131	18.15	
2+45	1.4882	10.91	
2+50	1.5224	4.97	
2+55	1.5491	3.88	
3+ 0	1.5655	2.38	
3+ 5	1.5693	0.55	
3+10	1.5698	0.08	
3+15	1.5699	0.01	

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt1d610.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	1.40	22.33

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	3.00	47.85

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 2.058(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.058(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt1d610

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.123	0.071	---	0.05
2	0.17	0.60	0.148	0.071	---	0.08
3	0.25	0.60	0.148	0.071	---	0.08
4	0.33	0.60	0.148	0.071	---	0.08
5	0.42	0.60	0.148	0.071	---	0.08
6	0.50	0.70	0.173	0.071	---	0.10
7	0.58	0.70	0.173	0.071	---	0.10
8	0.67	0.70	0.173	0.071	---	0.10
9	0.75	0.70	0.173	0.071	---	0.10
10	0.83	0.70	0.173	0.071	---	0.10
11	0.92	0.70	0.173	0.071	---	0.10
12	1.00	0.80	0.198	0.071	---	0.13
13	1.08	0.80	0.198	0.071	---	0.13
14	1.17	0.80	0.198	0.071	---	0.13
15	1.25	0.80	0.198	0.071	---	0.13
16	1.33	0.80	0.198	0.071	---	0.13
17	1.42	0.80	0.198	0.071	---	0.13
18	1.50	0.80	0.198	0.071	---	0.13
19	1.58	0.80	0.198	0.071	---	0.13
20	1.67	0.80	0.198	0.071	---	0.13
21	1.75	0.80	0.198	0.071	---	0.13
22	1.83	0.80	0.198	0.071	---	0.13
23	1.92	0.80	0.198	0.071	---	0.13
24	2.00	0.90	0.222	0.071	---	0.15
25	2.08	0.80	0.198	0.071	---	0.13
26	2.17	0.90	0.222	0.071	---	0.15
27	2.25	0.90	0.222	0.071	---	0.15
28	2.33	0.90	0.222	0.071	---	0.15
29	2.42	0.90	0.222	0.071	---	0.15
30	2.50	0.90	0.222	0.071	---	0.15
31	2.58	0.90	0.222	0.071	---	0.15
32	2.67	0.90	0.222	0.071	---	0.15
33	2.75	1.00	0.247	0.071	---	0.18
34	2.83	1.00	0.247	0.071	---	0.18
35	2.92	1.00	0.247	0.071	---	0.18
36	3.00	1.00	0.247	0.071	---	0.18
37	3.08	1.00	0.247	0.071	---	0.18
38	3.17	1.10	0.272	0.071	---	0.20
39	3.25	1.10	0.272	0.071	---	0.20
40	3.33	1.10	0.272	0.071	---	0.20
41	3.42	1.20	0.296	0.071	---	0.23
42	3.50	1.30	0.321	0.071	---	0.25
43	3.58	1.40	0.346	0.071	---	0.27
44	3.67	1.40	0.346	0.071	---	0.27
45	3.75	1.50	0.370	0.071	---	0.30
46	3.83	1.50	0.370	0.071	---	0.30
47	3.92	1.60	0.395	0.071	---	0.32
48	4.00	1.60	0.395	0.071	---	0.32
49	4.08	1.70	0.420	0.071	---	0.35
50	4.17	1.80	0.445	0.071	---	0.37
51	4.25	1.90	0.469	0.071	---	0.40
52	4.33	2.00	0.494	0.071	---	0.42
53	4.42	2.10	0.519	0.071	---	0.45
54	4.50	2.10	0.519	0.071	---	0.45
55	4.58	2.20	0.543	0.071	---	0.47
56	4.67	2.30	0.568	0.071	---	0.50
57	4.75	2.40	0.593	0.071	---	0.52
58	4.83	2.40	0.593	0.071	---	0.52
59	4.92	2.50	0.617	0.071	---	0.55
60	5.00	2.60	0.642	0.071	---	0.57
61	5.08	3.10	0.766	0.071	---	0.69
62	5.17	3.60	0.889	0.071	---	0.82

63	5.25	3.90	0.963	0.071	---	0.89
64	5.33	4.20	1.037	0.071	---	0.97
65	5.42	4.70	1.161	0.071	---	1.09
66	5.50	5.60	1.383	0.071	---	1.31
67	5.58	1.90	0.469	0.071	---	0.40
68	5.67	0.90	0.222	0.071	---	0.15
69	5.75	0.60	0.148	0.071	---	0.08
70	5.83	0.50	0.123	0.071	---	0.05
71	5.92	0.30	0.074	0.071	---	0.00
72	6.00	0.20	0.049	0.071	0.009	0.04
Sum =		100.0			Sum =	19.7

Flood volume = Effective rainfall 1.64(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 2.2(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 0.558(Ac.Ft)
Total rainfall = 2.06(In)
Flood volume = 94855.7 Cubic Feet
Total soil loss = 24307.5 Cubic Feet

Peak flow rate of this hydrograph = 18.818(CFS)

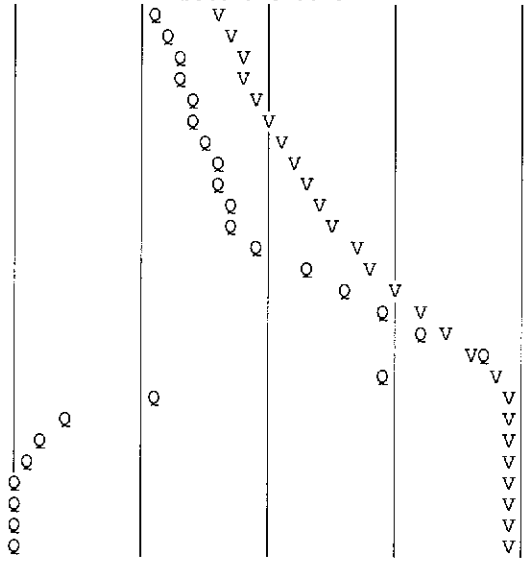
++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0024	0.35	Q
0+10	0.0089	0.94	VQ
0+15	0.0171	1.20	V Q
0+20	0.0257	1.24	V Q
0+25	0.0342	1.24	V Q
0+30	0.0439	1.41	V Q
0+35	0.0550	1.61	V Q
0+40	0.0663	1.64	V Q
0+45	0.0776	1.64	V Q
0+50	0.0889	1.64	V Q
0+55	0.1002	1.64	V Q
1+ 0	0.1126	1.80	VQ
1+ 5	0.1264	2.01	V Q
1+10	0.1404	2.03	V Q
1+15	0.1545	2.04	V Q
1+20	0.1685	2.04	VQ
1+25	0.1825	2.04	VQ
1+30	0.1966	2.04	VQ
1+35	0.2106	2.04	VQ
1+40	0.2247	2.04	Q
1+45	0.2387	2.04	Q
1+50	0.2527	2.04	Q
1+55	0.2668	2.04	Q
2+ 0	0.2819	2.20	QV
2+ 5	0.2974	2.24	QV
2+10	0.3127	2.23	QV
2+15	0.3293	2.41	Q V
2+20	0.3460	2.43	Q V
2+25	0.3628	2.44	Q V
2+30	0.3796	2.44	Q V
2+35	0.3964	2.44	Q V
2+40	0.4131	2.44	Q V
2+45	0.4310	2.60	Q V
2+50	0.4503	2.80	Q V
2+55	0.4698	2.83	Q V
3+ 0	0.4893	2.83	Q V
3+ 5	0.5088	2.83	Q V
3+10	0.5295	3.00	Q V
3+15	0.5515	3.20	Q V
3+20	0.5737	3.23	Q V
3+25	0.5971	3.39	Q V
3+30	0.6229	3.76	Q V
3+35	0.6515	4.15	Q V
3+40	0.6817	4.38	Q V
3+45	0.7133	4.58	Q V
3+50	0.7462	4.79	Q V
3+55	0.7805	4.98	Q V
4+ 0	0.8162	5.18	Q V
4+ 5	0.8532	5.37	Q V

sobonalt1d610

4+10	0.8928	5.74	
4+15	0.9350	6.14	
4+20	0.9800	6.53	
4+25	1.0277	6.93	
4+30	1.0771	7.16	
4+35	1.1278	7.36	
4+40	1.1810	7.73	
4+45	1.2369	8.12	
4+50	1.2945	8.36	
4+55	1.3534	8.55	
5+ 0	1.4148	8.92	
5+ 5	1.4835	9.97	
5+10	1.5649	11.82	
5+15	1.6576	13.46	
5+20	1.7589	14.72	
5+25	1.8708	16.25	
5+30	2.0004	18.82	
5+35	2.1019	14.74	
5+40	2.1430	5.96	
5+45	2.1599	2.46	
5+50	2.1684	1.23	
5+55	2.1723	0.57	
6+ 0	2.1748	0.37	
6+ 5	2.1772	0.34	
6+10	2.1775	0.05	
6+15	2.1776	0.01	

sobonalt1d2410

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt1d2410.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	2.25	35.89

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	6.00	95.70

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 3.793(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.793(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph

sobonalt1d2410

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	0.126	0.005	0.02
2	0.17	0.07	0.030	0.125	0.005	0.02
3	0.25	0.07	0.030	0.125	0.005	0.02
4	0.33	0.10	0.046	0.124	0.008	0.04
5	0.42	0.10	0.046	0.124	0.008	0.04
6	0.50	0.10	0.046	0.123	0.008	0.04
7	0.58	0.10	0.046	0.123	0.008	0.04
8	0.67	0.10	0.046	0.122	0.008	0.04
9	0.75	0.10	0.046	0.122	0.008	0.04
10	0.83	0.13	0.061	0.121	0.011	0.05
11	0.92	0.13	0.061	0.121	0.011	0.05
12	1.00	0.13	0.061	0.120	0.011	0.05
13	1.08	0.10	0.046	0.120	0.008	0.04
14	1.17	0.10	0.046	0.119	0.008	0.04
15	1.25	0.10	0.046	0.119	0.008	0.04
16	1.33	0.10	0.046	0.118	0.008	0.04
17	1.42	0.10	0.046	0.118	0.008	0.04
18	1.50	0.10	0.046	0.117	0.008	0.04
19	1.58	0.10	0.046	0.117	0.008	0.04
20	1.67	0.10	0.046	0.117	0.008	0.04
21	1.75	0.10	0.046	0.116	0.008	0.04
22	1.83	0.13	0.061	0.116	0.011	0.05
23	1.92	0.13	0.061	0.115	0.011	0.05
24	2.00	0.13	0.061	0.115	0.011	0.05
25	2.08	0.13	0.061	0.114	0.011	0.05
26	2.17	0.13	0.061	0.114	0.011	0.05
27	2.25	0.13	0.061	0.113	0.011	0.05
28	2.33	0.13	0.061	0.113	0.011	0.05
29	2.42	0.13	0.061	0.112	0.011	0.05
30	2.50	0.13	0.061	0.112	0.011	0.05
31	2.58	0.17	0.076	0.111	0.014	0.06
32	2.67	0.17	0.076	0.111	0.014	0.06
33	2.75	0.17	0.076	0.110	0.014	0.06
34	2.83	0.17	0.076	0.110	0.014	0.06
35	2.92	0.17	0.076	0.110	0.014	0.06
36	3.00	0.17	0.076	0.109	0.014	0.06
37	3.08	0.17	0.076	0.109	0.014	0.06
38	3.17	0.17	0.076	0.108	0.014	0.06
39	3.25	0.17	0.076	0.108	0.014	0.06
40	3.33	0.17	0.076	0.107	0.014	0.06
41	3.42	0.17	0.076	0.107	0.014	0.06
42	3.50	0.17	0.076	0.106	0.014	0.06
43	3.58	0.17	0.076	0.106	0.014	0.06
44	3.67	0.17	0.076	0.106	0.014	0.06
45	3.75	0.17	0.076	0.105	0.014	0.06
46	3.83	0.20	0.091	0.105	0.016	0.07
47	3.92	0.20	0.091	0.104	0.016	0.07
48	4.00	0.20	0.091	0.104	0.016	0.07
49	4.08	0.20	0.091	0.103	0.016	0.07
50	4.17	0.20	0.091	0.103	0.016	0.07
51	4.25	0.20	0.091	0.102	0.016	0.07
52	4.33	0.23	0.106	0.102	---	0.00
53	4.42	0.23	0.106	0.102	---	0.00
54	4.50	0.23	0.106	0.101	---	0.01
55	4.58	0.23	0.106	0.101	---	0.01
56	4.67	0.23	0.106	0.100	---	0.01
57	4.75	0.23	0.106	0.100	---	0.01
58	4.83	0.27	0.121	0.099	---	0.02
59	4.92	0.27	0.121	0.099	---	0.02
60	5.00	0.27	0.121	0.099	---	0.02
61	5.08	0.20	0.091	0.098	0.016	0.07
62	5.17	0.20	0.091	0.098	0.016	0.07

sobonalt1d2410

63	5.25	0.20	0.091	0.097	0.016	0.07
64	5.33	0.23	0.106	0.097	---	0.01
65	5.42	0.23	0.106	0.096	---	0.01
66	5.50	0.23	0.106	0.096	---	0.01
67	5.58	0.27	0.121	0.096	---	0.03
68	5.67	0.27	0.121	0.095	---	0.03
69	5.75	0.27	0.121	0.095	---	0.03
70	5.83	0.27	0.121	0.094	---	0.03
71	5.92	0.27	0.121	0.094	---	0.03
72	6.00	0.27	0.121	0.093	---	0.03
73	6.08	0.30	0.137	0.093	---	0.04
74	6.17	0.30	0.137	0.093	---	0.04
75	6.25	0.30	0.137	0.092	---	0.04
76	6.33	0.30	0.137	0.092	---	0.04
77	6.42	0.30	0.137	0.091	---	0.05
78	6.50	0.30	0.137	0.091	---	0.05
79	6.58	0.33	0.152	0.091	---	0.06
80	6.67	0.33	0.152	0.090	---	0.06
81	6.75	0.33	0.152	0.090	---	0.06
82	6.83	0.33	0.152	0.089	---	0.06
83	6.92	0.33	0.152	0.089	---	0.06
84	7.00	0.33	0.152	0.089	---	0.06
85	7.08	0.33	0.152	0.088	---	0.06
86	7.17	0.33	0.152	0.088	---	0.06
87	7.25	0.33	0.152	0.087	---	0.06
88	7.33	0.37	0.167	0.087	---	0.08
89	7.42	0.37	0.167	0.087	---	0.08
90	7.50	0.37	0.167	0.086	---	0.08
91	7.58	0.40	0.182	0.086	---	0.10
92	7.67	0.40	0.182	0.085	---	0.10
93	7.75	0.40	0.182	0.085	---	0.10
94	7.83	0.43	0.197	0.085	---	0.11
95	7.92	0.43	0.197	0.084	---	0.11
96	8.00	0.43	0.197	0.084	---	0.11
97	8.08	0.50	0.228	0.083	---	0.14
98	8.17	0.50	0.228	0.083	---	0.14
99	8.25	0.50	0.228	0.083	---	0.14
100	8.33	0.50	0.228	0.082	---	0.15
101	8.42	0.50	0.228	0.082	---	0.15
102	8.50	0.50	0.228	0.082	---	0.15
103	8.58	0.53	0.243	0.081	---	0.16
104	8.67	0.53	0.243	0.081	---	0.16
105	8.75	0.53	0.243	0.080	---	0.16
106	8.83	0.57	0.258	0.080	---	0.18
107	8.92	0.57	0.258	0.080	---	0.18
108	9.00	0.57	0.258	0.079	---	0.18
109	9.08	0.63	0.288	0.079	---	0.21
110	9.17	0.63	0.288	0.078	---	0.21
111	9.25	0.63	0.288	0.078	---	0.21
112	9.33	0.67	0.303	0.078	---	0.23
113	9.42	0.67	0.303	0.077	---	0.23
114	9.50	0.67	0.303	0.077	---	0.23
115	9.58	0.70	0.319	0.077	---	0.24
116	9.67	0.70	0.319	0.076	---	0.24
117	9.75	0.70	0.319	0.076	---	0.24
118	9.83	0.73	0.334	0.076	---	0.26
119	9.92	0.73	0.334	0.075	---	0.26
120	10.00	0.73	0.334	0.075	---	0.26
121	10.08	0.50	0.228	0.074	---	0.15
122	10.17	0.50	0.228	0.074	---	0.15
123	10.25	0.50	0.228	0.074	---	0.15
124	10.33	0.50	0.228	0.073	---	0.15
125	10.42	0.50	0.228	0.073	---	0.15
126	10.50	0.50	0.228	0.073	---	0.15
127	10.58	0.67	0.303	0.072	---	0.23
128	10.67	0.67	0.303	0.072	---	0.23
129	10.75	0.67	0.303	0.072	---	0.23
130	10.83	0.67	0.303	0.071	---	0.23
131	10.92	0.67	0.303	0.071	---	0.23
132	11.00	0.67	0.303	0.071	---	0.23
133	11.08	0.63	0.288	0.070	---	0.22
134	11.17	0.63	0.288	0.070	---	0.22
135	11.25	0.63	0.288	0.069	---	0.22
136	11.33	0.63	0.288	0.069	---	0.22
137	11.42	0.63	0.288	0.069	---	0.22
138	11.50	0.63	0.288	0.068	---	0.22
139	11.58	0.57	0.258	0.068	---	0.19
140	11.67	0.57	0.258	0.068	---	0.19
141	11.75	0.57	0.258	0.067	---	0.19

142	11.83	0.60	0.273	0.067	---	0.21
143	11.92	0.60	0.273	0.067	---	0.21
144	12.00	0.60	0.273	0.066	---	0.21
145	12.08	0.83	0.379	0.066	---	0.31
146	12.17	0.83	0.379	0.066	---	0.31
147	12.25	0.83	0.379	0.065	---	0.31
148	12.33	0.87	0.394	0.065	---	0.33
149	12.42	0.87	0.394	0.065	---	0.33
150	12.50	0.87	0.394	0.064	---	0.33
151	12.58	0.93	0.425	0.064	---	0.36
152	12.67	0.93	0.425	0.064	---	0.36
153	12.75	0.93	0.425	0.064	---	0.36
154	12.83	0.97	0.440	0.063	---	0.38
155	12.92	0.97	0.440	0.063	---	0.38
156	13.00	0.97	0.440	0.063	---	0.38
157	13.08	1.13	0.516	0.062	---	0.45
158	13.17	1.13	0.516	0.062	---	0.45
159	13.25	1.13	0.516	0.062	---	0.45
160	13.33	1.13	0.516	0.061	---	0.45
161	13.42	1.13	0.516	0.061	---	0.45
162	13.50	1.13	0.516	0.061	---	0.46
163	13.58	0.77	0.349	0.060	---	0.29
164	13.67	0.77	0.349	0.060	---	0.29
165	13.75	0.77	0.349	0.060	---	0.29
166	13.83	0.77	0.349	0.059	---	0.29
167	13.92	0.77	0.349	0.059	---	0.29
168	14.00	0.77	0.349	0.059	---	0.29
169	14.08	0.90	0.410	0.059	---	0.35
170	14.17	0.90	0.410	0.058	---	0.35
171	14.25	0.90	0.410	0.058	---	0.35
172	14.33	0.87	0.394	0.058	---	0.34
173	14.42	0.87	0.394	0.057	---	0.34
174	14.50	0.87	0.394	0.057	---	0.34
175	14.58	0.87	0.394	0.057	---	0.34
176	14.67	0.87	0.394	0.056	---	0.34
177	14.75	0.87	0.394	0.056	---	0.34
178	14.83	0.83	0.379	0.056	---	0.32
179	14.92	0.83	0.379	0.056	---	0.32
180	15.00	0.83	0.379	0.055	---	0.32
181	15.08	0.80	0.364	0.055	---	0.31
182	15.17	0.80	0.364	0.055	---	0.31
183	15.25	0.80	0.364	0.054	---	0.31
184	15.33	0.77	0.349	0.054	---	0.29
185	15.42	0.77	0.349	0.054	---	0.30
186	15.50	0.77	0.349	0.054	---	0.30
187	15.58	0.63	0.288	0.053	---	0.23
188	15.67	0.63	0.288	0.053	---	0.24
189	15.75	0.63	0.288	0.053	---	0.24
190	15.83	0.63	0.288	0.053	---	0.24
191	15.92	0.63	0.288	0.052	---	0.24
192	16.00	0.63	0.288	0.052	---	0.24
193	16.08	0.13	0.061	0.052	---	0.01
194	16.17	0.13	0.061	0.051	---	0.01
195	16.25	0.13	0.061	0.051	---	0.01
196	16.33	0.13	0.061	0.051	---	0.01
197	16.42	0.13	0.061	0.051	---	0.01
198	16.50	0.13	0.061	0.050	---	0.01
199	16.58	0.10	0.046	0.050	0.008	0.04
200	16.67	0.10	0.046	0.050	0.008	0.04
201	16.75	0.10	0.046	0.050	0.008	0.04
202	16.83	0.10	0.046	0.049	0.008	0.04
203	16.92	0.10	0.046	0.049	0.008	0.04
204	17.00	0.10	0.046	0.049	0.008	0.04
205	17.08	0.17	0.076	0.049	---	0.03
206	17.17	0.17	0.076	0.048	---	0.03
207	17.25	0.17	0.076	0.048	---	0.03
208	17.33	0.17	0.076	0.048	---	0.03
209	17.42	0.17	0.076	0.048	---	0.03
210	17.50	0.17	0.076	0.047	---	0.03
211	17.58	0.17	0.076	0.047	---	0.03
212	17.67	0.17	0.076	0.047	---	0.03
213	17.75	0.17	0.076	0.047	---	0.03
214	17.83	0.13	0.061	0.047	---	0.01
215	17.92	0.13	0.061	0.046	---	0.01
216	18.00	0.13	0.061	0.046	---	0.01
217	18.08	0.13	0.061	0.046	---	0.01
218	18.17	0.13	0.061	0.046	---	0.02
219	18.25	0.13	0.061	0.045	---	0.02
220	18.33	0.13	0.061	0.045	---	0.02

221	18.42	0.13	0.061	0.045	---	0.02
222	18.50	0.13	0.061	0.045	---	0.02
223	18.58	0.10	0.046	0.045	---	0.00
224	18.67	0.10	0.046	0.044	---	0.00
225	18.75	0.10	0.046	0.044	---	0.00
226	18.83	0.07	0.030	0.044	0.005	0.02
227	18.92	0.07	0.030	0.044	0.005	0.02
228	19.00	0.07	0.030	0.043	0.005	0.02
229	19.08	0.10	0.046	0.043	---	0.00
230	19.17	0.10	0.046	0.043	---	0.00
231	19.25	0.10	0.046	0.043	---	0.00
232	19.33	0.13	0.061	0.043	---	0.02
233	19.42	0.13	0.061	0.042	---	0.02
234	19.50	0.13	0.061	0.042	---	0.02
235	19.58	0.10	0.046	0.042	---	0.00
236	19.67	0.10	0.046	0.042	---	0.00
237	19.75	0.10	0.046	0.042	---	0.00
238	19.83	0.07	0.030	0.041	0.005	0.02
239	19.92	0.07	0.030	0.041	0.005	0.02
240	20.00	0.07	0.030	0.041	0.005	0.02
241	20.08	0.10	0.046	0.041	---	0.00
242	20.17	0.10	0.046	0.041	---	0.00
243	20.25	0.10	0.046	0.041	---	0.00
244	20.33	0.10	0.046	0.040	---	0.01
245	20.42	0.10	0.046	0.040	---	0.01
246	20.50	0.10	0.046	0.040	---	0.01
247	20.58	0.10	0.046	0.040	---	0.01
248	20.67	0.10	0.046	0.040	---	0.01
249	20.75	0.10	0.046	0.040	---	0.01
250	20.83	0.07	0.030	0.039	0.005	0.02
251	20.92	0.07	0.030	0.039	0.005	0.02
252	21.00	0.07	0.030	0.039	0.005	0.02
253	21.08	0.10	0.046	0.039	---	0.01
254	21.17	0.10	0.046	0.039	---	0.01
255	21.25	0.10	0.046	0.039	---	0.01
256	21.33	0.07	0.030	0.038	0.005	0.02
257	21.42	0.07	0.030	0.038	0.005	0.02
258	21.50	0.07	0.030	0.038	0.005	0.02
259	21.58	0.10	0.046	0.038	---	0.01
260	21.67	0.10	0.046	0.038	---	0.01
261	21.75	0.10	0.046	0.038	---	0.01
262	21.83	0.07	0.030	0.038	0.005	0.02
263	21.92	0.07	0.030	0.038	0.005	0.02
264	22.00	0.07	0.030	0.037	0.005	0.02
265	22.08	0.10	0.046	0.037	---	0.01
266	22.17	0.10	0.046	0.037	---	0.01
267	22.25	0.10	0.046	0.037	---	0.01
268	22.33	0.07	0.030	0.037	0.005	0.02
269	22.42	0.07	0.030	0.037	0.005	0.02
270	22.50	0.07	0.030	0.037	0.005	0.02
271	22.58	0.07	0.030	0.037	0.005	0.02
272	22.67	0.07	0.030	0.036	0.005	0.02
273	22.75	0.07	0.030	0.036	0.005	0.02
274	22.83	0.07	0.030	0.036	0.005	0.02
275	22.92	0.07	0.030	0.036	0.005	0.02
276	23.00	0.07	0.030	0.036	0.005	0.02
277	23.08	0.07	0.030	0.036	0.005	0.02
278	23.17	0.07	0.030	0.036	0.005	0.02
279	23.25	0.07	0.030	0.036	0.005	0.02
280	23.33	0.07	0.030	0.036	0.005	0.02
281	23.42	0.07	0.030	0.036	0.005	0.02
282	23.50	0.07	0.030	0.036	0.005	0.02
283	23.58	0.07	0.030	0.036	0.005	0.02
284	23.67	0.07	0.030	0.036	0.005	0.02
285	23.75	0.07	0.030	0.036	0.005	0.02
286	23.83	0.07	0.030	0.035	0.005	0.02
287	23.92	0.07	0.030	0.035	0.005	0.02
288	24.00	0.07	0.030	0.035	0.005	0.02
Sum =		100.0			Sum =	32.0

Flood volume = Effective rainfall 2.67(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 3.5(Ac.Ft)
Total soil loss = 1.13(In)
Total soil loss = 1.498(Ac.Ft)
Total rainfall = 3.79(In)
Flood volume = 154331.6 Cubic Feet
Total soil loss = 65257.9 Cubic Feet

Peak flow rate of this hydrograph = 7.316(CFS)

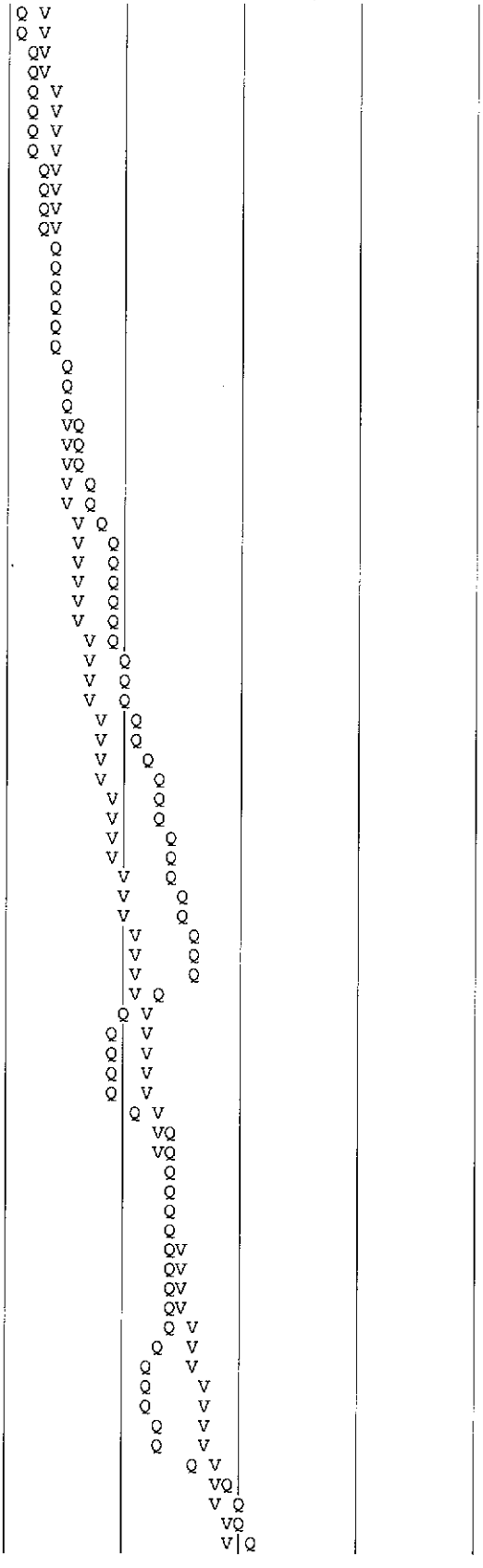
---

sobonalt1d2410

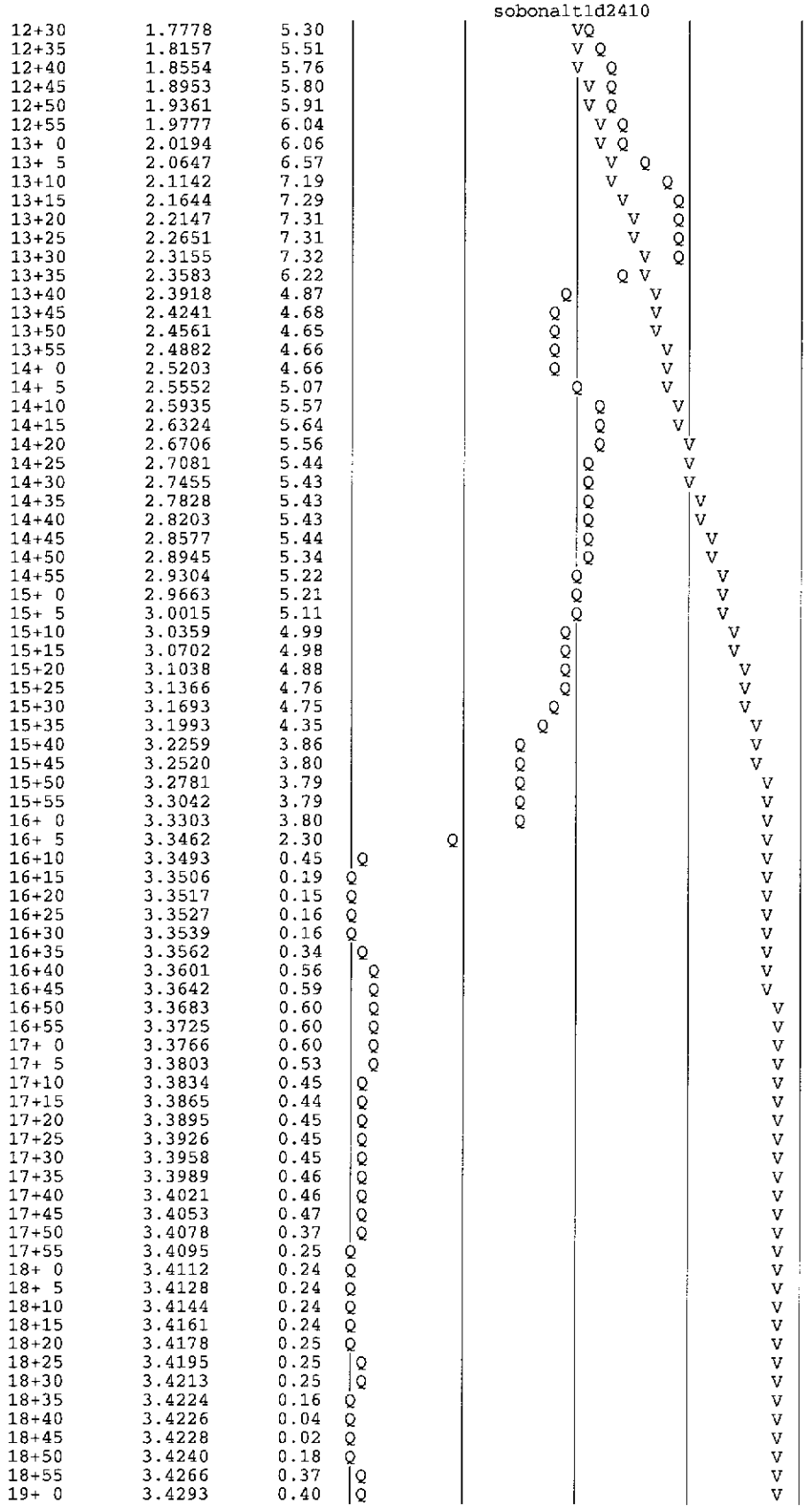
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0011	0.16	Q
0+10	0.0037	0.37	VQ
0+15	0.0064	0.40	VQ
0+20	0.0097	0.48	VQ
0+25	0.0137	0.58	V Q
0+30	0.0178	0.60	V Q
0+35	0.0220	0.60	V Q
0+40	0.0261	0.60	V Q
0+45	0.0302	0.60	V Q
0+50	0.0349	0.68	V Q
0+55	0.0403	0.78	V Q
1+ 0	0.0458	0.80	V Q
1+ 5	0.0508	0.72	V Q
1+10	0.0550	0.62	V Q
1+15	0.0592	0.60	V Q
1+20	0.0633	0.60	V Q
1+25	0.0674	0.60	V Q
1+30	0.0716	0.60	V Q
1+35	0.0757	0.60	V Q
1+40	0.0798	0.60	V Q
1+45	0.0840	0.60	V Q
1+50	0.0887	0.68	VQ
1+55	0.0941	0.78	V Q
2+ 0	0.0996	0.80	V Q
2+ 5	0.1051	0.80	V Q
2+10	0.1106	0.80	V Q
2+15	0.1161	0.80	V Q
2+20	0.1216	0.80	V Q
2+25	0.1271	0.80	V Q
2+30	0.1326	0.80	V Q
2+35	0.1387	0.88	V Q
2+40	0.1455	0.98	V Q
2+45	0.1524	1.00	V Q
2+50	0.1593	1.00	V Q
2+55	0.1661	1.00	V Q
3+ 0	0.1730	1.00	V Q
3+ 5	0.1799	1.00	V Q
3+10	0.1868	1.00	V Q
3+15	0.1937	1.00	V Q
3+20	0.2006	1.00	V Q
3+25	0.2075	1.00	V Q
3+30	0.2144	1.00	V Q
3+35	0.2213	1.00	V Q
3+40	0.2281	1.00	V Q
3+45	0.2350	1.00	V Q
3+50	0.2425	1.08	V Q
3+55	0.2506	1.18	V Q
4+ 0	0.2589	1.20	V Q
4+ 5	0.2672	1.20	VQ
4+10	0.2754	1.20	VQ
4+15	0.2837	1.20	VQ
4+20	0.2888	0.73	QV
4+25	0.2899	0.16	Q V
4+30	0.2905	0.09	Q V
4+35	0.2911	0.08	Q V
4+40	0.2917	0.09	Q V
4+45	0.2924	0.10	Q V
4+50	0.2938	0.20	Q V
4+55	0.2961	0.33	Q V
5+ 0	0.2986	0.36	Q V
5+ 5	0.3034	0.71	QV
5+10	0.3112	1.13	VQ
5+15	0.3194	1.19	VQ
5+20	0.3247	0.77	Q
5+25	0.3264	0.24	Q V
5+30	0.3276	0.17	Q V
5+35	0.3294	0.27	Q V
5+40	0.3321	0.40	Q V
5+45	0.3350	0.42	Q V
5+50	0.3380	0.43	Q V

5+55	0.3410	0.44	
6+ 0	0.3441	0.44	
6+ 5	0.3478	0.55	
6+10	0.3525	0.68	
6+15	0.3574	0.70	
6+20	0.3623	0.71	
6+25	0.3673	0.72	
6+30	0.3723	0.73	
6+35	0.3780	0.83	
6+40	0.3847	0.96	
6+45	0.3915	0.99	
6+50	0.3983	1.00	
6+55	0.4053	1.00	
7+ 0	0.4122	1.01	
7+ 5	0.4192	1.02	
7+10	0.4263	1.02	
7+15	0.4334	1.03	
7+20	0.4412	1.14	
7+25	0.4499	1.27	
7+30	0.4588	1.29	
7+35	0.4685	1.40	
7+40	0.4790	1.53	
7+45	0.4897	1.55	
7+50	0.5011	1.66	
7+55	0.5135	1.79	
8+ 0	0.5260	1.82	
8+ 5	0.5399	2.03	
8+10	0.5556	2.28	
8+15	0.5716	2.32	
8+20	0.5877	2.33	
8+25	0.6038	2.34	
8+30	0.6199	2.34	
8+35	0.6368	2.45	
8+40	0.6546	2.58	
8+45	0.6725	2.60	
8+50	0.6912	2.71	
8+55	0.7108	2.84	
9+ 0	0.7305	2.87	
9+ 5	0.7517	3.08	
9+10	0.7746	3.33	
9+15	0.7979	3.37	
9+20	0.8218	3.48	
9+25	0.8467	3.61	
9+30	0.8717	3.63	
9+35	0.8975	3.74	
9+40	0.9242	3.87	
9+45	0.9510	3.90	
9+50	0.9786	4.01	
9+55	1.0071	4.13	
10+ 0	1.0357	4.16	
10+ 5	1.0596	3.46	
10+10	1.0775	2.61	
10+15	1.0947	2.49	
10+20	1.1117	2.48	
10+25	1.1288	2.48	
10+30	1.1460	2.49	
10+35	1.1666	2.99	
10+40	1.1915	3.62	
10+45	1.2170	3.71	
10+50	1.2427	3.73	
10+55	1.2685	3.74	
11+ 0	1.2942	3.74	
11+ 5	1.3194	3.65	
11+10	1.3437	3.53	
11+15	1.3679	3.52	
11+20	1.3921	3.52	
11+25	1.4164	3.53	
11+30	1.4407	3.53	
11+35	1.4637	3.34	
11+40	1.4850	3.09	
11+45	1.5061	3.07	
11+50	1.5279	3.16	
11+55	1.5506	3.29	
12+ 0	1.5734	3.32	
12+ 5	1.6012	4.03	
12+10	1.6349	4.90	
12+15	1.6695	5.02	
12+20	1.7049	5.15	
12+25	1.7413	5.28	

sobonaltld2410

12+30	1.7778	5.30	
12+35	1.8157	5.51	
12+40	1.8554	5.76	
12+45	1.8953	5.80	
12+50	1.9361	5.91	
12+55	1.9777	6.04	
13+ 0	2.0194	6.06	
13+ 5	2.0647	6.57	
13+10	2.1142	7.19	
13+15	2.1644	7.29	
13+20	2.2147	7.31	
13+25	2.2651	7.31	
13+30	2.3155	7.32	
13+35	2.3583	6.22	
13+40	2.3918	4.87	
13+45	2.4241	4.68	
13+50	2.4561	4.65	
13+55	2.4882	4.66	
14+ 0	2.5203	4.66	
14+ 5	2.5552	5.07	
14+10	2.5935	5.57	
14+15	2.6324	5.64	
14+20	2.6706	5.56	
14+25	2.7081	5.44	
14+30	2.7455	5.43	
14+35	2.7828	5.43	
14+40	2.8203	5.43	
14+45	2.8577	5.44	
14+50	2.8945	5.34	
14+55	2.9304	5.22	
15+ 0	2.9663	5.21	
15+ 5	3.0015	5.11	
15+10	3.0359	4.99	
15+15	3.0702	4.98	
15+20	3.1038	4.88	
15+25	3.1366	4.76	
15+30	3.1693	4.75	
15+35	3.1993	4.35	
15+40	3.2259	3.86	
15+45	3.2520	3.80	
15+50	3.2781	3.79	
15+55	3.3042	3.79	
16+ 0	3.3303	3.80	
16+ 5	3.3462	2.30	
16+10	3.3493	0.45	
16+15	3.3506	0.19	
16+20	3.3517	0.15	
16+25	3.3527	0.16	
16+30	3.3539	0.16	
16+35	3.3562	0.34	
16+40	3.3601	0.56	
16+45	3.3642	0.59	
16+50	3.3683	0.60	
16+55	3.3725	0.60	
17+ 0	3.3766	0.60	
17+ 5	3.3803	0.53	
17+10	3.3834	0.45	
17+15	3.3865	0.44	
17+20	3.3895	0.45	
17+25	3.3926	0.45	
17+30	3.3958	0.45	
17+35	3.3989	0.46	
17+40	3.4021	0.46	
17+45	3.4053	0.47	
17+50	3.4078	0.37	
17+55	3.4095	0.25	
18+ 0	3.4112	0.24	
18+ 5	3.4128	0.24	
18+10	3.4144	0.24	
18+15	3.4161	0.24	
18+20	3.4178	0.25	
18+25	3.4195	0.25	
18+30	3.4213	0.25	
18+35	3.4224	0.16	
18+40	3.4226	0.04	
18+45	3.4228	0.02	
18+50	3.4240	0.18	
18+55	3.4266	0.37	
19+ 0	3.4293	0.40	

19+ 5	3.4310	0.25	Q				V
19+10	3.4315	0.07	Q				V
19+15	3.4318	0.05	Q				V
19+20	3.4328	0.14	Q				V
19+25	3.4346	0.27	Q				V
19+30	3.4366	0.29	Q				V
19+35	3.4380	0.20	Q				V
19+40	3.4385	0.08	Q				V
19+45	3.4390	0.06	Q				V
19+50	3.4403	0.20	Q				V
19+55	3.4429	0.37	Q				V
20+ 0	3.4456	0.40	Q				V
20+ 5	3.4475	0.27	Q				V
20+10	3.4482	0.10	Q				V
20+15	3.4487	0.08	Q				V
20+20	3.4493	0.08	Q				V
20+25	3.4498	0.08	Q				V
20+30	3.4504	0.09	Q				V
20+35	3.4510	0.09	Q				V
20+40	3.4517	0.09	Q				V
20+45	3.4523	0.09	Q				V
20+50	3.4538	0.22	Q				V
20+55	3.4564	0.37	Q				V
21+ 0	3.4591	0.40	Q				V
21+ 5	3.4611	0.28	Q				V
21+10	3.4620	0.13	Q				V
21+15	3.4627	0.11	Q				V
21+20	3.4643	0.23	Q				V
21+25	3.4669	0.38	Q				V
21+30	3.4696	0.40	Q				V
21+35	3.4716	0.28	Q				V
21+40	3.4726	0.14	Q				V
21+45	3.4735	0.13	Q				V
21+50	3.4751	0.24	Q				V
21+55	3.4777	0.38	Q				V
22+ 0	3.4804	0.40	Q				V
22+ 5	3.4824	0.29	Q				V
22+10	3.4835	0.16	Q				V
22+15	3.4845	0.14	Q				V
22+20	3.4861	0.24	Q				V
22+25	3.4887	0.38	Q				V
22+30	3.4915	0.40	Q				V
22+35	3.4942	0.40	Q				V
22+40	3.4970	0.40	Q				V
22+45	3.4997	0.40	Q				V
22+50	3.5025	0.40	Q				V
22+55	3.5053	0.40	Q				V
23+ 0	3.5080	0.40	Q				V
23+ 5	3.5108	0.40	Q				V
23+10	3.5135	0.40	Q				V
23+15	3.5163	0.40	Q				V
23+20	3.5190	0.40	Q				V
23+25	3.5218	0.40	Q				V
23+30	3.5245	0.40	Q				V
23+35	3.5273	0.40	Q				V
23+40	3.5301	0.40	Q				V
23+45	3.5328	0.40	Q				V
23+50	3.5356	0.40	Q				V
23+55	3.5383	0.40	Q				V
24+ 0	3.5411	0.40	Q				V
24+ 5	3.5427	0.24	Q				V
24+10	3.5429	0.03	Q				V
24+15	3.5430	0.00	Q				V

ALTERNATIVE NO. 2

UNDEVELOPED CONDITION

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt2110.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	0.55	7.04

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	1.20	15.36

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.817(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.817(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	86.00	0.000

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	1.730
2	0.167	194.180	55.366	7.142
3	0.250	291.271	18.995	2.450
4	0.333	388.361	7.769	1.002
5	0.417	485.451	2.779	0.359
6	0.500	582.541	0.892	0.115
7	0.583	679.631	0.599	0.077
8	0.667	776.721	0.191	0.025
		Sum =	100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.412	0.176	---	0.24
2	0.17	4.30	0.422	0.176	---	0.25
3	0.25	5.00	0.490	0.176	---	0.31
4	0.33	5.00	0.490	0.176	---	0.31
5	0.42	5.80	0.569	0.176	---	0.39
6	0.50	6.50	0.638	0.176	---	0.46
7	0.58	7.40	0.726	0.176	---	0.55
8	0.67	8.60	0.843	0.176	---	0.67
9	0.75	12.30	1.206	0.176	---	1.03
10	0.83	29.10	2.854	0.176	---	2.68
11	0.92	6.80	0.667	0.176	---	0.49
12	1.00	5.00	0.490	0.176	---	0.31
Sum =		100.0			Sum =	7.7

Flood volume = Effective rainfall 0.64(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.187(Ac.Ft)
Total rainfall = 0.82(In)
Flood volume = 29816.9 Cubic Feet
Total soil loss = 8159.1 Cubic Feet

Peak flow rate of this hydrograph = 23.476(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0028	0.41	Q				
0+10	0.0174	2.11	VQ				
0+15	0.0372	2.88	VQ				
0+20	0.0623	3.63	VQ				
0+25	0.0900	4.03	Q				
0+30	0.1232	4.81	QV				
0+35	0.1624	5.69	Q V				
0+40	0.2091	6.79	Q V				
0+45	0.2682	8.58	Q V				
0+50	0.3676	14.43	Q V				
0+55	0.5293	23.48	VQ				
1+ 0	0.6120	12.00	Q V				
1+ 5	0.6577	6.64	Q V				
1+10	0.6743	2.41	Q V				
1+15	0.6805	0.90	Q V				
1+20	0.6832	0.40	Q V				
1+25	0.6842	0.14	Q V				
1+30	0.6844	0.04	Q V				
1+35	0.6845	0.01	Q V				

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt2310.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	0.90	11.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	2.10	26.88

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 1.394(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.394(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	86.00	0.000

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt2310

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	1.730
2	0.167	194.180	55.366	7.142
3	0.250	291.271	18.995	2.450
4	0.333	388.361	7.769	1.002
5	0.417	485.451	2.779	0.359
6	0.500	582.541	0.892	0.115
7	0.583	679.631	0.599	0.077
8	0.667	776.721	0.191	0.025
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.217	0.176	---	0.04
2	0.17	1.30	0.217	0.176	---	0.04
3	0.25	1.10	0.184	0.176	---	0.01
4	0.33	1.50	0.251	0.176	---	0.08
5	0.42	1.50	0.251	0.176	---	0.08
6	0.50	1.80	0.301	0.176	---	0.13
7	0.58	1.50	0.251	0.176	---	0.08
8	0.67	1.80	0.301	0.176	---	0.13
9	0.75	1.80	0.301	0.176	---	0.13
10	0.83	1.50	0.251	0.176	---	0.08
11	0.92	1.60	0.268	0.176	---	0.09
12	1.00	1.80	0.301	0.176	---	0.13
13	1.08	2.20	0.368	0.176	---	0.19
14	1.17	2.20	0.368	0.176	---	0.19
15	1.25	2.20	0.368	0.176	---	0.19
16	1.33	2.00	0.334	0.176	---	0.16
17	1.42	2.60	0.435	0.176	---	0.26
18	1.50	2.70	0.452	0.176	---	0.28
19	1.58	2.40	0.401	0.176	---	0.23
20	1.67	2.70	0.452	0.176	---	0.28
21	1.75	3.30	0.552	0.176	---	0.38
22	1.83	3.10	0.518	0.176	---	0.34
23	1.92	2.90	0.485	0.176	---	0.31
24	2.00	3.00	0.502	0.176	---	0.33
25	2.08	3.10	0.518	0.176	---	0.34
26	2.17	4.20	0.702	0.176	---	0.53
27	2.25	5.00	0.836	0.176	---	0.66
28	2.33	3.50	0.585	0.176	---	0.41
29	2.42	6.80	1.137	0.176	---	0.96
30	2.50	7.30	1.221	0.176	---	1.05
31	2.58	8.20	1.371	0.176	---	1.20
32	2.67	5.90	0.987	0.176	---	0.81
33	2.75	2.00	0.334	0.176	---	0.16
34	2.83	1.80	0.301	0.176	---	0.13
35	2.92	1.80	0.301	0.176	---	0.13
36	3.00	0.60	0.100	0.176	0.090	0.01
Sum =		100.0			Sum =	10.5

Flood volume = Effective rainfall 0.87(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 0.554(Ac.Ft)
Total rainfall = 1.39(In)
Flood volume = 40605.8 Cubic Feet
Total soil loss = 24147.0 Cubic Feet

Peak flow rate of this hydrograph = 13.747(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0005	0.07	Q				
0+10	0.0031	0.37	Q				

sobonalt2310

0+15	0.0059	0.42	Q
0+20	0.0082	0.33	Q
0+25	0.0134	0.75	VQ
0+30	0.0200	0.97	VQ
0+35	0.0290	1.30	VQ
0+40	0.0370	1.17	VQ
0+45	0.0471	1.46	Q
0+50	0.0572	1.47	Q
0+55	0.0653	1.18	Q
1+ 0	0.0739	1.25	QV
1+ 5	0.0849	1.60	Q
1+10	0.0998	2.16	Q
1+15	0.1160	2.36	Q
1+20	0.1324	2.38	QV
1+25	0.1485	2.34	Q V
1+30	0.1693	3.02	QV
1+35	0.1918	3.27	Q V
1+40	0.2133	3.13	Q V
1+45	0.2380	3.58	Q V
1+50	0.2678	4.33	Q V
1+55	0.2976	4.32	Q V
2+ 0	0.3262	4.15	Q V
2+ 5	0.3552	4.22	Q V
2+10	0.3873	4.66	Q V
2+15	0.4304	6.26	Q V
2+20	0.4804	7.25	Q V
2+25	0.5281	6.93	Q V
2+30	0.6012	10.61	Q V
2+35	0.6882	12.64	Q V
2+40	0.7829	13.75	Q V
2+45	0.8553	10.51	Q V
2+50	0.8902	5.07	Q V
2+55	0.9105	2.95	Q V
3+ 0	0.9237	1.91	Q V
3+ 5	0.9290	0.77	Q V
3+10	0.9311	0.31	Q V
3+15	0.9318	0.10	Q V
3+20	0.9321	0.03	Q V
3+25	0.9322	0.01	Q V
3+30	0.9322	0.00	Q V
3+35	0.9322	0.00	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt2610.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	1.40	17.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	3.00	38.40

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 2.058(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.058(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	86.00	0.000

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt2610

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	1.730
2	0.167	194.180	55.366	7.142
3	0.250	291.271	18.995	2.450
4	0.333	388.361	7.769	1.002
5	0.417	485.451	2.779	0.359
6	0.500	582.541	0.892	0.115
7	0.583	679.631	0.599	0.077
8	0.667	776.721	0.191	0.025
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.123	0.176	0.111	0.01
2	0.17	0.60	0.148	0.176	0.133	0.01
3	0.25	0.60	0.148	0.176	0.133	0.01
4	0.33	0.60	0.148	0.176	0.133	0.01
5	0.42	0.60	0.148	0.176	0.133	0.01
6	0.50	0.70	0.173	0.176	0.156	0.02
7	0.58	0.70	0.173	0.176	0.156	0.02
8	0.67	0.70	0.173	0.176	0.156	0.02
9	0.75	0.70	0.173	0.176	0.156	0.02
10	0.83	0.70	0.173	0.176	0.156	0.02
11	0.92	0.70	0.173	0.176	0.156	0.02
12	1.00	0.80	0.198	0.176	---	0.02
13	1.08	0.80	0.198	0.176	---	0.02
14	1.17	0.80	0.198	0.176	---	0.02
15	1.25	0.80	0.198	0.176	---	0.02
16	1.33	0.80	0.198	0.176	---	0.02
17	1.42	0.80	0.198	0.176	---	0.02
18	1.50	0.80	0.198	0.176	---	0.02
19	1.58	0.80	0.198	0.176	---	0.02
20	1.67	0.80	0.198	0.176	---	0.02
21	1.75	0.80	0.198	0.176	---	0.02
22	1.83	0.80	0.198	0.176	---	0.02
23	1.92	0.80	0.198	0.176	---	0.02
24	2.00	0.90	0.222	0.176	---	0.05
25	2.08	0.80	0.198	0.176	---	0.02
26	2.17	0.90	0.222	0.176	---	0.05
27	2.25	0.90	0.222	0.176	---	0.05
28	2.33	0.90	0.222	0.176	---	0.05
29	2.42	0.90	0.222	0.176	---	0.05
30	2.50	0.90	0.222	0.176	---	0.05
31	2.58	0.90	0.222	0.176	---	0.05
32	2.67	0.90	0.222	0.176	---	0.05
33	2.75	1.00	0.247	0.176	---	0.07
34	2.83	1.00	0.247	0.176	---	0.07
35	2.92	1.00	0.247	0.176	---	0.07
36	3.00	1.00	0.247	0.176	---	0.07
37	3.08	1.00	0.247	0.176	---	0.07
38	3.17	1.10	0.272	0.176	---	0.10
39	3.25	1.10	0.272	0.176	---	0.10
40	3.33	1.10	0.272	0.176	---	0.10
41	3.42	1.20	0.296	0.176	---	0.12
42	3.50	1.30	0.321	0.176	---	0.15
43	3.58	1.40	0.346	0.176	---	0.17
44	3.67	1.40	0.346	0.176	---	0.17
45	3.75	1.50	0.370	0.176	---	0.19
46	3.83	1.50	0.370	0.176	---	0.19
47	3.92	1.60	0.395	0.176	---	0.22
48	4.00	1.60	0.395	0.176	---	0.22
49	4.08	1.70	0.420	0.176	---	0.24
50	4.17	1.80	0.445	0.176	---	0.27
51	4.25	1.90	0.469	0.176	---	0.29
52	4.33	2.00	0.494	0.176	---	0.32
53	4.42	2.10	0.519	0.176	---	0.34
54	4.50	2.10	0.519	0.176	---	0.34
55	4.58	2.20	0.543	0.176	---	0.37
56	4.67	2.30	0.568	0.176	---	0.39
57	4.75	2.40	0.593	0.176	---	0.42
58	4.83	2.40	0.593	0.176	---	0.42

59	4.92	2.50	0.617	0.176	---	0.44
60	5.00	2.60	0.642	0.176	---	0.47
61	5.08	3.10	0.766	0.176	---	0.59
62	5.17	3.60	0.889	0.176	---	0.71
63	5.25	3.90	0.963	0.176	---	0.79
64	5.33	4.20	1.037	0.176	---	0.86
65	5.42	4.70	1.161	0.176	---	0.99
66	5.50	5.60	1.383	0.176	---	1.21
67	5.58	1.90	0.469	0.176	---	0.29
68	5.67	0.90	0.222	0.176	---	0.05
69	5.75	0.60	0.148	0.176	0.133	0.01
70	5.83	0.50	0.123	0.176	0.111	0.01
71	5.92	0.30	0.074	0.176	0.067	0.01
72	6.00	0.20	0.049	0.176	0.044	0.00
Sum =		100.0			Sum =	12.8

Flood volume = Effective rainfall 1.06(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)
Total soil loss = 1.00(In)
Total soil loss = 1.062(Ac.Ft)
Total rainfall = 2.06(In)
Flood volume = 49387.0 Cubic Feet
Total soil loss = 46243.5 Cubic Feet

Peak flow rate of this hydrograph = 12.838(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0001	0.02	Q				
0+10	0.0009	0.11	Q				
0+15	0.0020	0.16	Q				
0+20	0.0033	0.18	Q				
0+25	0.0046	0.19	Q				
0+30	0.0059	0.19	Q				
0+35	0.0074	0.21	Q				
0+40	0.0089	0.22	Q				
0+45	0.0104	0.22	Q				
0+50	0.0119	0.22	Q				
0+55	0.0135	0.22	Q				
1+ 0	0.0151	0.23	Q				
1+ 5	0.0169	0.26	Q				
1+10	0.0188	0.28	Q				
1+15	0.0207	0.28	Q				
1+20	0.0227	0.28	Q				
1+25	0.0246	0.28	Q				
1+30	0.0266	0.28	Q				
1+35	0.0285	0.28	QV				
1+40	0.0305	0.28	QV				
1+45	0.0324	0.28	QV				
1+50	0.0344	0.28	QV				
1+55	0.0364	0.28	QV				
2+ 0	0.0386	0.33	QV				
2+ 5	0.0418	0.46	QV				
2+10	0.0444	0.39	QV				
2+15	0.0481	0.53	Q				
2+20	0.0520	0.57	Q				
2+25	0.0561	0.59	Q				
2+30	0.0602	0.60	QV				
2+35	0.0643	0.60	QV				
2+40	0.0685	0.60	QV				
2+45	0.0729	0.65	QV				
2+50	0.0786	0.82	QV				
2+55	0.0847	0.88	QV				
3+ 0	0.0909	0.91	Q V				
3+ 5	0.0972	0.92	Q V				
3+10	0.1039	0.96	Q V				
3+15	0.1117	1.14	QV				
3+20	0.1200	1.20	Q V				
3+25	0.1287	1.27	Q V				
3+30	0.1390	1.50	Q V				
3+35	0.1513	1.78	Q V				
3+40	0.1653	2.04	QV				
3+45	0.1804	2.18	Q V				

sobonalt2610

3+50	0.1968	2.39	
3+55	0.2141	2.51	
4+ 0	0.2328	2.72	
4+ 5	0.2523	2.83	
4+10	0.2736	3.08	
4+15	0.2968	3.37	
4+20	0.3221	3.68	
4+25	0.3496	3.99	
4+30	0.3790	4.27	
4+35	0.4093	4.41	
4+40	0.4415	4.67	
4+45	0.4756	4.96	
4+50	0.5117	5.23	
4+55	0.5486	5.37	
5+ 0	0.5874	5.62	
5+ 5	0.6293	6.09	
5+10	0.6794	7.28	
5+15	0.7388	8.62	
5+20	0.8057	9.72	
5+25	0.8802	10.82	
5+30	0.9657	12.40	
5+35	1.0541	12.84	
5+40	1.0995	6.60	
5+45	1.1189	2.82	
5+50	1.1270	1.17	
5+55	1.1306	0.53	
6+ 0	1.1325	0.27	
6+ 5	1.1334	0.13	
6+10	1.1336	0.04	
6+15	1.1337	0.01	
6+20	1.1338	0.00	
6+25	1.1338	0.00	
6+30	1.1338	0.00	
6+35	1.1338	0.00	

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt22410.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	2.25	28.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	6.00	76.80

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 3.793(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.793(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	86.00	0.000

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt22410

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	1.730
2	0.167	194.180	55.366	7.142
3	0.250	291.271	18.995	2.450
4	0.333	388.361	7.769	1.002
5	0.417	485.451	2.779	0.359
6	0.500	582.541	0.892	0.115
7	0.583	679.631	0.599	0.077
8	0.667	776.721	0.191	0.025
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	0.311	0.027	0.00
2	0.17	0.07	0.030	0.310	0.027	0.00
3	0.25	0.07	0.030	0.309	0.027	0.00
4	0.33	0.10	0.046	0.308	0.041	0.00
5	0.42	0.10	0.046	0.306	0.041	0.00
6	0.50	0.10	0.046	0.305	0.041	0.00
7	0.58	0.10	0.046	0.304	0.041	0.00
8	0.67	0.10	0.046	0.303	0.041	0.00
9	0.75	0.10	0.046	0.302	0.041	0.00
10	0.83	0.13	0.061	0.301	0.055	0.01
11	0.92	0.13	0.061	0.299	0.055	0.01
12	1.00	0.13	0.061	0.298	0.055	0.01
13	1.08	0.10	0.046	0.297	0.041	0.00
14	1.17	0.10	0.046	0.296	0.041	0.00
15	1.25	0.10	0.046	0.295	0.041	0.00
16	1.33	0.10	0.046	0.293	0.041	0.00
17	1.42	0.10	0.046	0.292	0.041	0.00
18	1.50	0.10	0.046	0.291	0.041	0.00
19	1.58	0.10	0.046	0.290	0.041	0.00
20	1.67	0.10	0.046	0.289	0.041	0.00
21	1.75	0.10	0.046	0.288	0.041	0.00
22	1.83	0.13	0.061	0.287	0.055	0.01
23	1.92	0.13	0.061	0.285	0.055	0.01
24	2.00	0.13	0.061	0.284	0.055	0.01
25	2.08	0.13	0.061	0.283	0.055	0.01
26	2.17	0.13	0.061	0.282	0.055	0.01
27	2.25	0.13	0.061	0.281	0.055	0.01
28	2.33	0.13	0.061	0.280	0.055	0.01
29	2.42	0.13	0.061	0.278	0.055	0.01
30	2.50	0.13	0.061	0.277	0.055	0.01
31	2.58	0.17	0.076	0.276	0.068	0.01
32	2.67	0.17	0.076	0.275	0.068	0.01
33	2.75	0.17	0.076	0.274	0.068	0.01
34	2.83	0.17	0.076	0.273	0.068	0.01
35	2.92	0.17	0.076	0.272	0.068	0.01
36	3.00	0.17	0.076	0.271	0.068	0.01
37	3.08	0.17	0.076	0.269	0.068	0.01
38	3.17	0.17	0.076	0.268	0.068	0.01
39	3.25	0.17	0.076	0.267	0.068	0.01
40	3.33	0.17	0.076	0.266	0.068	0.01
41	3.42	0.17	0.076	0.265	0.068	0.01
42	3.50	0.17	0.076	0.264	0.068	0.01
43	3.58	0.17	0.076	0.263	0.068	0.01
44	3.67	0.17	0.076	0.262	0.068	0.01
45	3.75	0.17	0.076	0.261	0.068	0.01
46	3.83	0.20	0.091	0.259	0.082	0.01
47	3.92	0.20	0.091	0.258	0.082	0.01
48	4.00	0.20	0.091	0.257	0.082	0.01
49	4.08	0.20	0.091	0.256	0.082	0.01
50	4.17	0.20	0.091	0.255	0.082	0.01
51	4.25	0.20	0.091	0.254	0.082	0.01
52	4.33	0.23	0.106	0.253	0.096	0.01
53	4.42	0.23	0.106	0.252	0.096	0.01
54	4.50	0.23	0.106	0.251	0.096	0.01
55	4.58	0.23	0.106	0.250	0.096	0.01
56	4.67	0.23	0.106	0.249	0.096	0.01
57	4.75	0.23	0.106	0.248	0.096	0.01
58	4.83	0.27	0.121	0.246	0.109	0.01

59	4.92	0.27	0.121	0.245	0.109	0.01
60	5.00	0.27	0.121	0.244	0.109	0.01
61	5.08	0.20	0.091	0.243	0.082	0.01
62	5.17	0.20	0.091	0.242	0.082	0.01
63	5.25	0.20	0.091	0.241	0.082	0.01
64	5.33	0.23	0.106	0.240	0.096	0.01
65	5.42	0.23	0.106	0.239	0.096	0.01
66	5.50	0.23	0.106	0.238	0.096	0.01
67	5.58	0.27	0.121	0.237	0.109	0.01
68	5.67	0.27	0.121	0.236	0.109	0.01
69	5.75	0.27	0.121	0.235	0.109	0.01
70	5.83	0.27	0.121	0.234	0.109	0.01
71	5.92	0.27	0.121	0.233	0.109	0.01
72	6.00	0.27	0.121	0.232	0.109	0.01
73	6.08	0.30	0.137	0.231	0.123	0.01
74	6.17	0.30	0.137	0.230	0.123	0.01
75	6.25	0.30	0.137	0.229	0.123	0.01
76	6.33	0.30	0.137	0.228	0.123	0.01
77	6.42	0.30	0.137	0.227	0.123	0.01
78	6.50	0.30	0.137	0.226	0.123	0.01
79	6.58	0.33	0.152	0.225	0.137	0.02
80	6.67	0.33	0.152	0.224	0.137	0.02
81	6.75	0.33	0.152	0.223	0.137	0.02
82	6.83	0.33	0.152	0.222	0.137	0.02
83	6.92	0.33	0.152	0.221	0.137	0.02
84	7.00	0.33	0.152	0.220	0.137	0.02
85	7.08	0.33	0.152	0.219	0.137	0.02
86	7.17	0.33	0.152	0.218	0.137	0.02
87	7.25	0.33	0.152	0.217	0.137	0.02
88	7.33	0.37	0.167	0.216	0.150	0.02
89	7.42	0.37	0.167	0.215	0.150	0.02
90	7.50	0.37	0.167	0.214	0.150	0.02
91	7.58	0.40	0.182	0.213	0.164	0.02
92	7.67	0.40	0.182	0.212	0.164	0.02
93	7.75	0.40	0.182	0.211	0.164	0.02
94	7.83	0.43	0.197	0.210	0.177	0.02
95	7.92	0.43	0.197	0.209	0.177	0.02
96	8.00	0.43	0.197	0.208	0.177	0.02
97	8.08	0.50	0.228	0.207	---	0.02
98	8.17	0.50	0.228	0.206	---	0.02
99	8.25	0.50	0.228	0.205	---	0.02
100	8.33	0.50	0.228	0.204	---	0.02
101	8.42	0.50	0.228	0.203	---	0.02
102	8.50	0.50	0.228	0.202	---	0.03
103	8.58	0.53	0.243	0.201	---	0.04
104	8.67	0.53	0.243	0.200	---	0.04
105	8.75	0.53	0.243	0.199	---	0.04
106	8.83	0.57	0.258	0.198	---	0.06
107	8.92	0.57	0.258	0.197	---	0.06
108	9.00	0.57	0.258	0.196	---	0.06
109	9.08	0.63	0.288	0.195	---	0.09
110	9.17	0.63	0.288	0.195	---	0.09
111	9.25	0.63	0.288	0.194	---	0.09
112	9.33	0.67	0.303	0.193	---	0.11
113	9.42	0.67	0.303	0.192	---	0.11
114	9.50	0.67	0.303	0.191	---	0.11
115	9.58	0.70	0.319	0.190	---	0.13
116	9.67	0.70	0.319	0.189	---	0.13
117	9.75	0.70	0.319	0.188	---	0.13
118	9.83	0.73	0.334	0.187	---	0.15
119	9.92	0.73	0.334	0.186	---	0.15
120	10.00	0.73	0.334	0.185	---	0.15
121	10.08	0.50	0.228	0.185	---	0.04
122	10.17	0.50	0.228	0.184	---	0.04
123	10.25	0.50	0.228	0.183	---	0.04
124	10.33	0.50	0.228	0.182	---	0.05
125	10.42	0.50	0.228	0.181	---	0.05
126	10.50	0.50	0.228	0.180	---	0.05
127	10.58	0.67	0.303	0.179	---	0.12
128	10.67	0.67	0.303	0.178	---	0.13
129	10.75	0.67	0.303	0.177	---	0.13
130	10.83	0.67	0.303	0.177	---	0.13
131	10.92	0.67	0.303	0.176	---	0.13
132	11.00	0.67	0.303	0.175	---	0.13
133	11.08	0.63	0.288	0.174	---	0.11
134	11.17	0.63	0.288	0.173	---	0.12
135	11.25	0.63	0.288	0.172	---	0.12
136	11.33	0.63	0.288	0.171	---	0.12
137	11.42	0.63	0.288	0.171	---	0.12

138	11.50	0.63	0.288	0.170	---	0.12
139	11.58	0.57	0.258	0.169	---	0.09
140	11.67	0.57	0.258	0.168	---	0.09
141	11.75	0.57	0.258	0.167	---	0.09
142	11.83	0.60	0.273	0.166	---	0.11
143	11.92	0.60	0.273	0.166	---	0.11
144	12.00	0.60	0.273	0.165	---	0.11
145	12.08	0.83	0.379	0.164	---	0.22
146	12.17	0.83	0.379	0.163	---	0.22
147	12.25	0.83	0.379	0.162	---	0.22
148	12.33	0.87	0.394	0.161	---	0.23
149	12.42	0.87	0.394	0.161	---	0.23
150	12.50	0.87	0.394	0.160	---	0.23
151	12.58	0.93	0.425	0.159	---	0.27
152	12.67	0.93	0.425	0.158	---	0.27
153	12.75	0.93	0.425	0.157	---	0.27
154	12.83	0.97	0.440	0.157	---	0.28
155	12.92	0.97	0.440	0.156	---	0.28
156	13.00	0.97	0.440	0.155	---	0.28
157	13.08	1.13	0.516	0.154	---	0.36
158	13.17	1.13	0.516	0.154	---	0.36
159	13.25	1.13	0.516	0.153	---	0.36
160	13.33	1.13	0.516	0.152	---	0.36
161	13.42	1.13	0.516	0.151	---	0.36
162	13.50	1.13	0.516	0.150	---	0.37
163	13.58	0.77	0.349	0.150	---	0.20
164	13.67	0.77	0.349	0.149	---	0.20
165	13.75	0.77	0.349	0.148	---	0.20
166	13.83	0.77	0.349	0.147	---	0.20
167	13.92	0.77	0.349	0.147	---	0.20
168	14.00	0.77	0.349	0.146	---	0.20
169	14.08	0.90	0.410	0.145	---	0.26
170	14.17	0.90	0.410	0.144	---	0.27
171	14.25	0.90	0.410	0.144	---	0.27
172	14.33	0.87	0.394	0.143	---	0.25
173	14.42	0.87	0.394	0.142	---	0.25
174	14.50	0.87	0.394	0.141	---	0.25
175	14.58	0.87	0.394	0.141	---	0.25
176	14.67	0.87	0.394	0.140	---	0.25
177	14.75	0.87	0.394	0.139	---	0.26
178	14.83	0.83	0.379	0.139	---	0.24
179	14.92	0.83	0.379	0.138	---	0.24
180	15.00	0.83	0.379	0.137	---	0.24
181	15.08	0.80	0.364	0.136	---	0.23
182	15.17	0.80	0.364	0.136	---	0.23
183	15.25	0.80	0.364	0.135	---	0.23
184	15.33	0.77	0.349	0.134	---	0.21
185	15.42	0.77	0.349	0.134	---	0.22
186	15.50	0.77	0.349	0.133	---	0.22
187	15.58	0.63	0.288	0.132	---	0.16
188	15.67	0.63	0.288	0.132	---	0.16
189	15.75	0.63	0.288	0.131	---	0.16
190	15.83	0.63	0.288	0.130	---	0.16
191	15.92	0.63	0.288	0.130	---	0.16
192	16.00	0.63	0.288	0.129	---	0.16
193	16.08	0.13	0.061	0.128	0.055	0.01
194	16.17	0.13	0.061	0.128	0.055	0.01
195	16.25	0.13	0.061	0.127	0.055	0.01
196	16.33	0.13	0.061	0.126	0.055	0.01
197	16.42	0.13	0.061	0.126	0.055	0.01
198	16.50	0.13	0.061	0.125	0.055	0.01
199	16.58	0.10	0.046	0.124	0.041	0.00
200	16.67	0.10	0.046	0.124	0.041	0.00
201	16.75	0.10	0.046	0.123	0.041	0.00
202	16.83	0.10	0.046	0.123	0.041	0.00
203	16.92	0.10	0.046	0.122	0.041	0.00
204	17.00	0.10	0.046	0.121	0.041	0.00
205	17.08	0.17	0.076	0.121	0.068	0.01
206	17.17	0.17	0.076	0.120	0.068	0.01
207	17.25	0.17	0.076	0.119	0.068	0.01
208	17.33	0.17	0.076	0.119	0.068	0.01
209	17.42	0.17	0.076	0.118	0.068	0.01
210	17.50	0.17	0.076	0.118	0.068	0.01
211	17.58	0.17	0.076	0.117	0.068	0.01
212	17.67	0.17	0.076	0.117	0.068	0.01
213	17.75	0.17	0.076	0.116	0.068	0.01
214	17.83	0.13	0.061	0.115	0.055	0.01
215	17.92	0.13	0.061	0.115	0.055	0.01
216	18.00	0.13	0.061	0.114	0.055	0.01

217	18.08	0.13	0.061	0.114	0.055	0.01
218	18.17	0.13	0.061	0.113	0.055	0.01
219	18.25	0.13	0.061	0.113	0.055	0.01
220	18.33	0.13	0.061	0.112	0.055	0.01
221	18.42	0.13	0.061	0.111	0.055	0.01
222	18.50	0.13	0.061	0.111	0.055	0.01
223	18.58	0.10	0.046	0.110	0.041	0.00
224	18.67	0.10	0.046	0.110	0.041	0.00
225	18.75	0.10	0.046	0.109	0.041	0.00
226	18.83	0.07	0.030	0.109	0.027	0.00
227	18.92	0.07	0.030	0.108	0.027	0.00
228	19.00	0.07	0.030	0.108	0.027	0.00
229	19.08	0.10	0.046	0.107	0.041	0.00
230	19.17	0.10	0.046	0.107	0.041	0.00
231	19.25	0.10	0.046	0.106	0.041	0.00
232	19.33	0.13	0.061	0.106	0.055	0.01
233	19.42	0.13	0.061	0.105	0.055	0.01
234	19.50	0.13	0.061	0.105	0.055	0.01
235	19.58	0.10	0.046	0.104	0.041	0.00
236	19.67	0.10	0.046	0.104	0.041	0.00
237	19.75	0.10	0.046	0.103	0.041	0.00
238	19.83	0.07	0.030	0.103	0.027	0.00
239	19.92	0.07	0.030	0.102	0.027	0.00
240	20.00	0.07	0.030	0.102	0.027	0.00
241	20.08	0.10	0.046	0.102	0.041	0.00
242	20.17	0.10	0.046	0.101	0.041	0.00
243	20.25	0.10	0.046	0.101	0.041	0.00
244	20.33	0.10	0.046	0.100	0.041	0.00
245	20.42	0.10	0.046	0.100	0.041	0.00
246	20.50	0.10	0.046	0.099	0.041	0.00
247	20.58	0.10	0.046	0.099	0.041	0.00
248	20.67	0.10	0.046	0.099	0.041	0.00
249	20.75	0.10	0.046	0.098	0.041	0.00
250	20.83	0.07	0.030	0.098	0.027	0.00
251	20.92	0.07	0.030	0.097	0.027	0.00
252	21.00	0.07	0.030	0.097	0.027	0.00
253	21.08	0.10	0.046	0.097	0.041	0.00
254	21.17	0.10	0.046	0.096	0.041	0.00
255	21.25	0.10	0.046	0.096	0.041	0.00
256	21.33	0.07	0.030	0.095	0.027	0.00
257	21.42	0.07	0.030	0.095	0.027	0.00
258	21.50	0.07	0.030	0.095	0.027	0.00
259	21.58	0.10	0.046	0.094	0.041	0.00
260	21.67	0.10	0.046	0.094	0.041	0.00
261	21.75	0.10	0.046	0.094	0.041	0.00
262	21.83	0.07	0.030	0.093	0.027	0.00
263	21.92	0.07	0.030	0.093	0.027	0.00
264	22.00	0.07	0.030	0.093	0.027	0.00
265	22.08	0.10	0.046	0.092	0.041	0.00
266	22.17	0.10	0.046	0.092	0.041	0.00
267	22.25	0.10	0.046	0.092	0.041	0.00
268	22.33	0.07	0.030	0.092	0.027	0.00
269	22.42	0.07	0.030	0.091	0.027	0.00
270	22.50	0.07	0.030	0.091	0.027	0.00
271	22.58	0.07	0.030	0.091	0.027	0.00
272	22.67	0.07	0.030	0.090	0.027	0.00
273	22.75	0.07	0.030	0.090	0.027	0.00
274	22.83	0.07	0.030	0.090	0.027	0.00
275	22.92	0.07	0.030	0.090	0.027	0.00
276	23.00	0.07	0.030	0.090	0.027	0.00
277	23.08	0.07	0.030	0.089	0.027	0.00
278	23.17	0.07	0.030	0.089	0.027	0.00
279	23.25	0.07	0.030	0.089	0.027	0.00
280	23.33	0.07	0.030	0.089	0.027	0.00
281	23.42	0.07	0.030	0.089	0.027	0.00
282	23.50	0.07	0.030	0.088	0.027	0.00
283	23.58	0.07	0.030	0.088	0.027	0.00
284	23.67	0.07	0.030	0.088	0.027	0.00
285	23.75	0.07	0.030	0.088	0.027	0.00
286	23.83	0.07	0.030	0.088	0.027	0.00
287	23.92	0.07	0.030	0.088	0.027	0.00
288	24.00	0.07	0.030	0.088	0.027	0.00
	Sum =	100.0			Sum =	17.3

Flood volume = Effective rainfall 1.44(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 1.5(Ac.Ft)
Total soil loss = 2.35(In)
Total soil loss = 2.509(Ac.Ft)
Total rainfall = 3.79(In)
Flood volume = 66950.3 Cubic Feet

Total soil loss = 109273.0 Cubic Feet

Peak flow rate of this hydrograph = 4.695(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

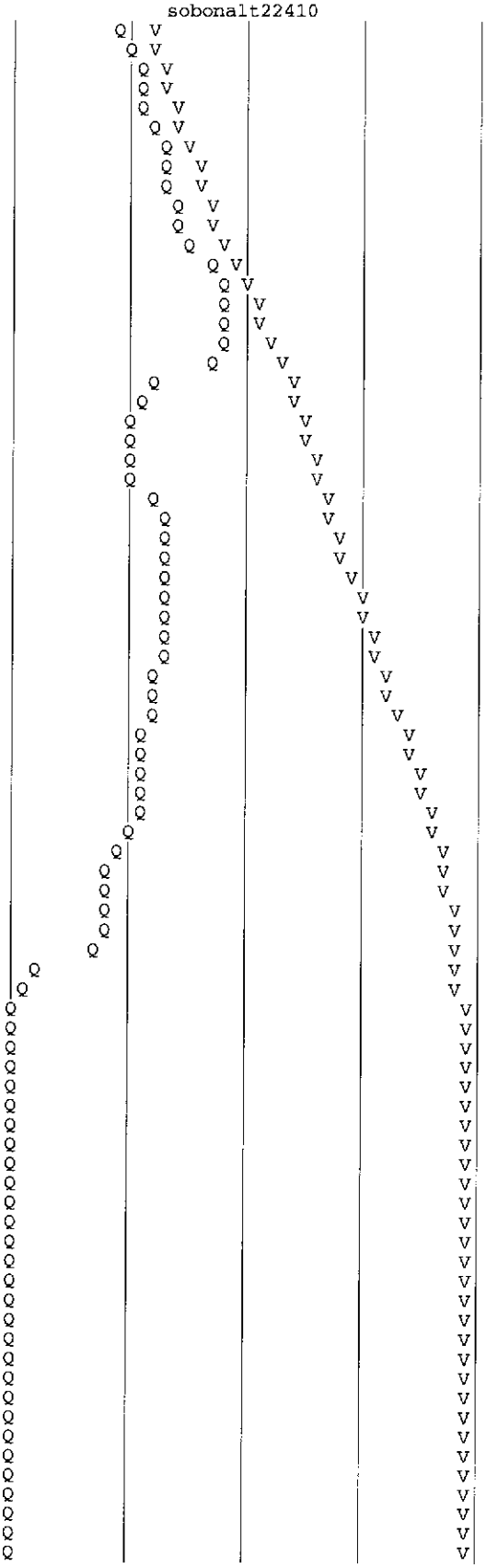
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0000	0.01	Q
0+10	0.0002	0.03	Q
0+15	0.0005	0.03	Q
0+20	0.0007	0.04	Q
0+25	0.0011	0.05	Q
0+30	0.0015	0.06	Q
0+35	0.0019	0.06	Q
0+40	0.0023	0.06	Q
0+45	0.0027	0.06	Q
0+50	0.0031	0.06	Q
0+55	0.0036	0.07	Q
1+ 0	0.0041	0.08	Q
1+ 5	0.0046	0.07	Q
1+10	0.0051	0.06	Q
1+15	0.0055	0.06	Q
1+20	0.0059	0.06	Q
1+25	0.0063	0.06	Q
1+30	0.0067	0.06	Q
1+35	0.0071	0.06	Q
1+40	0.0075	0.06	Q
1+45	0.0079	0.06	Q
1+50	0.0084	0.06	Q
1+55	0.0089	0.07	Q
2+ 0	0.0094	0.08	Q
2+ 5	0.0099	0.08	Q
2+10	0.0105	0.08	Q
2+15	0.0110	0.08	Q
2+20	0.0115	0.08	Q
2+25	0.0121	0.08	Q
2+30	0.0126	0.08	Q
2+35	0.0132	0.08	Q
2+40	0.0138	0.09	Q
2+45	0.0145	0.10	Q
2+50	0.0151	0.10	Q
2+55	0.0158	0.10	Q
3+ 0	0.0165	0.10	Q
3+ 5	0.0171	0.10	Q
3+10	0.0178	0.10	Q
3+15	0.0185	0.10	Q
3+20	0.0192	0.10	Q
3+25	0.0198	0.10	Q
3+30	0.0205	0.10	Q
3+35	0.0212	0.10	Q
3+40	0.0219	0.10	Q
3+45	0.0225	0.10	Q
3+50	0.0232	0.10	Q
3+55	0.0240	0.11	Q
4+ 0	0.0248	0.12	Q
4+ 5	0.0256	0.12	Q
4+10	0.0264	0.12	Q
4+15	0.0272	0.12	Q
4+20	0.0280	0.12	Q
4+25	0.0289	0.13	Q
4+30	0.0299	0.13	Q
4+35	0.0308	0.14	Q
4+40	0.0317	0.14	Q
4+45	0.0327	0.14	Q
4+50	0.0336	0.14	Q
4+55	0.0347	0.15	Q
5+ 0	0.0357	0.15	Q
5+ 5	0.0368	0.15	Q
5+10	0.0377	0.13	Q
5+15	0.0385	0.12	QV
5+20	0.0394	0.12	QV
5+25	0.0403	0.13	QV
5+30	0.0412	0.13	QV

5+35	0.0421	0.14	QV
5+40	0.0432	0.15	QV
5+45	0.0442	0.15	QV
5+50	0.0453	0.16	QV
5+55	0.0464	0.16	QV
6+ 0	0.0475	0.16	QV
6+ 5	0.0486	0.16	QV
6+10	0.0497	0.17	QV
6+15	0.0509	0.17	QV
6+20	0.0521	0.18	QV
6+25	0.0534	0.18	QV
6+30	0.0546	0.18	QV
6+35	0.0558	0.18	QV
6+40	0.0571	0.19	QV
6+45	0.0584	0.19	QV
6+50	0.0598	0.19	QV
6+55	0.0611	0.20	QV
7+ 0	0.0625	0.20	QV
7+ 5	0.0638	0.20	QV
7+10	0.0652	0.20	QV
7+15	0.0665	0.20	QV
7+20	0.0679	0.20	QV
7+25	0.0693	0.21	QV
7+30	0.0708	0.21	QV
7+35	0.0723	0.22	QV
7+40	0.0739	0.23	QV
7+45	0.0755	0.23	QV
7+50	0.0771	0.24	Q V
7+55	0.0788	0.25	Q V
8+ 0	0.0805	0.25	QV
8+ 5	0.0823	0.26	QV
8+10	0.0841	0.26	QV
8+15	0.0860	0.28	QV
8+20	0.0880	0.29	QV
8+25	0.0901	0.30	QV
8+30	0.0922	0.31	QV
8+35	0.0946	0.35	QV
8+40	0.0979	0.47	QV
8+45	0.1015	0.52	Q
8+50	0.1054	0.57	Q
8+55	0.1102	0.70	Q
9+ 0	0.1154	0.75	Q
9+ 5	0.1212	0.83	Q
9+10	0.1285	1.07	VQ
9+15	0.1365	1.16	VQ
9+20	0.1449	1.23	VQ
9+25	0.1542	1.36	VQ
9+30	0.1639	1.41	VQ
9+35	0.1740	1.46	VQ
9+40	0.1850	1.59	V Q
9+45	0.1963	1.64	VQ
9+50	0.2080	1.70	VQ
9+55	0.2205	1.82	V Q
10+ 0	0.2334	1.87	VQ
10+ 5	0.2453	1.72	Q
10+10	0.2520	0.98	Q V
10+15	0.2570	0.73	Q V
10+20	0.2614	0.63	Q V
10+25	0.2656	0.61	Q V
10+30	0.2697	0.61	Q V
10+35	0.2749	0.74	Q V
10+40	0.2838	1.29	Q V
10+45	0.2940	1.49	Q V
10+50	0.3049	1.58	QV
10+55	0.3160	1.62	Q V
11+ 0	0.3273	1.64	Q V
11+ 5	0.3385	1.63	Q V
11+10	0.3490	1.53	Q V
11+15	0.3594	1.51	Q V
11+20	0.3697	1.50	Q V
11+25	0.3801	1.51	Q V
11+30	0.3906	1.52	Q V
11+35	0.4007	1.47	Q V
11+40	0.4094	1.27	Q V
11+45	0.4177	1.20	Q V
11+50	0.4261	1.21	Q V
11+55	0.4351	1.32	Q V
12+ 0	0.4445	1.36	Q V
12+ 5	0.4553	1.57	Q V

sobonalt22410

12+10	0.4715	2.34
12+15	0.4895	2.62
12+20	0.5085	2.76
12+25	0.5286	2.92
12+30	0.5491	2.98
12+35	0.5702	3.07
12+40	0.5930	3.30
12+45	0.6163	3.39
12+50	0.6401	3.46
12+55	0.6648	3.58
13+ 0	0.6898	3.64
13+ 5	0.7160	3.79
13+10	0.7459	4.35
13+15	0.7773	4.55
13+20	0.8092	4.64
13+25	0.8414	4.68
13+30	0.8738	4.69
13+35	0.9042	4.42
13+40	0.9265	3.24
13+45	0.9461	2.84
13+50	0.9646	2.68
13+55	0.9827	2.63
14+ 0	1.0008	2.62
14+ 5	1.0196	2.73
14+10	1.0414	3.17
14+15	1.0643	3.32
14+20	1.0875	3.37
14+25	1.1101	3.29
14+30	1.1327	3.27
14+35	1.1552	3.27
14+40	1.1777	3.27
14+45	1.2003	3.28
14+50	1.2228	3.26
14+55	1.2446	3.16
15+ 0	1.2662	3.14
15+ 5	1.2876	3.10
15+10	1.3082	3.00
15+15	1.3287	2.97
15+20	1.3489	2.94
15+25	1.3684	2.83
15+30	1.3877	2.80
15+35	1.4062	2.69
15+40	1.4217	2.26
15+45	1.4363	2.12
15+50	1.4505	2.06
15+55	1.4646	2.05
16+ 0	1.4787	2.05
16+ 5	1.4911	1.79
16+10	1.4958	0.69
16+15	1.4980	0.32
16+20	1.4992	0.17
16+25	1.5000	0.11
16+30	1.5006	0.09
16+35	1.5011	0.08
16+40	1.5016	0.06
16+45	1.5020	0.06
16+50	1.5024	0.06
16+55	1.5028	0.06
17+ 0	1.5032	0.06
17+ 5	1.5037	0.06
17+10	1.5043	0.09
17+15	1.5049	0.09
17+20	1.5056	0.10
17+25	1.5062	0.10
17+30	1.5069	0.10
17+35	1.5076	0.10
17+40	1.5083	0.10
17+45	1.5089	0.10
17+50	1.5096	0.10
17+55	1.5102	0.08
18+ 0	1.5107	0.08
18+ 5	1.5113	0.08
18+10	1.5118	0.08
18+15	1.5124	0.08
18+20	1.5129	0.08
18+25	1.5134	0.08
18+30	1.5140	0.08
18+35	1.5145	0.08
18+40	1.5149	0.06



18+45	1.5154	0.06	Q				V
18+50	1.5158	0.06	Q				V
18+55	1.5161	0.05	Q				V
19+ 0	1.5164	0.04	Q				V
19+ 5	1.5167	0.04	Q				V
19+10	1.5170	0.05	Q				V
19+15	1.5174	0.06	Q				V
19+20	1.5178	0.06	Q				V
19+25	1.5183	0.07	Q				V
19+30	1.5188	0.08	Q				V
19+35	1.5194	0.07	Q				V
19+40	1.5198	0.06	Q				V
19+45	1.5202	0.06	Q				V
19+50	1.5206	0.06	Q				V
19+55	1.5209	0.05	Q				V
20+ 0	1.5212	0.04	Q				V
20+ 5	1.5215	0.04	Q				V
20+10	1.5219	0.05	Q				V
20+15	1.5223	0.06	Q				V
20+20	1.5227	0.06	Q				V
20+25	1.5231	0.06	Q				V
20+30	1.5235	0.06	Q				V
20+35	1.5239	0.06	Q				V
20+40	1.5243	0.06	Q				V
20+45	1.5247	0.06	Q				V
20+50	1.5251	0.06	Q				V
20+55	1.5254	0.05	Q				V
21+ 0	1.5257	0.04	Q				V
21+ 5	1.5260	0.04	Q				V
21+10	1.5263	0.05	Q				V
21+15	1.5267	0.06	Q				V
21+20	1.5271	0.06	Q				V
21+25	1.5274	0.04	Q				V
21+30	1.5277	0.04	Q				V
21+35	1.5280	0.04	Q				V
21+40	1.5283	0.05	Q				V
21+45	1.5287	0.06	Q				V
21+50	1.5291	0.06	Q				V
21+55	1.5294	0.04	Q				V
22+ 0	1.5297	0.04	Q				V
22+ 5	1.5300	0.04	Q				V
22+10	1.5304	0.05	Q				V
22+15	1.5308	0.06	Q				V
22+20	1.5311	0.06	Q				V
22+25	1.5314	0.04	Q				V
22+30	1.5317	0.04	Q				V
22+35	1.5320	0.04	Q				V
22+40	1.5323	0.04	Q				V
22+45	1.5326	0.04	Q				V
22+50	1.5328	0.04	Q				V
22+55	1.5331	0.04	Q				V
23+ 0	1.5334	0.04	Q				V
23+ 5	1.5336	0.04	Q				V
23+10	1.5339	0.04	Q				V
23+15	1.5342	0.04	Q				V
23+20	1.5344	0.04	Q				V
23+25	1.5347	0.04	Q				V
23+30	1.5350	0.04	Q				V
23+35	1.5352	0.04	Q				V
23+40	1.5355	0.04	Q				V
23+45	1.5358	0.04	Q				V
23+50	1.5361	0.04	Q				V
23+55	1.5363	0.04	Q				V
24+ 0	1.5366	0.04	Q				V
24+ 5	1.5368	0.03	Q				V
24+10	1.5369	0.01	Q				V
24+15	1.5369	0.00	Q				V
24+20	1.5370	0.00	Q				V
24+25	1.5370	0.00	Q				V
24+30	1.5370	0.00	Q				V
24+35	1.5370	0.00	Q				V

DEVELOPED CONDITION

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt2d110.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	0.55	7.04

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	1.20	15.36

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.817(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.817(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
		Sum = 100.000	Sum=	12.900

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.412	0.071	---	0.34
2	0.17	4.30	0.422	0.071	---	0.35
3	0.25	5.00	0.490	0.071	---	0.42
4	0.33	5.00	0.490	0.071	---	0.42
5	0.42	5.80	0.569	0.071	---	0.50
6	0.50	6.50	0.638	0.071	---	0.57
7	0.58	7.40	0.726	0.071	---	0.65
8	0.67	8.60	0.843	0.071	---	0.77
9	0.75	12.30	1.206	0.071	---	1.14
10	0.83	29.10	2.854	0.071	---	2.78
11	0.92	6.80	0.667	0.071	---	0.60
12	1.00	5.00	0.490	0.071	---	0.42
Sum =		100.0			Sum =	9.0

Flood volume = Effective rainfall 0.75(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.076(Ac.Ft)
Total rainfall = 0.82(In)
Flood volume = 34684.8 Cubic Feet
Total soil loss = 3291.1 Cubic Feet

Peak flow rate of this hydrograph = 22.985(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 7.5 15.0 22.5 30.0
0+ 5	0.0125	1.81	V Q
0+10	0.0406	4.09	V Q
0+15	0.0739	4.83	V Q
0+20	0.1106	5.34	V Q
0+25	0.1507	5.82	Q
0+30	0.1969	6.71	QV
0+35	0.2499	7.70	Q V
0+40	0.3117	8.97	Q V
0+45	0.3927	11.76	Q V
0+50	0.5510	22.99	V Q
0+55	0.7059	22.49	Q V
1+ 0	0.7668	8.85	Q V
1+ 5	0.7925	3.73	Q V
1+10	0.7958	0.48	Q V
1+15	0.7963	0.07	Q V

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt2d310.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	0.90	11.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	2.10	26.88

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 1.394(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.394(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph

sobonalt2d310

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.217	0.071	---	0.15
2	0.17	1.30	0.217	0.071	---	0.15
3	0.25	1.10	0.184	0.071	---	0.11
4	0.33	1.50	0.251	0.071	---	0.18
5	0.42	1.50	0.251	0.071	---	0.18
6	0.50	1.80	0.301	0.071	---	0.23
7	0.58	1.50	0.251	0.071	---	0.18
8	0.67	1.80	0.301	0.071	---	0.23
9	0.75	1.80	0.301	0.071	---	0.23
10	0.83	1.50	0.251	0.071	---	0.18
11	0.92	1.60	0.268	0.071	---	0.20
12	1.00	1.80	0.301	0.071	---	0.23
13	1.08	2.20	0.368	0.071	---	0.30
14	1.17	2.20	0.368	0.071	---	0.30
15	1.25	2.20	0.368	0.071	---	0.30
16	1.33	2.00	0.334	0.071	---	0.26
17	1.42	2.60	0.435	0.071	---	0.36
18	1.50	2.70	0.452	0.071	---	0.38
19	1.58	2.40	0.401	0.071	---	0.33
20	1.67	2.70	0.452	0.071	---	0.38
21	1.75	3.30	0.552	0.071	---	0.48
22	1.83	3.10	0.518	0.071	---	0.45
23	1.92	2.90	0.485	0.071	---	0.41
24	2.00	3.00	0.502	0.071	---	0.43
25	2.08	3.10	0.518	0.071	---	0.45
26	2.17	4.20	0.702	0.071	---	0.63
27	2.25	5.00	0.836	0.071	---	0.77
28	2.33	3.50	0.585	0.071	---	0.51
29	2.42	6.80	1.137	0.071	---	1.07
30	2.50	7.30	1.221	0.071	---	1.15
31	2.58	8.20	1.371	0.071	---	1.30
32	2.67	5.90	0.987	0.071	---	0.92
33	2.75	2.00	0.334	0.071	---	0.26
34	2.83	1.80	0.301	0.071	---	0.23
35	2.92	1.80	0.301	0.071	---	0.23
36	3.00	0.60	0.100	0.071	---	0.03
Sum =		100.0			Sum =	14.2

Flood volume = Effective rainfall 1.18(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 1.3(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.227(Ac.Ft)
Total rainfall = 1.39(In)
Flood volume = 54879.4 Cubic Feet
Total soil loss = 9873.4 Cubic Feet

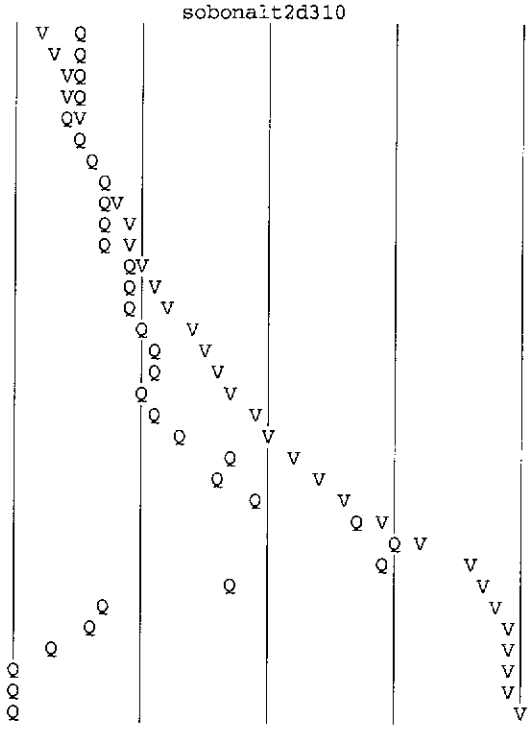
Peak flow rate of this hydrograph = 15.463(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0054	0.78	VQ				
0+10	0.0173	1.73	V Q				
0+15	0.0289	1.69	V Q				
0+20	0.0417	1.85	V Q				
0+25	0.0572	2.26	V Q				
0+30	0.0750	2.58	V Q				

sobonalt2d310

0+35	0.0932	2.65	
0+40	0.1114	2.64	
0+45	0.1315	2.92	
0+50	0.1501	2.70	
0+55	0.1671	2.47	
1+ 0	0.1857	2.71	
1+ 5	0.2084	3.29	
1+10	0.2343	3.76	
1+15	0.2606	3.82	
1+20	0.2858	3.66	
1+25	0.3131	3.97	
1+30	0.3454	4.68	
1+35	0.3772	4.61	
1+40	0.4087	4.58	
1+45	0.4459	5.40	
1+50	0.4866	5.92	
1+55	0.5253	5.62	
2+ 0	0.5631	5.48	
2+ 5	0.6019	5.64	
2+10	0.6482	6.73	
2+15	0.7079	8.66	
2+20	0.7656	8.37	
2+25	0.8332	9.82	
2+30	0.9272	13.65	
2+35	1.0337	15.46	
2+40	1.1340	14.57	
2+45	1.1943	8.75	
2+50	1.2218	3.99	
2+55	1.2432	3.11	
3+ 0	1.2564	1.91	
3+ 5	1.2594	0.44	
3+10	1.2598	0.06	
3+15	1.2599	0.00	

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt2d610.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	1.40	17.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	3.00	38.40

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 2.058(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.058(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt2d610

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.123	0.071	---	0.05
2	0.17	0.60	0.148	0.071	---	0.08
3	0.25	0.60	0.148	0.071	---	0.08
4	0.33	0.60	0.148	0.071	---	0.08
5	0.42	0.60	0.148	0.071	---	0.08
6	0.50	0.70	0.173	0.071	---	0.10
7	0.58	0.70	0.173	0.071	---	0.10
8	0.67	0.70	0.173	0.071	---	0.10
9	0.75	0.70	0.173	0.071	---	0.10
10	0.83	0.70	0.173	0.071	---	0.10
11	0.92	0.70	0.173	0.071	---	0.10
12	1.00	0.80	0.198	0.071	---	0.13
13	1.08	0.80	0.198	0.071	---	0.13
14	1.17	0.80	0.198	0.071	---	0.13
15	1.25	0.80	0.198	0.071	---	0.13
16	1.33	0.80	0.198	0.071	---	0.13
17	1.42	0.80	0.198	0.071	---	0.13
18	1.50	0.80	0.198	0.071	---	0.13
19	1.58	0.80	0.198	0.071	---	0.13
20	1.67	0.80	0.198	0.071	---	0.13
21	1.75	0.80	0.198	0.071	---	0.13
22	1.83	0.80	0.198	0.071	---	0.13
23	1.92	0.80	0.198	0.071	---	0.13
24	2.00	0.90	0.222	0.071	---	0.15
25	2.08	0.80	0.198	0.071	---	0.13
26	2.17	0.90	0.222	0.071	---	0.15
27	2.25	0.90	0.222	0.071	---	0.15
28	2.33	0.90	0.222	0.071	---	0.15
29	2.42	0.90	0.222	0.071	---	0.15
30	2.50	0.90	0.222	0.071	---	0.15
31	2.58	0.90	0.222	0.071	---	0.15
32	2.67	0.90	0.222	0.071	---	0.15
33	2.75	1.00	0.247	0.071	---	0.18
34	2.83	1.00	0.247	0.071	---	0.18
35	2.92	1.00	0.247	0.071	---	0.18
36	3.00	1.00	0.247	0.071	---	0.18
37	3.08	1.00	0.247	0.071	---	0.18
38	3.17	1.10	0.272	0.071	---	0.20
39	3.25	1.10	0.272	0.071	---	0.20
40	3.33	1.10	0.272	0.071	---	0.20
41	3.42	1.20	0.296	0.071	---	0.23
42	3.50	1.30	0.321	0.071	---	0.25
43	3.58	1.40	0.346	0.071	---	0.27
44	3.67	1.40	0.346	0.071	---	0.27
45	3.75	1.50	0.370	0.071	---	0.30
46	3.83	1.50	0.370	0.071	---	0.30
47	3.92	1.60	0.395	0.071	---	0.32
48	4.00	1.60	0.395	0.071	---	0.32
49	4.08	1.70	0.420	0.071	---	0.35
50	4.17	1.80	0.445	0.071	---	0.37
51	4.25	1.90	0.469	0.071	---	0.40
52	4.33	2.00	0.494	0.071	---	0.42
53	4.42	2.10	0.519	0.071	---	0.45
54	4.50	2.10	0.519	0.071	---	0.45
55	4.58	2.20	0.543	0.071	---	0.47
56	4.67	2.30	0.568	0.071	---	0.50
57	4.75	2.40	0.593	0.071	---	0.52
58	4.83	2.40	0.593	0.071	---	0.52
59	4.92	2.50	0.617	0.071	---	0.55
60	5.00	2.60	0.642	0.071	---	0.57
61	5.08	3.10	0.766	0.071	---	0.69
62	5.17	3.60	0.889	0.071	---	0.82

63	5.25	3.90	0.963	0.071	---	0.89
64	5.33	4.20	1.037	0.071	---	0.97
65	5.42	4.70	1.161	0.071	---	1.09
66	5.50	5.60	1.383	0.071	---	1.31
67	5.58	1.90	0.469	0.071	---	0.40
68	5.67	0.90	0.222	0.071	---	0.15
69	5.75	0.60	0.148	0.071	---	0.08
70	5.83	0.50	0.123	0.071	---	0.05
71	5.92	0.30	0.074	0.071	---	0.00
72	6.00	0.20	0.049	0.071	0.009	0.04
Sum =		100.0			Sum =	19.7

Flood volume = Effective rainfall 1.64(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 1.7(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 0.448(Ac.Ft)
Total rainfall = 2.06(In)
Flood volume = 76123.5 Cubic Feet
Total soil loss = 19507.0 Cubic Feet

Peak flow rate of this hydrograph = 15.102(CFS)

++

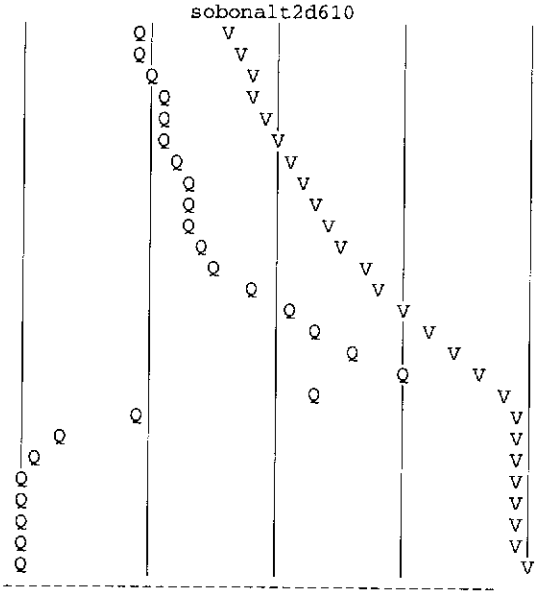
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0019	0.28	Q
0+10	0.0071	0.75	VQ
0+15	0.0138	0.96	VQ
0+20	0.0206	0.99	VQ
0+25	0.0275	1.00	VQ
0+30	0.0353	1.13	V Q
0+35	0.0441	1.29	VQ
0+40	0.0532	1.31	VQ
0+45	0.0623	1.32	VQ
0+50	0.0713	1.32	VQ
0+55	0.0804	1.32	VQ
1+ 0	0.0904	1.45	Q
1+ 5	0.1015	1.61	VQ
1+10	0.1127	1.63	VQ
1+15	0.1240	1.64	VQ
1+20	0.1352	1.64	Q
1+25	0.1465	1.64	Q
1+30	0.1578	1.64	Q
1+35	0.1690	1.64	Q
1+40	0.1803	1.64	QV
1+45	0.1916	1.64	QV
1+50	0.2028	1.64	QV
1+55	0.2141	1.64	QV
2+ 0	0.2263	1.77	Q V
2+ 5	0.2386	1.80	Q V
2+10	0.2510	1.79	Q V
2+15	0.2643	1.93	Q V
2+20	0.2777	1.95	Q V
2+25	0.2912	1.95	Q V
2+30	0.3046	1.95	Q V
2+35	0.3181	1.95	Q V
2+40	0.3316	1.95	Q V
2+45	0.3459	2.09	Q V
2+50	0.3614	2.25	Q V
2+55	0.3770	2.27	Q V
3+ 0	0.3927	2.27	Q V
3+ 5	0.4083	2.27	Q V
3+10	0.4249	2.40	Q V
3+15	0.4426	2.57	Q V
3+20	0.4604	2.59	Q V
3+25	0.4792	2.72	Q V
3+30	0.4999	3.02	Q V
3+35	0.5229	3.33	Q V
3+40	0.5471	3.52	Q V
3+45	0.5724	3.68	Q V
3+50	0.5989	3.84	Q V
3+55	0.6264	3.99	Q V
4+ 0	0.6550	4.16	Q V
4+ 5	0.6847	4.31	Q V

sobonalt2d610

4+10	0.7165	4.61
4+15	0.7504	4.92
4+20	0.7865	5.24
4+25	0.8248	5.56
4+30	0.8644	5.75
4+35	0.9051	5.91
4+40	0.9478	6.20
4+45	0.9927	6.52
4+50	1.0388	6.71
4+55	1.0861	6.86
5+ 0	1.1354	7.16
5+ 5	1.1905	8.00
5+10	1.2558	9.49
5+15	1.3302	10.80
5+20	1.4116	11.81
5+25	1.5014	13.04
5+30	1.6054	15.10
5+35	1.6869	11.83
5+40	1.7198	4.78
5+45	1.7334	1.97
5+50	1.7402	0.99
5+55	1.7433	0.46
6+ 0	1.7454	0.30
6+ 5	1.7473	0.28
6+10	1.7475	0.04
6+15	1.7476	0.01



sobonalt2d2410

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt2d2410.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	2.25	28.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	6.00	76.80

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 3.793(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.793(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt2d2410

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	0.126	0.005	0.02
2	0.17	0.07	0.030	0.125	0.005	0.02
3	0.25	0.07	0.030	0.125	0.005	0.02
4	0.33	0.10	0.046	0.124	0.008	0.04
5	0.42	0.10	0.046	0.124	0.008	0.04
6	0.50	0.10	0.046	0.123	0.008	0.04
7	0.58	0.10	0.046	0.123	0.008	0.04
8	0.67	0.10	0.046	0.122	0.008	0.04
9	0.75	0.10	0.046	0.122	0.008	0.04
10	0.83	0.13	0.061	0.121	0.011	0.05
11	0.92	0.13	0.061	0.121	0.011	0.05
12	1.00	0.13	0.061	0.120	0.011	0.05
13	1.08	0.10	0.046	0.120	0.008	0.04
14	1.17	0.10	0.046	0.119	0.008	0.04
15	1.25	0.10	0.046	0.119	0.008	0.04
16	1.33	0.10	0.046	0.118	0.008	0.04
17	1.42	0.10	0.046	0.118	0.008	0.04
18	1.50	0.10	0.046	0.117	0.008	0.04
19	1.58	0.10	0.046	0.117	0.008	0.04
20	1.67	0.10	0.046	0.117	0.008	0.04
21	1.75	0.10	0.046	0.116	0.008	0.04
22	1.83	0.13	0.061	0.116	0.011	0.05
23	1.92	0.13	0.061	0.115	0.011	0.05
24	2.00	0.13	0.061	0.115	0.011	0.05
25	2.08	0.13	0.061	0.114	0.011	0.05
26	2.17	0.13	0.061	0.114	0.011	0.05
27	2.25	0.13	0.061	0.113	0.011	0.05
28	2.33	0.13	0.061	0.113	0.011	0.05
29	2.42	0.13	0.061	0.112	0.011	0.05
30	2.50	0.13	0.061	0.112	0.011	0.05
31	2.58	0.17	0.076	0.111	0.014	0.06
32	2.67	0.17	0.076	0.111	0.014	0.06
33	2.75	0.17	0.076	0.110	0.014	0.06
34	2.83	0.17	0.076	0.110	0.014	0.06
35	2.92	0.17	0.076	0.110	0.014	0.06
36	3.00	0.17	0.076	0.109	0.014	0.06
37	3.08	0.17	0.076	0.109	0.014	0.06
38	3.17	0.17	0.076	0.108	0.014	0.06
39	3.25	0.17	0.076	0.108	0.014	0.06
40	3.33	0.17	0.076	0.107	0.014	0.06
41	3.42	0.17	0.076	0.107	0.014	0.06
42	3.50	0.17	0.076	0.106	0.014	0.06
43	3.58	0.17	0.076	0.106	0.014	0.06
44	3.67	0.17	0.076	0.106	0.014	0.06
45	3.75	0.17	0.076	0.105	0.014	0.06
46	3.83	0.20	0.091	0.105	0.016	0.07
47	3.92	0.20	0.091	0.104	0.016	0.07
48	4.00	0.20	0.091	0.104	0.016	0.07
49	4.08	0.20	0.091	0.103	0.016	0.07
50	4.17	0.20	0.091	0.103	0.016	0.07
51	4.25	0.20	0.091	0.102	0.016	0.07
52	4.33	0.23	0.106	0.102	---	0.00
53	4.42	0.23	0.106	0.102	---	0.00
54	4.50	0.23	0.106	0.101	---	0.01
55	4.58	0.23	0.106	0.101	---	0.01
56	4.67	0.23	0.106	0.100	---	0.01
57	4.75	0.23	0.106	0.100	---	0.01
58	4.83	0.27	0.121	0.099	---	0.02
59	4.92	0.27	0.121	0.099	---	0.02
60	5.00	0.27	0.121	0.099	---	0.02
61	5.08	0.20	0.091	0.098	0.016	0.07
62	5.17	0.20	0.091	0.098	0.016	0.07

63	5.25	0.20	0.091	0.097	0.016	0.07
64	5.33	0.23	0.106	0.097	---	0.01
65	5.42	0.23	0.106	0.096	---	0.01
66	5.50	0.23	0.106	0.096	---	0.01
67	5.58	0.27	0.121	0.096	---	0.03
68	5.67	0.27	0.121	0.095	---	0.03
69	5.75	0.27	0.121	0.095	---	0.03
70	5.83	0.27	0.121	0.094	---	0.03
71	5.92	0.27	0.121	0.094	---	0.03
72	6.00	0.27	0.121	0.093	---	0.03
73	6.08	0.30	0.137	0.093	---	0.04
74	6.17	0.30	0.137	0.093	---	0.04
75	6.25	0.30	0.137	0.092	---	0.04
76	6.33	0.30	0.137	0.092	---	0.04
77	6.42	0.30	0.137	0.091	---	0.05
78	6.50	0.30	0.137	0.091	---	0.05
79	6.58	0.33	0.152	0.091	---	0.06
80	6.67	0.33	0.152	0.090	---	0.06
81	6.75	0.33	0.152	0.090	---	0.06
82	6.83	0.33	0.152	0.089	---	0.06
83	6.92	0.33	0.152	0.089	---	0.06
84	7.00	0.33	0.152	0.089	---	0.06
85	7.08	0.33	0.152	0.088	---	0.06
86	7.17	0.33	0.152	0.088	---	0.06
87	7.25	0.33	0.152	0.087	---	0.06
88	7.33	0.37	0.167	0.087	---	0.08
89	7.42	0.37	0.167	0.087	---	0.08
90	7.50	0.37	0.167	0.086	---	0.08
91	7.58	0.40	0.182	0.086	---	0.10
92	7.67	0.40	0.182	0.085	---	0.10
93	7.75	0.40	0.182	0.085	---	0.10
94	7.83	0.43	0.197	0.085	---	0.11
95	7.92	0.43	0.197	0.084	---	0.11
96	8.00	0.43	0.197	0.084	---	0.11
97	8.08	0.50	0.228	0.083	---	0.14
98	8.17	0.50	0.228	0.083	---	0.14
99	8.25	0.50	0.228	0.083	---	0.14
100	8.33	0.50	0.228	0.082	---	0.15
101	8.42	0.50	0.228	0.082	---	0.15
102	8.50	0.50	0.228	0.082	---	0.15
103	8.58	0.53	0.243	0.081	---	0.16
104	8.67	0.53	0.243	0.081	---	0.16
105	8.75	0.53	0.243	0.080	---	0.16
106	8.83	0.57	0.258	0.080	---	0.18
107	8.92	0.57	0.258	0.080	---	0.18
108	9.00	0.57	0.258	0.079	---	0.18
109	9.08	0.63	0.288	0.079	---	0.21
110	9.17	0.63	0.288	0.078	---	0.21
111	9.25	0.63	0.288	0.078	---	0.21
112	9.33	0.67	0.303	0.078	---	0.23
113	9.42	0.67	0.303	0.077	---	0.23
114	9.50	0.67	0.303	0.077	---	0.23
115	9.58	0.70	0.319	0.077	---	0.24
116	9.67	0.70	0.319	0.076	---	0.24
117	9.75	0.70	0.319	0.076	---	0.24
118	9.83	0.73	0.334	0.076	---	0.26
119	9.92	0.73	0.334	0.075	---	0.26
120	10.00	0.73	0.334	0.075	---	0.26
121	10.08	0.50	0.228	0.074	---	0.15
122	10.17	0.50	0.228	0.074	---	0.15
123	10.25	0.50	0.228	0.074	---	0.15
124	10.33	0.50	0.228	0.073	---	0.15
125	10.42	0.50	0.228	0.073	---	0.15
126	10.50	0.50	0.228	0.073	---	0.15
127	10.58	0.67	0.303	0.072	---	0.23
128	10.67	0.67	0.303	0.072	---	0.23
129	10.75	0.67	0.303	0.072	---	0.23
130	10.83	0.67	0.303	0.071	---	0.23
131	10.92	0.67	0.303	0.071	---	0.23
132	11.00	0.67	0.303	0.071	---	0.23
133	11.08	0.63	0.288	0.070	---	0.22
134	11.17	0.63	0.288	0.070	---	0.22
135	11.25	0.63	0.288	0.069	---	0.22
136	11.33	0.63	0.288	0.069	---	0.22
137	11.42	0.63	0.288	0.069	---	0.22
138	11.50	0.63	0.288	0.068	---	0.22
139	11.58	0.57	0.258	0.068	---	0.19
140	11.67	0.57	0.258	0.068	---	0.19
141	11.75	0.57	0.258	0.067	---	0.19

142	11.83	0.60	0.273	0.067	---	0.21
143	11.92	0.60	0.273	0.067	---	0.21
144	12.00	0.60	0.273	0.066	---	0.21
145	12.08	0.83	0.379	0.066	---	0.31
146	12.17	0.83	0.379	0.066	---	0.31
147	12.25	0.83	0.379	0.065	---	0.31
148	12.33	0.87	0.394	0.065	---	0.33
149	12.42	0.87	0.394	0.065	---	0.33
150	12.50	0.87	0.394	0.064	---	0.33
151	12.58	0.93	0.425	0.064	---	0.36
152	12.67	0.93	0.425	0.064	---	0.36
153	12.75	0.93	0.425	0.064	---	0.36
154	12.83	0.97	0.440	0.063	---	0.38
155	12.92	0.97	0.440	0.063	---	0.38
156	13.00	0.97	0.440	0.063	---	0.38
157	13.08	1.13	0.516	0.062	---	0.45
158	13.17	1.13	0.516	0.062	---	0.45
159	13.25	1.13	0.516	0.062	---	0.45
160	13.33	1.13	0.516	0.061	---	0.45
161	13.42	1.13	0.516	0.061	---	0.45
162	13.50	1.13	0.516	0.061	---	0.46
163	13.58	0.77	0.349	0.060	---	0.29
164	13.67	0.77	0.349	0.060	---	0.29
165	13.75	0.77	0.349	0.060	---	0.29
166	13.83	0.77	0.349	0.059	---	0.29
167	13.92	0.77	0.349	0.059	---	0.29
168	14.00	0.77	0.349	0.059	---	0.29
169	14.08	0.90	0.410	0.059	---	0.35
170	14.17	0.90	0.410	0.058	---	0.35
171	14.25	0.90	0.410	0.058	---	0.35
172	14.33	0.87	0.394	0.058	---	0.34
173	14.42	0.87	0.394	0.057	---	0.34
174	14.50	0.87	0.394	0.057	---	0.34
175	14.58	0.87	0.394	0.057	---	0.34
176	14.67	0.87	0.394	0.056	---	0.34
177	14.75	0.87	0.394	0.056	---	0.34
178	14.83	0.83	0.379	0.056	---	0.32
179	14.92	0.83	0.379	0.056	---	0.32
180	15.00	0.83	0.379	0.055	---	0.32
181	15.08	0.80	0.364	0.055	---	0.31
182	15.17	0.80	0.364	0.055	---	0.31
183	15.25	0.80	0.364	0.054	---	0.31
184	15.33	0.77	0.349	0.054	---	0.29
185	15.42	0.77	0.349	0.054	---	0.30
186	15.50	0.77	0.349	0.054	---	0.30
187	15.58	0.63	0.288	0.053	---	0.23
188	15.67	0.63	0.288	0.053	---	0.24
189	15.75	0.63	0.288	0.053	---	0.24
190	15.83	0.63	0.288	0.053	---	0.24
191	15.92	0.63	0.288	0.052	---	0.24
192	16.00	0.63	0.288	0.052	---	0.24
193	16.08	0.13	0.061	0.052	---	0.01
194	16.17	0.13	0.061	0.051	---	0.01
195	16.25	0.13	0.061	0.051	---	0.01
196	16.33	0.13	0.061	0.051	---	0.01
197	16.42	0.13	0.061	0.051	---	0.01
198	16.50	0.13	0.061	0.050	---	0.01
199	16.58	0.10	0.046	0.050	0.008	0.04
200	16.67	0.10	0.046	0.050	0.008	0.04
201	16.75	0.10	0.046	0.050	0.008	0.04
202	16.83	0.10	0.046	0.049	0.008	0.04
203	16.92	0.10	0.046	0.049	0.008	0.04
204	17.00	0.10	0.046	0.049	0.008	0.04
205	17.08	0.17	0.076	0.049	---	0.03
206	17.17	0.17	0.076	0.048	---	0.03
207	17.25	0.17	0.076	0.048	---	0.03
208	17.33	0.17	0.076	0.048	---	0.03
209	17.42	0.17	0.076	0.048	---	0.03
210	17.50	0.17	0.076	0.047	---	0.03
211	17.58	0.17	0.076	0.047	---	0.03
212	17.67	0.17	0.076	0.047	---	0.03
213	17.75	0.17	0.076	0.047	---	0.03
214	17.83	0.13	0.061	0.047	---	0.01
215	17.92	0.13	0.061	0.046	---	0.01
216	18.00	0.13	0.061	0.046	---	0.01
217	18.08	0.13	0.061	0.046	---	0.01
218	18.17	0.13	0.061	0.046	---	0.02
219	18.25	0.13	0.061	0.045	---	0.02
220	18.33	0.13	0.061	0.045	---	0.02

221	18.42	0.13	0.061	0.045	---	0.02
222	18.50	0.13	0.061	0.045	---	0.02
223	18.58	0.10	0.046	0.045	---	0.00
224	18.67	0.10	0.046	0.044	---	0.00
225	18.75	0.10	0.046	0.044	---	0.00
226	18.83	0.07	0.030	0.044	0.005	0.02
227	18.92	0.07	0.030	0.044	0.005	0.02
228	19.00	0.07	0.030	0.043	0.005	0.02
229	19.08	0.10	0.046	0.043	---	0.00
230	19.17	0.10	0.046	0.043	---	0.00
231	19.25	0.10	0.046	0.043	---	0.00
232	19.33	0.13	0.061	0.043	---	0.02
233	19.42	0.13	0.061	0.042	---	0.02
234	19.50	0.13	0.061	0.042	---	0.02
235	19.58	0.10	0.046	0.042	---	0.00
236	19.67	0.10	0.046	0.042	---	0.00
237	19.75	0.10	0.046	0.042	---	0.00
238	19.83	0.07	0.030	0.041	0.005	0.02
239	19.92	0.07	0.030	0.041	0.005	0.02
240	20.00	0.07	0.030	0.041	0.005	0.02
241	20.08	0.10	0.046	0.041	---	0.00
242	20.17	0.10	0.046	0.041	---	0.00
243	20.25	0.10	0.046	0.041	---	0.00
244	20.33	0.10	0.046	0.040	---	0.01
245	20.42	0.10	0.046	0.040	---	0.01
246	20.50	0.10	0.046	0.040	---	0.01
247	20.58	0.10	0.046	0.040	---	0.01
248	20.67	0.10	0.046	0.040	---	0.01
249	20.75	0.10	0.046	0.040	---	0.01
250	20.83	0.07	0.030	0.039	0.005	0.02
251	20.92	0.07	0.030	0.039	0.005	0.02
252	21.00	0.07	0.030	0.039	0.005	0.02
253	21.08	0.10	0.046	0.039	---	0.01
254	21.17	0.10	0.046	0.039	---	0.01
255	21.25	0.10	0.046	0.039	---	0.01
256	21.33	0.07	0.030	0.038	0.005	0.02
257	21.42	0.07	0.030	0.038	0.005	0.02
258	21.50	0.07	0.030	0.038	0.005	0.02
259	21.58	0.10	0.046	0.038	---	0.01
260	21.67	0.10	0.046	0.038	---	0.01
261	21.75	0.10	0.046	0.038	---	0.01
262	21.83	0.07	0.030	0.038	0.005	0.02
263	21.92	0.07	0.030	0.038	0.005	0.02
264	22.00	0.07	0.030	0.037	0.005	0.02
265	22.08	0.10	0.046	0.037	---	0.01
266	22.17	0.10	0.046	0.037	---	0.01
267	22.25	0.10	0.046	0.037	---	0.01
268	22.33	0.07	0.030	0.037	0.005	0.02
269	22.42	0.07	0.030	0.037	0.005	0.02
270	22.50	0.07	0.030	0.037	0.005	0.02
271	22.58	0.07	0.030	0.037	0.005	0.02
272	22.67	0.07	0.030	0.036	0.005	0.02
273	22.75	0.07	0.030	0.036	0.005	0.02
274	22.83	0.07	0.030	0.036	0.005	0.02
275	22.92	0.07	0.030	0.036	0.005	0.02
276	23.00	0.07	0.030	0.036	0.005	0.02
277	23.08	0.07	0.030	0.036	0.005	0.02
278	23.17	0.07	0.030	0.036	0.005	0.02
279	23.25	0.07	0.030	0.036	0.005	0.02
280	23.33	0.07	0.030	0.036	0.005	0.02
281	23.42	0.07	0.030	0.036	0.005	0.02
282	23.50	0.07	0.030	0.036	0.005	0.02
283	23.58	0.07	0.030	0.036	0.005	0.02
284	23.67	0.07	0.030	0.036	0.005	0.02
285	23.75	0.07	0.030	0.036	0.005	0.02
286	23.83	0.07	0.030	0.035	0.005	0.02
287	23.92	0.07	0.030	0.035	0.005	0.02
288	24.00	0.07	0.030	0.035	0.005	0.02
Sum =		100.0			Sum =	32.0

Flood volume = Effective rainfall 2.67(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 2.8(Ac.Ft)
Total soil loss = 1.13(In)
Total soil loss = 1.202(Ac.Ft)
Total rainfall = 3.79(In)
Flood volume = 123853.4 Cubic Feet
Total soil loss = 52370.0 Cubic Feet

Peak flow rate of this hydrograph = 5.872(CFS)

---

sobonalt2d2410

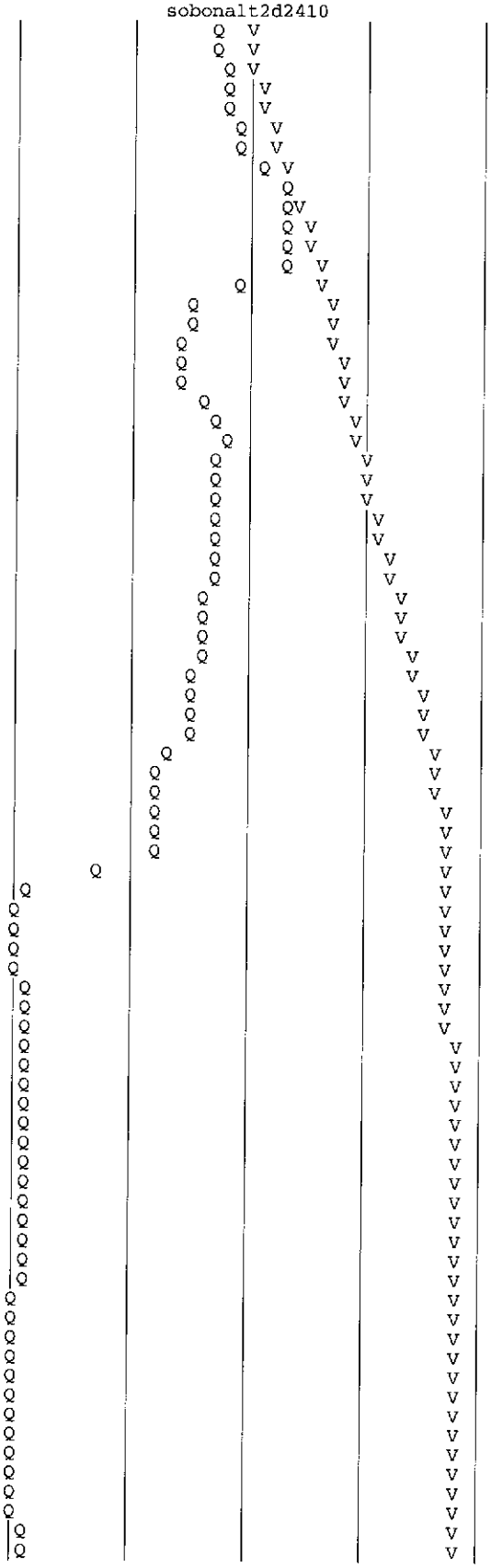
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0009	0.13	Q				
0+10	0.0029	0.29	VQ				
0+15	0.0051	0.32	VQ				
0+20	0.0078	0.39	VQ				
0+25	0.0110	0.47	VQ				
0+30	0.0143	0.48	VQ				
0+35	0.0176	0.48	VQ				
0+40	0.0209	0.48	VQ				
0+45	0.0243	0.48	VQ				
0+50	0.0280	0.55	V Q				
0+55	0.0324	0.63	V Q				
1+ 0	0.0368	0.64	V Q				
1+ 5	0.0407	0.58	V Q				
1+10	0.0442	0.50	VQ				
1+15	0.0475	0.48	VQ				
1+20	0.0508	0.48	VQ				
1+25	0.0541	0.48	VQ				
1+30	0.0574	0.48	VQ				
1+35	0.0608	0.48	VQ				
1+40	0.0641	0.48	VQ				
1+45	0.0674	0.48	VQ				
1+50	0.0712	0.55	VQ				
1+55	0.0755	0.63	VQ				
2+ 0	0.0799	0.64	VQ				
2+ 5	0.0843	0.64	VQ				
2+10	0.0888	0.64	VQ				
2+15	0.0932	0.64	VQ				
2+20	0.0976	0.64	VQ				
2+25	0.1020	0.64	VQ				
2+30	0.1064	0.64	VQ				
2+35	0.1113	0.71	VQ				
2+40	0.1168	0.79	V Q				
2+45	0.1223	0.80	V Q				
2+50	0.1278	0.80	V Q				
2+55	0.1333	0.80	V Q				
3+ 0	0.1389	0.80	V Q				
3+ 5	0.1444	0.80	VQ				
3+10	0.1499	0.80	VQ				
3+15	0.1554	0.80	VQ				
3+20	0.1610	0.80	VQ				
3+25	0.1665	0.80	VQ				
3+30	0.1720	0.80	VQ				
3+35	0.1776	0.80	VQ				
3+40	0.1831	0.80	VQ				
3+45	0.1886	0.80	VQ				
3+50	0.1946	0.87	VQ				
3+55	0.2011	0.95	VQ				
4+ 0	0.2078	0.96	VQ				
4+ 5	0.2144	0.96	Q				
4+10	0.2210	0.96	Q				
4+15	0.2277	0.96	Q				
4+20	0.2317	0.59	QV				
4+25	0.2326	0.13	Q V				
4+30	0.2331	0.07	Q V				
4+35	0.2336	0.07	Q V				
4+40	0.2341	0.07	Q V				
4+45	0.2346	0.08	Q V				
4+50	0.2358	0.16	Q V				
4+55	0.2376	0.27	Q V				
5+ 0	0.2396	0.29	Q V				
5+ 5	0.2435	0.57	QV				
5+10	0.2498	0.91	Q				
5+15	0.2563	0.96	Q				
5+20	0.2606	0.62	QV				
5+25	0.2619	0.19	Q V				
5+30	0.2629	0.14	Q V				
5+35	0.2643	0.21	Q V				
5+40	0.2665	0.32	Q V				
5+45	0.2689	0.34	Q V				
5+50	0.2712	0.35	Q V				

5+55	0.2737	0.35	Q V
6+ 0	0.2761	0.36	Q V
6+ 5	0.2791	0.44	Q V
6+10	0.2829	0.55	QV
6+15	0.2868	0.57	Q V
6+20	0.2908	0.57	Q V
6+25	0.2947	0.58	Q V
6+30	0.2988	0.58	Q V
6+35	0.3034	0.67	Q V
6+40	0.3087	0.77	QV
6+45	0.3142	0.79	QV
6+50	0.3197	0.80	QV
6+55	0.3252	0.81	QV
7+ 0	0.3308	0.81	QV
7+ 5	0.3364	0.82	QV
7+10	0.3421	0.82	QV
7+15	0.3478	0.83	QV
7+20	0.3541	0.91	QV
7+25	0.3611	1.02	QV
7+30	0.3682	1.04	QV
7+35	0.3759	1.12	QV
7+40	0.3844	1.23	QV
7+45	0.3930	1.25	QV
7+50	0.4022	1.33	Q
7+55	0.4121	1.44	Q
8+ 0	0.4221	1.46	Q
8+ 5	0.4333	1.63	Q
8+10	0.4459	1.83	VQ
8+15	0.4587	1.86	VQ
8+20	0.4716	1.87	VQ
8+25	0.4846	1.88	VQ
8+30	0.4975	1.88	VQ
8+35	0.5111	1.97	Q
8+40	0.5253	2.07	VQ
8+45	0.5397	2.09	VQ
8+50	0.5547	2.18	VQ
8+55	0.5704	2.28	VQ
9+ 0	0.5863	2.30	VQ
9+ 5	0.6033	2.47	VQ
9+10	0.6217	2.67	V Q
9+15	0.6403	2.70	VQ
9+20	0.6595	2.79	V Q
9+25	0.6795	2.90	V Q
9+30	0.6996	2.92	V Q
9+35	0.7203	3.00	V Q
9+40	0.7417	3.11	V Q
9+45	0.7632	3.13	V Q
9+50	0.7853	3.21	VQ
9+55	0.8082	3.32	V Q
10+ 0	0.8312	3.34	V Q
10+ 5	0.8503	2.78	Q
10+10	0.8647	2.09	Q V
10+15	0.8785	2.00	Q V
10+20	0.8922	1.99	Q V
10+25	0.9059	1.99	Q V
10+30	0.9197	2.00	Q V
10+35	0.9362	2.40	Q V
10+40	0.9562	2.90	Q V
10+45	0.9767	2.98	Q V
10+50	0.9973	2.99	Q V
10+55	1.0180	3.00	Q V
11+ 0	1.0386	3.00	Q V
11+ 5	1.0588	2.93	Q V
11+10	1.0783	2.83	Q V
11+15	1.0977	2.82	Q V
11+20	1.1172	2.82	Q V
11+25	1.1367	2.83	Q V
11+30	1.1562	2.83	Q V
11+35	1.1746	2.68	Q V
11+40	1.1917	2.48	Q V
11+45	1.2087	2.46	Q V
11+50	1.2262	2.54	Q V
11+55	1.2444	2.64	Q V
12+ 0	1.2627	2.66	Q V
12+ 5	1.2850	3.23	Q V
12+10	1.3120	3.93	Q V
12+15	1.3398	4.03	Q V
12+20	1.3682	4.13	Q V
12+25	1.3974	4.24	Q V

sobonalt2d2410

12+30	1.4267	4.25	
12+35	1.4571	4.42	
12+40	1.4890	4.62	
12+45	1.5210	4.66	
12+50	1.5537	4.74	
12+55	1.5871	4.85	
13+ 0	1.6206	4.87	
13+ 5	1.6569	5.27	
13+10	1.6967	5.77	
13+15	1.7370	5.85	
13+20	1.7774	5.86	
13+25	1.8178	5.87	
13+30	1.8582	5.87	
13+35	1.8926	4.99	
13+40	1.9195	3.91	
13+45	1.9453	3.76	
13+50	1.9711	3.73	
13+55	1.9968	3.74	
14+ 0	2.0226	3.74	
14+ 5	2.0506	4.07	
14+10	2.0813	4.47	
14+15	2.1125	4.53	
14+20	2.1432	4.46	
14+25	2.1733	4.36	
14+30	2.2033	4.35	
14+35	2.2333	4.36	
14+40	2.2633	4.36	
14+45	2.2933	4.36	
14+50	2.3229	4.29	
14+55	2.3517	4.19	
15+ 0	2.3805	4.18	
15+ 5	2.4088	4.10	
15+10	2.4364	4.01	
15+15	2.4639	4.00	
15+20	2.4909	3.92	
15+25	2.5172	3.82	
15+30	2.5434	3.81	
15+35	2.5675	3.49	
15+40	2.5888	3.10	
15+45	2.6098	3.05	
15+50	2.6307	3.04	
15+55	2.6517	3.04	
16+ 0	2.6727	3.05	
16+ 5	2.6853	1.84	
16+10	2.6878	0.36	
16+15	2.6889	0.16	
16+20	2.6898	0.12	
16+25	2.6906	0.13	
16+30	2.6915	0.13	
16+35	2.6934	0.28	
16+40	2.6965	0.45	
16+45	2.6998	0.48	
16+50	2.7031	0.48	
16+55	2.7065	0.48	
17+ 0	2.7098	0.48	
17+ 5	2.7127	0.43	
17+10	2.7152	0.36	
17+15	2.7177	0.36	
17+20	2.7201	0.36	
17+25	2.7226	0.36	
17+30	2.7251	0.36	
17+35	2.7277	0.37	
17+40	2.7302	0.37	
17+45	2.7328	0.37	
17+50	2.7348	0.30	
17+55	2.7362	0.20	
18+ 0	2.7375	0.19	
18+ 5	2.7388	0.19	
18+10	2.7401	0.19	
18+15	2.7415	0.20	
18+20	2.7428	0.20	
18+25	2.7442	0.20	
18+30	2.7456	0.20	
18+35	2.7465	0.13	
18+40	2.7467	0.03	
18+45	2.7468	0.02	
18+50	2.7478	0.14	
18+55	2.7499	0.30	
19+ 0	2.7520	0.32	

sobonalt2d2410

19+ 5	2.7534	0.20	Q
19+10	2.7538	0.05	Q
19+15	2.7541	0.04	Q
19+20	2.7549	0.12	Q
19+25	2.7563	0.22	Q
19+30	2.7580	0.23	Q
19+35	2.7590	0.16	Q
19+40	2.7595	0.06	Q
19+45	2.7598	0.05	Q
19+50	2.7609	0.16	Q
19+55	2.7630	0.30	|Q
20+ 0	2.7652	0.32	|Q
20+ 5	2.7666	0.21	Q
20+10	2.7672	0.08	Q
20+15	2.7676	0.07	Q
20+20	2.7681	0.06	Q
20+25	2.7685	0.07	Q
20+30	2.7690	0.07	Q
20+35	2.7695	0.07	Q
20+40	2.7700	0.07	Q
20+45	2.7705	0.08	Q
20+50	2.7717	0.18	Q
20+55	2.7738	0.30	|Q
21+ 0	2.7760	0.32	|Q
21+ 5	2.7776	0.22	Q
21+10	2.7783	0.11	Q
21+15	2.7789	0.09	Q
21+20	2.7802	0.18	Q
21+25	2.7822	0.30	|Q
21+30	2.7844	0.32	|Q
21+35	2.7860	0.23	Q
21+40	2.7868	0.12	Q
21+45	2.7875	0.10	Q
21+50	2.7888	0.19	Q
21+55	2.7909	0.30	|Q
22+ 0	2.7931	0.32	|Q
22+ 5	2.7947	0.23	Q
22+10	2.7956	0.12	Q
22+15	2.7963	0.11	Q
22+20	2.7977	0.20	Q
22+25	2.7998	0.30	|Q
22+30	2.8020	0.32	|Q
22+35	2.8042	0.32	|Q
22+40	2.8064	0.32	|Q
22+45	2.8086	0.32	|Q
22+50	2.8108	0.32	|Q
22+55	2.8130	0.32	|Q
23+ 0	2.8152	0.32	|Q
23+ 5	2.8174	0.32	|Q
23+10	2.8197	0.32	|Q
23+15	2.8219	0.32	|Q
23+20	2.8241	0.32	|Q
23+25	2.8263	0.32	|Q
23+30	2.8285	0.32	|Q
23+35	2.8307	0.32	|Q
23+40	2.8329	0.32	|Q
23+45	2.8351	0.32	|Q
23+50	2.8373	0.32	|Q
23+55	2.8396	0.32	|Q
24+ 0	2.8418	0.32	|Q
24+ 5	2.8431	0.19	Q
24+10	2.8433	0.03	Q
24+15	2.8433	0.00	Q

ALTERNATIVE NO. 3

UNDEVELOPED CONDITION

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt3110.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	0.55	3.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	1.20	7.08

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.817(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.817(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	86.00	0.000

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	0.797
2	0.167	194.180	55.366	3.292
3	0.250	291.271	18.995	1.129
4	0.333	388.361	7.769	0.462
5	0.417	485.451	2.779	0.165
6	0.500	582.541	0.892	0.053
7	0.583	679.631	0.599	0.036
8	0.667	776.721	0.191	0.011
		Sum =	100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.412	0.176	---	0.24
2	0.17	4.30	0.422	0.176	---	0.25
3	0.25	5.00	0.490	0.176	---	0.31
4	0.33	5.00	0.490	0.176	---	0.31
5	0.42	5.80	0.569	0.176	---	0.39
6	0.50	6.50	0.638	0.176	---	0.46
7	0.58	7.40	0.726	0.176	---	0.55
8	0.67	8.60	0.844	0.176	---	0.67
9	0.75	12.30	1.206	0.176	---	1.03
10	0.83	29.10	2.854	0.176	---	2.68
11	0.92	6.80	0.667	0.176	---	0.49
12	1.00	5.00	0.490	0.176	---	0.31
Sum =		100.0			Sum =	7.7

Flood volume = Effective rainfall 0.64(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.086(Ac.Ft)
Total rainfall = 0.82(In)
Flood volume = 13744.8 Cubic Feet
Total soil loss = 3760.8 Cubic Feet

Peak flow rate of this hydrograph = 10.822(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0013	0.19	Q
0+10	0.0080	0.97	Q
0+15	0.0172	1.33	Q
0+20	0.0287	1.68	Q
0+25	0.0415	1.86	Q V
0+30	0.0568	2.22	Q V
0+35	0.0749	2.62	Q V
0+40	0.0964	3.13	Q V
0+45	0.1236	3.95	Q V
0+50	0.1695	6.65	Q V
0+55	0.2440	10.82	Q V
1+ 0	0.2821	5.53	Q V
1+ 5	0.3032	3.06	Q V
1+10	0.3108	1.11	Q V
1+15	0.3137	0.41	Q V
1+20	0.3150	0.19	Q V
1+25	0.3154	0.06	Q V
1+30	0.3155	0.02	Q V
1+35	0.3155	0.00	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt3310.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	0.90	5.31

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	2.10	12.39

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 1.394(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.394(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	86.00	0.000

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt3310

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	0.797
2	0.167	194.180	55.366	3.292
3	0.250	291.271	18.995	1.129
4	0.333	388.361	7.769	0.462
5	0.417	485.451	2.779	0.165
6	0.500	582.541	0.892	0.053
7	0.583	679.631	0.599	0.036
8	0.667	776.721	0.191	0.011
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.217	0.176	---	0.04
2	0.17	1.30	0.217	0.176	---	0.04
3	0.25	1.10	0.184	0.176	---	0.01
4	0.33	1.50	0.251	0.176	---	0.08
5	0.42	1.50	0.251	0.176	---	0.08
6	0.50	1.80	0.301	0.176	---	0.13
7	0.58	1.50	0.251	0.176	---	0.08
8	0.67	1.80	0.301	0.176	---	0.13
9	0.75	1.80	0.301	0.176	---	0.13
10	0.83	1.50	0.251	0.176	---	0.08
11	0.92	1.60	0.268	0.176	---	0.09
12	1.00	1.80	0.301	0.176	---	0.13
13	1.08	2.20	0.368	0.176	---	0.19
14	1.17	2.20	0.368	0.176	---	0.19
15	1.25	2.20	0.368	0.176	---	0.19
16	1.33	2.00	0.334	0.176	---	0.16
17	1.42	2.60	0.435	0.176	---	0.26
18	1.50	2.70	0.452	0.176	---	0.28
19	1.58	2.40	0.401	0.176	---	0.23
20	1.67	2.70	0.452	0.176	---	0.28
21	1.75	3.30	0.552	0.176	---	0.38
22	1.83	3.10	0.518	0.176	---	0.34
23	1.92	2.90	0.485	0.176	---	0.31
24	2.00	3.00	0.502	0.176	---	0.33
25	2.08	3.10	0.518	0.176	---	0.34
26	2.17	4.20	0.702	0.176	---	0.53
27	2.25	5.00	0.836	0.176	---	0.66
28	2.33	3.50	0.585	0.176	---	0.41
29	2.42	6.80	1.137	0.176	---	0.96
30	2.50	7.30	1.221	0.176	---	1.05
31	2.58	8.20	1.371	0.176	---	1.20
32	2.67	5.90	0.987	0.176	---	0.81
33	2.75	2.00	0.334	0.176	---	0.16
34	2.83	1.80	0.301	0.176	---	0.13
35	2.92	1.80	0.301	0.176	---	0.13
36	3.00	0.60	0.100	0.176	0.090	0.01
Sum =		100.0			Sum =	10.5

Flood volume = Effective rainfall 0.87(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 0.256(Ac.Ft)
Total rainfall = 1.39(In)
Flood volume = 18717.6 Cubic Feet
Total soil loss = 11130.3 Cubic Feet

Peak flow rate of this hydrograph = 6.337(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0002	0.03	Q				
0+10	0.0014	0.17	Q				

sobonalt3310

0+15	0.0027	0.19	Q
0+20	0.0038	0.15	Q
0+25	0.0062	0.34	VQ
0+30	0.0092	0.45	VQ
0+35	0.0133	0.60	VQ
0+40	0.0171	0.54	VQ
0+45	0.0217	0.67	Q
0+50	0.0264	0.68	Q
0+55	0.0301	0.54	Q
1+ 0	0.0341	0.58	QV
1+ 5	0.0391	0.74	QV
1+10	0.0460	1.00	QV
1+15	0.0535	1.09	Q
1+20	0.0610	1.10	QV
1+25	0.0685	1.08	Q V
1+30	0.0780	1.39	Q V
1+35	0.0884	1.51	Q V
1+40	0.0983	1.44	Q V
1+45	0.1097	1.65	Q V
1+50	0.1235	2.00	Q V
1+55	0.1372	1.99	Q V
2+ 0	0.1503	1.91	Q V
2+ 5	0.1637	1.94	Q V
2+10	0.1785	2.15	Q V
2+15	0.1984	2.89	Q V
2+20	0.2214	3.34	Q V
2+25	0.2435	3.20	Q V
2+30	0.2771	4.89	Q V
2+35	0.3173	5.83	Q V
2+40	0.3609	6.34	Q V
2+45	0.3942	4.84	Q V
2+50	0.4104	2.34	Q V
2+55	0.4197	1.36	Q V
3+ 0	0.4258	0.88	Q V
3+ 5	0.4282	0.36	Q V
3+10	0.4292	0.14	Q V
3+15	0.4295	0.05	Q V
3+20	0.4296	0.01	Q V
3+25	0.4297	0.01	Q V
3+30	0.4297	0.00	Q V
3+35	0.4297	0.00	Q V

sobonalt3610

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt3610.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	1.40	8.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	3.00	17.70

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 2.058(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.058(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	86.00	0.000

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph

sobonalt3610

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	0.797
2	0.167	194.180	55.366	3.292
3	0.250	291.271	18.995	1.129
4	0.333	388.361	7.769	0.462
5	0.417	485.451	2.779	0.165
6	0.500	582.541	0.892	0.053
7	0.583	679.631	0.599	0.036
8	0.667	776.721	0.191	0.011
			Sum = 100.000	Sum= 5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.123	0.176	0.111	0.01
2	0.17	0.60	0.148	0.176	0.133	0.01
3	0.25	0.60	0.148	0.176	0.133	0.01
4	0.33	0.60	0.148	0.176	0.133	0.01
5	0.42	0.60	0.148	0.176	0.133	0.01
6	0.50	0.70	0.173	0.176	0.156	0.02
7	0.58	0.70	0.173	0.176	0.156	0.02
8	0.67	0.70	0.173	0.176	0.156	0.02
9	0.75	0.70	0.173	0.176	0.156	0.02
10	0.83	0.70	0.173	0.176	0.156	0.02
11	0.92	0.70	0.173	0.176	0.156	0.02
12	1.00	0.80	0.198	0.176	---	0.02
13	1.08	0.80	0.198	0.176	---	0.02
14	1.17	0.80	0.198	0.176	---	0.02
15	1.25	0.80	0.198	0.176	---	0.02
16	1.33	0.80	0.198	0.176	---	0.02
17	1.42	0.80	0.198	0.176	---	0.02
18	1.50	0.80	0.198	0.176	---	0.02
19	1.58	0.80	0.198	0.176	---	0.02
20	1.67	0.80	0.198	0.176	---	0.02
21	1.75	0.80	0.198	0.176	---	0.02
22	1.83	0.80	0.198	0.176	---	0.02
23	1.92	0.80	0.198	0.176	---	0.02
24	2.00	0.90	0.222	0.176	---	0.05
25	2.08	0.80	0.198	0.176	---	0.02
26	2.17	0.90	0.222	0.176	---	0.05
27	2.25	0.90	0.222	0.176	---	0.05
28	2.33	0.90	0.222	0.176	---	0.05
29	2.42	0.90	0.222	0.176	---	0.05
30	2.50	0.90	0.222	0.176	---	0.05
31	2.58	0.90	0.222	0.176	---	0.05
32	2.67	0.90	0.222	0.176	---	0.05
33	2.75	1.00	0.247	0.176	---	0.07
34	2.83	1.00	0.247	0.176	---	0.07
35	2.92	1.00	0.247	0.176	---	0.07
36	3.00	1.00	0.247	0.176	---	0.07
37	3.08	1.00	0.247	0.176	---	0.07
38	3.17	1.10	0.272	0.176	---	0.10
39	3.25	1.10	0.272	0.176	---	0.10
40	3.33	1.10	0.272	0.176	---	0.10
41	3.42	1.20	0.296	0.176	---	0.12
42	3.50	1.30	0.321	0.176	---	0.15
43	3.58	1.40	0.346	0.176	---	0.17
44	3.67	1.40	0.346	0.176	---	0.17
45	3.75	1.50	0.370	0.176	---	0.19
46	3.83	1.50	0.370	0.176	---	0.19
47	3.92	1.60	0.395	0.176	---	0.22
48	4.00	1.60	0.395	0.176	---	0.22
49	4.08	1.70	0.420	0.176	---	0.24
50	4.17	1.80	0.445	0.176	---	0.27
51	4.25	1.90	0.469	0.176	---	0.29
52	4.33	2.00	0.494	0.176	---	0.32
53	4.42	2.10	0.519	0.176	---	0.34
54	4.50	2.10	0.519	0.176	---	0.34
55	4.58	2.20	0.543	0.176	---	0.37
56	4.67	2.30	0.568	0.176	---	0.39
57	4.75	2.40	0.593	0.176	---	0.42
58	4.83	2.40	0.593	0.176	---	0.42

59	4.92	2.50	0.617	0.176	---	0.44
60	5.00	2.60	0.642	0.176	---	0.47
61	5.08	3.10	0.766	0.176	---	0.59
62	5.17	3.60	0.889	0.176	---	0.71
63	5.25	3.90	0.963	0.176	---	0.79
64	5.33	4.20	1.037	0.176	---	0.86
65	5.42	4.70	1.161	0.176	---	0.99
66	5.50	5.60	1.383	0.176	---	1.21
67	5.58	1.90	0.469	0.176	---	0.29
68	5.67	0.90	0.222	0.176	---	0.05
69	5.75	0.60	0.148	0.176	0.133	0.01
70	5.83	0.50	0.123	0.176	0.111	0.01
71	5.92	0.30	0.074	0.176	0.067	0.01
72	6.00	0.20	0.049	0.176	0.044	0.00
Sum =		100.0			Sum =	12.8

Flood volume = Effective rainfall 1.06(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 1.00(In)
Total soil loss = 0.489(Ac.Ft)
Total rainfall = 2.06(In)
Flood volume = 22765.3 Cubic Feet
Total soil loss = 21315.4 Cubic Feet

Peak flow rate of this hydrograph = 5.918(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01	Q				
0+10	0.0004	0.05	Q				
0+15	0.0009	0.07	Q				
0+20	0.0015	0.08	Q				
0+25	0.0021	0.09	Q				
0+30	0.0027	0.09	Q				
0+35	0.0034	0.10	Q				
0+40	0.0041	0.10	Q				
0+45	0.0048	0.10	Q				
0+50	0.0055	0.10	Q				
0+55	0.0062	0.10	Q				
1+ 0	0.0069	0.11	Q				
1+ 5	0.0078	0.12	Q				
1+10	0.0087	0.13	Q				
1+15	0.0096	0.13	Q				
1+20	0.0105	0.13	Q				
1+25	0.0114	0.13	Q				
1+30	0.0123	0.13	Q				
1+35	0.0132	0.13	QV				
1+40	0.0141	0.13	QV				
1+45	0.0150	0.13	QV				
1+50	0.0159	0.13	QV				
1+55	0.0168	0.13	QV				
2+ 0	0.0178	0.15	QV				
2+ 5	0.0193	0.21	QV				
2+10	0.0205	0.18	QV				
2+15	0.0222	0.24	QV				
2+20	0.0240	0.26	Q				
2+25	0.0259	0.27	Q				
2+30	0.0278	0.28	QV				
2+35	0.0297	0.28	QV				
2+40	0.0316	0.28	QV				
2+45	0.0336	0.30	QV				
2+50	0.0362	0.38	QV				
2+55	0.0390	0.41	QV				
3+ 0	0.0419	0.42	Q V				
3+ 5	0.0448	0.42	Q V				
3+10	0.0479	0.44	Q V				
3+15	0.0515	0.53	QV				
3+20	0.0553	0.55	Q V				
3+25	0.0593	0.58	Q V				
3+30	0.0641	0.69	Q V				
3+35	0.0697	0.82	Q V				
3+40	0.0762	0.94	Q V				
3+45	0.0831	1.01	Q V				

sobonalt3610

3+50	0.0907	1.10	
3+55	0.0987	1.16	
4+ 0	0.1073	1.25	
4+ 5	0.1163	1.31	
4+10	0.1261	1.42	
4+15	0.1368	1.55	
4+20	0.1485	1.70	
4+25	0.1611	1.84	
4+30	0.1747	1.97	
4+35	0.1887	2.03	
4+40	0.2035	2.15	
4+45	0.2193	2.29	
4+50	0.2359	2.41	
4+55	0.2529	2.47	
5+ 0	0.2707	2.59	
5+ 5	0.2901	2.81	
5+10	0.3132	3.35	
5+15	0.3406	3.98	
5+20	0.3714	4.48	
5+25	0.4058	4.99	
5+30	0.4451	5.72	
5+35	0.4859	5.92	
5+40	0.5068	3.04	
5+45	0.5158	1.30	
5+50	0.5195	0.54	
5+55	0.5212	0.24	
6+ 0	0.5220	0.13	
6+ 5	0.5224	0.06	
6+10	0.5226	0.02	
6+15	0.5226	0.01	
6+20	0.5226	0.00	
6+25	0.5226	0.00	
6+30	0.5226	0.00	
6+35	0.5226	0.00	

sobonalt32410

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt32410.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	2.25	13.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	6.00	35.40

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 3.793(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.793(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	86.00	0.000

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt32410

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	0.797
2	0.167	194.180	55.366	3.292
3	0.250	291.271	18.995	1.129
4	0.333	388.361	7.769	0.462
5	0.417	485.451	2.779	0.165
6	0.500	582.541	0.892	0.053
7	0.583	679.631	0.599	0.036
8	0.667	776.721	0.191	0.011
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	0.311	0.027	0.00
2	0.17	0.07	0.030	0.310	0.027	0.00
3	0.25	0.07	0.030	0.309	0.027	0.00
4	0.33	0.10	0.046	0.308	0.041	0.00
5	0.42	0.10	0.046	0.306	0.041	0.00
6	0.50	0.10	0.046	0.305	0.041	0.00
7	0.58	0.10	0.046	0.304	0.041	0.00
8	0.67	0.10	0.046	0.303	0.041	0.00
9	0.75	0.10	0.046	0.302	0.041	0.00
10	0.83	0.13	0.061	0.301	0.055	0.01
11	0.92	0.13	0.061	0.299	0.055	0.01
12	1.00	0.13	0.061	0.298	0.055	0.01
13	1.08	0.10	0.046	0.297	0.041	0.00
14	1.17	0.10	0.046	0.296	0.041	0.00
15	1.25	0.10	0.046	0.295	0.041	0.00
16	1.33	0.10	0.046	0.293	0.041	0.00
17	1.42	0.10	0.046	0.292	0.041	0.00
18	1.50	0.10	0.046	0.291	0.041	0.00
19	1.58	0.10	0.046	0.290	0.041	0.00
20	1.67	0.10	0.046	0.289	0.041	0.00
21	1.75	0.10	0.046	0.288	0.041	0.00
22	1.83	0.13	0.061	0.287	0.055	0.01
23	1.92	0.13	0.061	0.285	0.055	0.01
24	2.00	0.13	0.061	0.284	0.055	0.01
25	2.08	0.13	0.061	0.283	0.055	0.01
26	2.17	0.13	0.061	0.282	0.055	0.01
27	2.25	0.13	0.061	0.281	0.055	0.01
28	2.33	0.13	0.061	0.280	0.055	0.01
29	2.42	0.13	0.061	0.278	0.055	0.01
30	2.50	0.13	0.061	0.277	0.055	0.01
31	2.58	0.17	0.076	0.276	0.068	0.01
32	2.67	0.17	0.076	0.275	0.068	0.01
33	2.75	0.17	0.076	0.274	0.068	0.01
34	2.83	0.17	0.076	0.273	0.068	0.01
35	2.92	0.17	0.076	0.272	0.068	0.01
36	3.00	0.17	0.076	0.271	0.068	0.01
37	3.08	0.17	0.076	0.269	0.068	0.01
38	3.17	0.17	0.076	0.268	0.068	0.01
39	3.25	0.17	0.076	0.267	0.068	0.01
40	3.33	0.17	0.076	0.266	0.068	0.01
41	3.42	0.17	0.076	0.265	0.068	0.01
42	3.50	0.17	0.076	0.264	0.068	0.01
43	3.58	0.17	0.076	0.263	0.068	0.01
44	3.67	0.17	0.076	0.262	0.068	0.01
45	3.75	0.17	0.076	0.261	0.068	0.01
46	3.83	0.20	0.091	0.259	0.082	0.01
47	3.92	0.20	0.091	0.258	0.082	0.01
48	4.00	0.20	0.091	0.257	0.082	0.01
49	4.08	0.20	0.091	0.256	0.082	0.01
50	4.17	0.20	0.091	0.255	0.082	0.01
51	4.25	0.20	0.091	0.254	0.082	0.01
52	4.33	0.23	0.106	0.253	0.096	0.01
53	4.42	0.23	0.106	0.252	0.096	0.01
54	4.50	0.23	0.106	0.251	0.096	0.01
55	4.58	0.23	0.106	0.250	0.096	0.01
56	4.67	0.23	0.106	0.249	0.096	0.01
57	4.75	0.23	0.106	0.248	0.096	0.01
58	4.83	0.27	0.121	0.246	0.109	0.01

59	4.92	0.27	0.121	0.245	0.109	0.01
60	5.00	0.27	0.121	0.244	0.109	0.01
61	5.08	0.20	0.091	0.243	0.082	0.01
62	5.17	0.20	0.091	0.242	0.082	0.01
63	5.25	0.20	0.091	0.241	0.082	0.01
64	5.33	0.23	0.106	0.240	0.096	0.01
65	5.42	0.23	0.106	0.239	0.096	0.01
66	5.50	0.23	0.106	0.238	0.096	0.01
67	5.58	0.27	0.121	0.237	0.109	0.01
68	5.67	0.27	0.121	0.236	0.109	0.01
69	5.75	0.27	0.121	0.235	0.109	0.01
70	5.83	0.27	0.121	0.234	0.109	0.01
71	5.92	0.27	0.121	0.233	0.109	0.01
72	6.00	0.27	0.121	0.232	0.109	0.01
73	6.08	0.30	0.137	0.231	0.123	0.01
74	6.17	0.30	0.137	0.230	0.123	0.01
75	6.25	0.30	0.137	0.229	0.123	0.01
76	6.33	0.30	0.137	0.228	0.123	0.01
77	6.42	0.30	0.137	0.227	0.123	0.01
78	6.50	0.30	0.137	0.226	0.123	0.01
79	6.58	0.33	0.152	0.225	0.137	0.02
80	6.67	0.33	0.152	0.224	0.137	0.02
81	6.75	0.33	0.152	0.223	0.137	0.02
82	6.83	0.33	0.152	0.222	0.137	0.02
83	6.92	0.33	0.152	0.221	0.137	0.02
84	7.00	0.33	0.152	0.220	0.137	0.02
85	7.08	0.33	0.152	0.219	0.137	0.02
86	7.17	0.33	0.152	0.218	0.137	0.02
87	7.25	0.33	0.152	0.217	0.137	0.02
88	7.33	0.37	0.167	0.216	0.150	0.02
89	7.42	0.37	0.167	0.215	0.150	0.02
90	7.50	0.37	0.167	0.214	0.150	0.02
91	7.58	0.40	0.182	0.213	0.164	0.02
92	7.67	0.40	0.182	0.212	0.164	0.02
93	7.75	0.40	0.182	0.211	0.164	0.02
94	7.83	0.43	0.197	0.210	0.178	0.02
95	7.92	0.43	0.197	0.209	0.178	0.02
96	8.00	0.43	0.197	0.208	0.178	0.02
97	8.08	0.50	0.228	0.207	---	0.02
98	8.17	0.50	0.228	0.206	---	0.02
99	8.25	0.50	0.228	0.205	---	0.02
100	8.33	0.50	0.228	0.204	---	0.02
101	8.42	0.50	0.228	0.203	---	0.02
102	8.50	0.50	0.228	0.202	---	0.03
103	8.58	0.53	0.243	0.201	---	0.04
104	8.67	0.53	0.243	0.200	---	0.04
105	8.75	0.53	0.243	0.199	---	0.04
106	8.83	0.57	0.258	0.198	---	0.06
107	8.92	0.57	0.258	0.197	---	0.06
108	9.00	0.57	0.258	0.196	---	0.06
109	9.08	0.63	0.288	0.195	---	0.09
110	9.17	0.63	0.288	0.195	---	0.09
111	9.25	0.63	0.288	0.194	---	0.09
112	9.33	0.67	0.303	0.193	---	0.11
113	9.42	0.67	0.303	0.192	---	0.11
114	9.50	0.67	0.303	0.191	---	0.11
115	9.58	0.70	0.319	0.190	---	0.13
116	9.67	0.70	0.319	0.189	---	0.13
117	9.75	0.70	0.319	0.188	---	0.13
118	9.83	0.73	0.334	0.187	---	0.15
119	9.92	0.73	0.334	0.186	---	0.15
120	10.00	0.73	0.334	0.185	---	0.15
121	10.08	0.50	0.228	0.185	---	0.04
122	10.17	0.50	0.228	0.184	---	0.04
123	10.25	0.50	0.228	0.183	---	0.04
124	10.33	0.50	0.228	0.182	---	0.05
125	10.42	0.50	0.228	0.181	---	0.05
126	10.50	0.50	0.228	0.180	---	0.05
127	10.58	0.67	0.303	0.179	---	0.12
128	10.67	0.67	0.303	0.178	---	0.13
129	10.75	0.67	0.303	0.177	---	0.13
130	10.83	0.67	0.303	0.177	---	0.13
131	10.92	0.67	0.303	0.176	---	0.13
132	11.00	0.67	0.303	0.175	---	0.13
133	11.08	0.63	0.288	0.174	---	0.11
134	11.17	0.63	0.288	0.173	---	0.12
135	11.25	0.63	0.288	0.172	---	0.12
136	11.33	0.63	0.288	0.171	---	0.12
137	11.42	0.63	0.288	0.171	---	0.12

138	11.50	0.63	0.288	0.170	---	0.12
139	11.58	0.57	0.258	0.169	---	0.09
140	11.67	0.57	0.258	0.168	---	0.09
141	11.75	0.57	0.258	0.167	---	0.09
142	11.83	0.60	0.273	0.166	---	0.11
143	11.92	0.60	0.273	0.166	---	0.11
144	12.00	0.60	0.273	0.165	---	0.11
145	12.08	0.83	0.379	0.164	---	0.22
146	12.17	0.83	0.379	0.163	---	0.22
147	12.25	0.83	0.379	0.162	---	0.22
148	12.33	0.87	0.394	0.161	---	0.23
149	12.42	0.87	0.394	0.161	---	0.23
150	12.50	0.87	0.394	0.160	---	0.23
151	12.58	0.93	0.425	0.159	---	0.27
152	12.67	0.93	0.425	0.158	---	0.27
153	12.75	0.93	0.425	0.157	---	0.27
154	12.83	0.97	0.440	0.157	---	0.28
155	12.92	0.97	0.440	0.156	---	0.28
156	13.00	0.97	0.440	0.155	---	0.28
157	13.08	1.13	0.516	0.154	---	0.36
158	13.17	1.13	0.516	0.154	---	0.36
159	13.25	1.13	0.516	0.153	---	0.36
160	13.33	1.13	0.516	0.152	---	0.36
161	13.42	1.13	0.516	0.151	---	0.36
162	13.50	1.13	0.516	0.150	---	0.37
163	13.58	0.77	0.349	0.150	---	0.20
164	13.67	0.77	0.349	0.149	---	0.20
165	13.75	0.77	0.349	0.148	---	0.20
166	13.83	0.77	0.349	0.147	---	0.20
167	13.92	0.77	0.349	0.147	---	0.20
168	14.00	0.77	0.349	0.146	---	0.20
169	14.08	0.90	0.410	0.145	---	0.26
170	14.17	0.90	0.410	0.144	---	0.27
171	14.25	0.90	0.410	0.144	---	0.27
172	14.33	0.87	0.394	0.143	---	0.25
173	14.42	0.87	0.394	0.142	---	0.25
174	14.50	0.87	0.394	0.141	---	0.25
175	14.58	0.87	0.394	0.141	---	0.25
176	14.67	0.87	0.394	0.140	---	0.25
177	14.75	0.87	0.394	0.139	---	0.26
178	14.83	0.83	0.379	0.139	---	0.24
179	14.92	0.83	0.379	0.138	---	0.24
180	15.00	0.83	0.379	0.137	---	0.24
181	15.08	0.80	0.364	0.136	---	0.23
182	15.17	0.80	0.364	0.136	---	0.23
183	15.25	0.80	0.364	0.135	---	0.23
184	15.33	0.77	0.349	0.134	---	0.21
185	15.42	0.77	0.349	0.134	---	0.22
186	15.50	0.77	0.349	0.133	---	0.22
187	15.58	0.63	0.288	0.132	---	0.16
188	15.67	0.63	0.288	0.132	---	0.16
189	15.75	0.63	0.288	0.131	---	0.16
190	15.83	0.63	0.288	0.130	---	0.16
191	15.92	0.63	0.288	0.130	---	0.16
192	16.00	0.63	0.288	0.129	---	0.16
193	16.08	0.13	0.061	0.128	0.055	0.01
194	16.17	0.13	0.061	0.128	0.055	0.01
195	16.25	0.13	0.061	0.127	0.055	0.01
196	16.33	0.13	0.061	0.126	0.055	0.01
197	16.42	0.13	0.061	0.126	0.055	0.01
198	16.50	0.13	0.061	0.125	0.055	0.01
199	16.58	0.10	0.046	0.124	0.041	0.00
200	16.67	0.10	0.046	0.124	0.041	0.00
201	16.75	0.10	0.046	0.123	0.041	0.00
202	16.83	0.10	0.046	0.123	0.041	0.00
203	16.92	0.10	0.046	0.122	0.041	0.00
204	17.00	0.10	0.046	0.121	0.041	0.00
205	17.08	0.17	0.076	0.121	0.068	0.01
206	17.17	0.17	0.076	0.120	0.068	0.01
207	17.25	0.17	0.076	0.119	0.068	0.01
208	17.33	0.17	0.076	0.119	0.068	0.01
209	17.42	0.17	0.076	0.118	0.068	0.01
210	17.50	0.17	0.076	0.118	0.068	0.01
211	17.58	0.17	0.076	0.117	0.068	0.01
212	17.67	0.17	0.076	0.117	0.068	0.01
213	17.75	0.17	0.076	0.116	0.068	0.01
214	17.83	0.13	0.061	0.115	0.055	0.01
215	17.92	0.13	0.061	0.115	0.055	0.01
216	18.00	0.13	0.061	0.114	0.055	0.01

217	18.08	0.13	0.061	0.114	0.055	0.01
218	18.17	0.13	0.061	0.113	0.055	0.01
219	18.25	0.13	0.061	0.113	0.055	0.01
220	18.33	0.13	0.061	0.112	0.055	0.01
221	18.42	0.13	0.061	0.111	0.055	0.01
222	18.50	0.13	0.061	0.111	0.055	0.01
223	18.58	0.10	0.046	0.110	0.041	0.00
224	18.67	0.10	0.046	0.110	0.041	0.00
225	18.75	0.10	0.046	0.109	0.041	0.00
226	18.83	0.07	0.030	0.109	0.027	0.00
227	18.92	0.07	0.030	0.108	0.027	0.00
228	19.00	0.07	0.030	0.108	0.027	0.00
229	19.08	0.10	0.046	0.107	0.041	0.00
230	19.17	0.10	0.046	0.107	0.041	0.00
231	19.25	0.10	0.046	0.106	0.041	0.00
232	19.33	0.13	0.061	0.106	0.055	0.01
233	19.42	0.13	0.061	0.105	0.055	0.01
234	19.50	0.13	0.061	0.105	0.055	0.01
235	19.58	0.10	0.046	0.104	0.041	0.00
236	19.67	0.10	0.046	0.104	0.041	0.00
237	19.75	0.10	0.046	0.103	0.041	0.00
238	19.83	0.07	0.030	0.103	0.027	0.00
239	19.92	0.07	0.030	0.102	0.027	0.00
240	20.00	0.07	0.030	0.102	0.027	0.00
241	20.08	0.10	0.046	0.102	0.041	0.00
242	20.17	0.10	0.046	0.101	0.041	0.00
243	20.25	0.10	0.046	0.101	0.041	0.00
244	20.33	0.10	0.046	0.100	0.041	0.00
245	20.42	0.10	0.046	0.100	0.041	0.00
246	20.50	0.10	0.046	0.099	0.041	0.00
247	20.58	0.10	0.046	0.099	0.041	0.00
248	20.67	0.10	0.046	0.099	0.041	0.00
249	20.75	0.10	0.046	0.098	0.041	0.00
250	20.83	0.07	0.030	0.098	0.027	0.00
251	20.92	0.07	0.030	0.097	0.027	0.00
252	21.00	0.07	0.030	0.097	0.027	0.00
253	21.08	0.10	0.046	0.097	0.041	0.00
254	21.17	0.10	0.046	0.096	0.041	0.00
255	21.25	0.10	0.046	0.096	0.041	0.00
256	21.33	0.07	0.030	0.095	0.027	0.00
257	21.42	0.07	0.030	0.095	0.027	0.00
258	21.50	0.07	0.030	0.095	0.027	0.00
259	21.58	0.10	0.046	0.094	0.041	0.00
260	21.67	0.10	0.046	0.094	0.041	0.00
261	21.75	0.10	0.046	0.094	0.041	0.00
262	21.83	0.07	0.030	0.093	0.027	0.00
263	21.92	0.07	0.030	0.093	0.027	0.00
264	22.00	0.07	0.030	0.093	0.027	0.00
265	22.08	0.10	0.046	0.092	0.041	0.00
266	22.17	0.10	0.046	0.092	0.041	0.00
267	22.25	0.10	0.046	0.092	0.041	0.00
268	22.33	0.07	0.030	0.092	0.027	0.00
269	22.42	0.07	0.030	0.091	0.027	0.00
270	22.50	0.07	0.030	0.091	0.027	0.00
271	22.58	0.07	0.030	0.091	0.027	0.00
272	22.67	0.07	0.030	0.090	0.027	0.00
273	22.75	0.07	0.030	0.090	0.027	0.00
274	22.83	0.07	0.030	0.090	0.027	0.00
275	22.92	0.07	0.030	0.090	0.027	0.00
276	23.00	0.07	0.030	0.090	0.027	0.00
277	23.08	0.07	0.030	0.089	0.027	0.00
278	23.17	0.07	0.030	0.089	0.027	0.00
279	23.25	0.07	0.030	0.089	0.027	0.00
280	23.33	0.07	0.030	0.089	0.027	0.00
281	23.42	0.07	0.030	0.089	0.027	0.00
282	23.50	0.07	0.030	0.088	0.027	0.00
283	23.58	0.07	0.030	0.088	0.027	0.00
284	23.67	0.07	0.030	0.088	0.027	0.00
285	23.75	0.07	0.030	0.088	0.027	0.00
286	23.83	0.07	0.030	0.088	0.027	0.00
287	23.92	0.07	0.030	0.088	0.027	0.00
288	24.00	0.07	0.030	0.088	0.027	0.00
Sum =		100.0			Sum =	17.3

Flood volume = Effective rainfall 1.44(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)
Total soil loss = 2.35(In)
Total soil loss = 1.156(Ac.Ft)
Total rainfall = 3.79(In)
Flood volume = 30860.7 Cubic Feet

Total soil loss = 50368.3 Cubic Feet

Peak flow rate of this hydrograph = 2.164(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0002	0.02	Q				
0+20	0.0003	0.02	Q				
0+25	0.0005	0.02	Q				
0+30	0.0007	0.03	Q				
0+35	0.0009	0.03	Q				
0+40	0.0011	0.03	Q				
0+45	0.0012	0.03	Q				
0+50	0.0014	0.03	Q				
0+55	0.0017	0.03	Q				
1+ 0	0.0019	0.03	Q				
1+ 5	0.0021	0.03	Q				
1+10	0.0023	0.03	Q				
1+15	0.0025	0.03	Q				
1+20	0.0027	0.03	Q				
1+25	0.0029	0.03	Q				
1+30	0.0031	0.03	Q				
1+35	0.0033	0.03	Q				
1+40	0.0035	0.03	Q				
1+45	0.0037	0.03	Q				
1+50	0.0039	0.03	Q				
1+55	0.0041	0.03	Q				
2+ 0	0.0043	0.03	Q				
2+ 5	0.0046	0.04	Q				
2+10	0.0048	0.04	Q				
2+15	0.0051	0.04	Q				
2+20	0.0053	0.04	Q				
2+25	0.0056	0.04	Q				
2+30	0.0058	0.04	Q				
2+35	0.0061	0.04	Q				
2+40	0.0064	0.04	Q				
2+45	0.0067	0.04	Q				
2+50	0.0070	0.04	Q				
2+55	0.0073	0.04	Q				
3+ 0	0.0076	0.05	Q				
3+ 5	0.0079	0.05	Q				
3+10	0.0082	0.05	Q				
3+15	0.0085	0.05	Q				
3+20	0.0088	0.05	Q				
3+25	0.0091	0.05	Q				
3+30	0.0095	0.05	Q				
3+35	0.0098	0.05	Q				
3+40	0.0101	0.05	Q				
3+45	0.0104	0.05	Q				
3+50	0.0107	0.05	Q				
3+55	0.0111	0.05	Q				
4+ 0	0.0114	0.05	Q				
4+ 5	0.0118	0.05	Q				
4+10	0.0122	0.05	Q				
4+15	0.0125	0.05	Q				
4+20	0.0129	0.06	Q				
4+25	0.0133	0.06	Q				
4+30	0.0138	0.06	Q				
4+35	0.0142	0.06	Q				
4+40	0.0146	0.06	Q				
4+45	0.0151	0.06	Q				
4+50	0.0155	0.06	Q				
4+55	0.0160	0.07	Q				
5+ 0	0.0165	0.07	Q				
5+ 5	0.0170	0.07	Q				
5+10	0.0174	0.06	Q				
5+15	0.0178	0.06	QV				
5+20	0.0181	0.06	QV				
5+25	0.0186	0.06	QV				
5+30	0.0190	0.06	QV				

5+35	0.0194	0.06	QV
5+40	0.0199	0.07	QV
5+45	0.0204	0.07	QV
5+50	0.0209	0.07	QV
5+55	0.0214	0.07	QV
6+ 0	0.0219	0.07	QV
6+ 5	0.0224	0.07	QV
6+10	0.0229	0.08	QV
6+15	0.0235	0.08	QV
6+20	0.0240	0.08	QV
6+25	0.0246	0.08	QV
6+30	0.0252	0.08	QV
6+35	0.0257	0.08	QV
6+40	0.0263	0.09	QV
6+45	0.0269	0.09	QV
6+50	0.0276	0.09	QV
6+55	0.0282	0.09	QV
7+ 0	0.0288	0.09	QV
7+ 5	0.0294	0.09	QV
7+10	0.0300	0.09	QV
7+15	0.0307	0.09	QV
7+20	0.0313	0.09	QV
7+25	0.0320	0.10	QV
7+30	0.0326	0.10	QV
7+35	0.0333	0.10	QV
7+40	0.0340	0.11	QV
7+45	0.0348	0.11	QV
7+50	0.0355	0.11	Q V
7+55	0.0363	0.11	Q V
8+ 0	0.0371	0.12	Q V
8+ 5	0.0379	0.12	Q V
8+10	0.0388	0.12	Q V
8+15	0.0397	0.13	Q V
8+20	0.0406	0.13	Q V
8+25	0.0415	0.14	Q V
8+30	0.0425	0.14	Q V
8+35	0.0436	0.16	Q V
8+40	0.0451	0.22	Q V
8+45	0.0468	0.24	Q V
8+50	0.0486	0.26	QV
8+55	0.0508	0.32	QV
9+ 0	0.0532	0.35	Q V
9+ 5	0.0558	0.38	Q V
9+10	0.0592	0.49	Q V
9+15	0.0629	0.53	QV
9+20	0.0668	0.56	QV
9+25	0.0711	0.63	Q V
9+30	0.0756	0.65	Q V
9+35	0.0802	0.68	Q V
9+40	0.0853	0.73	Q V
9+45	0.0905	0.76	Q V
9+50	0.0959	0.78	Q V
9+55	0.1017	0.84	Q V
10+ 0	0.1076	0.86	Q V
10+ 5	0.1131	0.79	Q V
10+10	0.1162	0.45	Q V
10+15	0.1185	0.34	Q V
10+20	0.1205	0.29	Q V
10+25	0.1224	0.28	Q V
10+30	0.1243	0.28	Q V
10+35	0.1267	0.34	Q V
10+40	0.1308	0.60	Q V
10+45	0.1355	0.69	Q V
10+50	0.1405	0.73	Q V
10+55	0.1457	0.74	Q V
11+ 0	0.1509	0.75	Q V
11+ 5	0.1560	0.75	Q V
11+10	0.1609	0.71	Q V
11+15	0.1657	0.69	Q V
11+20	0.1704	0.69	Q V
11+25	0.1752	0.69	Q V
11+30	0.1800	0.70	Q V
11+35	0.1847	0.68	Q V
11+40	0.1887	0.58	Q V
11+45	0.1925	0.55	Q V
11+50	0.1964	0.56	Q V
11+55	0.2006	0.61	Q V
12+ 0	0.2049	0.63	Q V
12+ 5	0.2099	0.72	Q V

sobonalt32410

12+10	0.2173	1.08	
12+15	0.2256	1.21	
12+20	0.2344	1.27	
12+25	0.2437	1.35	
12+30	0.2531	1.37	
12+35	0.2629	1.41	
12+40	0.2733	1.52	
12+45	0.2841	1.56	
12+50	0.2951	1.59	
12+55	0.3064	1.65	
13+ 0	0.3180	1.68	
13+ 5	0.3300	1.75	
13+10	0.3438	2.01	
13+15	0.3583	2.10	
13+20	0.3730	2.14	
13+25	0.3879	2.16	
13+30	0.4028	2.16	
13+35	0.4168	2.04	
13+40	0.4271	1.49	
13+45	0.4361	1.31	
13+50	0.4446	1.24	
13+55	0.4530	1.21	
14+ 0	0.4613	1.21	
14+ 5	0.4700	1.26	
14+10	0.4800	1.46	
14+15	0.4906	1.53	
14+20	0.5013	1.55	
14+25	0.5117	1.52	
14+30	0.5221	1.51	
14+35	0.5325	1.51	
14+40	0.5429	1.51	
14+45	0.5533	1.51	
14+50	0.5637	1.50	
14+55	0.5737	1.46	
15+ 0	0.5837	1.45	
15+ 5	0.5935	1.43	
15+10	0.6030	1.38	
15+15	0.6125	1.37	
15+20	0.6218	1.35	
15+25	0.6308	1.30	
15+30	0.6397	1.29	
15+35	0.6482	1.24	
15+40	0.6554	1.04	
15+45	0.6621	0.98	
15+50	0.6686	0.95	
15+55	0.6751	0.94	
16+ 0	0.6816	0.95	
16+ 5	0.6873	0.82	
16+10	0.6895	0.32	
16+15	0.6905	0.15	
16+20	0.6910	0.08	
16+25	0.6914	0.05	
16+30	0.6917	0.04	
16+35	0.6920	0.04	
16+40	0.6922	0.03	
16+45	0.6924	0.03	
16+50	0.6925	0.03	
16+55	0.6927	0.03	
17+ 0	0.6929	0.03	
17+ 5	0.6931	0.03	
17+10	0.6934	0.04	
17+15	0.6937	0.04	
17+20	0.6940	0.04	
17+25	0.6943	0.04	
17+30	0.6946	0.04	
17+35	0.6949	0.05	
17+40	0.6952	0.05	
17+45	0.6955	0.05	
17+50	0.6958	0.04	
17+55	0.6961	0.04	
18+ 0	0.6964	0.04	
18+ 5	0.6966	0.04	
18+10	0.6969	0.04	
18+15	0.6971	0.04	
18+20	0.6974	0.04	
18+25	0.6976	0.04	
18+30	0.6979	0.04	
18+35	0.6981	0.03	
18+40	0.6983	0.03	

18+45	0.6985	0.03	Q			V
18+50	0.6987	0.03	Q			V
18+55	0.6988	0.02	Q			V
19+ 0	0.6990	0.02	Q			V
19+ 5	0.6991	0.02	Q			V
19+10	0.6993	0.02	Q			V
19+15	0.6994	0.03	Q			V
19+20	0.6996	0.03	Q			V
19+25	0.6999	0.03	Q			V
19+30	0.7001	0.03	Q			V
19+35	0.7003	0.03	Q			V
19+40	0.7006	0.03	Q			V
19+45	0.7007	0.03	Q			V
19+50	0.7009	0.03	Q			V
19+55	0.7011	0.02	Q			V
20+ 0	0.7012	0.02	Q			V
20+ 5	0.7013	0.02	Q			V
20+10	0.7015	0.02	Q			V
20+15	0.7017	0.03	Q			V
20+20	0.7019	0.03	Q			V
20+25	0.7021	0.03	Q			V
20+30	0.7022	0.03	Q			V
20+35	0.7024	0.03	Q			V
20+40	0.7026	0.03	Q			V
20+45	0.7028	0.03	Q			V
20+50	0.7030	0.03	Q			V
20+55	0.7031	0.02	Q			V
21+ 0	0.7033	0.02	Q			V
21+ 5	0.7034	0.02	Q			V
21+10	0.7036	0.02	Q			V
21+15	0.7037	0.03	Q			V
21+20	0.7039	0.03	Q			V
21+25	0.7041	0.02	Q			V
21+30	0.7042	0.02	Q			V
21+35	0.7043	0.02	Q			V
21+40	0.7045	0.02	Q			V
21+45	0.7047	0.03	Q			V
21+50	0.7048	0.03	Q			V
21+55	0.7050	0.02	Q			V
22+ 0	0.7051	0.02	Q			V
22+ 5	0.7053	0.02	Q			V
22+10	0.7054	0.02	Q			V
22+15	0.7056	0.03	Q			V
22+20	0.7058	0.03	Q			V
22+25	0.7059	0.02	Q			V
22+30	0.7061	0.02	Q			V
22+35	0.7062	0.02	Q			V
22+40	0.7063	0.02	Q			V
22+45	0.7064	0.02	Q			V
22+50	0.7066	0.02	Q			V
22+55	0.7067	0.02	Q			V
23+ 0	0.7068	0.02	Q			V
23+ 5	0.7069	0.02	Q			V
23+10	0.7071	0.02	Q			V
23+15	0.7072	0.02	Q			V
23+20	0.7073	0.02	Q			V
23+25	0.7074	0.02	Q			V
23+30	0.7075	0.02	Q			V
23+35	0.7077	0.02	Q			V
23+40	0.7078	0.02	Q			V
23+45	0.7079	0.02	Q			V
23+50	0.7080	0.02	Q			V
23+55	0.7082	0.02	Q			V
24+ 0	0.7083	0.02	Q			V
24+ 5	0.7084	0.02	Q			V
24+10	0.7084	0.01	Q			V
24+15	0.7085	0.00	Q			V
24+20	0.7085	0.00	Q			V
24+25	0.7085	0.00	Q			V
24+30	0.7085	0.00	Q			V
24+35	0.7085	0.00	Q			V

DEVELOPED CONDITION

sobonalt3d110

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt3d110.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	0.55	3.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	1.20	7.08

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.817(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.817(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	2.443
2	0.167	388.361	50.563	3.006
3	0.250	582.541	7.110	0.423
4	0.333	776.721	1.235	0.073
		Sum = 100.000	Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.412	0.071	---	0.34
2	0.17	4.30	0.422	0.071	---	0.35
3	0.25	5.00	0.490	0.071	---	0.42
4	0.33	5.00	0.490	0.071	---	0.42
5	0.42	5.80	0.569	0.071	---	0.50
6	0.50	6.50	0.638	0.071	---	0.57
7	0.58	7.40	0.726	0.071	---	0.65
8	0.67	8.60	0.844	0.071	---	0.77
9	0.75	12.30	1.206	0.071	---	1.14
10	0.83	29.10	2.854	0.071	---	2.78
11	0.92	6.80	0.667	0.071	---	0.60
12	1.00	5.00	0.490	0.071	---	0.42
Sum =		100.0			Sum =	9.0

Flood volume = Effective rainfall 0.75(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.035(Ac.Ft)
Total rainfall = 0.82(In)
Flood volume = 15988.6 Cubic Feet
Total soil loss = 1517.0 Cubic Feet

Peak flow rate of this hydrograph = 10.595(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0057	0.83	VQ
0+10	0.0187	1.88	VQ
0+15	0.0340	2.23	VQ
0+20	0.0510	2.46	QV
0+25	0.0695	2.68	Q V
0+30	0.0908	3.09	Q V
0+35	0.1152	3.55	Q V
0+40	0.1437	4.14	Q V
0+45	0.1810	5.42	Q V
0+50	0.2540	10.60	Q V
0+55	0.3254	10.37	Q V
1+ 0	0.3535	4.08	Q V
1+ 5	0.3653	1.72	Q V
1+10	0.3668	0.22	Q V
1+15	0.3670	0.03	Q V

sobonalt3d310

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt3d310.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	0.90	5.31

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	2.10	12.39

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 1.394(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.394(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt3d310

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	194.180	41.092		2.443
2	0.167	388.361	50.563		3.006
3	0.250	582.541	7.110		0.423
4	0.333	776.721	1.235		0.073
			Sum = 100.000	Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.217	0.071	---	0.15
2	0.17	1.30	0.217	0.071	---	0.15
3	0.25	1.10	0.184	0.071	---	0.11
4	0.33	1.50	0.251	0.071	---	0.18
5	0.42	1.50	0.251	0.071	---	0.18
6	0.50	1.80	0.301	0.071	---	0.23
7	0.58	1.50	0.251	0.071	---	0.18
8	0.67	1.80	0.301	0.071	---	0.23
9	0.75	1.80	0.301	0.071	---	0.23
10	0.83	1.50	0.251	0.071	---	0.18
11	0.92	1.60	0.268	0.071	---	0.20
12	1.00	1.80	0.301	0.071	---	0.23
13	1.08	2.20	0.368	0.071	---	0.30
14	1.17	2.20	0.368	0.071	---	0.30
15	1.25	2.20	0.368	0.071	---	0.30
16	1.33	2.00	0.334	0.071	---	0.26
17	1.42	2.60	0.435	0.071	---	0.36
18	1.50	2.70	0.452	0.071	---	0.38
19	1.58	2.40	0.401	0.071	---	0.33
20	1.67	2.70	0.452	0.071	---	0.38
21	1.75	3.30	0.552	0.071	---	0.48
22	1.83	3.10	0.518	0.071	---	0.45
23	1.92	2.90	0.485	0.071	---	0.41
24	2.00	3.00	0.502	0.071	---	0.43
25	2.08	3.10	0.518	0.071	---	0.45
26	2.17	4.20	0.702	0.071	---	0.63
27	2.25	5.00	0.836	0.071	---	0.77
28	2.33	3.50	0.585	0.071	---	0.51
29	2.42	6.80	1.137	0.071	---	1.07
30	2.50	7.30	1.221	0.071	---	1.15
31	2.58	8.20	1.371	0.071	---	1.30
32	2.67	5.90	0.987	0.071	---	0.92
33	2.75	2.00	0.334	0.071	---	0.26
34	2.83	1.80	0.301	0.071	---	0.23
35	2.92	1.80	0.301	0.071	---	0.23
36	3.00	0.60	0.100	0.071	---	0.03
Sum =		100.0			Sum =	14.2

Flood volume = Effective rainfall 1.18(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.104(Ac.Ft)
Total rainfall = 1.39(In)
Flood volume = 25296.9 Cubic Feet
Total soil loss = 4551.0 Cubic Feet

Peak flow rate of this hydrograph = 7.127(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0025	0.36	VQ				
0+10	0.0080	0.80	V Q				
0+15	0.0133	0.78	V Q				
0+20	0.0192	0.85	V Q				
0+25	0.0264	1.04	V Q				
0+30	0.0346	1.19	V Q				

sobonalt3d310

0+35	0.0430	1.22	V Q
0+40	0.0513	1.21	VQ
0+45	0.0606	1.35	VQ
0+50	0.0692	1.24	Q
0+55	0.0770	1.14	QV
1+ 0	0.0856	1.25	QV
1+ 5	0.0961	1.52	Q
1+10	0.1080	1.73	QV
1+15	0.1201	1.76	QV
1+20	0.1317	1.69	Q V
1+25	0.1443	1.83	Q V
1+30	0.1592	2.16	Q V
1+35	0.1738	2.13	Q V
1+40	0.1884	2.11	Q V
1+45	0.2055	2.49	Q V
1+50	0.2243	2.73	Q V
1+55	0.2422	2.59	Q V
2+ 0	0.2595	2.52	Q V
2+ 5	0.2774	2.60	Q V
2+10	0.2988	3.10	Q V
2+15	0.3263	3.99	Q V
2+20	0.3529	3.86	Q V
2+25	0.3840	4.52	Q V
2+30	0.4274	6.29	Q V
2+35	0.4765	7.13	Q V
2+40	0.5227	6.72	Q V
2+45	0.5505	4.03	Q V
2+50	0.5632	1.84	Q V
2+55	0.5731	1.43	Q V
3+ 0	0.5791	0.88	Q V
3+ 5	0.5805	0.20	Q V
3+10	0.5807	0.03	Q V
3+15	0.5807	0.00	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt3d610.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	1.40	8.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	3.00	17.70

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 2.058(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.058(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt3d610
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	2.443
2	0.167	388.361	50.563	3.006
3	0.250	582.541	7.110	0.423
4	0.333	776.721	1.235	0.073
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.123	0.071	---	0.05
2	0.17	0.60	0.148	0.071	---	0.08
3	0.25	0.60	0.148	0.071	---	0.08
4	0.33	0.60	0.148	0.071	---	0.08
5	0.42	0.60	0.148	0.071	---	0.08
6	0.50	0.70	0.173	0.071	---	0.10
7	0.58	0.70	0.173	0.071	---	0.10
8	0.67	0.70	0.173	0.071	---	0.10
9	0.75	0.70	0.173	0.071	---	0.10
10	0.83	0.70	0.173	0.071	---	0.10
11	0.92	0.70	0.173	0.071	---	0.10
12	1.00	0.80	0.198	0.071	---	0.13
13	1.08	0.80	0.198	0.071	---	0.13
14	1.17	0.80	0.198	0.071	---	0.13
15	1.25	0.80	0.198	0.071	---	0.13
16	1.33	0.80	0.198	0.071	---	0.13
17	1.42	0.80	0.198	0.071	---	0.13
18	1.50	0.80	0.198	0.071	---	0.13
19	1.58	0.80	0.198	0.071	---	0.13
20	1.67	0.80	0.198	0.071	---	0.13
21	1.75	0.80	0.198	0.071	---	0.13
22	1.83	0.80	0.198	0.071	---	0.13
23	1.92	0.80	0.198	0.071	---	0.13
24	2.00	0.90	0.222	0.071	---	0.15
25	2.08	0.80	0.198	0.071	---	0.13
26	2.17	0.90	0.222	0.071	---	0.15
27	2.25	0.90	0.222	0.071	---	0.15
28	2.33	0.90	0.222	0.071	---	0.15
29	2.42	0.90	0.222	0.071	---	0.15
30	2.50	0.90	0.222	0.071	---	0.15
31	2.58	0.90	0.222	0.071	---	0.15
32	2.67	0.90	0.222	0.071	---	0.15
33	2.75	1.00	0.247	0.071	---	0.18
34	2.83	1.00	0.247	0.071	---	0.18
35	2.92	1.00	0.247	0.071	---	0.18
36	3.00	1.00	0.247	0.071	---	0.18
37	3.08	1.00	0.247	0.071	---	0.18
38	3.17	1.10	0.272	0.071	---	0.20
39	3.25	1.10	0.272	0.071	---	0.20
40	3.33	1.10	0.272	0.071	---	0.20
41	3.42	1.20	0.296	0.071	---	0.23
42	3.50	1.30	0.321	0.071	---	0.25
43	3.58	1.40	0.346	0.071	---	0.27
44	3.67	1.40	0.346	0.071	---	0.27
45	3.75	1.50	0.370	0.071	---	0.30
46	3.83	1.50	0.370	0.071	---	0.30
47	3.92	1.60	0.395	0.071	---	0.32
48	4.00	1.60	0.395	0.071	---	0.32
49	4.08	1.70	0.420	0.071	---	0.35
50	4.17	1.80	0.445	0.071	---	0.37
51	4.25	1.90	0.469	0.071	---	0.40
52	4.33	2.00	0.494	0.071	---	0.42
53	4.42	2.10	0.519	0.071	---	0.45
54	4.50	2.10	0.519	0.071	---	0.45
55	4.58	2.20	0.543	0.071	---	0.47
56	4.67	2.30	0.568	0.071	---	0.50
57	4.75	2.40	0.593	0.071	---	0.52
58	4.83	2.40	0.593	0.071	---	0.52
59	4.92	2.50	0.617	0.071	---	0.55
60	5.00	2.60	0.642	0.071	---	0.57
61	5.08	3.10	0.766	0.071	---	0.69
62	5.17	3.60	0.889	0.071	---	0.82

63	5.25	3.90	0.963	0.071	---	0.89
64	5.33	4.20	1.037	0.071	---	0.97
65	5.42	4.70	1.161	0.071	---	1.09
66	5.50	5.60	1.383	0.071	---	1.31
67	5.58	1.90	0.469	0.071	---	0.40
68	5.67	0.90	0.222	0.071	---	0.15
69	5.75	0.60	0.148	0.071	---	0.08
70	5.83	0.50	0.123	0.071	---	0.05
71	5.92	0.30	0.074	0.071	---	0.00
72	6.00	0.20	0.049	0.071	0.009	0.04
Sum =		100.0			Sum =	19.7

Flood volume = Effective rainfall 1.64(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 0.206(Ac.Ft)
Total rainfall = 2.06(In)
Flood volume = 35089.2 Cubic Feet
Total soil loss = 8991.5 Cubic Feet

Peak flow rate of this hydrograph = 6.961(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0009	0.13	Q
0+10	0.0033	0.35	VQ
0+15	0.0063	0.44	VQ
0+20	0.0095	0.46	VQ
0+25	0.0127	0.46	VQ
0+30	0.0163	0.52	V Q
0+35	0.0203	0.59	VQ
0+40	0.0245	0.61	VQ
0+45	0.0287	0.61	VQ
0+50	0.0329	0.61	VQ
0+55	0.0371	0.61	VQ
1+ 0	0.0417	0.67	Q
1+ 5	0.0468	0.74	Q
1+10	0.0519	0.75	VQ
1+15	0.0571	0.75	VQ
1+20	0.0623	0.75	Q
1+25	0.0675	0.75	Q
1+30	0.0727	0.75	Q
1+35	0.0779	0.75	Q
1+40	0.0831	0.75	QV
1+45	0.0883	0.75	QV
1+50	0.0935	0.75	QV
1+55	0.0987	0.75	QV
2+ 0	0.1043	0.81	Q V
2+ 5	0.1100	0.83	Q V
2+10	0.1157	0.82	Q V
2+15	0.1218	0.89	Q V
2+20	0.1280	0.90	Q V
2+25	0.1342	0.90	Q V
2+30	0.1404	0.90	Q V
2+35	0.1466	0.90	Q V
2+40	0.1528	0.90	Q V
2+45	0.1595	0.96	Q V
2+50	0.1666	1.04	Q V
2+55	0.1738	1.05	Q V
3+ 0	0.1810	1.05	Q V
3+ 5	0.1882	1.05	Q V
3+10	0.1959	1.11	Q V
3+15	0.2040	1.18	Q V
3+20	0.2122	1.19	Q V
3+25	0.2209	1.26	Q V
3+30	0.2304	1.39	Q V
3+35	0.2410	1.54	Q V
3+40	0.2522	1.62	Q V
3+45	0.2638	1.69	Q V
3+50	0.2760	1.77	Q V
3+55	0.2887	1.84	Q V
4+ 0	0.3019	1.92	Q V
4+ 5	0.3156	1.99	Q V

sobonalt3d610

4+10	0.3303	2.12	
4+15	0.3459	2.27	
4+20	0.3625	2.42	
4+25	0.3802	2.56	
4+30	0.3984	2.65	
4+35	0.4172	2.72	
4+40	0.4369	2.86	
4+45	0.4576	3.00	
4+50	0.4789	3.09	
4+55	0.5006	3.16	
5+ 0	0.5234	3.30	
5+ 5	0.5488	3.69	
5+10	0.5789	4.37	
5+15	0.6132	4.98	
5+20	0.6507	5.44	
5+25	0.6921	6.01	
5+30	0.7400	6.96	
5+35	0.7776	5.45	
5+40	0.7927	2.20	
5+45	0.7990	0.91	
5+50	0.8021	0.45	
5+55	0.8036	0.21	
6+ 0	0.8045	0.14	
6+ 5	0.8054	0.13	
6+10	0.8055	0.02	
6+15	0.8055	0.00	

sobonalt3d2410

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt3d2410.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	2.25	13.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	6.00	35.40

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 3.793(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.793(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph

sobonalt3d2410

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	2.443
2	0.167	388.361	50.563	3.006
3	0.250	582.541	7.110	0.423
4	0.333	776.721	1.235	0.073
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	0.126	0.005	0.02
2	0.17	0.07	0.030	0.125	0.005	0.02
3	0.25	0.07	0.030	0.125	0.005	0.02
4	0.33	0.10	0.046	0.124	0.008	0.04
5	0.42	0.10	0.046	0.124	0.008	0.04
6	0.50	0.10	0.046	0.123	0.008	0.04
7	0.58	0.10	0.046	0.123	0.008	0.04
8	0.67	0.10	0.046	0.122	0.008	0.04
9	0.75	0.10	0.046	0.122	0.008	0.04
10	0.83	0.13	0.061	0.121	0.011	0.05
11	0.92	0.13	0.061	0.121	0.011	0.05
12	1.00	0.13	0.061	0.120	0.011	0.05
13	1.08	0.10	0.046	0.120	0.008	0.04
14	1.17	0.10	0.046	0.119	0.008	0.04
15	1.25	0.10	0.046	0.119	0.008	0.04
16	1.33	0.10	0.046	0.118	0.008	0.04
17	1.42	0.10	0.046	0.118	0.008	0.04
18	1.50	0.10	0.046	0.117	0.008	0.04
19	1.58	0.10	0.046	0.117	0.008	0.04
20	1.67	0.10	0.046	0.117	0.008	0.04
21	1.75	0.10	0.046	0.116	0.008	0.04
22	1.83	0.13	0.061	0.116	0.011	0.05
23	1.92	0.13	0.061	0.115	0.011	0.05
24	2.00	0.13	0.061	0.115	0.011	0.05
25	2.08	0.13	0.061	0.114	0.011	0.05
26	2.17	0.13	0.061	0.114	0.011	0.05
27	2.25	0.13	0.061	0.113	0.011	0.05
28	2.33	0.13	0.061	0.113	0.011	0.05
29	2.42	0.13	0.061	0.112	0.011	0.05
30	2.50	0.13	0.061	0.112	0.011	0.05
31	2.58	0.17	0.076	0.111	0.014	0.06
32	2.67	0.17	0.076	0.111	0.014	0.06
33	2.75	0.17	0.076	0.110	0.014	0.06
34	2.83	0.17	0.076	0.110	0.014	0.06
35	2.92	0.17	0.076	0.110	0.014	0.06
36	3.00	0.17	0.076	0.109	0.014	0.06
37	3.08	0.17	0.076	0.109	0.014	0.06
38	3.17	0.17	0.076	0.108	0.014	0.06
39	3.25	0.17	0.076	0.108	0.014	0.06
40	3.33	0.17	0.076	0.107	0.014	0.06
41	3.42	0.17	0.076	0.107	0.014	0.06
42	3.50	0.17	0.076	0.106	0.014	0.06
43	3.58	0.17	0.076	0.106	0.014	0.06
44	3.67	0.17	0.076	0.106	0.014	0.06
45	3.75	0.17	0.076	0.105	0.014	0.06
46	3.83	0.20	0.091	0.105	0.016	0.07
47	3.92	0.20	0.091	0.104	0.016	0.07
48	4.00	0.20	0.091	0.104	0.016	0.07
49	4.08	0.20	0.091	0.103	0.016	0.07
50	4.17	0.20	0.091	0.103	0.016	0.07
51	4.25	0.20	0.091	0.102	0.016	0.07
52	4.33	0.23	0.106	0.102	---	0.00
53	4.42	0.23	0.106	0.102	---	0.00
54	4.50	0.23	0.106	0.101	---	0.01
55	4.58	0.23	0.106	0.101	---	0.01
56	4.67	0.23	0.106	0.100	---	0.01
57	4.75	0.23	0.106	0.100	---	0.01
58	4.83	0.27	0.121	0.099	---	0.02
59	4.92	0.27	0.121	0.099	---	0.02
60	5.00	0.27	0.121	0.099	---	0.02
61	5.08	0.20	0.091	0.098	0.016	0.07
62	5.17	0.20	0.091	0.098	0.016	0.07

63	5.25	0.20	0.091	0.097	0.016	0.07
64	5.33	0.23	0.106	0.097	---	0.01
65	5.42	0.23	0.106	0.096	---	0.01
66	5.50	0.23	0.106	0.096	---	0.01
67	5.58	0.27	0.121	0.096	---	0.03
68	5.67	0.27	0.121	0.095	---	0.03
69	5.75	0.27	0.121	0.095	---	0.03
70	5.83	0.27	0.121	0.094	---	0.03
71	5.92	0.27	0.121	0.094	---	0.03
72	6.00	0.27	0.121	0.093	---	0.03
73	6.08	0.30	0.137	0.093	---	0.04
74	6.17	0.30	0.137	0.093	---	0.04
75	6.25	0.30	0.137	0.092	---	0.04
76	6.33	0.30	0.137	0.092	---	0.04
77	6.42	0.30	0.137	0.091	---	0.05
78	6.50	0.30	0.137	0.091	---	0.05
79	6.58	0.33	0.152	0.091	---	0.06
80	6.67	0.33	0.152	0.090	---	0.06
81	6.75	0.33	0.152	0.090	---	0.06
82	6.83	0.33	0.152	0.089	---	0.06
83	6.92	0.33	0.152	0.089	---	0.06
84	7.00	0.33	0.152	0.089	---	0.06
85	7.08	0.33	0.152	0.088	---	0.06
86	7.17	0.33	0.152	0.088	---	0.06
87	7.25	0.33	0.152	0.087	---	0.06
88	7.33	0.37	0.167	0.087	---	0.08
89	7.42	0.37	0.167	0.087	---	0.08
90	7.50	0.37	0.167	0.086	---	0.08
91	7.58	0.40	0.182	0.086	---	0.10
92	7.67	0.40	0.182	0.085	---	0.10
93	7.75	0.40	0.182	0.085	---	0.10
94	7.83	0.43	0.197	0.085	---	0.11
95	7.92	0.43	0.197	0.084	---	0.11
96	8.00	0.43	0.197	0.084	---	0.11
97	8.08	0.50	0.228	0.083	---	0.14
98	8.17	0.50	0.228	0.083	---	0.14
99	8.25	0.50	0.228	0.083	---	0.14
100	8.33	0.50	0.228	0.082	---	0.15
101	8.42	0.50	0.228	0.082	---	0.15
102	8.50	0.50	0.228	0.082	---	0.15
103	8.58	0.53	0.243	0.081	---	0.16
104	8.67	0.53	0.243	0.081	---	0.16
105	8.75	0.53	0.243	0.080	---	0.16
106	8.83	0.57	0.258	0.080	---	0.18
107	8.92	0.57	0.258	0.080	---	0.18
108	9.00	0.57	0.258	0.079	---	0.18
109	9.08	0.63	0.288	0.079	---	0.21
110	9.17	0.63	0.288	0.078	---	0.21
111	9.25	0.63	0.288	0.078	---	0.21
112	9.33	0.67	0.303	0.078	---	0.23
113	9.42	0.67	0.303	0.077	---	0.23
114	9.50	0.67	0.303	0.077	---	0.23
115	9.58	0.70	0.319	0.077	---	0.24
116	9.67	0.70	0.319	0.076	---	0.24
117	9.75	0.70	0.319	0.076	---	0.24
118	9.83	0.73	0.334	0.076	---	0.26
119	9.92	0.73	0.334	0.075	---	0.26
120	10.00	0.73	0.334	0.075	---	0.26
121	10.08	0.50	0.228	0.074	---	0.15
122	10.17	0.50	0.228	0.074	---	0.15
123	10.25	0.50	0.228	0.074	---	0.15
124	10.33	0.50	0.228	0.073	---	0.15
125	10.42	0.50	0.228	0.073	---	0.15
126	10.50	0.50	0.228	0.073	---	0.15
127	10.58	0.67	0.303	0.072	---	0.23
128	10.67	0.67	0.303	0.072	---	0.23
129	10.75	0.67	0.303	0.072	---	0.23
130	10.83	0.67	0.303	0.071	---	0.23
131	10.92	0.67	0.303	0.071	---	0.23
132	11.00	0.67	0.303	0.071	---	0.23
133	11.08	0.63	0.288	0.070	---	0.22
134	11.17	0.63	0.288	0.070	---	0.22
135	11.25	0.63	0.288	0.069	---	0.22
136	11.33	0.63	0.288	0.069	---	0.22
137	11.42	0.63	0.288	0.069	---	0.22
138	11.50	0.63	0.288	0.068	---	0.22
139	11.58	0.57	0.258	0.068	---	0.19
140	11.67	0.57	0.258	0.068	---	0.19
141	11.75	0.57	0.258	0.067	---	0.19

142	11.83	0.60	0.273	0.067	---	0.21
143	11.92	0.60	0.273	0.067	---	0.21
144	12.00	0.60	0.273	0.066	---	0.21
145	12.08	0.83	0.379	0.066	---	0.31
146	12.17	0.83	0.379	0.066	---	0.31
147	12.25	0.83	0.379	0.065	---	0.31
148	12.33	0.87	0.394	0.065	---	0.33
149	12.42	0.87	0.394	0.065	---	0.33
150	12.50	0.87	0.394	0.064	---	0.33
151	12.58	0.93	0.425	0.064	---	0.36
152	12.67	0.93	0.425	0.064	---	0.36
153	12.75	0.93	0.425	0.064	---	0.36
154	12.83	0.97	0.440	0.063	---	0.38
155	12.92	0.97	0.440	0.063	---	0.38
156	13.00	0.97	0.440	0.063	---	0.38
157	13.08	1.13	0.516	0.062	---	0.45
158	13.17	1.13	0.516	0.062	---	0.45
159	13.25	1.13	0.516	0.062	---	0.45
160	13.33	1.13	0.516	0.061	---	0.45
161	13.42	1.13	0.516	0.061	---	0.45
162	13.50	1.13	0.516	0.061	---	0.46
163	13.58	0.77	0.349	0.060	---	0.29
164	13.67	0.77	0.349	0.060	---	0.29
165	13.75	0.77	0.349	0.060	---	0.29
166	13.83	0.77	0.349	0.059	---	0.29
167	13.92	0.77	0.349	0.059	---	0.29
168	14.00	0.77	0.349	0.059	---	0.29
169	14.08	0.90	0.410	0.059	---	0.35
170	14.17	0.90	0.410	0.058	---	0.35
171	14.25	0.90	0.410	0.058	---	0.35
172	14.33	0.87	0.394	0.058	---	0.34
173	14.42	0.87	0.394	0.057	---	0.34
174	14.50	0.87	0.394	0.057	---	0.34
175	14.58	0.87	0.394	0.057	---	0.34
176	14.67	0.87	0.394	0.056	---	0.34
177	14.75	0.87	0.394	0.056	---	0.34
178	14.83	0.83	0.379	0.056	---	0.32
179	14.92	0.83	0.379	0.056	---	0.32
180	15.00	0.83	0.379	0.055	---	0.32
181	15.08	0.80	0.364	0.055	---	0.31
182	15.17	0.80	0.364	0.055	---	0.31
183	15.25	0.80	0.364	0.054	---	0.31
184	15.33	0.77	0.349	0.054	---	0.29
185	15.42	0.77	0.349	0.054	---	0.30
186	15.50	0.77	0.349	0.054	---	0.30
187	15.58	0.63	0.288	0.053	---	0.23
188	15.67	0.63	0.288	0.053	---	0.24
189	15.75	0.63	0.288	0.053	---	0.24
190	15.83	0.63	0.288	0.053	---	0.24
191	15.92	0.63	0.288	0.052	---	0.24
192	16.00	0.63	0.288	0.052	---	0.24
193	16.08	0.13	0.061	0.052	---	0.01
194	16.17	0.13	0.061	0.051	---	0.01
195	16.25	0.13	0.061	0.051	---	0.01
196	16.33	0.13	0.061	0.051	---	0.01
197	16.42	0.13	0.061	0.051	---	0.01
198	16.50	0.13	0.061	0.050	---	0.01
199	16.58	0.10	0.046	0.050	0.008	0.04
200	16.67	0.10	0.046	0.050	0.008	0.04
201	16.75	0.10	0.046	0.050	0.008	0.04
202	16.83	0.10	0.046	0.049	0.008	0.04
203	16.92	0.10	0.046	0.049	0.008	0.04
204	17.00	0.10	0.046	0.049	0.008	0.04
205	17.08	0.17	0.076	0.049	---	0.03
206	17.17	0.17	0.076	0.048	---	0.03
207	17.25	0.17	0.076	0.048	---	0.03
208	17.33	0.17	0.076	0.048	---	0.03
209	17.42	0.17	0.076	0.048	---	0.03
210	17.50	0.17	0.076	0.047	---	0.03
211	17.58	0.17	0.076	0.047	---	0.03
212	17.67	0.17	0.076	0.047	---	0.03
213	17.75	0.17	0.076	0.047	---	0.03
214	17.83	0.13	0.061	0.047	---	0.01
215	17.92	0.13	0.061	0.046	---	0.01
216	18.00	0.13	0.061	0.046	---	0.01
217	18.08	0.13	0.061	0.046	---	0.01
218	18.17	0.13	0.061	0.046	---	0.02
219	18.25	0.13	0.061	0.045	---	0.02
220	18.33	0.13	0.061	0.045	---	0.02

221	18.42	0.13	0.061	0.045	---	0.02
222	18.50	0.13	0.061	0.045	---	0.02
223	18.58	0.10	0.046	0.045	---	0.00
224	18.67	0.10	0.046	0.044	---	0.00
225	18.75	0.10	0.046	0.044	---	0.00
226	18.83	0.07	0.030	0.044	0.005	0.02
227	18.92	0.07	0.030	0.044	0.005	0.02
228	19.00	0.07	0.030	0.043	0.005	0.02
229	19.08	0.10	0.046	0.043	---	0.00
230	19.17	0.10	0.046	0.043	---	0.00
231	19.25	0.10	0.046	0.043	---	0.00
232	19.33	0.13	0.061	0.043	---	0.02
233	19.42	0.13	0.061	0.042	---	0.02
234	19.50	0.13	0.061	0.042	---	0.02
235	19.58	0.10	0.046	0.042	---	0.00
236	19.67	0.10	0.046	0.042	---	0.00
237	19.75	0.10	0.046	0.042	---	0.00
238	19.83	0.07	0.030	0.041	0.005	0.02
239	19.92	0.07	0.030	0.041	0.005	0.02
240	20.00	0.07	0.030	0.041	0.005	0.02
241	20.08	0.10	0.046	0.041	---	0.00
242	20.17	0.10	0.046	0.041	---	0.00
243	20.25	0.10	0.046	0.041	---	0.00
244	20.33	0.10	0.046	0.040	---	0.01
245	20.42	0.10	0.046	0.040	---	0.01
246	20.50	0.10	0.046	0.040	---	0.01
247	20.58	0.10	0.046	0.040	---	0.01
248	20.67	0.10	0.046	0.040	---	0.01
249	20.75	0.10	0.046	0.040	---	0.01
250	20.83	0.07	0.030	0.039	0.005	0.02
251	20.92	0.07	0.030	0.039	0.005	0.02
252	21.00	0.07	0.030	0.039	0.005	0.02
253	21.08	0.10	0.046	0.039	---	0.01
254	21.17	0.10	0.046	0.039	---	0.01
255	21.25	0.10	0.046	0.039	---	0.01
256	21.33	0.07	0.030	0.038	0.005	0.02
257	21.42	0.07	0.030	0.038	0.005	0.02
258	21.50	0.07	0.030	0.038	0.005	0.02
259	21.58	0.10	0.046	0.038	---	0.01
260	21.67	0.10	0.046	0.038	---	0.01
261	21.75	0.10	0.046	0.038	---	0.01
262	21.83	0.07	0.030	0.038	0.005	0.02
263	21.92	0.07	0.030	0.038	0.005	0.02
264	22.00	0.07	0.030	0.037	0.005	0.02
265	22.08	0.10	0.046	0.037	---	0.01
266	22.17	0.10	0.046	0.037	---	0.01
267	22.25	0.10	0.046	0.037	---	0.01
268	22.33	0.07	0.030	0.037	0.005	0.02
269	22.42	0.07	0.030	0.037	0.005	0.02
270	22.50	0.07	0.030	0.037	0.005	0.02
271	22.58	0.07	0.030	0.037	0.005	0.02
272	22.67	0.07	0.030	0.036	0.005	0.02
273	22.75	0.07	0.030	0.036	0.005	0.02
274	22.83	0.07	0.030	0.036	0.005	0.02
275	22.92	0.07	0.030	0.036	0.005	0.02
276	23.00	0.07	0.030	0.036	0.005	0.02
277	23.08	0.07	0.030	0.036	0.005	0.02
278	23.17	0.07	0.030	0.036	0.005	0.02
279	23.25	0.07	0.030	0.036	0.005	0.02
280	23.33	0.07	0.030	0.036	0.005	0.02
281	23.42	0.07	0.030	0.036	0.005	0.02
282	23.50	0.07	0.030	0.036	0.005	0.02
283	23.58	0.07	0.030	0.036	0.005	0.02
284	23.67	0.07	0.030	0.036	0.005	0.02
285	23.75	0.07	0.030	0.036	0.005	0.02
286	23.83	0.07	0.030	0.035	0.005	0.02
287	23.92	0.07	0.030	0.035	0.005	0.02
288	24.00	0.07	0.030	0.035	0.005	0.02
Sum =		100.0			Sum =	32.0

Flood volume = Effective rainfall 2.67(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 1.3(Ac.Ft)
Total soil loss = 1.13(In)
Total soil loss = 0.554(Ac.Ft)
Total rainfall = 3.79(In)
Flood volume = 57089.7 Cubic Feet
Total soil loss = 24139.3 Cubic Feet

Peak flow rate of this hydrograph = 2.706(CFS)

---

sobonalt3d2410

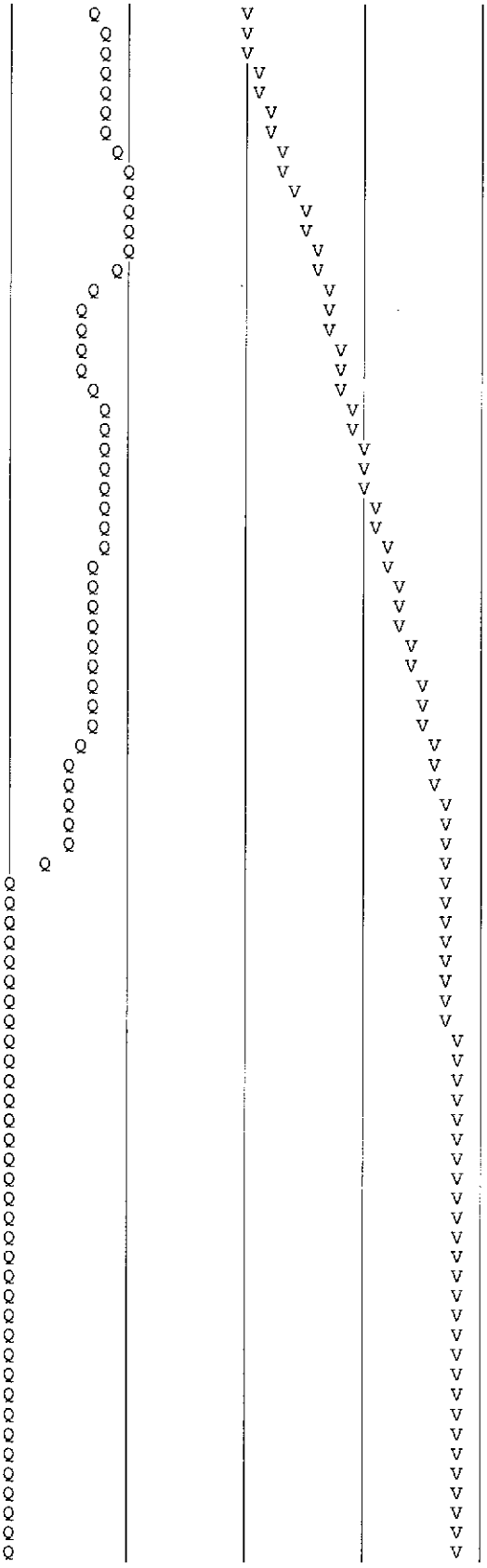
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0004	0.06	Q				
0+10	0.0014	0.14	Q				
0+15	0.0024	0.15	Q				
0+20	0.0036	0.18	Q				
0+25	0.0051	0.22	Q				
0+30	0.0066	0.22	Q				
0+35	0.0081	0.22	Q				
0+40	0.0097	0.22	Q				
0+45	0.0112	0.22	Q				
0+50	0.0129	0.25	VQ				
0+55	0.0149	0.29	VQ				
1+ 0	0.0170	0.30	VQ				
1+ 5	0.0188	0.27	VQ				
1+10	0.0204	0.23	Q				
1+15	0.0219	0.22	Q				
1+20	0.0234	0.22	Q				
1+25	0.0249	0.22	Q				
1+30	0.0265	0.22	Q				
1+35	0.0280	0.22	Q				
1+40	0.0295	0.22	Q				
1+45	0.0311	0.22	Q				
1+50	0.0328	0.25	Q				
1+55	0.0348	0.29	Q				
2+ 0	0.0368	0.30	Q				
2+ 5	0.0389	0.30	Q				
2+10	0.0409	0.30	Q				
2+15	0.0429	0.30	Q				
2+20	0.0450	0.30	Q				
2+25	0.0470	0.30	Q				
2+30	0.0491	0.30	Q				
2+35	0.0513	0.33	Q				
2+40	0.0538	0.36	Q				
2+45	0.0564	0.37	Q				
2+50	0.0589	0.37	Q				
2+55	0.0615	0.37	Q				
3+ 0	0.0640	0.37	Q				
3+ 5	0.0666	0.37	QV				
3+10	0.0691	0.37	QV				
3+15	0.0717	0.37	QV				
3+20	0.0742	0.37	QV				
3+25	0.0767	0.37	QV				
3+30	0.0793	0.37	QV				
3+35	0.0818	0.37	QV				
3+40	0.0844	0.37	QV				
3+45	0.0869	0.37	QV				
3+50	0.0897	0.40	QV				
3+55	0.0927	0.44	QV				
4+ 0	0.0958	0.44	QV				
4+ 5	0.0988	0.44	Q V				
4+10	0.1019	0.44	Q V				
4+15	0.1049	0.44	Q V				
4+20	0.1068	0.27	Q V				
4+25	0.1072	0.06	Q V				
4+30	0.1075	0.03	Q V				
4+35	0.1077	0.03	Q V				
4+40	0.1079	0.03	Q V				
4+45	0.1082	0.04	Q V				
4+50	0.1087	0.08	Q V				
4+55	0.1095	0.12	Q V				
5+ 0	0.1104	0.13	Q V				
5+ 5	0.1122	0.26	Q V				
5+10	0.1151	0.42	Q V				
5+15	0.1182	0.44	Q V				
5+20	0.1201	0.28	Q V				
5+25	0.1207	0.09	Q V				
5+30	0.1212	0.06	Q V				
5+35	0.1219	0.10	Q V				
5+40	0.1229	0.15	Q V				
5+45	0.1239	0.16	Q V				
5+50	0.1250	0.16	Q V				

5+55	0.1261	0.16	Q V
6+ 0	0.1273	0.16	Q V
6+ 5	0.1287	0.20	Q V
6+10	0.1304	0.25	Q V
6+15	0.1322	0.26	Q V
6+20	0.1340	0.26	Q V
6+25	0.1359	0.27	Q V
6+30	0.1377	0.27	Q V
6+35	0.1398	0.31	Q V
6+40	0.1423	0.36	Q V
6+45	0.1448	0.37	Q V
6+50	0.1474	0.37	Q V
6+55	0.1499	0.37	Q V
7+ 0	0.1525	0.37	Q V
7+ 5	0.1551	0.38	Q V
7+10	0.1577	0.38	Q V
7+15	0.1603	0.38	Q V
7+20	0.1632	0.42	Q V
7+25	0.1664	0.47	Q V
7+30	0.1697	0.48	Q V
7+35	0.1733	0.52	Q V
7+40	0.1772	0.57	Q V
7+45	0.1811	0.57	Q V
7+50	0.1854	0.62	Q V
7+55	0.1899	0.66	Q V
8+ 0	0.1946	0.67	Q V
8+ 5	0.1997	0.75	Q V
8+10	0.2055	0.84	Q V
8+15	0.2115	0.86	Q V
8+20	0.2174	0.86	Q V
8+25	0.2234	0.87	Q V
8+30	0.2293	0.87	Q V
8+35	0.2356	0.91	Q V
8+40	0.2421	0.95	Q V
8+45	0.2488	0.96	Q V
8+50	0.2557	1.00	Q V
8+55	0.2629	1.05	Q V
9+ 0	0.2702	1.06	Q V
9+ 5	0.2781	1.14	Q V
9+10	0.2866	1.23	Q V
9+15	0.2951	1.25	Q V
9+20	0.3040	1.29	Q V
9+25	0.3132	1.34	Q V
9+30	0.3225	1.34	Q V
9+35	0.3320	1.38	Q V
9+40	0.3419	1.43	Q V
9+45	0.3518	1.44	Q V
9+50	0.3620	1.48	Q V
9+55	0.3725	1.53	Q V
10+ 0	0.3831	1.54	Q V
10+ 5	0.3920	1.28	Q V
10+10	0.3986	0.96	Q V
10+15	0.4049	0.92	Q V
10+20	0.4113	0.92	Q V
10+25	0.4176	0.92	Q V
10+30	0.4239	0.92	Q V
10+35	0.4315	1.11	Q V
10+40	0.4408	1.34	Q V
10+45	0.4502	1.37	Q V
10+50	0.4597	1.38	Q V
10+55	0.4692	1.38	Q V
11+ 0	0.4788	1.38	Q V
11+ 5	0.4881	1.35	Q V
11+10	0.4970	1.31	Q V
11+15	0.5060	1.30	Q V
11+20	0.5150	1.30	Q V
11+25	0.5240	1.30	Q V
11+30	0.5329	1.31	Q V
11+35	0.5414	1.23	Q V
11+40	0.5493	1.14	Q V
11+45	0.5571	1.13	Q V
11+50	0.5652	1.17	Q V
11+55	0.5736	1.22	Q V
12+ 0	0.5820	1.23	Q V
12+ 5	0.5923	1.49	Q V
12+10	0.6048	1.81	Q V
12+15	0.6176	1.86	Q V
12+20	0.6307	1.90	Q V
12+25	0.6441	1.95	Q V

sobonalt3d2410

12+30	0.6576	1.96	
12+35	0.6717	2.04	
12+40	0.6863	2.13	
12+45	0.7011	2.15	
12+50	0.7162	2.19	
12+55	0.7316	2.23	
13+ 0	0.7470	2.24	
13+ 5	0.7638	2.43	
13+10	0.7821	2.66	
13+15	0.8007	2.70	
13+20	0.8193	2.70	
13+25	0.8379	2.70	
13+30	0.8565	2.71	
13+35	0.8724	2.30	
13+40	0.8848	1.80	
13+45	0.8967	1.73	
13+50	0.9085	1.72	
13+55	0.9204	1.72	
14+ 0	0.9323	1.72	
14+ 5	0.9452	1.87	
14+10	0.9594	2.06	
14+15	0.9738	2.09	
14+20	0.9879	2.06	
14+25	1.0018	2.01	
14+30	1.0156	2.01	
14+35	1.0294	2.01	
14+40	1.0433	2.01	
14+45	1.0571	2.01	
14+50	1.0707	1.98	
14+55	1.0840	1.93	
15+ 0	1.0973	1.93	
15+ 5	1.1103	1.89	
15+10	1.1230	1.85	
15+15	1.1357	1.84	
15+20	1.1482	1.81	
15+25	1.1603	1.76	
15+30	1.1724	1.76	
15+35	1.1835	1.61	
15+40	1.1933	1.43	
15+45	1.2030	1.40	
15+50	1.2126	1.40	
15+55	1.2223	1.40	
16+ 0	1.2319	1.40	
16+ 5	1.2378	0.85	
16+10	1.2389	0.17	
16+15	1.2394	0.07	
16+20	1.2398	0.06	
16+25	1.2402	0.06	
16+30	1.2406	0.06	
16+35	1.2415	0.13	
16+40	1.2430	0.21	
16+45	1.2445	0.22	
16+50	1.2460	0.22	
16+55	1.2475	0.22	
17+ 0	1.2491	0.22	
17+ 5	1.2504	0.20	
17+10	1.2516	0.17	
17+15	1.2527	0.16	
17+20	1.2538	0.17	
17+25	1.2550	0.17	
17+30	1.2561	0.17	
17+35	1.2573	0.17	
17+40	1.2585	0.17	
17+45	1.2597	0.17	
17+50	1.2606	0.14	
17+55	1.2612	0.09	
18+ 0	1.2618	0.09	
18+ 5	1.2624	0.09	
18+10	1.2631	0.09	
18+15	1.2637	0.09	
18+20	1.2643	0.09	
18+25	1.2649	0.09	
18+30	1.2656	0.09	
18+35	1.2660	0.06	
18+40	1.2661	0.01	
18+45	1.2661	0.01	
18+50	1.2666	0.07	
18+55	1.2675	0.14	
19+ 0	1.2685	0.15	

19+ 5	1.2692	0.09	Q			V
19+10	1.2694	0.03	Q			V
19+15	1.2695	0.02	Q			V
19+20	1.2698	0.05	Q			V
19+25	1.2705	0.10	Q			V
19+30	1.2713	0.11	Q			V
19+35	1.2718	0.07	Q			V
19+40	1.2720	0.03	Q			V
19+45	1.2721	0.02	Q			V
19+50	1.2726	0.07	Q			V
19+55	1.2736	0.14	Q			V
20+ 0	1.2746	0.15	Q			V
20+ 5	1.2753	0.10	Q			V
20+10	1.2755	0.04	Q			V
20+15	1.2757	0.03	Q			V
20+20	1.2759	0.03	Q			V
20+25	1.2762	0.03	Q			V
20+30	1.2764	0.03	Q			V
20+35	1.2766	0.03	Q			V
20+40	1.2768	0.03	Q			V
20+45	1.2771	0.03	Q			V
20+50	1.2776	0.08	Q			V
20+55	1.2786	0.14	Q			V
21+ 0	1.2796	0.15	Q			V
21+ 5	1.2803	0.10	Q			V
21+10	1.2806	0.05	Q			V
21+15	1.2809	0.04	Q			V
21+20	1.2815	0.08	Q			V
21+25	1.2825	0.14	Q			V
21+30	1.2835	0.15	Q			V
21+35	1.2842	0.11	Q			V
21+40	1.2846	0.05	Q			V
21+45	1.2849	0.05	Q			V
21+50	1.2855	0.09	Q			V
21+55	1.2865	0.14	Q			V
22+ 0	1.2875	0.15	Q			V
22+ 5	1.2882	0.11	Q			V
22+10	1.2886	0.06	Q			V
22+15	1.2890	0.05	Q			V
22+20	1.2896	0.09	Q			V
22+25	1.2905	0.14	Q			V
22+30	1.2916	0.15	Q			V
22+35	1.2926	0.15	Q			V
22+40	1.2936	0.15	Q			V
22+45	1.2946	0.15	Q			V
22+50	1.2956	0.15	Q			V
22+55	1.2966	0.15	Q			V
23+ 0	1.2977	0.15	Q			V
23+ 5	1.2987	0.15	Q			V
23+10	1.2997	0.15	Q			V
23+15	1.3007	0.15	Q			V
23+20	1.3017	0.15	Q			V
23+25	1.3028	0.15	Q			V
23+30	1.3038	0.15	Q			V
23+35	1.3048	0.15	Q			V
23+40	1.3058	0.15	Q			V
23+45	1.3068	0.15	Q			V
23+50	1.3079	0.15	Q			V
23+55	1.3089	0.15	Q			V
24+ 0	1.3099	0.15	Q			V
24+ 5	1.3105	0.09	Q			V
24+10	1.3106	0.01	Q			V
24+15	1.3106	0.00	Q			V

ALTERATIVE NO. 4
(PREFERRED ALTERATIVE)

UNDEVELOPED CONDITION

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt4110.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	0.55	8.97

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	1.20	19.56

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.817(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.817(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	86.00	0.000

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.203
2	0.167	194.180	55.366	9.095
3	0.250	291.271	18.995	3.120
4	0.333	388.361	7.769	1.276
5	0.417	485.451	2.779	0.457
6	0.500	582.541	0.892	0.146
7	0.583	679.631	0.599	0.098
8	0.667	776.721	0.191	0.031
		Sum =	100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.412	0.176	---	0.24
2	0.17	4.30	0.422	0.176	---	0.25
3	0.25	5.00	0.490	0.176	---	0.31
4	0.33	5.00	0.490	0.176	---	0.31
5	0.42	5.80	0.569	0.176	---	0.39
6	0.50	6.50	0.637	0.176	---	0.46
7	0.58	7.40	0.726	0.176	---	0.55
8	0.67	8.60	0.843	0.176	---	0.67
9	0.75	12.30	1.206	0.176	---	1.03
10	0.83	29.10	2.854	0.176	---	2.68
11	0.92	6.80	0.667	0.176	---	0.49
12	1.00	5.00	0.490	0.176	---	0.31
Sum =		100.0			Sum =	7.7

Flood volume = Effective rainfall 0.64(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.239(Ac.Ft)
Total rainfall = 0.82(In)
Flood volume = 37968.4 Cubic Feet
Total soil loss = 10390.1 Cubic Feet

Peak flow rate of this hydrograph = 29.894(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0036	0.52	Q				
0+10	0.0221	2.69	V Q				
0+15	0.0474	3.67	V Q				
0+20	0.0793	4.63	V Q				
0+25	0.1147	5.14	VQ				
0+30	0.1569	6.13	VQ				
0+35	0.2068	7.25	Q				
0+40	0.2663	8.64		QV			
0+45	0.3415	10.92		QV			
0+50	0.4681	18.38			V Q		
0+55	0.6740	29.89				V	Q
1+ 0	0.7793	15.29			Q	V	
1+ 5	0.8375	8.46		Q			V
1+10	0.8586	3.07	Q				V
1+15	0.8665	1.14	Q				V
1+20	0.8700	0.51	Q				V
1+25	0.8712	0.18	Q				V
1+30	0.8716	0.05	Q				V
1+35	0.8716	0.01	Q				V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt4310.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	0.90	14.67

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	2.10	34.23

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 1.394(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.394(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	86.00	0.000

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.203
2	0.167	194.180	55.366	9.095
3	0.250	291.271	18.995	3.120
4	0.333	388.361	7.769	1.276
5	0.417	485.451	2.779	0.457
6	0.500	582.541	0.892	0.146
7	0.583	679.631	0.599	0.098
8	0.667	776.721	0.191	0.031
			Sum = 100.000	Sum= 16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.217	0.176	---	0.04
2	0.17	1.30	0.217	0.176	---	0.04
3	0.25	1.10	0.184	0.176	---	0.01
4	0.33	1.50	0.251	0.176	---	0.08
5	0.42	1.50	0.251	0.176	---	0.08
6	0.50	1.80	0.301	0.176	---	0.13
7	0.58	1.50	0.251	0.176	---	0.08
8	0.67	1.80	0.301	0.176	---	0.13
9	0.75	1.80	0.301	0.176	---	0.13
10	0.83	1.50	0.251	0.176	---	0.08
11	0.92	1.60	0.268	0.176	---	0.09
12	1.00	1.80	0.301	0.176	---	0.13
13	1.08	2.20	0.368	0.176	---	0.19
14	1.17	2.20	0.368	0.176	---	0.19
15	1.25	2.20	0.368	0.176	---	0.19
16	1.33	2.00	0.334	0.176	---	0.16
17	1.42	2.60	0.435	0.176	---	0.26
18	1.50	2.70	0.452	0.176	---	0.28
19	1.58	2.40	0.401	0.176	---	0.23
20	1.67	2.70	0.452	0.176	---	0.28
21	1.75	3.30	0.552	0.176	---	0.38
22	1.83	3.10	0.518	0.176	---	0.34
23	1.92	2.90	0.485	0.176	---	0.31
24	2.00	3.00	0.502	0.176	---	0.33
25	2.08	3.10	0.518	0.176	---	0.34
26	2.17	4.20	0.702	0.176	---	0.53
27	2.25	5.00	0.836	0.176	---	0.66
28	2.33	3.50	0.585	0.176	---	0.41
29	2.42	6.80	1.137	0.176	---	0.96
30	2.50	7.30	1.221	0.176	---	1.05
31	2.58	8.20	1.371	0.176	---	1.20
32	2.67	5.90	0.987	0.176	---	0.81
33	2.75	2.00	0.334	0.176	---	0.16
34	2.83	1.80	0.301	0.176	---	0.13
35	2.92	1.80	0.301	0.176	---	0.13
36	3.00	0.60	0.100	0.176	0.090	0.01
Sum =		100.0			Sum =	10.5

Flood volume = Effective rainfall 0.87(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 1.2(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 0.706(Ac.Ft)
Total rainfall = 1.39(In)
Flood volume = 51707.7 Cubic Feet
Total soil loss = 30749.7 Cubic Feet

Peak flow rate of this hydrograph = 17.506(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0006	0.09	Q
0+10	0.0039	0.47	Q

sobonalt4310

0+15	0.0075	0.53	VQ
0+20	0.0105	0.43	Q
0+25	0.0170	0.95	VQ
0+30	0.0255	1.23	V Q
0+35	0.0369	1.65	V Q
0+40	0.0471	1.49	VQ
0+45	0.0599	1.86	VQ
0+50	0.0728	1.87	VQ
0+55	0.0832	1.50	VQ
1+ 0	0.0941	1.59	Q
1+ 5	0.1081	2.04	VQ
1+10	0.1271	2.75	VQ
1+15	0.1478	3.00	V Q
1+20	0.1686	3.03	VQ
1+25	0.1891	2.98	QV
1+30	0.2156	3.84	Q
1+35	0.2442	4.16	Q
1+40	0.2717	3.98	Q V
1+45	0.3031	4.56	QV
1+50	0.3411	5.51	Q
1+55	0.3790	5.50	QV
2+ 0	0.4153	5.28	Q V
2+ 5	0.4523	5.37	Q V
2+10	0.4932	5.94	Q V
2+15	0.5481	7.97	Q V
2+20	0.6117	9.24	Q V
2+25	0.6725	8.83	Q V
2+30	0.7656	13.51	V Q
2+35	0.8764	16.09	V Q
2+40	0.9970	17.51	V Q
2+45	1.0891	13.38	Q V
2+50	1.1336	6.46	Q V
2+55	1.1595	3.76	Q V
3+ 0	1.1763	2.44	Q V
3+ 5	1.1830	0.98	Q V
3+10	1.1857	0.39	Q V
3+15	1.1866	0.13	Q V
3+20	1.1869	0.04	Q V
3+25	1.1870	0.02	Q V
3+30	1.1870	0.00	Q V
3+35	1.1870	0.00	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt4610.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	1.40	22.82

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	3.00	48.90

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 2.058(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.058(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	86.00	0.000

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

---

sobonalt4610

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	97.090	13.410	2.203
2	0.167	194.180	55.366	9.095
3	0.250	291.271	18.995	3.120
4	0.333	388.361	7.769	1.276
5	0.417	485.451	2.779	0.457
6	0.500	582.541	0.892	0.146
7	0.583	679.631	0.599	0.098
8	0.667	776.721	0.191	0.031
			Sum = 100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.123	0.176	0.111	0.01
2	0.17	0.60	0.148	0.176	0.133	0.01
3	0.25	0.60	0.148	0.176	0.133	0.01
4	0.33	0.60	0.148	0.176	0.133	0.01
5	0.42	0.60	0.148	0.176	0.133	0.01
6	0.50	0.70	0.173	0.176	0.156	0.02
7	0.58	0.70	0.173	0.176	0.156	0.02
8	0.67	0.70	0.173	0.176	0.156	0.02
9	0.75	0.70	0.173	0.176	0.156	0.02
10	0.83	0.70	0.173	0.176	0.156	0.02
11	0.92	0.70	0.173	0.176	0.156	0.02
12	1.00	0.80	0.198	0.176	---	0.02
13	1.08	0.80	0.198	0.176	---	0.02
14	1.17	0.80	0.198	0.176	---	0.02
15	1.25	0.80	0.198	0.176	---	0.02
16	1.33	0.80	0.198	0.176	---	0.02
17	1.42	0.80	0.198	0.176	---	0.02
18	1.50	0.80	0.198	0.176	---	0.02
19	1.58	0.80	0.198	0.176	---	0.02
20	1.67	0.80	0.198	0.176	---	0.02
21	1.75	0.80	0.198	0.176	---	0.02
22	1.83	0.80	0.198	0.176	---	0.02
23	1.92	0.80	0.198	0.176	---	0.02
24	2.00	0.90	0.222	0.176	---	0.05
25	2.08	0.80	0.198	0.176	---	0.02
26	2.17	0.90	0.222	0.176	---	0.05
27	2.25	0.90	0.222	0.176	---	0.05
28	2.33	0.90	0.222	0.176	---	0.05
29	2.42	0.90	0.222	0.176	---	0.05
30	2.50	0.90	0.222	0.176	---	0.05
31	2.58	0.90	0.222	0.176	---	0.05
32	2.67	0.90	0.222	0.176	---	0.05
33	2.75	1.00	0.247	0.176	---	0.07
34	2.83	1.00	0.247	0.176	---	0.07
35	2.92	1.00	0.247	0.176	---	0.07
36	3.00	1.00	0.247	0.176	---	0.07
37	3.08	1.00	0.247	0.176	---	0.07
38	3.17	1.10	0.272	0.176	---	0.10
39	3.25	1.10	0.272	0.176	---	0.10
40	3.33	1.10	0.272	0.176	---	0.10
41	3.42	1.20	0.296	0.176	---	0.12
42	3.50	1.30	0.321	0.176	---	0.15
43	3.58	1.40	0.346	0.176	---	0.17
44	3.67	1.40	0.346	0.176	---	0.17
45	3.75	1.50	0.370	0.176	---	0.19
46	3.83	1.50	0.370	0.176	---	0.19
47	3.92	1.60	0.395	0.176	---	0.22
48	4.00	1.60	0.395	0.176	---	0.22
49	4.08	1.70	0.420	0.176	---	0.24
50	4.17	1.80	0.445	0.176	---	0.27
51	4.25	1.90	0.469	0.176	---	0.29
52	4.33	2.00	0.494	0.176	---	0.32
53	4.42	2.10	0.519	0.176	---	0.34
54	4.50	2.10	0.519	0.176	---	0.34
55	4.58	2.20	0.543	0.176	---	0.37
56	4.67	2.30	0.568	0.176	---	0.39
57	4.75	2.40	0.593	0.176	---	0.42
58	4.83	2.40	0.593	0.176	---	0.42

59	4.92	2.50	0.617	0.176	---	0.44
60	5.00	2.60	0.642	0.176	---	0.47
61	5.08	3.10	0.766	0.176	---	0.59
62	5.17	3.60	0.889	0.176	---	0.71
63	5.25	3.90	0.963	0.176	---	0.79
64	5.33	4.20	1.037	0.176	---	0.86
65	5.42	4.70	1.161	0.176	---	0.99
66	5.50	5.60	1.383	0.176	---	1.21
67	5.58	1.90	0.469	0.176	---	0.29
68	5.67	0.90	0.222	0.176	---	0.05
69	5.75	0.60	0.148	0.176	0.133	0.01
70	5.83	0.50	0.123	0.176	0.111	0.01
71	5.92	0.30	0.074	0.176	0.067	0.01
72	6.00	0.20	0.049	0.176	0.044	0.00
Sum =		100.0			Sum =	12.8

Flood volume = Effective rainfall 1.06(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 1.00(In)
Total soil loss = 1.352(Ac.Ft)
Total rainfall = 2.06(In)
Flood volume = 62889.9 Cubic Feet
Total soil loss = 58888.1 Cubic Feet

Peak flow rate of this hydrograph = 16.348(CFS)

---

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0002	0.03	Q
0+10	0.0012	0.15	Q
0+15	0.0026	0.21	Q
0+20	0.0042	0.23	Q
0+25	0.0058	0.24	Q
0+30	0.0075	0.25	Q
0+35	0.0094	0.27	Q
0+40	0.0113	0.28	Q
0+45	0.0133	0.28	Q
0+50	0.0152	0.28	Q
0+55	0.0172	0.28	Q
1+ 0	0.0192	0.29	Q
1+ 5	0.0215	0.34	Q
1+10	0.0239	0.35	Q
1+15	0.0264	0.36	Q
1+20	0.0289	0.36	Q
1+25	0.0314	0.36	Q
1+30	0.0339	0.36	Q
1+35	0.0363	0.36	QV
1+40	0.0388	0.36	QV
1+45	0.0413	0.36	QV
1+50	0.0438	0.36	QV
1+55	0.0463	0.36	QV
2+ 0	0.0492	0.42	QV
2+ 5	0.0532	0.59	Q
2+10	0.0566	0.49	QV
2+15	0.0612	0.67	Q
2+20	0.0662	0.73	Q
2+25	0.0714	0.75	Q
2+30	0.0767	0.76	QV
2+35	0.0819	0.76	QV
2+40	0.0872	0.77	QV
2+45	0.0929	0.82	QV
2+50	0.1001	1.05	Q
2+55	0.1078	1.12	Q
3+ 0	0.1158	1.16	QV
3+ 5	0.1238	1.17	QV
3+10	0.1322	1.22	QV
3+15	0.1422	1.45	QV
3+20	0.1528	1.53	QV
3+25	0.1639	1.62	QV
3+30	0.1770	1.91	QV
3+35	0.1926	2.27	QV
3+40	0.2105	2.60	Q
3+45	0.2297	2.78	QV

sobonalt4610

3+50	0.2507	3.05	Q
3+55	0.2727	3.20	QV
4+ 0	0.2965	3.46	Q V
4+ 5	0.3213	3.61	QV
4+10	0.3483	3.92	Q V
4+15	0.3779	4.29	Q V
4+20	0.4101	4.68	Q V
4+25	0.4452	5.08	Q V
4+30	0.4826	5.43	Q V
4+35	0.5213	5.61	Q V
4+40	0.5622	5.94	Q V
4+45	0.6057	6.32	Q V
4+50	0.6515	6.66	Q V
4+55	0.6986	6.84	Q V
5+ 0	0.7479	7.16	Q V
5+ 5	0.8013	7.75	Q V
5+10	0.8651	9.26	Q V
5+15	0.9408	10.98	Q V
5+20	1.0260	12.38	Q V
5+25	1.1209	13.78	Q V
5+30	1.2297	15.79	Q V
5+35	1.3423	16.35	Q V
5+40	1.4001	8.40	Q V
5+45	1.4249	3.59	Q V
5+50	1.4351	1.49	Q V
5+55	1.4397	0.67	Q V
6+ 0	1.4421	0.35	Q V
6+ 5	1.4433	0.16	Q V
6+10	1.4436	0.05	Q V
6+15	1.4437	0.01	Q V
6+20	1.4437	0.01	Q V
6+25	1.4437	0.00	Q V
6+30	1.4438	0.00	Q V
6+35	1.4438	0.00	Q V

sobonalt42410

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt42410.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.086 Hr.
Lag time = 5.15 Min.
25% of lag time = 1.29 Min.
40% of lag time = 2.06 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	2.25	36.68

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	6.00	97.80

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 3.793(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.793(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	86.00	0.000

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176
					Sum (F) =	0.176

Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h

sobonalt42410

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	97.090	13.410		2.203
2	0.167	194.180	55.366		9.095
3	0.250	291.271	18.995		3.120
4	0.333	388.361	7.769		1.276
5	0.417	485.451	2.779		0.457
6	0.500	582.541	0.892		0.146
7	0.583	679.631	0.599		0.098
8	0.667	776.721	0.191		0.031
			Sum = 100.000	Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	0.311	0.027	0.00
2	0.17	0.07	0.030	0.310	0.027	0.00
3	0.25	0.07	0.030	0.309	0.027	0.00
4	0.33	0.10	0.046	0.308	0.041	0.00
5	0.42	0.10	0.046	0.306	0.041	0.00
6	0.50	0.10	0.046	0.305	0.041	0.00
7	0.58	0.10	0.046	0.304	0.041	0.00
8	0.67	0.10	0.046	0.303	0.041	0.00
9	0.75	0.10	0.046	0.302	0.041	0.00
10	0.83	0.13	0.061	0.301	0.055	0.01
11	0.92	0.13	0.061	0.299	0.055	0.01
12	1.00	0.13	0.061	0.298	0.055	0.01
13	1.08	0.10	0.046	0.297	0.041	0.00
14	1.17	0.10	0.046	0.296	0.041	0.00
15	1.25	0.10	0.046	0.295	0.041	0.00
16	1.33	0.10	0.046	0.293	0.041	0.00
17	1.42	0.10	0.046	0.292	0.041	0.00
18	1.50	0.10	0.046	0.291	0.041	0.00
19	1.58	0.10	0.046	0.290	0.041	0.00
20	1.67	0.10	0.046	0.289	0.041	0.00
21	1.75	0.10	0.046	0.288	0.041	0.00
22	1.83	0.13	0.061	0.287	0.055	0.01
23	1.92	0.13	0.061	0.285	0.055	0.01
24	2.00	0.13	0.061	0.284	0.055	0.01
25	2.08	0.13	0.061	0.283	0.055	0.01
26	2.17	0.13	0.061	0.282	0.055	0.01
27	2.25	0.13	0.061	0.281	0.055	0.01
28	2.33	0.13	0.061	0.280	0.055	0.01
29	2.42	0.13	0.061	0.278	0.055	0.01
30	2.50	0.13	0.061	0.277	0.055	0.01
31	2.58	0.17	0.076	0.276	0.068	0.01
32	2.67	0.17	0.076	0.275	0.068	0.01
33	2.75	0.17	0.076	0.274	0.068	0.01
34	2.83	0.17	0.076	0.273	0.068	0.01
35	2.92	0.17	0.076	0.272	0.068	0.01
36	3.00	0.17	0.076	0.271	0.068	0.01
37	3.08	0.17	0.076	0.269	0.068	0.01
38	3.17	0.17	0.076	0.268	0.068	0.01
39	3.25	0.17	0.076	0.267	0.068	0.01
40	3.33	0.17	0.076	0.266	0.068	0.01
41	3.42	0.17	0.076	0.265	0.068	0.01
42	3.50	0.17	0.076	0.264	0.068	0.01
43	3.58	0.17	0.076	0.263	0.068	0.01
44	3.67	0.17	0.076	0.262	0.068	0.01
45	3.75	0.17	0.076	0.261	0.068	0.01
46	3.83	0.20	0.091	0.259	0.082	0.01
47	3.92	0.20	0.091	0.258	0.082	0.01
48	4.00	0.20	0.091	0.257	0.082	0.01
49	4.08	0.20	0.091	0.256	0.082	0.01
50	4.17	0.20	0.091	0.255	0.082	0.01
51	4.25	0.20	0.091	0.254	0.082	0.01
52	4.33	0.23	0.106	0.253	0.096	0.01
53	4.42	0.23	0.106	0.252	0.096	0.01
54	4.50	0.23	0.106	0.251	0.096	0.01
55	4.58	0.23	0.106	0.250	0.096	0.01
56	4.67	0.23	0.106	0.249	0.096	0.01
57	4.75	0.23	0.106	0.248	0.096	0.01
58	4.83	0.27	0.121	0.246	0.109	0.01

59	4.92	0.27	0.121	0.245	0.109	0.01
60	5.00	0.27	0.121	0.244	0.109	0.01
61	5.08	0.20	0.091	0.243	0.082	0.01
62	5.17	0.20	0.091	0.242	0.082	0.01
63	5.25	0.20	0.091	0.241	0.082	0.01
64	5.33	0.23	0.106	0.240	0.096	0.01
65	5.42	0.23	0.106	0.239	0.096	0.01
66	5.50	0.23	0.106	0.238	0.096	0.01
67	5.58	0.27	0.121	0.237	0.109	0.01
68	5.67	0.27	0.121	0.236	0.109	0.01
69	5.75	0.27	0.121	0.235	0.109	0.01
70	5.83	0.27	0.121	0.234	0.109	0.01
71	5.92	0.27	0.121	0.233	0.109	0.01
72	6.00	0.27	0.121	0.232	0.109	0.01
73	6.08	0.30	0.137	0.231	0.123	0.01
74	6.17	0.30	0.137	0.230	0.123	0.01
75	6.25	0.30	0.137	0.229	0.123	0.01
76	6.33	0.30	0.137	0.228	0.123	0.01
77	6.42	0.30	0.137	0.227	0.123	0.01
78	6.50	0.30	0.137	0.226	0.123	0.01
79	6.58	0.33	0.152	0.225	0.137	0.02
80	6.67	0.33	0.152	0.224	0.137	0.02
81	6.75	0.33	0.152	0.223	0.137	0.02
82	6.83	0.33	0.152	0.222	0.137	0.02
83	6.92	0.33	0.152	0.221	0.137	0.02
84	7.00	0.33	0.152	0.220	0.137	0.02
85	7.08	0.33	0.152	0.219	0.137	0.02
86	7.17	0.33	0.152	0.218	0.137	0.02
87	7.25	0.33	0.152	0.217	0.137	0.02
88	7.33	0.37	0.167	0.216	0.150	0.02
89	7.42	0.37	0.167	0.215	0.150	0.02
90	7.50	0.37	0.167	0.214	0.150	0.02
91	7.58	0.40	0.182	0.213	0.164	0.02
92	7.67	0.40	0.182	0.212	0.164	0.02
93	7.75	0.40	0.182	0.211	0.164	0.02
94	7.83	0.43	0.197	0.210	0.177	0.02
95	7.92	0.43	0.197	0.209	0.177	0.02
96	8.00	0.43	0.197	0.208	0.177	0.02
97	8.08	0.50	0.228	0.207	---	0.02
98	8.17	0.50	0.228	0.206	---	0.02
99	8.25	0.50	0.228	0.205	---	0.02
100	8.33	0.50	0.228	0.204	---	0.02
101	8.42	0.50	0.228	0.203	---	0.02
102	8.50	0.50	0.228	0.202	---	0.03
103	8.58	0.53	0.243	0.201	---	0.04
104	8.67	0.53	0.243	0.200	---	0.04
105	8.75	0.53	0.243	0.199	---	0.04
106	8.83	0.57	0.258	0.198	---	0.06
107	8.92	0.57	0.258	0.197	---	0.06
108	9.00	0.57	0.258	0.196	---	0.06
109	9.08	0.63	0.288	0.195	---	0.09
110	9.17	0.63	0.288	0.195	---	0.09
111	9.25	0.63	0.288	0.194	---	0.09
112	9.33	0.67	0.303	0.193	---	0.11
113	9.42	0.67	0.303	0.192	---	0.11
114	9.50	0.67	0.303	0.191	---	0.11
115	9.58	0.70	0.319	0.190	---	0.13
116	9.67	0.70	0.319	0.189	---	0.13
117	9.75	0.70	0.319	0.188	---	0.13
118	9.83	0.73	0.334	0.187	---	0.15
119	9.92	0.73	0.334	0.186	---	0.15
120	10.00	0.73	0.334	0.185	---	0.15
121	10.08	0.50	0.228	0.185	---	0.04
122	10.17	0.50	0.228	0.184	---	0.04
123	10.25	0.50	0.228	0.183	---	0.04
124	10.33	0.50	0.228	0.182	---	0.05
125	10.42	0.50	0.228	0.181	---	0.05
126	10.50	0.50	0.228	0.180	---	0.05
127	10.58	0.67	0.303	0.179	---	0.12
128	10.67	0.67	0.303	0.178	---	0.13
129	10.75	0.67	0.303	0.177	---	0.13
130	10.83	0.67	0.303	0.177	---	0.13
131	10.92	0.67	0.303	0.176	---	0.13
132	11.00	0.67	0.303	0.175	---	0.13
133	11.08	0.63	0.288	0.174	---	0.11
134	11.17	0.63	0.288	0.173	---	0.12
135	11.25	0.63	0.288	0.172	---	0.12
136	11.33	0.63	0.288	0.171	---	0.12
137	11.42	0.63	0.288	0.171	---	0.12

138	11.50	0.63	0.288	0.170	---	0.12
139	11.58	0.57	0.258	0.169	---	0.09
140	11.67	0.57	0.258	0.168	---	0.09
141	11.75	0.57	0.258	0.167	---	0.09
142	11.83	0.60	0.273	0.166	---	0.11
143	11.92	0.60	0.273	0.166	---	0.11
144	12.00	0.60	0.273	0.165	---	0.11
145	12.08	0.83	0.379	0.164	---	0.22
146	12.17	0.83	0.379	0.163	---	0.22
147	12.25	0.83	0.379	0.162	---	0.22
148	12.33	0.87	0.394	0.161	---	0.23
149	12.42	0.87	0.394	0.161	---	0.23
150	12.50	0.87	0.394	0.160	---	0.23
151	12.58	0.93	0.425	0.159	---	0.27
152	12.67	0.93	0.425	0.158	---	0.27
153	12.75	0.93	0.425	0.157	---	0.27
154	12.83	0.97	0.440	0.157	---	0.28
155	12.92	0.97	0.440	0.156	---	0.28
156	13.00	0.97	0.440	0.155	---	0.28
157	13.08	1.13	0.516	0.154	---	0.36
158	13.17	1.13	0.516	0.154	---	0.36
159	13.25	1.13	0.516	0.153	---	0.36
160	13.33	1.13	0.516	0.152	---	0.36
161	13.42	1.13	0.516	0.151	---	0.36
162	13.50	1.13	0.516	0.150	---	0.37
163	13.58	0.77	0.349	0.150	---	0.20
164	13.67	0.77	0.349	0.149	---	0.20
165	13.75	0.77	0.349	0.148	---	0.20
166	13.83	0.77	0.349	0.147	---	0.20
167	13.92	0.77	0.349	0.147	---	0.20
168	14.00	0.77	0.349	0.146	---	0.20
169	14.08	0.90	0.410	0.145	---	0.26
170	14.17	0.90	0.410	0.144	---	0.27
171	14.25	0.90	0.410	0.144	---	0.27
172	14.33	0.87	0.394	0.143	---	0.25
173	14.42	0.87	0.394	0.142	---	0.25
174	14.50	0.87	0.394	0.141	---	0.25
175	14.58	0.87	0.394	0.141	---	0.25
176	14.67	0.87	0.394	0.140	---	0.25
177	14.75	0.87	0.394	0.139	---	0.26
178	14.83	0.83	0.379	0.139	---	0.24
179	14.92	0.83	0.379	0.138	---	0.24
180	15.00	0.83	0.379	0.137	---	0.24
181	15.08	0.80	0.364	0.136	---	0.23
182	15.17	0.80	0.364	0.136	---	0.23
183	15.25	0.80	0.364	0.135	---	0.23
184	15.33	0.77	0.349	0.134	---	0.21
185	15.42	0.77	0.349	0.134	---	0.22
186	15.50	0.77	0.349	0.133	---	0.22
187	15.58	0.63	0.288	0.132	---	0.16
188	15.67	0.63	0.288	0.132	---	0.16
189	15.75	0.63	0.288	0.131	---	0.16
190	15.83	0.63	0.288	0.130	---	0.16
191	15.92	0.63	0.288	0.130	---	0.16
192	16.00	0.63	0.288	0.129	---	0.16
193	16.08	0.13	0.061	0.128	0.055	0.01
194	16.17	0.13	0.061	0.128	0.055	0.01
195	16.25	0.13	0.061	0.127	0.055	0.01
196	16.33	0.13	0.061	0.126	0.055	0.01
197	16.42	0.13	0.061	0.126	0.055	0.01
198	16.50	0.13	0.061	0.125	0.055	0.01
199	16.58	0.10	0.046	0.124	0.041	0.00
200	16.67	0.10	0.046	0.124	0.041	0.00
201	16.75	0.10	0.046	0.123	0.041	0.00
202	16.83	0.10	0.046	0.123	0.041	0.00
203	16.92	0.10	0.046	0.122	0.041	0.00
204	17.00	0.10	0.046	0.121	0.041	0.00
205	17.08	0.17	0.076	0.121	0.068	0.01
206	17.17	0.17	0.076	0.120	0.068	0.01
207	17.25	0.17	0.076	0.119	0.068	0.01
208	17.33	0.17	0.076	0.119	0.068	0.01
209	17.42	0.17	0.076	0.118	0.068	0.01
210	17.50	0.17	0.076	0.118	0.068	0.01
211	17.58	0.17	0.076	0.117	0.068	0.01
212	17.67	0.17	0.076	0.117	0.068	0.01
213	17.75	0.17	0.076	0.116	0.068	0.01
214	17.83	0.13	0.061	0.115	0.055	0.01
215	17.92	0.13	0.061	0.115	0.055	0.01
216	18.00	0.13	0.061	0.114	0.055	0.01

217	18.08	0.13	0.061	0.114	0.055	0.01
218	18.17	0.13	0.061	0.113	0.055	0.01
219	18.25	0.13	0.061	0.113	0.055	0.01
220	18.33	0.13	0.061	0.112	0.055	0.01
221	18.42	0.13	0.061	0.111	0.055	0.01
222	18.50	0.13	0.061	0.111	0.055	0.01
223	18.58	0.10	0.046	0.110	0.041	0.00
224	18.67	0.10	0.046	0.110	0.041	0.00
225	18.75	0.10	0.046	0.109	0.041	0.00
226	18.83	0.07	0.030	0.109	0.027	0.00
227	18.92	0.07	0.030	0.108	0.027	0.00
228	19.00	0.07	0.030	0.108	0.027	0.00
229	19.08	0.10	0.046	0.107	0.041	0.00
230	19.17	0.10	0.046	0.107	0.041	0.00
231	19.25	0.10	0.046	0.106	0.041	0.00
232	19.33	0.13	0.061	0.106	0.055	0.01
233	19.42	0.13	0.061	0.105	0.055	0.01
234	19.50	0.13	0.061	0.105	0.055	0.01
235	19.58	0.10	0.046	0.104	0.041	0.00
236	19.67	0.10	0.046	0.104	0.041	0.00
237	19.75	0.10	0.046	0.103	0.041	0.00
238	19.83	0.07	0.030	0.103	0.027	0.00
239	19.92	0.07	0.030	0.102	0.027	0.00
240	20.00	0.07	0.030	0.102	0.027	0.00
241	20.08	0.10	0.046	0.102	0.041	0.00
242	20.17	0.10	0.046	0.101	0.041	0.00
243	20.25	0.10	0.046	0.101	0.041	0.00
244	20.33	0.10	0.046	0.100	0.041	0.00
245	20.42	0.10	0.046	0.100	0.041	0.00
246	20.50	0.10	0.046	0.099	0.041	0.00
247	20.58	0.10	0.046	0.099	0.041	0.00
248	20.67	0.10	0.046	0.099	0.041	0.00
249	20.75	0.10	0.046	0.098	0.041	0.00
250	20.83	0.07	0.030	0.098	0.027	0.00
251	20.92	0.07	0.030	0.097	0.027	0.00
252	21.00	0.07	0.030	0.097	0.027	0.00
253	21.08	0.10	0.046	0.097	0.041	0.00
254	21.17	0.10	0.046	0.096	0.041	0.00
255	21.25	0.10	0.046	0.096	0.041	0.00
256	21.33	0.07	0.030	0.095	0.027	0.00
257	21.42	0.07	0.030	0.095	0.027	0.00
258	21.50	0.07	0.030	0.095	0.027	0.00
259	21.58	0.10	0.046	0.094	0.041	0.00
260	21.67	0.10	0.046	0.094	0.041	0.00
261	21.75	0.10	0.046	0.094	0.041	0.00
262	21.83	0.07	0.030	0.093	0.027	0.00
263	21.92	0.07	0.030	0.093	0.027	0.00
264	22.00	0.07	0.030	0.093	0.027	0.00
265	22.08	0.10	0.046	0.092	0.041	0.00
266	22.17	0.10	0.046	0.092	0.041	0.00
267	22.25	0.10	0.046	0.092	0.041	0.00
268	22.33	0.07	0.030	0.092	0.027	0.00
269	22.42	0.07	0.030	0.091	0.027	0.00
270	22.50	0.07	0.030	0.091	0.027	0.00
271	22.58	0.07	0.030	0.091	0.027	0.00
272	22.67	0.07	0.030	0.090	0.027	0.00
273	22.75	0.07	0.030	0.090	0.027	0.00
274	22.83	0.07	0.030	0.090	0.027	0.00
275	22.92	0.07	0.030	0.090	0.027	0.00
276	23.00	0.07	0.030	0.090	0.027	0.00
277	23.08	0.07	0.030	0.089	0.027	0.00
278	23.17	0.07	0.030	0.089	0.027	0.00
279	23.25	0.07	0.030	0.089	0.027	0.00
280	23.33	0.07	0.030	0.089	0.027	0.00
281	23.42	0.07	0.030	0.089	0.027	0.00
282	23.50	0.07	0.030	0.088	0.027	0.00
283	23.58	0.07	0.030	0.088	0.027	0.00
284	23.67	0.07	0.030	0.088	0.027	0.00
285	23.75	0.07	0.030	0.088	0.027	0.00
286	23.83	0.07	0.030	0.088	0.027	0.00
287	23.92	0.07	0.030	0.088	0.027	0.00
288	24.00	0.07	0.030	0.088	0.027	0.00
	Sum =	100.0			Sum =	17.3

Flood volume = Effective rainfall 1.44(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 2.0(Ac.Ft)
Total soil loss = 2.35(In)
Total soil loss = 3.194(Ac.Ft)
Total rainfall = 3.79(In)
Flood volume = 85255.9 Cubic Feet

Total soil loss = 139152.0 Cubic Feet

Peak flow rate of this hydrograph = 5.978(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.01	Q				
0+10	0.0003	0.03	Q				
0+15	0.0006	0.04	Q				
0+20	0.0009	0.05	Q				
0+25	0.0014	0.07	Q				
0+30	0.0019	0.07	Q				
0+35	0.0024	0.07	Q				
0+40	0.0029	0.07	Q				
0+45	0.0034	0.07	Q				
0+50	0.0040	0.08	Q				
0+55	0.0046	0.09	Q				
1+ 0	0.0053	0.10	Q				
1+ 5	0.0059	0.10	Q				
1+10	0.0065	0.08	Q				
1+15	0.0070	0.08	Q				
1+20	0.0075	0.08	Q				
1+25	0.0080	0.08	Q				
1+30	0.0086	0.07	Q				
1+35	0.0091	0.07	Q				
1+40	0.0096	0.07	Q				
1+45	0.0101	0.07	Q				
1+50	0.0107	0.08	Q				
1+55	0.0113	0.09	Q				
2+ 0	0.0119	0.10	Q				
2+ 5	0.0126	0.10	Q				
2+10	0.0133	0.10	Q				
2+15	0.0140	0.10	Q				
2+20	0.0147	0.10	Q				
2+25	0.0154	0.10	Q				
2+30	0.0161	0.10	Q				
2+35	0.0168	0.10	Q				
2+40	0.0176	0.12	Q				
2+45	0.0184	0.12	Q				
2+50	0.0193	0.12	Q				
2+55	0.0201	0.12	Q				
3+ 0	0.0210	0.12	Q				
3+ 5	0.0218	0.12	Q				
3+10	0.0227	0.12	Q				
3+15	0.0236	0.12	Q				
3+20	0.0244	0.12	Q				
3+25	0.0253	0.12	Q				
3+30	0.0261	0.12	Q				
3+35	0.0270	0.12	Q				
3+40	0.0278	0.12	Q				
3+45	0.0287	0.12	Q				
3+50	0.0296	0.13	Q				
3+55	0.0306	0.14	Q				
4+ 0	0.0316	0.15	Q				
4+ 5	0.0326	0.15	Q				
4+10	0.0336	0.15	Q				
4+15	0.0346	0.15	Q				
4+20	0.0357	0.15	Q				
4+25	0.0369	0.17	Q				
4+30	0.0380	0.17	Q				
4+35	0.0392	0.17	Q				
4+40	0.0404	0.17	Q				
4+45	0.0416	0.17	Q				
4+50	0.0429	0.18	Q				
4+55	0.0442	0.19	Q				
5+ 0	0.0455	0.20	Q				
5+ 5	0.0468	0.19	Q				
5+10	0.0480	0.16	Q				
5+15	0.0490	0.16	QV				
5+20	0.0501	0.16	QV				
5+25	0.0513	0.17	QV				
5+30	0.0525	0.17	QV				

5+35	0.0537	0.18	QV
5+40	0.0550	0.19	QV
5+45	0.0563	0.20	QV
5+50	0.0577	0.20	QV
5+55	0.0591	0.20	QV
6+ 0	0.0605	0.20	QV
6+ 5	0.0618	0.20	QV
6+10	0.0633	0.22	QV
6+15	0.0649	0.22	QV
6+20	0.0664	0.22	QV
6+25	0.0679	0.22	QV
6+30	0.0695	0.22	QV
6+35	0.0711	0.23	QV
6+40	0.0727	0.24	QV
6+45	0.0744	0.25	QV
6+50	0.0761	0.25	QV
6+55	0.0778	0.25	QV
7+ 0	0.0796	0.25	QV
7+ 5	0.0813	0.25	QV
7+10	0.0830	0.25	QV
7+15	0.0847	0.25	QV
7+20	0.0864	0.25	Q
7+25	0.0883	0.27	Q
7+30	0.0902	0.27	Q
7+35	0.0921	0.28	Q
7+40	0.0941	0.29	Q
7+45	0.0961	0.30	Q
7+50	0.0982	0.30	QV
7+55	0.1004	0.32	QV
8+ 0	0.1026	0.32	QV
8+ 5	0.1048	0.33	QV
8+10	0.1071	0.34	QV
8+15	0.1095	0.35	QV
8+20	0.1121	0.37	QV
8+25	0.1147	0.38	QV
8+30	0.1174	0.40	QV
8+35	0.1205	0.45	QV
8+40	0.1246	0.60	Q
8+45	0.1292	0.66	Q
8+50	0.1342	0.73	Q
8+55	0.1404	0.89	VQ
9+ 0	0.1470	0.96	Q
9+ 5	0.1543	1.06	VQ
9+10	0.1636	1.36	V Q
9+15	0.1738	1.47	V Q
9+20	0.1845	1.56	V Q
9+25	0.1964	1.73	V Q
9+30	0.2088	1.79	V Q
9+35	0.2216	1.87	V Q
9+40	0.2356	2.03	V Q
9+45	0.2500	2.09	V Q
9+50	0.2649	2.16	V Q
9+55	0.2808	2.32	V Q
10+ 0	0.2973	2.38	V Q
10+ 5	0.3123	2.19	V Q
10+10	0.3209	1.24	Q V
10+15	0.3273	0.93	Q V
10+20	0.3328	0.81	Q V
10+25	0.3382	0.77	Q V
10+30	0.3435	0.77	Q V
10+35	0.3500	0.95	Q V
10+40	0.3613	1.65	QV
10+45	0.3744	1.90	Q
10+50	0.3883	2.01	VQ
10+55	0.4024	2.06	Q
11+ 0	0.4168	2.08	Q
11+ 5	0.4310	2.07	Q
11+10	0.4445	1.95	Q V
11+15	0.4577	1.92	Q V
11+20	0.4708	1.91	Q V
11+25	0.4841	1.92	Q V
11+30	0.4973	1.93	Q V
11+35	0.5103	1.88	Q V
11+40	0.5214	1.61	Q V
11+45	0.5319	1.53	Q V
11+50	0.5425	1.54	Q V
11+55	0.5541	1.68	Q V
12+ 0	0.5661	1.74	Q V
12+ 5	0.5798	2.00	Q V

sobonalt42410

12+10	0.6004	2.99	
12+15	0.6233	3.33	
12+20	0.6476	3.52	
12+25	0.6731	3.72	
12+30	0.6993	3.79	
12+35	0.7262	3.90	
12+40	0.7551	4.20	
12+45	0.7848	4.31	
12+50	0.8151	4.40	
12+55	0.8465	4.57	
13+ 0	0.8784	4.63	
13+ 5	0.9117	4.83	
13+10	0.9499	5.54	
13+15	0.9898	5.80	
13+20	1.0305	5.91	
13+25	1.0715	5.95	
13+30	1.1127	5.98	
13+35	1.1514	5.63	
13+40	1.1799	4.13	
13+45	1.2048	3.62	
13+50	1.2283	3.42	
13+55	1.2514	3.35	
14+ 0	1.2745	3.34	
14+ 5	1.2984	3.47	
14+10	1.3261	4.03	
14+15	1.3553	4.23	
14+20	1.3848	4.29	
14+25	1.4137	4.19	
14+30	1.4424	4.16	
14+35	1.4710	4.16	
14+40	1.4997	4.17	
14+45	1.5285	4.18	
14+50	1.5572	4.16	
14+55	1.5849	4.03	
15+ 0	1.6124	3.99	
15+ 5	1.6396	3.95	
15+10	1.6659	3.82	
15+15	1.6920	3.78	
15+20	1.7177	3.74	
15+25	1.7425	3.60	
15+30	1.7671	3.57	
15+35	1.7907	3.42	
15+40	1.8105	2.87	
15+45	1.8290	2.69	
15+50	1.8471	2.63	
15+55	1.8651	2.61	
16+ 0	1.8831	2.61	
16+ 5	1.8987	2.28	
16+10	1.9048	0.88	
16+15	1.9076	0.41	
16+20	1.9091	0.21	
16+25	1.9101	0.14	
16+30	1.9109	0.12	
16+35	1.9116	0.10	
16+40	1.9122	0.08	
16+45	1.9127	0.08	
16+50	1.9132	0.08	
16+55	1.9137	0.08	
17+ 0	1.9143	0.07	
17+ 5	1.9148	0.08	
17+10	1.9156	0.11	
17+15	1.9164	0.12	
17+20	1.9172	0.12	
17+25	1.9181	0.12	
17+30	1.9189	0.12	
17+35	1.9198	0.12	
17+40	1.9207	0.12	
17+45	1.9215	0.12	
17+50	1.9223	0.12	
17+55	1.9231	0.11	
18+ 0	1.9238	0.10	
18+ 5	1.9245	0.10	
18+10	1.9252	0.10	
18+15	1.9259	0.10	
18+20	1.9266	0.10	
18+25	1.9272	0.10	
18+30	1.9279	0.10	
18+35	1.9286	0.10	
18+40	1.9292	0.08	

18+45	1.9297	0.08	Q			V
18+50	1.9302	0.07	Q			V
18+55	1.9306	0.06	Q			V
19+ 0	1.9310	0.05	Q			V
19+ 5	1.9313	0.05	Q			V
19+10	1.9318	0.07	Q			V
19+15	1.9323	0.07	Q			V
19+20	1.9328	0.08	Q			V
19+25	1.9335	0.09	Q			V
19+30	1.9341	0.10	Q			V
19+35	1.9348	0.10	Q			V
19+40	1.9353	0.08	Q			V
19+45	1.9359	0.08	Q			V
19+50	1.9364	0.07	Q			V
19+55	1.9368	0.06	Q			V
20+ 0	1.9371	0.05	Q			V
20+ 5	1.9375	0.05	Q			V
20+10	1.9380	0.07	Q			V
20+15	1.9385	0.07	Q			V
20+20	1.9390	0.07	Q			V
20+25	1.9395	0.07	Q			V
20+30	1.9400	0.07	Q			V
20+35	1.9405	0.07	Q			V
20+40	1.9410	0.07	Q			V
20+45	1.9416	0.07	Q			V
20+50	1.9421	0.07	Q			V
20+55	1.9424	0.06	Q			V
21+ 0	1.9428	0.05	Q			V
21+ 5	1.9432	0.05	Q			V
21+10	1.9437	0.07	Q			V
21+15	1.9441	0.07	Q			V
21+20	1.9446	0.07	Q			V
21+25	1.9450	0.06	Q			V
21+30	1.9454	0.05	Q			V
21+35	1.9458	0.05	Q			V
21+40	1.9462	0.07	Q			V
21+45	1.9467	0.07	Q			V
21+50	1.9472	0.07	Q			V
21+55	1.9476	0.06	Q			V
22+ 0	1.9480	0.05	Q			V
22+ 5	1.9483	0.05	Q			V
22+10	1.9488	0.07	Q			V
22+15	1.9493	0.07	Q			V
22+20	1.9498	0.07	Q			V
22+25	1.9502	0.06	Q			V
22+30	1.9505	0.05	Q			V
22+35	1.9509	0.05	Q			V
22+40	1.9512	0.05	Q			V
22+45	1.9516	0.05	Q			V
22+50	1.9519	0.05	Q			V
22+55	1.9523	0.05	Q			V
23+ 0	1.9526	0.05	Q			V
23+ 5	1.9530	0.05	Q			V
23+10	1.9533	0.05	Q			V
23+15	1.9536	0.05	Q			V
23+20	1.9540	0.05	Q			V
23+25	1.9543	0.05	Q			V
23+30	1.9547	0.05	Q			V
23+35	1.9550	0.05	Q			V
23+40	1.9554	0.05	Q			V
23+45	1.9557	0.05	Q			V
23+50	1.9560	0.05	Q			V
23+55	1.9564	0.05	Q			V
24+ 0	1.9567	0.05	Q			V
24+ 5	1.9570	0.04	Q			V
24+10	1.9571	0.02	Q			V
24+15	1.9572	0.01	Q			V
24+20	1.9572	0.00	Q			V
24+25	1.9572	0.00	Q			V
24+30	1.9572	0.00	Q			V
24+35	1.9572	0.00	Q			V

DEVELOPED CONDITION

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt4d110.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	0.55	8.97

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	1.20	19.56

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.817(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.817(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
		Sum =	100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.412	0.071	---	0.34
2	0.17	4.30	0.422	0.071	---	0.35
3	0.25	5.00	0.490	0.071	---	0.42
4	0.33	5.00	0.490	0.071	---	0.42
5	0.42	5.80	0.569	0.071	---	0.50
6	0.50	6.50	0.637	0.071	---	0.57
7	0.58	7.40	0.726	0.071	---	0.65
8	0.67	8.60	0.843	0.071	---	0.77
9	0.75	12.30	1.206	0.071	---	1.14
10	0.83	29.10	2.854	0.071	---	2.78
11	0.92	6.80	0.667	0.071	---	0.60
12	1.00	5.00	0.490	0.071	---	0.42
Sum =		100.0			Sum =	9.0

Flood volume = Effective rainfall 0.75(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 1.0(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.096(Ac.Ft)
Total rainfall = 0.82(In)
Flood volume = 44167.4 Cubic Feet
Total soil loss = 4191.1 Cubic Feet

Peak flow rate of this hydrograph = 29.269(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0159	2.30	V Q				
0+10	0.0517	5.20	V Q				
0+15	0.0941	6.15	V Q				
0+20	0.1409	6.80	V Q				
0+25	0.1919	7.41	V Q				
0+30	0.2507	8.54	V Q				
0+35	0.3182	9.80	VQ				
0+40	0.3969	11.42	Q				
0+45	0.5000	14.97	Q				
0+50	0.7016	29.27	V				Q
0+55	0.8988	28.64	V			V	Q
1+ 0	0.9764	11.27	Q				V
1+ 5	1.0091	4.75	Q				V
1+10	1.0134	0.61	Q				V
1+15	1.0139	0.09	Q				V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt4d310.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	0.90	14.67

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	2.10	34.23

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 1.394(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.394(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
			Sum = 100.000	Sum= 16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.217	0.071	---	0.15
2	0.17	1.30	0.217	0.071	---	0.15
3	0.25	1.10	0.184	0.071	---	0.11
4	0.33	1.50	0.251	0.071	---	0.18
5	0.42	1.50	0.251	0.071	---	0.18
6	0.50	1.80	0.301	0.071	---	0.23
7	0.58	1.50	0.251	0.071	---	0.18
8	0.67	1.80	0.301	0.071	---	0.23
9	0.75	1.80	0.301	0.071	---	0.23
10	0.83	1.50	0.251	0.071	---	0.18
11	0.92	1.60	0.268	0.071	---	0.20
12	1.00	1.80	0.301	0.071	---	0.23
13	1.08	2.20	0.368	0.071	---	0.30
14	1.17	2.20	0.368	0.071	---	0.30
15	1.25	2.20	0.368	0.071	---	0.30
16	1.33	2.00	0.334	0.071	---	0.26
17	1.42	2.60	0.435	0.071	---	0.36
18	1.50	2.70	0.452	0.071	---	0.38
19	1.58	2.40	0.401	0.071	---	0.33
20	1.67	2.70	0.452	0.071	---	0.38
21	1.75	3.30	0.552	0.071	---	0.48
22	1.83	3.10	0.518	0.071	---	0.45
23	1.92	2.90	0.485	0.071	---	0.41
24	2.00	3.00	0.502	0.071	---	0.43
25	2.08	3.10	0.518	0.071	---	0.45
26	2.17	4.20	0.702	0.071	---	0.63
27	2.25	5.00	0.836	0.071	---	0.77
28	2.33	3.50	0.585	0.071	---	0.51
29	2.42	6.80	1.137	0.071	---	1.07
30	2.50	7.30	1.221	0.071	---	1.15
31	2.58	8.20	1.371	0.071	---	1.30
32	2.67	5.90	0.987	0.071	---	0.92
33	2.75	2.00	0.334	0.071	---	0.26
34	2.83	1.80	0.301	0.071	---	0.23
35	2.92	1.80	0.301	0.071	---	0.23
36	3.00	0.60	0.100	0.071	---	0.03
Sum =		100.0			Sum =	14.2

Flood volume = Effective rainfall 1.18(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 1.6(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.289(Ac.Ft)
Total rainfall = 1.39(In)
Flood volume = 69884.2 Cubic Feet
Total soil loss = 12573.2 Cubic Feet

Peak flow rate of this hydrograph = 19.690(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0068	0.99	VQ				
0+10	0.0220	2.21	V Q				
0+15	0.0369	2.15	V Q				
0+20	0.0531	2.36	V Q				
0+25	0.0729	2.87	V Q				
0+30	0.0955	3.28	V Q				

sobonalt4d310

0+35	0.1187	3.38	V Q
0+40	0.1419	3.36	V Q
0+45	0.1675	3.72	V Q
0+50	0.1912	3.43	V Q
0+55	0.2128	3.14	VQ
1+ 0	0.2365	3.45	VQ
1+ 5	0.2654	4.19	V Q
1+10	0.2983	4.78	V Q
1+15	0.3318	4.87	VQ
1+20	0.3639	4.66	Q
1+25	0.3987	5.06	VQ
1+30	0.4398	5.96	VQ
1+35	0.4803	5.87	Q
1+40	0.5205	5.84	QV
1+45	0.5678	6.88	QV
1+50	0.6197	7.53	Q
1+55	0.6690	7.16	Q V
2+ 0	0.7170	6.97	Q V
2+ 5	0.7664	7.18	Q V
2+10	0.8255	8.57	Q V
2+15	0.9014	11.03	Q
2+20	0.9749	10.66	Q V
2+25	1.0610	12.50	Q V
2+30	1.1807	17.38	V Q
2+35	1.3163	19.69	V Q
2+40	1.4441	18.55	VQ
2+45	1.5208	11.14	Q V
2+50	1.5558	5.08	Q V
2+55	1.5831	3.96	Q V
3+ 0	1.5999	2.43	Q V
3+ 5	1.6037	0.56	Q V
3+10	1.6043	0.08	Q V
3+15	1.6043	0.01	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt4d610.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	1.40	22.82

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	3.00	48.90

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 2.058(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.058(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt4d610
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
			Sum = 100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.123	0.071	---	0.05
2	0.17	0.60	0.148	0.071	---	0.08
3	0.25	0.60	0.148	0.071	---	0.08
4	0.33	0.60	0.148	0.071	---	0.08
5	0.42	0.60	0.148	0.071	---	0.08
6	0.50	0.70	0.173	0.071	---	0.10
7	0.58	0.70	0.173	0.071	---	0.10
8	0.67	0.70	0.173	0.071	---	0.10
9	0.75	0.70	0.173	0.071	---	0.10
10	0.83	0.70	0.173	0.071	---	0.10
11	0.92	0.70	0.173	0.071	---	0.10
12	1.00	0.80	0.198	0.071	---	0.13
13	1.08	0.80	0.198	0.071	---	0.13
14	1.17	0.80	0.198	0.071	---	0.13
15	1.25	0.80	0.198	0.071	---	0.13
16	1.33	0.80	0.198	0.071	---	0.13
17	1.42	0.80	0.198	0.071	---	0.13
18	1.50	0.80	0.198	0.071	---	0.13
19	1.58	0.80	0.198	0.071	---	0.13
20	1.67	0.80	0.198	0.071	---	0.13
21	1.75	0.80	0.198	0.071	---	0.13
22	1.83	0.80	0.198	0.071	---	0.13
23	1.92	0.80	0.198	0.071	---	0.13
24	2.00	0.90	0.222	0.071	---	0.15
25	2.08	0.80	0.198	0.071	---	0.13
26	2.17	0.90	0.222	0.071	---	0.15
27	2.25	0.90	0.222	0.071	---	0.15
28	2.33	0.90	0.222	0.071	---	0.15
29	2.42	0.90	0.222	0.071	---	0.15
30	2.50	0.90	0.222	0.071	---	0.15
31	2.58	0.90	0.222	0.071	---	0.15
32	2.67	0.90	0.222	0.071	---	0.15
33	2.75	1.00	0.247	0.071	---	0.18
34	2.83	1.00	0.247	0.071	---	0.18
35	2.92	1.00	0.247	0.071	---	0.18
36	3.00	1.00	0.247	0.071	---	0.18
37	3.08	1.00	0.247	0.071	---	0.18
38	3.17	1.10	0.272	0.071	---	0.20
39	3.25	1.10	0.272	0.071	---	0.20
40	3.33	1.10	0.272	0.071	---	0.20
41	3.42	1.20	0.296	0.071	---	0.23
42	3.50	1.30	0.321	0.071	---	0.25
43	3.58	1.40	0.346	0.071	---	0.27
44	3.67	1.40	0.346	0.071	---	0.27
45	3.75	1.50	0.370	0.071	---	0.30
46	3.83	1.50	0.370	0.071	---	0.30
47	3.92	1.60	0.395	0.071	---	0.32
48	4.00	1.60	0.395	0.071	---	0.32
49	4.08	1.70	0.420	0.071	---	0.35
50	4.17	1.80	0.445	0.071	---	0.37
51	4.25	1.90	0.469	0.071	---	0.40
52	4.33	2.00	0.494	0.071	---	0.42
53	4.42	2.10	0.519	0.071	---	0.45
54	4.50	2.10	0.519	0.071	---	0.45
55	4.58	2.20	0.543	0.071	---	0.47
56	4.67	2.30	0.568	0.071	---	0.50
57	4.75	2.40	0.593	0.071	---	0.52
58	4.83	2.40	0.593	0.071	---	0.52
59	4.92	2.50	0.617	0.071	---	0.55
60	5.00	2.60	0.642	0.071	---	0.57
61	5.08	3.10	0.766	0.071	---	0.69
62	5.17	3.60	0.889	0.071	---	0.82

63	5.25	3.90	0.963	0.071	---	0.89
64	5.33	4.20	1.037	0.071	---	0.97
65	5.42	4.70	1.161	0.071	---	1.09
66	5.50	5.60	1.383	0.071	---	1.31
67	5.58	1.90	0.469	0.071	---	0.40
68	5.67	0.90	0.222	0.071	---	0.15
69	5.75	0.60	0.148	0.071	---	0.08
70	5.83	0.50	0.123	0.071	---	0.05
71	5.92	0.30	0.074	0.071	---	0.00
72	6.00	0.20	0.049	0.071	0.009	0.04
Sum =		100.0			Sum =	19.7

Flood volume = Effective rainfall 1.64(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 2.2(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 0.570(Ac.Ft)
Total rainfall = 2.06(In)
Flood volume = 96937.0 Cubic Feet
Total soil loss = 24840.9 Cubic Feet

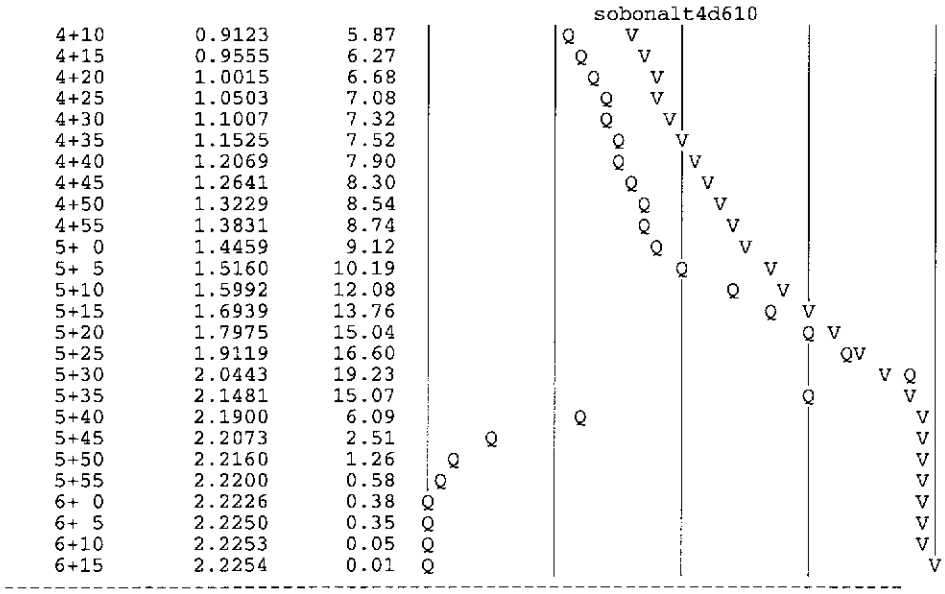
Peak flow rate of this hydrograph = 19.231(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0024	0.36	Q
0+10	0.0091	0.96	VQ
0+15	0.0175	1.23	V Q
0+20	0.0262	1.27	V Q
0+25	0.0350	1.27	V Q
0+30	0.0449	1.44	V Q
0+35	0.0562	1.64	V Q
0+40	0.0677	1.67	V Q
0+45	0.0793	1.68	V Q
0+50	0.0908	1.68	V Q
0+55	0.1024	1.68	V Q
1+ 0	0.1151	1.84	VQ
1+ 5	0.1292	2.05	V Q
1+10	0.1435	2.08	V Q
1+15	0.1579	2.08	V Q
1+20	0.1722	2.08	VQ
1+25	0.1866	2.08	VQ
1+30	0.2009	2.08	VQ
1+35	0.2152	2.08	VQ
1+40	0.2296	2.08	Q
1+45	0.2439	2.08	Q
1+50	0.2583	2.08	Q
1+55	0.2726	2.08	Q
2+ 0	0.2881	2.25	QV
2+ 5	0.3039	2.29	QV
2+10	0.3196	2.28	QV
2+15	0.3365	2.46	Q V
2+20	0.3536	2.48	Q V
2+25	0.3708	2.49	Q V
2+30	0.3879	2.49	Q V
2+35	0.4051	2.49	Q V
2+40	0.4222	2.49	Q V
2+45	0.4405	2.66	Q V
2+50	0.4602	2.86	Q V
2+55	0.4801	2.89	Q V
3+ 0	0.5001	2.90	Q V
3+ 5	0.5200	2.90	Q V
3+10	0.5411	3.06	Q V
3+15	0.5636	3.27	Q V
3+20	0.5863	3.30	Q V
3+25	0.6102	3.47	Q V
3+30	0.6366	3.84	Q V
3+35	0.6658	4.24	Q V
3+40	0.6967	4.48	Q V
3+45	0.7289	4.68	Q V
3+50	0.7626	4.89	Q V
3+55	0.7976	5.09	Q V
4+ 0	0.8341	5.30	Q V
4+ 5	0.8719	5.49	Q V



4+10	0.9123	5.87	
4+15	0.9555	6.27	
4+20	1.0015	6.68	
4+25	1.0503	7.08	
4+30	1.1007	7.32	
4+35	1.1525	7.52	
4+40	1.2069	7.90	
4+45	1.2641	8.30	
4+50	1.3229	8.54	
4+55	1.3831	8.74	
5+ 0	1.4459	9.12	
5+ 5	1.5160	10.19	
5+10	1.5992	12.08	
5+15	1.6939	13.76	
5+20	1.7975	15.04	
5+25	1.9119	16.60	
5+30	2.0443	19.23	
5+35	2.1481	15.07	
5+40	2.1900	6.09	
5+45	2.2073	2.51	
5+50	2.2160	1.26	
5+55	2.2200	0.58	
6+ 0	2.2226	0.38	
6+ 5	2.2250	0.35	
6+10	2.2253	0.05	
6+15	2.2254	0.01	

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/10/08 File: sobonalt4d2410.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	2.25	36.68

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	6.00	97.80

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 3.793(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.793(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt4d2410

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
			Sum = 100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	0.126	0.005	0.02
2	0.17	0.07	0.030	0.125	0.005	0.02
3	0.25	0.07	0.030	0.125	0.005	0.02
4	0.33	0.10	0.046	0.124	0.008	0.04
5	0.42	0.10	0.046	0.124	0.008	0.04
6	0.50	0.10	0.046	0.123	0.008	0.04
7	0.58	0.10	0.046	0.123	0.008	0.04
8	0.67	0.10	0.046	0.122	0.008	0.04
9	0.75	0.10	0.046	0.122	0.008	0.04
10	0.83	0.13	0.061	0.121	0.011	0.05
11	0.92	0.13	0.061	0.121	0.011	0.05
12	1.00	0.13	0.061	0.120	0.011	0.05
13	1.08	0.10	0.046	0.120	0.008	0.04
14	1.17	0.10	0.046	0.119	0.008	0.04
15	1.25	0.10	0.046	0.119	0.008	0.04
16	1.33	0.10	0.046	0.118	0.008	0.04
17	1.42	0.10	0.046	0.118	0.008	0.04
18	1.50	0.10	0.046	0.117	0.008	0.04
19	1.58	0.10	0.046	0.117	0.008	0.04
20	1.67	0.10	0.046	0.117	0.008	0.04
21	1.75	0.10	0.046	0.116	0.008	0.04
22	1.83	0.13	0.061	0.116	0.011	0.05
23	1.92	0.13	0.061	0.115	0.011	0.05
24	2.00	0.13	0.061	0.115	0.011	0.05
25	2.08	0.13	0.061	0.114	0.011	0.05
26	2.17	0.13	0.061	0.114	0.011	0.05
27	2.25	0.13	0.061	0.113	0.011	0.05
28	2.33	0.13	0.061	0.113	0.011	0.05
29	2.42	0.13	0.061	0.112	0.011	0.05
30	2.50	0.13	0.061	0.112	0.011	0.05
31	2.58	0.17	0.076	0.111	0.014	0.06
32	2.67	0.17	0.076	0.111	0.014	0.06
33	2.75	0.17	0.076	0.110	0.014	0.06
34	2.83	0.17	0.076	0.110	0.014	0.06
35	2.92	0.17	0.076	0.110	0.014	0.06
36	3.00	0.17	0.076	0.109	0.014	0.06
37	3.08	0.17	0.076	0.109	0.014	0.06
38	3.17	0.17	0.076	0.108	0.014	0.06
39	3.25	0.17	0.076	0.108	0.014	0.06
40	3.33	0.17	0.076	0.107	0.014	0.06
41	3.42	0.17	0.076	0.107	0.014	0.06
42	3.50	0.17	0.076	0.106	0.014	0.06
43	3.58	0.17	0.076	0.106	0.014	0.06
44	3.67	0.17	0.076	0.106	0.014	0.06
45	3.75	0.17	0.076	0.105	0.014	0.06
46	3.83	0.20	0.091	0.105	0.016	0.07
47	3.92	0.20	0.091	0.104	0.016	0.07
48	4.00	0.20	0.091	0.104	0.016	0.07
49	4.08	0.20	0.091	0.103	0.016	0.07
50	4.17	0.20	0.091	0.103	0.016	0.07
51	4.25	0.20	0.091	0.102	0.016	0.07
52	4.33	0.23	0.106	0.102	---	0.00
53	4.42	0.23	0.106	0.102	---	0.00
54	4.50	0.23	0.106	0.101	---	0.01
55	4.58	0.23	0.106	0.101	---	0.01
56	4.67	0.23	0.106	0.100	---	0.01
57	4.75	0.23	0.106	0.100	---	0.01
58	4.83	0.27	0.121	0.099	---	0.02
59	4.92	0.27	0.121	0.099	---	0.02
60	5.00	0.27	0.121	0.099	---	0.02
61	5.08	0.20	0.091	0.098	0.016	0.07
62	5.17	0.20	0.091	0.098	0.016	0.07

63	5.25	0.20	0.091	0.097	0.016	0.07
64	5.33	0.23	0.106	0.097	---	0.01
65	5.42	0.23	0.106	0.096	---	0.01
66	5.50	0.23	0.106	0.096	---	0.01
67	5.58	0.27	0.121	0.096	---	0.03
68	5.67	0.27	0.121	0.095	---	0.03
69	5.75	0.27	0.121	0.095	---	0.03
70	5.83	0.27	0.121	0.094	---	0.03
71	5.92	0.27	0.121	0.094	---	0.03
72	6.00	0.27	0.121	0.093	---	0.03
73	6.08	0.30	0.137	0.093	---	0.04
74	6.17	0.30	0.137	0.093	---	0.04
75	6.25	0.30	0.137	0.092	---	0.04
76	6.33	0.30	0.137	0.092	---	0.04
77	6.42	0.30	0.137	0.091	---	0.05
78	6.50	0.30	0.137	0.091	---	0.05
79	6.58	0.33	0.152	0.091	---	0.06
80	6.67	0.33	0.152	0.090	---	0.06
81	6.75	0.33	0.152	0.090	---	0.06
82	6.83	0.33	0.152	0.089	---	0.06
83	6.92	0.33	0.152	0.089	---	0.06
84	7.00	0.33	0.152	0.089	---	0.06
85	7.08	0.33	0.152	0.088	---	0.06
86	7.17	0.33	0.152	0.088	---	0.06
87	7.25	0.33	0.152	0.087	---	0.06
88	7.33	0.37	0.167	0.087	---	0.08
89	7.42	0.37	0.167	0.087	---	0.08
90	7.50	0.37	0.167	0.086	---	0.08
91	7.58	0.40	0.182	0.086	---	0.10
92	7.67	0.40	0.182	0.085	---	0.10
93	7.75	0.40	0.182	0.085	---	0.10
94	7.83	0.43	0.197	0.085	---	0.11
95	7.92	0.43	0.197	0.084	---	0.11
96	8.00	0.43	0.197	0.084	---	0.11
97	8.08	0.50	0.228	0.083	---	0.14
98	8.17	0.50	0.228	0.083	---	0.14
99	8.25	0.50	0.228	0.083	---	0.14
100	8.33	0.50	0.228	0.082	---	0.15
101	8.42	0.50	0.228	0.082	---	0.15
102	8.50	0.50	0.228	0.082	---	0.15
103	8.58	0.53	0.243	0.081	---	0.16
104	8.67	0.53	0.243	0.081	---	0.16
105	8.75	0.53	0.243	0.080	---	0.16
106	8.83	0.57	0.258	0.080	---	0.18
107	8.92	0.57	0.258	0.080	---	0.18
108	9.00	0.57	0.258	0.079	---	0.18
109	9.08	0.63	0.288	0.079	---	0.21
110	9.17	0.63	0.288	0.078	---	0.21
111	9.25	0.63	0.288	0.078	---	0.21
112	9.33	0.67	0.303	0.078	---	0.23
113	9.42	0.67	0.303	0.077	---	0.23
114	9.50	0.67	0.303	0.077	---	0.23
115	9.58	0.70	0.319	0.077	---	0.24
116	9.67	0.70	0.319	0.076	---	0.24
117	9.75	0.70	0.319	0.076	---	0.24
118	9.83	0.73	0.334	0.076	---	0.26
119	9.92	0.73	0.334	0.075	---	0.26
120	10.00	0.73	0.334	0.075	---	0.26
121	10.08	0.50	0.228	0.074	---	0.15
122	10.17	0.50	0.228	0.074	---	0.15
123	10.25	0.50	0.228	0.074	---	0.15
124	10.33	0.50	0.228	0.073	---	0.15
125	10.42	0.50	0.228	0.073	---	0.15
126	10.50	0.50	0.228	0.073	---	0.15
127	10.58	0.67	0.303	0.072	---	0.23
128	10.67	0.67	0.303	0.072	---	0.23
129	10.75	0.67	0.303	0.072	---	0.23
130	10.83	0.67	0.303	0.071	---	0.23
131	10.92	0.67	0.303	0.071	---	0.23
132	11.00	0.67	0.303	0.071	---	0.23
133	11.08	0.63	0.288	0.070	---	0.22
134	11.17	0.63	0.288	0.070	---	0.22
135	11.25	0.63	0.288	0.069	---	0.22
136	11.33	0.63	0.288	0.069	---	0.22
137	11.42	0.63	0.288	0.069	---	0.22
138	11.50	0.63	0.288	0.068	---	0.22
139	11.58	0.57	0.258	0.068	---	0.19
140	11.67	0.57	0.258	0.068	---	0.19
141	11.75	0.57	0.258	0.067	---	0.19

142	11.83	0.60	0.273	0.067	---	0.21
143	11.92	0.60	0.273	0.067	---	0.21
144	12.00	0.60	0.273	0.066	---	0.21
145	12.08	0.83	0.379	0.066	---	0.31
146	12.17	0.83	0.379	0.066	---	0.31
147	12.25	0.83	0.379	0.065	---	0.31
148	12.33	0.87	0.394	0.065	---	0.33
149	12.42	0.87	0.394	0.065	---	0.33
150	12.50	0.87	0.394	0.064	---	0.33
151	12.58	0.93	0.425	0.064	---	0.36
152	12.67	0.93	0.425	0.064	---	0.36
153	12.75	0.93	0.425	0.064	---	0.36
154	12.83	0.97	0.440	0.063	---	0.38
155	12.92	0.97	0.440	0.063	---	0.38
156	13.00	0.97	0.440	0.063	---	0.38
157	13.08	1.13	0.516	0.062	---	0.45
158	13.17	1.13	0.516	0.062	---	0.45
159	13.25	1.13	0.516	0.062	---	0.45
160	13.33	1.13	0.516	0.061	---	0.45
161	13.42	1.13	0.516	0.061	---	0.45
162	13.50	1.13	0.516	0.061	---	0.46
163	13.58	0.77	0.349	0.060	---	0.29
164	13.67	0.77	0.349	0.060	---	0.29
165	13.75	0.77	0.349	0.060	---	0.29
166	13.83	0.77	0.349	0.059	---	0.29
167	13.92	0.77	0.349	0.059	---	0.29
168	14.00	0.77	0.349	0.059	---	0.29
169	14.08	0.90	0.410	0.059	---	0.35
170	14.17	0.90	0.410	0.058	---	0.35
171	14.25	0.90	0.410	0.058	---	0.35
172	14.33	0.87	0.394	0.058	---	0.34
173	14.42	0.87	0.394	0.057	---	0.34
174	14.50	0.87	0.394	0.057	---	0.34
175	14.58	0.87	0.394	0.057	---	0.34
176	14.67	0.87	0.394	0.056	---	0.34
177	14.75	0.87	0.394	0.056	---	0.34
178	14.83	0.83	0.379	0.056	---	0.32
179	14.92	0.83	0.379	0.056	---	0.32
180	15.00	0.83	0.379	0.055	---	0.32
181	15.08	0.80	0.364	0.055	---	0.31
182	15.17	0.80	0.364	0.055	---	0.31
183	15.25	0.80	0.364	0.054	---	0.31
184	15.33	0.77	0.349	0.054	---	0.29
185	15.42	0.77	0.349	0.054	---	0.30
186	15.50	0.77	0.349	0.054	---	0.30
187	15.58	0.63	0.288	0.053	---	0.23
188	15.67	0.63	0.288	0.053	---	0.24
189	15.75	0.63	0.288	0.053	---	0.24
190	15.83	0.63	0.288	0.053	---	0.24
191	15.92	0.63	0.288	0.052	---	0.24
192	16.00	0.63	0.288	0.052	---	0.24
193	16.08	0.13	0.061	0.052	---	0.01
194	16.17	0.13	0.061	0.051	---	0.01
195	16.25	0.13	0.061	0.051	---	0.01
196	16.33	0.13	0.061	0.051	---	0.01
197	16.42	0.13	0.061	0.051	---	0.01
198	16.50	0.13	0.061	0.050	---	0.01
199	16.58	0.10	0.046	0.050	0.008	0.04
200	16.67	0.10	0.046	0.050	0.008	0.04
201	16.75	0.10	0.046	0.050	0.008	0.04
202	16.83	0.10	0.046	0.049	0.008	0.04
203	16.92	0.10	0.046	0.049	0.008	0.04
204	17.00	0.10	0.046	0.049	0.008	0.04
205	17.08	0.17	0.076	0.049	---	0.03
206	17.17	0.17	0.076	0.048	---	0.03
207	17.25	0.17	0.076	0.048	---	0.03
208	17.33	0.17	0.076	0.048	---	0.03
209	17.42	0.17	0.076	0.048	---	0.03
210	17.50	0.17	0.076	0.047	---	0.03
211	17.58	0.17	0.076	0.047	---	0.03
212	17.67	0.17	0.076	0.047	---	0.03
213	17.75	0.17	0.076	0.047	---	0.03
214	17.83	0.13	0.061	0.047	---	0.01
215	17.92	0.13	0.061	0.046	---	0.01
216	18.00	0.13	0.061	0.046	---	0.01
217	18.08	0.13	0.061	0.046	---	0.01
218	18.17	0.13	0.061	0.046	---	0.02
219	18.25	0.13	0.061	0.045	---	0.02
220	18.33	0.13	0.061	0.045	---	0.02

221	18.42	0.13	0.061	0.045	---	0.02
222	18.50	0.13	0.061	0.045	---	0.02
223	18.58	0.10	0.046	0.045	---	0.00
224	18.67	0.10	0.046	0.044	---	0.00
225	18.75	0.10	0.046	0.044	---	0.00
226	18.83	0.07	0.030	0.044	0.005	0.02
227	18.92	0.07	0.030	0.044	0.005	0.02
228	19.00	0.07	0.030	0.043	0.005	0.02
229	19.08	0.10	0.046	0.043	---	0.00
230	19.17	0.10	0.046	0.043	---	0.00
231	19.25	0.10	0.046	0.043	---	0.00
232	19.33	0.13	0.061	0.043	---	0.02
233	19.42	0.13	0.061	0.042	---	0.02
234	19.50	0.13	0.061	0.042	---	0.02
235	19.58	0.10	0.046	0.042	---	0.00
236	19.67	0.10	0.046	0.042	---	0.00
237	19.75	0.10	0.046	0.042	---	0.00
238	19.83	0.07	0.030	0.041	0.005	0.02
239	19.92	0.07	0.030	0.041	0.005	0.02
240	20.00	0.07	0.030	0.041	0.005	0.02
241	20.08	0.10	0.046	0.041	---	0.00
242	20.17	0.10	0.046	0.041	---	0.00
243	20.25	0.10	0.046	0.041	---	0.00
244	20.33	0.10	0.046	0.040	---	0.01
245	20.42	0.10	0.046	0.040	---	0.01
246	20.50	0.10	0.046	0.040	---	0.01
247	20.58	0.10	0.046	0.040	---	0.01
248	20.67	0.10	0.046	0.040	---	0.01
249	20.75	0.10	0.046	0.040	---	0.01
250	20.83	0.07	0.030	0.039	0.005	0.02
251	20.92	0.07	0.030	0.039	0.005	0.02
252	21.00	0.07	0.030	0.039	0.005	0.02
253	21.08	0.10	0.046	0.039	---	0.01
254	21.17	0.10	0.046	0.039	---	0.01
255	21.25	0.10	0.046	0.039	---	0.01
256	21.33	0.07	0.030	0.038	0.005	0.02
257	21.42	0.07	0.030	0.038	0.005	0.02
258	21.50	0.07	0.030	0.038	0.005	0.02
259	21.58	0.10	0.046	0.038	---	0.01
260	21.67	0.10	0.046	0.038	---	0.01
261	21.75	0.10	0.046	0.038	---	0.01
262	21.83	0.07	0.030	0.038	0.005	0.02
263	21.92	0.07	0.030	0.038	0.005	0.02
264	22.00	0.07	0.030	0.037	0.005	0.02
265	22.08	0.10	0.046	0.037	---	0.01
266	22.17	0.10	0.046	0.037	---	0.01
267	22.25	0.10	0.046	0.037	---	0.01
268	22.33	0.07	0.030	0.037	0.005	0.02
269	22.42	0.07	0.030	0.037	0.005	0.02
270	22.50	0.07	0.030	0.037	0.005	0.02
271	22.58	0.07	0.030	0.037	0.005	0.02
272	22.67	0.07	0.030	0.036	0.005	0.02
273	22.75	0.07	0.030	0.036	0.005	0.02
274	22.83	0.07	0.030	0.036	0.005	0.02
275	22.92	0.07	0.030	0.036	0.005	0.02
276	23.00	0.07	0.030	0.036	0.005	0.02
277	23.08	0.07	0.030	0.036	0.005	0.02
278	23.17	0.07	0.030	0.036	0.005	0.02
279	23.25	0.07	0.030	0.036	0.005	0.02
280	23.33	0.07	0.030	0.036	0.005	0.02
281	23.42	0.07	0.030	0.036	0.005	0.02
282	23.50	0.07	0.030	0.036	0.005	0.02
283	23.58	0.07	0.030	0.036	0.005	0.02
284	23.67	0.07	0.030	0.036	0.005	0.02
285	23.75	0.07	0.030	0.036	0.005	0.02
286	23.83	0.07	0.030	0.035	0.005	0.02
287	23.92	0.07	0.030	0.035	0.005	0.02
288	24.00	0.07	0.030	0.035	0.005	0.02
Sum =		100.0			Sum =	32.0

Flood volume = Effective rainfall 2.67(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 3.6(Ac.Ft)
Total soil loss = 1.13(In)
Total soil loss = 1.531(Ac.Ft)
Total rainfall = 3.79(In)
Flood volume = 157718.0 Cubic Feet
Total soil loss = 66689.9 Cubic Feet

Peak flow rate of this hydrograph = 7.477(CFS)

---

sobonalt4d2410

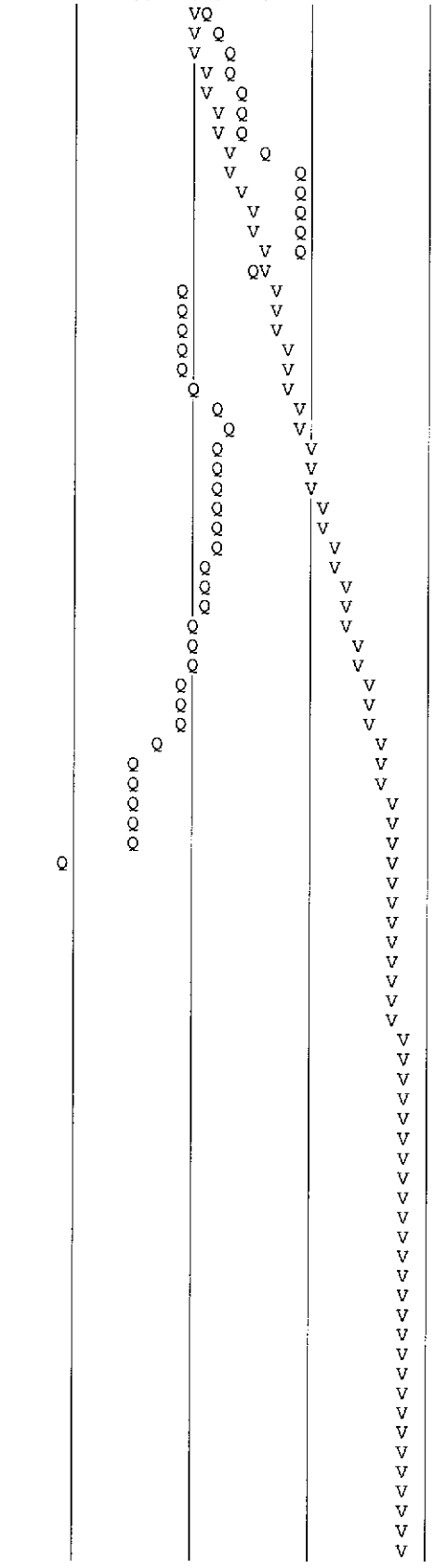
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0012	0.17	Q				
0+10	0.0037	0.37	VQ				
0+15	0.0065	0.40	VQ				
0+20	0.0099	0.49	VQ				
0+25	0.0140	0.60	V Q				
0+30	0.0182	0.61	V Q				
0+35	0.0225	0.61	V Q				
0+40	0.0267	0.61	V Q				
0+45	0.0309	0.61	V Q				
0+50	0.0357	0.70	V Q				
0+55	0.0412	0.80	V Q				
1+ 0	0.0468	0.82	V Q				
1+ 5	0.0519	0.73	V Q				
1+10	0.0562	0.63	V Q				
1+15	0.0605	0.62	V Q				
1+20	0.0647	0.61	V Q				
1+25	0.0689	0.61	V Q				
1+30	0.0731	0.61	V Q				
1+35	0.0774	0.61	V Q				
1+40	0.0816	0.61	V Q				
1+45	0.0858	0.61	V Q				
1+50	0.0906	0.70	VQ				
1+55	0.0961	0.80	V Q				
2+ 0	0.1018	0.82	V Q				
2+ 5	0.1074	0.82	V Q				
2+10	0.1130	0.82	V Q				
2+15	0.1186	0.82	V Q				
2+20	0.1243	0.82	V Q				
2+25	0.1299	0.82	V Q				
2+30	0.1355	0.82	V Q				
2+35	0.1418	0.90	V Q				
2+40	0.1487	1.01	V Q				
2+45	0.1557	1.02	V Q				
2+50	0.1627	1.02	V Q				
2+55	0.1698	1.02	V Q				
3+ 0	0.1768	1.02	V Q				
3+ 5	0.1839	1.02	V Q				
3+10	0.1909	1.02	V Q				
3+15	0.1979	1.02	V Q				
3+20	0.2050	1.02	V Q				
3+25	0.2120	1.02	V Q				
3+30	0.2191	1.02	V Q				
3+35	0.2261	1.02	V Q				
3+40	0.2332	1.02	V Q				
3+45	0.2402	1.02	V Q				
3+50	0.2478	1.11	V Q				
3+55	0.2561	1.21	V Q				
4+ 0	0.2646	1.22	V Q				
4+ 5	0.2730	1.23	VQ				
4+10	0.2815	1.23	VQ				
4+15	0.2899	1.23	VQ				
4+20	0.2951	0.75	Q				
4+25	0.2963	0.17	Q V				
4+30	0.2969	0.09	Q V				
4+35	0.2975	0.09	Q V				
4+40	0.2981	0.09	Q V				
4+45	0.2988	0.10	Q V				
4+50	0.3002	0.21	Q V				
4+55	0.3026	0.34	Q V				
5+ 0	0.3051	0.37	Q V				
5+ 5	0.3101	0.72	QV				
5+10	0.3181	1.16	VQ				
5+15	0.3264	1.22	VQ				
5+20	0.3318	0.79	Q				
5+25	0.3335	0.25	Q V				
5+30	0.3348	0.18	Q V				
5+35	0.3366	0.27	Q V				
5+40	0.3394	0.41	Q V				
5+45	0.3424	0.43	Q V				
5+50	0.3454	0.44	Q V				

5+55	0.3485	0.45	Q V
6+ 0	0.3516	0.45	Q V
6+ 5	0.3555	0.56	QV
6+10	0.3603	0.70	QV
6+15	0.3652	0.72	Q V
6+20	0.3703	0.73	Q V
6+25	0.3753	0.74	Q V
6+30	0.3804	0.74	Q V
6+35	0.3863	0.85	QV
6+40	0.3931	0.99	QV
6+45	0.4001	1.01	Q
6+50	0.4071	1.02	Q
6+55	0.4141	1.03	Q
7+ 0	0.4213	1.03	Q
7+ 5	0.4284	1.04	Q
7+10	0.4356	1.05	Q
7+15	0.4429	1.05	Q
7+20	0.4509	1.16	Q
7+25	0.4598	1.29	Q
7+30	0.4689	1.32	Q
7+35	0.4787	1.43	Q
7+40	0.4895	1.56	VQ
7+45	0.5004	1.59	VQ
7+50	0.5121	1.70	VQ
7+55	0.5248	1.83	V Q
8+ 0	0.5375	1.86	V Q
8+ 5	0.5518	2.07	V Q
8+10	0.5678	2.33	V Q
8+15	0.5842	2.37	V Q
8+20	0.6006	2.38	V Q
8+25	0.6170	2.39	V Q
8+30	0.6335	2.40	V Q
8+35	0.6508	2.50	V Q
8+40	0.6690	2.64	V Q
8+45	0.6873	2.66	V Q
8+50	0.7064	2.77	V Q
8+55	0.7264	2.91	V Q
9+ 0	0.7466	2.93	V Q
9+ 5	0.7682	3.14	V Q
9+10	0.7916	3.40	V Q
9+15	0.8154	3.44	V Q
9+20	0.8399	3.56	V Q
9+25	0.8653	3.69	V Q
9+30	0.8909	3.71	V Q
9+35	0.9172	3.83	V Q
9+40	0.9445	3.96	V Q
9+45	0.9719	3.98	V Q
9+50	1.0001	4.09	V Q
9+55	1.0292	4.23	V Q
10+ 0	1.0584	4.25	V Q
10+ 5	1.0828	3.54	V Q
10+10	1.1012	2.66	Q V
10+15	1.1187	2.55	Q V
10+20	1.1361	2.53	Q V
10+25	1.1536	2.54	Q V
10+30	1.1711	2.54	Q V
10+35	1.1922	3.06	QV
10+40	1.2176	3.70	VQ
10+45	1.2438	3.79	V Q
10+50	1.2700	3.81	VQ
10+55	1.2963	3.82	VQ
11+ 0	1.3226	3.82	VQ
11+ 5	1.3483	3.73	Q
11+10	1.3731	3.61	QV
11+15	1.3979	3.59	QV
11+20	1.4227	3.60	QV
11+25	1.4475	3.60	QV
11+30	1.4723	3.61	Q V
11+35	1.4958	3.41	Q V
11+40	1.5176	3.16	Q V
11+45	1.5392	3.13	Q V
11+50	1.5614	3.23	Q V
11+55	1.5846	3.37	Q V
12+ 0	1.6080	3.39	Q V
12+ 5	1.6363	4.11	Q V
12+10	1.6708	5.00	V Q
12+15	1.7061	5.13	V Q
12+20	1.7423	5.26	V Q
12+25	1.7795	5.39	V Q

sobonalt4d2410

12+30	1.8168	5.42	
12+35	1.8556	5.63	
12+40	1.8961	5.89	
12+45	1.9369	5.93	
12+50	1.9785	6.04	
12+55	2.0211	6.17	
13+ 0	2.0637	6.20	
13+ 5	2.1100	6.72	
13+10	2.1606	7.35	
13+15	2.2119	7.45	
13+20	2.2633	7.47	
13+25	2.3148	7.47	
13+30	2.3663	7.48	
13+35	2.4100	6.36	
13+40	2.4443	4.97	
13+45	2.4772	4.78	
13+50	2.5100	4.75	
13+55	2.5428	4.76	
14+ 0	2.5756	4.76	
14+ 5	2.6112	5.18	
14+10	2.6504	5.69	
14+15	2.6901	5.76	
14+20	2.7292	5.68	
14+25	2.7675	5.56	
14+30	2.8057	5.54	
14+35	2.8439	5.55	
14+40	2.8821	5.55	
14+45	2.9204	5.56	
14+50	2.9580	5.46	
14+55	2.9948	5.34	
15+ 0	3.0314	5.32	
15+ 5	3.0674	5.22	
15+10	3.1025	5.10	
15+15	3.1376	5.09	
15+20	3.1719	4.99	
15+25	3.2054	4.87	
15+30	3.2389	4.85	
15+35	3.2695	4.44	
15+40	3.2966	3.95	
15+45	3.3234	3.88	
15+50	3.3500	3.87	
15+55	3.3767	3.88	
16+ 0	3.4034	3.88	
16+ 5	3.4196	2.35	
16+10	3.4228	0.46	
16+15	3.4241	0.20	
16+20	3.4252	0.16	
16+25	3.4263	0.16	
16+30	3.4275	0.17	
16+35	3.4299	0.35	
16+40	3.4338	0.58	
16+45	3.4380	0.61	
16+50	3.4423	0.61	
16+55	3.4465	0.61	
17+ 0	3.4507	0.61	
17+ 5	3.4545	0.54	
17+10	3.4576	0.46	
17+15	3.4608	0.45	
17+20	3.4639	0.46	
17+25	3.4671	0.46	
17+30	3.4703	0.46	
17+35	3.4735	0.47	
17+40	3.4767	0.47	
17+45	3.4800	0.48	
17+50	3.4826	0.38	
17+55	3.4844	0.25	
18+ 0	3.4860	0.24	
18+ 5	3.4877	0.24	
18+10	3.4894	0.25	
18+15	3.4911	0.25	
18+20	3.4928	0.25	
18+25	3.4946	0.26	
18+30	3.4964	0.26	
18+35	3.4975	0.16	
18+40	3.4977	0.04	
18+45	3.4979	0.02	
18+50	3.4992	0.18	
18+55	3.5017	0.38	
19+ 0	3.5045	0.40	

19+ 5	3.5063	0.26	Q V
19+10	3.5068	0.07	Q V
19+15	3.5071	0.05	Q V
19+20	3.5081	0.15	Q V
19+25	3.5100	0.28	Q V
19+30	3.5121	0.30	Q V
19+35	3.5134	0.20	Q V
19+40	3.5140	0.08	Q V
19+45	3.5144	0.06	Q V
19+50	3.5158	0.20	Q V
19+55	3.5184	0.38	Q V
20+ 0	3.5212	0.40	Q V
20+ 5	3.5231	0.27	Q V
20+10	3.5238	0.10	Q V
20+15	3.5244	0.08	Q V
20+20	3.5250	0.08	Q V
20+25	3.5255	0.08	Q V
20+30	3.5261	0.09	Q V
20+35	3.5268	0.09	Q V
20+40	3.5274	0.09	Q V
20+45	3.5281	0.10	Q V
20+50	3.5296	0.23	Q V
20+55	3.5323	0.38	Q V
21+ 0	3.5350	0.41	Q V
21+ 5	3.5370	0.29	Q V
21+10	3.5379	0.13	Q V
21+15	3.5387	0.12	Q V
21+20	3.5403	0.23	Q V
21+25	3.5430	0.38	Q V
21+30	3.5458	0.41	Q V
21+35	3.5478	0.29	Q V
21+40	3.5488	0.15	Q V
21+45	3.5497	0.13	Q V
21+50	3.5514	0.24	Q V
21+55	3.5540	0.39	Q V
22+ 0	3.5568	0.41	Q V
22+ 5	3.5588	0.30	Q V
22+10	3.5599	0.16	Q V
22+15	3.5609	0.14	Q V
22+20	3.5626	0.25	Q V
22+25	3.5653	0.39	Q V
22+30	3.5681	0.41	Q V
22+35	3.5709	0.41	Q V
22+40	3.5737	0.41	Q V
22+45	3.5765	0.41	Q V
22+50	3.5794	0.41	Q V
22+55	3.5822	0.41	Q V
23+ 0	3.5850	0.41	Q V
23+ 5	3.5878	0.41	Q V
23+10	3.5906	0.41	Q V
23+15	3.5934	0.41	Q V
23+20	3.5962	0.41	Q V
23+25	3.5991	0.41	Q V
23+30	3.6019	0.41	Q V
23+35	3.6047	0.41	Q V
23+40	3.6075	0.41	Q V
23+45	3.6103	0.41	Q V
23+50	3.6131	0.41	Q V
23+55	3.6160	0.41	Q V
24+ 0	3.6188	0.41	Q V
24+ 5	3.6204	0.24	Q V
24+10	3.6207	0.03	Q V
24+15	3.6207	0.01	Q V

ONSITE HYDROLOGY
2-YEAR STORM EVENT
(WQMP)

WQMP - SOBOBA EIS								
2 YEAR STORM EVENT								
STORM DURATION	Alt. No. 1 A = 15.95		Alt. No. 2 A = 12.8		Alt. No. 3 A = 5.9		Preferred Alt. A = 16.3 Pref. Alt.	
	V AC-FT	Q CFS	V AC-FT	Q CFS	V AC-FT	Q CFS	V AC-FT	Q CFS
24-Hour	2.0	3.9	1.6	3.2	0.7	1.5	2.0	4.0
6-Hour	1.3	12.4	1.1	10.0	0.5	4.6	1.3	12.7
3-Hour	0.9	12.0	0.7	9.7	0.3	4.5	0.9	12.3
1-Hour	0.6	18.9	0.5	15.2	0.2	7.0	0.7	19.3

ALTERNATIVE NO. 1

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt1d12.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	0.55	8.77

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	1.20	19.14

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.550(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.550(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
		Sum = 100.000	Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.277	0.071	---	0.21
2	0.17	4.30	0.284	0.071	---	0.21
3	0.25	5.00	0.330	0.071	---	0.26
4	0.33	5.00	0.330	0.071	---	0.26
5	0.42	5.80	0.383	0.071	---	0.31
6	0.50	6.50	0.429	0.071	---	0.36
7	0.58	7.40	0.488	0.071	---	0.42
8	0.67	8.60	0.568	0.071	---	0.50
9	0.75	12.30	0.812	0.071	---	0.74
10	0.83	29.10	1.920	0.071	---	1.85
11	0.92	6.80	0.449	0.071	---	0.38
12	1.00	5.00	0.330	0.071	---	0.26
Sum =		100.0			Sum =	5.7

Flood volume = Effective rainfall 0.48(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.094(Ac.Ft)
Total rainfall = 0.55(In)
Flood volume = 27738.5 Cubic Feet
Total soil loss = 4101.1 Cubic Feet

Peak flow rate of this hydrograph = 18.898(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0094	1.36	V Q				
0+10	0.0306	3.09	V Q				
0+15	0.0560	3.68	V Q				
0+20	0.0842	4.10	V Q				
0+25	0.1153	4.51	V Q				
0+30	0.1515	5.25	VQ				
0+35	0.1933	6.08	Q				
0+40	0.2426	7.15	QV				
0+45	0.3079	9.48	QV				
0+50	0.4380	18.90	V			Q	
0+55	0.5653	18.48				VQ	
1+ 0	0.6139	7.05	Q			V	
1+ 5	0.6339	2.91	Q			V	
1+10	0.6364	0.37	Q			V	
1+15	0.6368	0.05	Q			V	

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt1d32.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	0.90	14.36

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	2.10	33.49

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 0.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt1d32

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
			Sum = 100.000	Sum= 16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.140	0.071	---	0.07
2	0.17	1.30	0.140	0.071	---	0.07
3	0.25	1.10	0.119	0.071	---	0.05
4	0.33	1.50	0.162	0.071	---	0.09
5	0.42	1.50	0.162	0.071	---	0.09
6	0.50	1.80	0.194	0.071	---	0.12
7	0.58	1.50	0.162	0.071	---	0.09
8	0.67	1.80	0.194	0.071	---	0.12
9	0.75	1.80	0.194	0.071	---	0.12
10	0.83	1.50	0.162	0.071	---	0.09
11	0.92	1.60	0.173	0.071	---	0.10
12	1.00	1.80	0.194	0.071	---	0.12
13	1.08	2.20	0.238	0.071	---	0.17
14	1.17	2.20	0.238	0.071	---	0.17
15	1.25	2.20	0.238	0.071	---	0.17
16	1.33	2.00	0.216	0.071	---	0.15
17	1.42	2.60	0.281	0.071	---	0.21
18	1.50	2.70	0.292	0.071	---	0.22
19	1.58	2.40	0.259	0.071	---	0.19
20	1.67	2.70	0.292	0.071	---	0.22
21	1.75	3.30	0.356	0.071	---	0.29
22	1.83	3.10	0.335	0.071	---	0.26
23	1.92	2.90	0.313	0.071	---	0.24
24	2.00	3.00	0.324	0.071	---	0.25
25	2.08	3.10	0.335	0.071	---	0.26
26	2.17	4.20	0.454	0.071	---	0.38
27	2.25	5.00	0.540	0.071	---	0.47
28	2.33	3.50	0.378	0.071	---	0.31
29	2.42	6.80	0.734	0.071	---	0.66
30	2.50	7.30	0.788	0.071	---	0.72
31	2.58	8.20	0.886	0.071	---	0.81
32	2.67	5.90	0.637	0.071	---	0.57
33	2.75	2.00	0.216	0.071	---	0.15
34	2.83	1.80	0.194	0.071	---	0.12
35	2.92	1.80	0.194	0.071	---	0.12
36	3.00	0.60	0.065	0.071	0.012	0.05
Sum =		100.0			Sum =	8.3

Flood volume = Effective rainfall 0.69(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.276(Ac.Ft)
Total rainfall = 0.90(In)
Flood volume = 40087.3 Cubic Feet
Total soil loss = 12017.7 Cubic Feet

Peak flow rate of this hydrograph = 12.039(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0032	0.46	Q
0+10	0.0102	1.03	V Q
0+15	0.0169	0.96	VQ
0+20	0.0243	1.09	VQ
0+25	0.0341	1.41	VQ
0+30	0.0456	1.67	V Q

sobonalt1d32

0+35	0.0575	1.73	
0+40	0.0693	1.72	
0+45	0.0827	1.95	
0+50	0.0949	1.77	
0+55	0.1058	1.58	
1+ 0	0.1180	1.77	
1+ 5	0.1335	2.24	
1+10	0.1515	2.62	
1+15	0.1699	2.67	
1+20	0.1874	2.54	
1+25	0.2066	2.79	
1+30	0.2298	3.37	
1+35	0.2526	3.31	
1+40	0.2752	3.28	
1+45	0.3023	3.94	
1+50	0.3323	4.36	
1+55	0.3607	4.12	
2+ 0	0.3883	4.00	
2+ 5	0.4167	4.13	
2+10	0.4513	5.01	
2+15	0.4965	6.56	
2+20	0.5401	6.33	
2+25	0.5917	7.50	
2+30	0.6646	10.58	
2+35	0.7475	12.04	
2+40	0.8255	11.32	
2+45	0.8712	6.64	
2+50	0.8905	2.81	
2+55	0.9050	2.10	
3+ 0	0.9155	1.53	
3+ 5	0.9196	0.60	
3+10	0.9202	0.09	
3+15	0.9203	0.01	

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt1d62.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	1.40	22.33

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	3.00	47.85

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 1.400(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.400(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt1d62

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.084	0.071	---	0.01
2	0.17	0.60	0.101	0.071	---	0.03
3	0.25	0.60	0.101	0.071	---	0.03
4	0.33	0.60	0.101	0.071	---	0.03
5	0.42	0.60	0.101	0.071	---	0.03
6	0.50	0.70	0.118	0.071	---	0.05
7	0.58	0.70	0.118	0.071	---	0.05
8	0.67	0.70	0.118	0.071	---	0.05
9	0.75	0.70	0.118	0.071	---	0.05
10	0.83	0.70	0.118	0.071	---	0.05
11	0.92	0.70	0.118	0.071	---	0.05
12	1.00	0.80	0.134	0.071	---	0.06
13	1.08	0.80	0.134	0.071	---	0.06
14	1.17	0.80	0.134	0.071	---	0.06
15	1.25	0.80	0.134	0.071	---	0.06
16	1.33	0.80	0.134	0.071	---	0.06
17	1.42	0.80	0.134	0.071	---	0.06
18	1.50	0.80	0.134	0.071	---	0.06
19	1.58	0.80	0.134	0.071	---	0.06
20	1.67	0.80	0.134	0.071	---	0.06
21	1.75	0.80	0.134	0.071	---	0.06
22	1.83	0.80	0.134	0.071	---	0.06
23	1.92	0.80	0.134	0.071	---	0.06
24	2.00	0.90	0.151	0.071	---	0.08
25	2.08	0.80	0.134	0.071	---	0.06
26	2.17	0.90	0.151	0.071	---	0.08
27	2.25	0.90	0.151	0.071	---	0.08
28	2.33	0.90	0.151	0.071	---	0.08
29	2.42	0.90	0.151	0.071	---	0.08
30	2.50	0.90	0.151	0.071	---	0.08
31	2.58	0.90	0.151	0.071	---	0.08
32	2.67	0.90	0.151	0.071	---	0.08
33	2.75	1.00	0.168	0.071	---	0.10
34	2.83	1.00	0.168	0.071	---	0.10
35	2.92	1.00	0.168	0.071	---	0.10
36	3.00	1.00	0.168	0.071	---	0.10
37	3.08	1.00	0.168	0.071	---	0.10
38	3.17	1.10	0.185	0.071	---	0.11
39	3.25	1.10	0.185	0.071	---	0.11
40	3.33	1.10	0.185	0.071	---	0.11
41	3.42	1.20	0.202	0.071	---	0.13
42	3.50	1.30	0.218	0.071	---	0.15
43	3.58	1.40	0.235	0.071	---	0.16
44	3.67	1.40	0.235	0.071	---	0.16
45	3.75	1.50	0.252	0.071	---	0.18
46	3.83	1.50	0.252	0.071	---	0.18
47	3.92	1.60	0.269	0.071	---	0.20
48	4.00	1.60	0.269	0.071	---	0.20
49	4.08	1.70	0.286	0.071	---	0.21
50	4.17	1.80	0.302	0.071	---	0.23
51	4.25	1.90	0.319	0.071	---	0.25
52	4.33	2.00	0.336	0.071	---	0.27
53	4.42	2.10	0.353	0.071	---	0.28
54	4.50	2.10	0.353	0.071	---	0.28
55	4.58	2.20	0.370	0.071	---	0.30
56	4.67	2.30	0.386	0.071	---	0.32
57	4.75	2.40	0.403	0.071	---	0.33
58	4.83	2.40	0.403	0.071	---	0.33
59	4.92	2.50	0.420	0.071	---	0.35
60	5.00	2.60	0.437	0.071	---	0.37
61	5.08	3.10	0.521	0.071	---	0.45
62	5.17	3.60	0.605	0.071	---	0.53

63	5.25	3.90	0.655	0.071	---	0.58
64	5.33	4.20	0.706	0.071	---	0.63
65	5.42	4.70	0.790	0.071	---	0.72
66	5.50	5.60	0.941	0.071	---	0.87
67	5.58	1.90	0.319	0.071	---	0.25
68	5.67	0.90	0.151	0.071	---	0.08
69	5.75	0.60	0.101	0.071	---	0.03
70	5.83	0.50	0.084	0.071	---	0.01
71	5.92	0.30	0.050	0.071	0.009	0.04
72	6.00	0.20	0.034	0.071	0.006	0.03
Sum =		100.0			Sum =	11.8

Flood volume = Effective rainfall 0.99(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 1.3(Ac.Ft)
Total soil loss = 0.41(In)
Total soil loss = 0.551(Ac.Ft)
Total rainfall = 1.40(In)
Flood volume = 57057.6 Cubic Feet
Total soil loss = 23995.8 Cubic Feet

Peak flow rate of this hydrograph = 12.436(CFS)

++

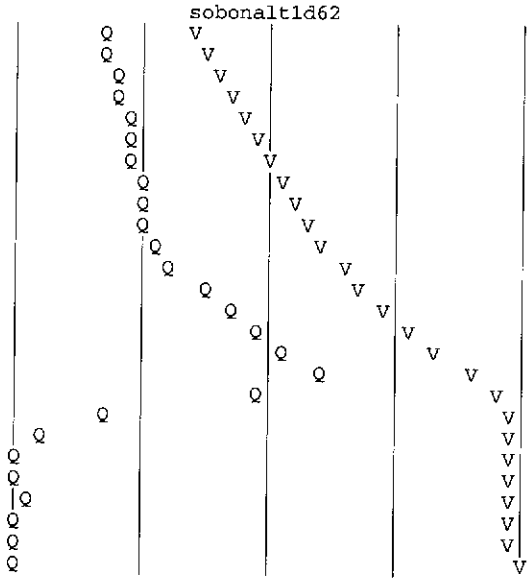
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0006	0.09	Q
0+10	0.0027	0.31	Q
0+15	0.0058	0.46	Q
0+20	0.0091	0.48	Q
0+25	0.0125	0.48	Q
0+30	0.0165	0.59	VQ
0+35	0.0216	0.73	VQ
0+40	0.0267	0.75	VQ
0+45	0.0319	0.75	VQ
0+50	0.0371	0.75	|Q
0+55	0.0423	0.75	|Q
1+ 0	0.0482	0.86	|Q
1+ 5	0.0551	1.00	|Q
1+10	0.0621	1.02	|VQ
1+15	0.0691	1.02	| Q
1+20	0.0762	1.02	| Q
1+25	0.0832	1.02	| Q
1+30	0.0903	1.02	| Q
1+35	0.0973	1.02	| Q
1+40	0.1044	1.02	| QV
1+45	0.1114	1.02	| QV
1+50	0.1184	1.02	| QV
1+55	0.1255	1.02	| QV
2+ 0	0.1333	1.13	| Q V
2+ 5	0.1413	1.16	| Q V
2+10	0.1492	1.15	| Q V
2+15	0.1580	1.27	| Q V
2+20	0.1668	1.29	| Q V
2+25	0.1757	1.29	| Q V
2+30	0.1846	1.29	| Q V
2+35	0.1935	1.29	| Q V
2+40	0.2024	1.29	| Q V
2+45	0.2121	1.40	| Q V
2+50	0.2227	1.54	| Q V
2+55	0.2335	1.56	| Q V
3+ 0	0.2442	1.56	| Q V
3+ 5	0.2550	1.56	| Q V
3+10	0.2665	1.67	| Q V
3+15	0.2790	1.81	| Q V
3+20	0.2916	1.83	| Q V
3+25	0.3050	1.94	| Q V
3+30	0.3201	2.19	| Q V
3+35	0.3370	2.46	| Q V
3+40	0.3550	2.62	| Q V
3+45	0.3740	2.75	| Q | V
3+50	0.3939	2.89	| Q | V
3+55	0.4147	3.02	| Q | V
4+ 0	0.4364	3.16	| Q | V
4+ 5	0.4591	3.29	| Q | V

sobonalt1d62

4+10	0.4835	3.54	
4+15	0.5097	3.81	
4+20	0.5378	4.08	
4+25	0.5678	4.35	
4+30	0.5988	4.51	
4+35	0.6308	4.64	
4+40	0.6645	4.89	
4+45	0.7000	5.16	
4+50	0.7367	5.32	
4+55	0.7742	5.45	
5+ 0	0.8135	5.70	
5+ 5	0.8577	6.41	
5+10	0.9106	7.68	
5+15	0.9711	8.79	
5+20	1.0375	9.65	
5+25	1.1111	10.69	
5+30	1.1968	12.44	
5+35	1.2633	9.66	
5+40	1.2887	3.69	
5+45	1.2977	1.31	
5+50	1.3010	0.47	
5+55	1.3040	0.43	
6+ 0	1.3077	0.54	
6+ 5	1.3096	0.27	
6+10	1.3098	0.04	
6+15	1.3099	0.01	



U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt1d242.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 15.95(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.95(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	2.25	35.89

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.95	6.00	95.70

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 2.250(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.250(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.950	69.00	0.900

Total Area Entered = 15.95(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt1d242

FOOTHILL S-Curve

Unit Hydrograph Data

Unit	time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.605
2	0.167	388.361	50.563	8.128
3	0.250	582.541	7.110	1.143
4	0.333	776.721	1.235	0.199
			Sum = 100.000 Sum=	16.075

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.126	0.003	0.01
2	0.17	0.07	0.018	0.125	0.003	0.01
3	0.25	0.07	0.018	0.125	0.003	0.01
4	0.33	0.10	0.027	0.124	0.005	0.02
5	0.42	0.10	0.027	0.124	0.005	0.02
6	0.50	0.10	0.027	0.123	0.005	0.02
7	0.58	0.10	0.027	0.123	0.005	0.02
8	0.67	0.10	0.027	0.122	0.005	0.02
9	0.75	0.10	0.027	0.122	0.005	0.02
10	0.83	0.13	0.036	0.121	0.006	0.03
11	0.92	0.13	0.036	0.121	0.006	0.03
12	1.00	0.13	0.036	0.120	0.006	0.03
13	1.08	0.10	0.027	0.120	0.005	0.02
14	1.17	0.10	0.027	0.119	0.005	0.02
15	1.25	0.10	0.027	0.119	0.005	0.02
16	1.33	0.10	0.027	0.118	0.005	0.02
17	1.42	0.10	0.027	0.118	0.005	0.02
18	1.50	0.10	0.027	0.117	0.005	0.02
19	1.58	0.10	0.027	0.117	0.005	0.02
20	1.67	0.10	0.027	0.117	0.005	0.02
21	1.75	0.10	0.027	0.116	0.005	0.02
22	1.83	0.13	0.036	0.116	0.006	0.03
23	1.92	0.13	0.036	0.115	0.006	0.03
24	2.00	0.13	0.036	0.115	0.006	0.03
25	2.08	0.13	0.036	0.114	0.006	0.03
26	2.17	0.13	0.036	0.114	0.006	0.03
27	2.25	0.13	0.036	0.113	0.006	0.03
28	2.33	0.13	0.036	0.113	0.006	0.03
29	2.42	0.13	0.036	0.112	0.006	0.03
30	2.50	0.13	0.036	0.112	0.006	0.03
31	2.58	0.17	0.045	0.111	0.008	0.04
32	2.67	0.17	0.045	0.111	0.008	0.04
33	2.75	0.17	0.045	0.110	0.008	0.04
34	2.83	0.17	0.045	0.110	0.008	0.04
35	2.92	0.17	0.045	0.110	0.008	0.04
36	3.00	0.17	0.045	0.109	0.008	0.04
37	3.08	0.17	0.045	0.109	0.008	0.04
38	3.17	0.17	0.045	0.108	0.008	0.04
39	3.25	0.17	0.045	0.108	0.008	0.04
40	3.33	0.17	0.045	0.107	0.008	0.04
41	3.42	0.17	0.045	0.107	0.008	0.04
42	3.50	0.17	0.045	0.106	0.008	0.04
43	3.58	0.17	0.045	0.106	0.008	0.04
44	3.67	0.17	0.045	0.106	0.008	0.04
45	3.75	0.17	0.045	0.105	0.008	0.04
46	3.83	0.20	0.054	0.105	0.010	0.04
47	3.92	0.20	0.054	0.104	0.010	0.04
48	4.00	0.20	0.054	0.104	0.010	0.04
49	4.08	0.20	0.054	0.103	0.010	0.04
50	4.17	0.20	0.054	0.103	0.010	0.04
51	4.25	0.20	0.054	0.102	0.010	0.04
52	4.33	0.23	0.063	0.102	0.011	0.05
53	4.42	0.23	0.063	0.102	0.011	0.05
54	4.50	0.23	0.063	0.101	0.011	0.05
55	4.58	0.23	0.063	0.101	0.011	0.05
56	4.67	0.23	0.063	0.100	0.011	0.05
57	4.75	0.23	0.063	0.100	0.011	0.05
58	4.83	0.27	0.072	0.099	0.013	0.06
59	4.92	0.27	0.072	0.099	0.013	0.06
60	5.00	0.27	0.072	0.099	0.013	0.06
61	5.08	0.20	0.054	0.098	0.010	0.04
62	5.17	0.20	0.054	0.098	0.010	0.04

sobonalt1d242

63	5.25	0.20	0.054	0.097	0.010	0.04
64	5.33	0.23	0.063	0.097	0.011	0.05
65	5.42	0.23	0.063	0.096	0.011	0.05
66	5.50	0.23	0.063	0.096	0.011	0.05
67	5.58	0.27	0.072	0.096	0.013	0.06
68	5.67	0.27	0.072	0.095	0.013	0.06
69	5.75	0.27	0.072	0.095	0.013	0.06
70	5.83	0.27	0.072	0.094	0.013	0.06
71	5.92	0.27	0.072	0.094	0.013	0.06
72	6.00	0.27	0.072	0.093	0.013	0.06
73	6.08	0.30	0.081	0.093	0.015	0.07
74	6.17	0.30	0.081	0.093	0.015	0.07
75	6.25	0.30	0.081	0.092	0.015	0.07
76	6.33	0.30	0.081	0.092	0.015	0.07
77	6.42	0.30	0.081	0.091	0.015	0.07
78	6.50	0.30	0.081	0.091	0.015	0.07
79	6.58	0.33	0.090	0.091	0.016	0.07
80	6.67	0.33	0.090	0.090	0.016	0.07
81	6.75	0.33	0.090	0.090	---	0.00
82	6.83	0.33	0.090	0.089	---	0.00
83	6.92	0.33	0.090	0.089	---	0.00
84	7.00	0.33	0.090	0.089	---	0.00
85	7.08	0.33	0.090	0.088	---	0.00
86	7.17	0.33	0.090	0.088	---	0.00
87	7.25	0.33	0.090	0.087	---	0.00
88	7.33	0.37	0.099	0.087	---	0.01
89	7.42	0.37	0.099	0.087	---	0.01
90	7.50	0.37	0.099	0.086	---	0.01
91	7.58	0.40	0.108	0.086	---	0.02
92	7.67	0.40	0.108	0.085	---	0.02
93	7.75	0.40	0.108	0.085	---	0.02
94	7.83	0.43	0.117	0.085	---	0.03
95	7.92	0.43	0.117	0.084	---	0.03
96	8.00	0.43	0.117	0.084	---	0.03
97	8.08	0.50	0.135	0.083	---	0.05
98	8.17	0.50	0.135	0.083	---	0.05
99	8.25	0.50	0.135	0.083	---	0.05
100	8.33	0.50	0.135	0.082	---	0.05
101	8.42	0.50	0.135	0.082	---	0.05
102	8.50	0.50	0.135	0.082	---	0.05
103	8.58	0.53	0.144	0.081	---	0.06
104	8.67	0.53	0.144	0.081	---	0.06
105	8.75	0.53	0.144	0.080	---	0.06
106	8.83	0.57	0.153	0.080	---	0.07
107	8.92	0.57	0.153	0.080	---	0.07
108	9.00	0.57	0.153	0.079	---	0.07
109	9.08	0.63	0.171	0.079	---	0.09
110	9.17	0.63	0.171	0.078	---	0.09
111	9.25	0.63	0.171	0.078	---	0.09
112	9.33	0.67	0.180	0.078	---	0.10
113	9.42	0.67	0.180	0.077	---	0.10
114	9.50	0.67	0.180	0.077	---	0.10
115	9.58	0.70	0.189	0.077	---	0.11
116	9.67	0.70	0.189	0.076	---	0.11
117	9.75	0.70	0.189	0.076	---	0.11
118	9.83	0.73	0.198	0.076	---	0.12
119	9.92	0.73	0.198	0.075	---	0.12
120	10.00	0.73	0.198	0.075	---	0.12
121	10.08	0.50	0.135	0.074	---	0.06
122	10.17	0.50	0.135	0.074	---	0.06
123	10.25	0.50	0.135	0.074	---	0.06
124	10.33	0.50	0.135	0.073	---	0.06
125	10.42	0.50	0.135	0.073	---	0.06
126	10.50	0.50	0.135	0.073	---	0.06
127	10.58	0.67	0.180	0.072	---	0.11
128	10.67	0.67	0.180	0.072	---	0.11
129	10.75	0.67	0.180	0.072	---	0.11
130	10.83	0.67	0.180	0.071	---	0.11
131	10.92	0.67	0.180	0.071	---	0.11
132	11.00	0.67	0.180	0.071	---	0.11
133	11.08	0.63	0.171	0.070	---	0.10
134	11.17	0.63	0.171	0.070	---	0.10
135	11.25	0.63	0.171	0.069	---	0.10
136	11.33	0.63	0.171	0.069	---	0.10
137	11.42	0.63	0.171	0.069	---	0.10
138	11.50	0.63	0.171	0.068	---	0.10
139	11.58	0.57	0.153	0.068	---	0.08
140	11.67	0.57	0.153	0.068	---	0.09
141	11.75	0.57	0.153	0.067	---	0.09

142	11.83	0.60	0.162	0.067	---	0.09
143	11.92	0.60	0.162	0.067	---	0.10
144	12.00	0.60	0.162	0.066	---	0.10
145	12.08	0.83	0.225	0.066	---	0.16
146	12.17	0.83	0.225	0.066	---	0.16
147	12.25	0.83	0.225	0.065	---	0.16
148	12.33	0.87	0.234	0.065	---	0.17
149	12.42	0.87	0.234	0.065	---	0.17
150	12.50	0.87	0.234	0.064	---	0.17
151	12.58	0.93	0.252	0.064	---	0.19
152	12.67	0.93	0.252	0.064	---	0.19
153	12.75	0.93	0.252	0.064	---	0.19
154	12.83	0.97	0.261	0.063	---	0.20
155	12.92	0.97	0.261	0.063	---	0.20
156	13.00	0.97	0.261	0.063	---	0.20
157	13.08	1.13	0.306	0.062	---	0.24
158	13.17	1.13	0.306	0.062	---	0.24
159	13.25	1.13	0.306	0.062	---	0.24
160	13.33	1.13	0.306	0.061	---	0.24
161	13.42	1.13	0.306	0.061	---	0.25
162	13.50	1.13	0.306	0.061	---	0.25
163	13.58	0.77	0.207	0.060	---	0.15
164	13.67	0.77	0.207	0.060	---	0.15
165	13.75	0.77	0.207	0.060	---	0.15
166	13.83	0.77	0.207	0.059	---	0.15
167	13.92	0.77	0.207	0.059	---	0.15
168	14.00	0.77	0.207	0.059	---	0.15
169	14.08	0.90	0.243	0.059	---	0.18
170	14.17	0.90	0.243	0.058	---	0.18
171	14.25	0.90	0.243	0.058	---	0.19
172	14.33	0.87	0.234	0.058	---	0.18
173	14.42	0.87	0.234	0.057	---	0.18
174	14.50	0.87	0.234	0.057	---	0.18
175	14.58	0.87	0.234	0.057	---	0.18
176	14.67	0.87	0.234	0.056	---	0.18
177	14.75	0.87	0.234	0.056	---	0.18
178	14.83	0.83	0.225	0.056	---	0.17
179	14.92	0.83	0.225	0.056	---	0.17
180	15.00	0.83	0.225	0.055	---	0.17
181	15.08	0.80	0.216	0.055	---	0.16
182	15.17	0.80	0.216	0.055	---	0.16
183	15.25	0.80	0.216	0.054	---	0.16
184	15.33	0.77	0.207	0.054	---	0.15
185	15.42	0.77	0.207	0.054	---	0.15
186	15.50	0.77	0.207	0.054	---	0.15
187	15.58	0.63	0.171	0.053	---	0.12
188	15.67	0.63	0.171	0.053	---	0.12
189	15.75	0.63	0.171	0.053	---	0.12
190	15.83	0.63	0.171	0.053	---	0.12
191	15.92	0.63	0.171	0.052	---	0.12
192	16.00	0.63	0.171	0.052	---	0.12
193	16.08	0.13	0.036	0.052	0.006	0.03
194	16.17	0.13	0.036	0.051	0.006	0.03
195	16.25	0.13	0.036	0.051	0.006	0.03
196	16.33	0.13	0.036	0.051	0.006	0.03
197	16.42	0.13	0.036	0.051	0.006	0.03
198	16.50	0.13	0.036	0.050	0.006	0.03
199	16.58	0.10	0.027	0.050	0.005	0.02
200	16.67	0.10	0.027	0.050	0.005	0.02
201	16.75	0.10	0.027	0.050	0.005	0.02
202	16.83	0.10	0.027	0.049	0.005	0.02
203	16.92	0.10	0.027	0.049	0.005	0.02
204	17.00	0.10	0.027	0.049	0.005	0.02
205	17.08	0.17	0.045	0.049	0.008	0.04
206	17.17	0.17	0.045	0.048	0.008	0.04
207	17.25	0.17	0.045	0.048	0.008	0.04
208	17.33	0.17	0.045	0.048	0.008	0.04
209	17.42	0.17	0.045	0.048	0.008	0.04
210	17.50	0.17	0.045	0.047	0.008	0.04
211	17.58	0.17	0.045	0.047	0.008	0.04
212	17.67	0.17	0.045	0.047	0.008	0.04
213	17.75	0.17	0.045	0.047	0.008	0.04
214	17.83	0.13	0.036	0.047	0.006	0.03
215	17.92	0.13	0.036	0.046	0.006	0.03
216	18.00	0.13	0.036	0.046	0.006	0.03
217	18.08	0.13	0.036	0.046	0.006	0.03
218	18.17	0.13	0.036	0.046	0.006	0.03
219	18.25	0.13	0.036	0.045	0.006	0.03
220	18.33	0.13	0.036	0.045	0.006	0.03

221	18.42	0.13	0.036	0.045	0.006	0.03
222	18.50	0.13	0.036	0.045	0.006	0.03
223	18.58	0.10	0.027	0.045	0.005	0.02
224	18.67	0.10	0.027	0.044	0.005	0.02
225	18.75	0.10	0.027	0.044	0.005	0.02
226	18.83	0.07	0.018	0.044	0.003	0.01
227	18.92	0.07	0.018	0.044	0.003	0.01
228	19.00	0.07	0.018	0.043	0.003	0.01
229	19.08	0.10	0.027	0.043	0.005	0.02
230	19.17	0.10	0.027	0.043	0.005	0.02
231	19.25	0.10	0.027	0.043	0.005	0.02
232	19.33	0.13	0.036	0.043	0.006	0.03
233	19.42	0.13	0.036	0.042	0.006	0.03
234	19.50	0.13	0.036	0.042	0.006	0.03
235	19.58	0.10	0.027	0.042	0.005	0.02
236	19.67	0.10	0.027	0.042	0.005	0.02
237	19.75	0.10	0.027	0.042	0.005	0.02
238	19.83	0.07	0.018	0.041	0.003	0.01
239	19.92	0.07	0.018	0.041	0.003	0.01
240	20.00	0.07	0.018	0.041	0.003	0.01
241	20.08	0.10	0.027	0.041	0.005	0.02
242	20.17	0.10	0.027	0.041	0.005	0.02
243	20.25	0.10	0.027	0.041	0.005	0.02
244	20.33	0.10	0.027	0.040	0.005	0.02
245	20.42	0.10	0.027	0.040	0.005	0.02
246	20.50	0.10	0.027	0.040	0.005	0.02
247	20.58	0.10	0.027	0.040	0.005	0.02
248	20.67	0.10	0.027	0.040	0.005	0.02
249	20.75	0.10	0.027	0.040	0.005	0.02
250	20.83	0.07	0.018	0.039	0.003	0.01
251	20.92	0.07	0.018	0.039	0.003	0.01
252	21.00	0.07	0.018	0.039	0.003	0.01
253	21.08	0.10	0.027	0.039	0.005	0.02
254	21.17	0.10	0.027	0.039	0.005	0.02
255	21.25	0.10	0.027	0.039	0.005	0.02
256	21.33	0.07	0.018	0.038	0.003	0.01
257	21.42	0.07	0.018	0.038	0.003	0.01
258	21.50	0.07	0.018	0.038	0.003	0.01
259	21.58	0.10	0.027	0.038	0.005	0.02
260	21.67	0.10	0.027	0.038	0.005	0.02
261	21.75	0.10	0.027	0.038	0.005	0.02
262	21.83	0.07	0.018	0.038	0.003	0.01
263	21.92	0.07	0.018	0.038	0.003	0.01
264	22.00	0.07	0.018	0.037	0.003	0.01
265	22.08	0.10	0.027	0.037	0.005	0.02
266	22.17	0.10	0.027	0.037	0.005	0.02
267	22.25	0.10	0.027	0.037	0.005	0.02
268	22.33	0.07	0.018	0.037	0.003	0.01
269	22.42	0.07	0.018	0.037	0.003	0.01
270	22.50	0.07	0.018	0.037	0.003	0.01
271	22.58	0.07	0.018	0.037	0.003	0.01
272	22.67	0.07	0.018	0.036	0.003	0.01
273	22.75	0.07	0.018	0.036	0.003	0.01
274	22.83	0.07	0.018	0.036	0.003	0.01
275	22.92	0.07	0.018	0.036	0.003	0.01
276	23.00	0.07	0.018	0.036	0.003	0.01
277	23.08	0.07	0.018	0.036	0.003	0.01
278	23.17	0.07	0.018	0.036	0.003	0.01
279	23.25	0.07	0.018	0.036	0.003	0.01
280	23.33	0.07	0.018	0.036	0.003	0.01
281	23.42	0.07	0.018	0.036	0.003	0.01
282	23.50	0.07	0.018	0.036	0.003	0.01
283	23.58	0.07	0.018	0.036	0.003	0.01
284	23.67	0.07	0.018	0.036	0.003	0.01
285	23.75	0.07	0.018	0.036	0.003	0.01
286	23.83	0.07	0.018	0.035	0.003	0.01
287	23.92	0.07	0.018	0.035	0.003	0.01
288	24.00	0.07	0.018	0.035	0.003	0.01
Sum =		100.0			Sum =	18.0

Flood volume = Effective rainfall 1.50(In)
times area 15.9(Ac.)/[(In)/(Ft.)] = 2.0(Ac.Ft)
Total soil loss = 0.75(In)
Total soil loss = 0.994(Ac.Ft)
Total rainfall = 2.25(In)
Flood volume = 86971.2 Cubic Feet
Total soil loss = 43296.3 Cubic Feet

Peak flow rate of this hydrograph = 3.942(CFS)

---

sobonalt1d242

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0007	0.10	Q
0+10	0.0022	0.22	Q
0+15	0.0038	0.23	Q
0+20	0.0058	0.29	VQ
0+25	0.0081	0.35	VQ
0+30	0.0106	0.35	VQ
0+35	0.0130	0.36	VQ
0+40	0.0155	0.36	VQ
0+45	0.0179	0.36	VQ
0+50	0.0207	0.40	VQ
0+55	0.0239	0.46	VQ
1+ 0	0.0272	0.47	VQ
1+ 5	0.0301	0.43	VQ
1+10	0.0326	0.37	VQ
1+15	0.0351	0.36	VQ
1+20	0.0376	0.36	VQ
1+25	0.0400	0.36	VQ
1+30	0.0425	0.36	VQ
1+35	0.0449	0.36	VQ
1+40	0.0474	0.36	VQ
1+45	0.0498	0.36	VQ
1+50	0.0526	0.40	Q
1+55	0.0558	0.46	Q
2+ 0	0.0591	0.47	Q
2+ 5	0.0623	0.47	Q
2+10	0.0656	0.47	Q
2+15	0.0689	0.47	Q
2+20	0.0721	0.47	Q
2+25	0.0754	0.47	Q
2+30	0.0787	0.47	Q
2+35	0.0823	0.52	VQ
2+40	0.0863	0.58	VQ
2+45	0.0904	0.59	VQ
2+50	0.0945	0.59	VQ
2+55	0.0986	0.59	VQ
3+ 0	0.1026	0.59	Q
3+ 5	0.1067	0.59	Q
3+10	0.1108	0.59	Q
3+15	0.1149	0.59	Q
3+20	0.1190	0.59	Q
3+25	0.1231	0.59	Q
3+30	0.1272	0.59	Q
3+35	0.1313	0.59	Q
3+40	0.1353	0.59	Q
3+45	0.1394	0.59	Q
3+50	0.1439	0.64	Q
3+55	0.1487	0.70	Q
4+ 0	0.1536	0.71	QV
4+ 5	0.1585	0.71	QV
4+10	0.1634	0.71	QV
4+15	0.1683	0.71	QV
4+20	0.1735	0.76	Q
4+25	0.1792	0.82	Q
4+30	0.1849	0.83	Q
4+35	0.1906	0.83	Q
4+40	0.1963	0.83	Q
4+45	0.2021	0.83	QV
4+50	0.2081	0.88	QV
4+55	0.2146	0.94	QV
5+ 0	0.2211	0.95	QV
5+ 5	0.2270	0.85	QV
5+10	0.2320	0.73	Q V
5+15	0.2370	0.72	Q V
5+20	0.2422	0.76	QV
5+25	0.2479	0.82	QV
5+30	0.2536	0.83	Q V
5+35	0.2596	0.88	Q V
5+40	0.2661	0.94	Q V
5+45	0.2726	0.95	Q V
5+50	0.2792	0.95	Q V

5+55	0.2857	0.95	
6+ 0	0.2922	0.95	
6+ 5	0.2991	1.00	
6+10	0.3064	1.06	
6+15	0.3138	1.07	
6+20	0.3211	1.07	
6+25	0.3285	1.07	
6+30	0.3358	1.07	
6+35	0.3435	1.12	
6+40	0.3516	1.18	
6+45	0.3564	0.70	
6+50	0.3572	0.10	
6+55	0.3573	0.03	
7+ 0	0.3575	0.02	
7+ 5	0.3576	0.02	
7+10	0.3578	0.03	
7+15	0.3581	0.04	
7+20	0.3588	0.10	
7+25	0.3601	0.18	
7+30	0.3615	0.20	
7+35	0.3633	0.27	
7+40	0.3657	0.35	
7+45	0.3682	0.36	
7+50	0.3712	0.43	
7+55	0.3747	0.51	
8+ 0	0.3783	0.53	
8+ 5	0.3828	0.65	
8+10	0.3884	0.81	
8+15	0.3941	0.83	
8+20	0.3999	0.84	
8+25	0.4058	0.85	
8+30	0.4117	0.86	
8+35	0.4180	0.92	
8+40	0.4249	1.00	
8+45	0.4319	1.02	
8+50	0.4394	1.08	
8+55	0.4474	1.16	
9+ 0	0.4556	1.18	
9+ 5	0.4646	1.31	
9+10	0.4746	1.46	
9+15	0.4848	1.49	
9+20	0.4956	1.56	
9+25	0.5068	1.63	
9+30	0.5182	1.65	
9+35	0.5300	1.72	
9+40	0.5424	1.80	
9+45	0.5549	1.81	
9+50	0.5678	1.88	
9+55	0.5813	1.96	
10+ 0	0.5949	1.98	
10+ 5	0.6057	1.57	
10+10	0.6130	1.06	
10+15	0.6199	0.99	
10+20	0.6267	0.99	
10+25	0.6335	0.99	
10+30	0.6404	1.00	
10+35	0.6493	1.30	
10+40	0.6609	1.67	
10+45	0.6728	1.73	
10+50	0.6848	1.75	
10+55	0.6969	1.75	
11+ 0	0.7090	1.76	
11+ 5	0.7207	1.70	
11+10	0.7320	1.64	
11+15	0.7432	1.63	
11+20	0.7544	1.63	
11+25	0.7657	1.64	
11+30	0.7771	1.65	
11+35	0.7876	1.53	
11+40	0.7972	1.39	
11+45	0.8067	1.38	
11+50	0.8166	1.44	
11+55	0.8270	1.52	
12+ 0	0.8375	1.53	
12+ 5	0.8510	1.95	
12+10	0.8680	2.47	
12+15	0.8856	2.55	
12+20	0.9037	2.63	
12+25	0.9223	2.71	

sobonalt1d242

12+30	0.9410	2.72	
12+35	0.9607	2.85	
12+40	0.9813	3.00	
12+45	1.0021	3.02	
12+50	1.0234	3.09	
12+55	1.0453	3.17	
13+ 0	1.0672	3.19	
13+ 5	1.0913	3.49	
13+10	1.1178	3.86	
13+15	1.1448	3.92	
13+20	1.1719	3.93	
13+25	1.1990	3.94	
13+30	1.2262	3.94	
13+35	1.2489	3.29	
13+40	1.2660	2.49	
13+45	1.2824	2.38	
13+50	1.2988	2.37	
13+55	1.3151	2.37	
14+ 0	1.3315	2.38	
14+ 5	1.3496	2.62	
14+10	1.3697	2.92	
14+15	1.3901	2.97	
14+20	1.4102	2.92	
14+25	1.4298	2.85	
14+30	1.4494	2.84	
14+35	1.4690	2.85	
14+40	1.4887	2.85	
14+45	1.5083	2.86	
14+50	1.5276	2.80	
14+55	1.5465	2.73	
15+ 0	1.5652	2.73	
15+ 5	1.5836	2.67	
15+10	1.6016	2.60	
15+15	1.6194	2.60	
15+20	1.6369	2.54	
15+25	1.6539	2.47	
15+30	1.6709	2.47	
15+35	1.6863	2.23	
15+40	1.6996	1.94	
15+45	1.7128	1.90	
15+50	1.7259	1.90	
15+55	1.7390	1.91	
16+ 0	1.7521	1.91	
16+ 5	1.7613	1.32	
16+10	1.7653	0.59	
16+15	1.7687	0.49	
16+20	1.7720	0.47	
16+25	1.7753	0.47	
16+30	1.7785	0.47	
16+35	1.7815	0.43	
16+40	1.7840	0.37	
16+45	1.7865	0.36	
16+50	1.7889	0.36	
16+55	1.7914	0.36	
17+ 0	1.7938	0.36	
17+ 5	1.7969	0.45	
17+10	1.8009	0.57	
17+15	1.8050	0.59	
17+20	1.8091	0.59	
17+25	1.8131	0.59	
17+30	1.8172	0.59	
17+35	1.8213	0.59	
17+40	1.8254	0.59	
17+45	1.8295	0.59	
17+50	1.8332	0.54	
17+55	1.8366	0.48	
18+ 0	1.8399	0.48	
18+ 5	1.8431	0.47	
18+10	1.8464	0.47	
18+15	1.8497	0.47	
18+20	1.8529	0.47	
18+25	1.8562	0.47	
18+30	1.8595	0.47	
18+35	1.8624	0.43	
18+40	1.8649	0.37	
18+45	1.8674	0.36	
18+50	1.8695	0.31	
18+55	1.8712	0.25	
19+ 0	1.8729	0.24	

sobonalt1d242

19+ 5	1.8748	0.29	Q V
19+10	1.8772	0.35	Q V
19+15	1.8797	0.35	Q V
19+20	1.8824	0.40	Q V
19+25	1.8856	0.46	Q V
19+30	1.8889	0.47	Q V
19+35	1.8918	0.43	Q V
19+40	1.8944	0.37	Q V
19+45	1.8968	0.36	Q V
19+50	1.8989	0.31	Q V
19+55	1.9006	0.25	Q V
20+ 0	1.9023	0.24	Q V
20+ 5	1.9043	0.29	Q V
20+10	1.9066	0.35	Q V
20+15	1.9091	0.35	Q V
20+20	1.9115	0.36	Q V
20+25	1.9140	0.36	Q V
20+30	1.9164	0.36	Q V
20+35	1.9189	0.36	Q V
20+40	1.9213	0.36	Q V
20+45	1.9238	0.36	Q V
20+50	1.9259	0.31	Q V
20+55	1.9276	0.25	Q V
21+ 0	1.9293	0.24	Q V
21+ 5	1.9312	0.29	Q V
21+10	1.9336	0.35	Q V
21+15	1.9361	0.35	Q V
21+20	1.9382	0.31	Q V
21+25	1.9399	0.25	Q V
21+30	1.9415	0.24	Q V
21+35	1.9435	0.29	Q V
21+40	1.9459	0.35	Q V
21+45	1.9483	0.35	Q V
21+50	1.9504	0.31	Q V
21+55	1.9521	0.25	Q V
22+ 0	1.9538	0.24	Q V
22+ 5	1.9557	0.29	Q V
22+10	1.9581	0.35	Q V
22+15	1.9606	0.35	Q V
22+20	1.9627	0.31	Q V
22+25	1.9644	0.25	Q V
22+30	1.9660	0.24	Q V
22+35	1.9677	0.24	Q V
22+40	1.9693	0.24	Q V
22+45	1.9709	0.24	Q V
22+50	1.9726	0.24	Q V
22+55	1.9742	0.24	Q V
23+ 0	1.9758	0.24	Q V
23+ 5	1.9775	0.24	Q V
23+10	1.9791	0.24	Q V
23+15	1.9808	0.24	Q V
23+20	1.9824	0.24	Q V
23+25	1.9840	0.24	Q V
23+30	1.9857	0.24	Q V
23+35	1.9873	0.24	Q V
23+40	1.9889	0.24	Q V
23+45	1.9906	0.24	Q V
23+50	1.9922	0.24	Q V
23+55	1.9938	0.24	Q V
24+ 0	1.9955	0.24	Q V
24+ 5	1.9964	0.14	Q V
24+10	1.9966	0.02	Q V
24+15	1.9966	0.00	Q V

ALTERNATIVE NO. 2

sobonalt2d12

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt2d12.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	0.55	7.04

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	1.20	15.36

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.550(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.550(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
		Sum = 100.000	Sum=	12.900

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.277	0.071	---	0.21
2	0.17	4.30	0.284	0.071	---	0.21
3	0.25	5.00	0.330	0.071	---	0.26
4	0.33	5.00	0.330	0.071	---	0.26
5	0.42	5.80	0.383	0.071	---	0.31
6	0.50	6.50	0.429	0.071	---	0.36
7	0.58	7.40	0.488	0.071	---	0.42
8	0.67	8.60	0.568	0.071	---	0.50
9	0.75	12.30	0.812	0.071	---	0.74
10	0.83	29.10	1.920	0.071	---	1.85
11	0.92	6.80	0.449	0.071	---	0.38
12	1.00	5.00	0.330	0.071	---	0.26
Sum =		100.0			Sum =	5.7

Flood volume = Effective rainfall 0.48(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.076(Ac.Ft)
Total rainfall = 0.55(In)
Flood volume = 22261.1 Cubic Feet
Total soil loss = 3291.1 Cubic Feet

Peak flow rate of this hydrograph = 15.167(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0075	1.09	V Q
0+10	0.0246	2.48	V Q
0+15	0.0449	2.95	V Q
0+20	0.0676	3.29	VQ
0+25	0.0925	3.62	Q
0+30	0.1215	4.21	QV
0+35	0.1551	4.88	Q V
0+40	0.1947	5.74	Q V
0+45	0.2471	7.61	Q V
0+50	0.3515	15.17	V Q
0+55	0.4537	14.83	Q V
1+ 0	0.4926	5.66	Q V
1+ 5	0.5087	2.33	Q V
1+10	0.5108	0.30	Q V
1+15	0.5110	0.04	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt2d32.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	0.90	11.52

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	2.10	26.88

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 0.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt2d32

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
		Sum = 100.000	Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.140	0.071	---	0.07
2	0.17	1.30	0.140	0.071	---	0.07
3	0.25	1.10	0.119	0.071	---	0.05
4	0.33	1.50	0.162	0.071	---	0.09
5	0.42	1.50	0.162	0.071	---	0.09
6	0.50	1.80	0.194	0.071	---	0.12
7	0.58	1.50	0.162	0.071	---	0.09
8	0.67	1.80	0.194	0.071	---	0.12
9	0.75	1.80	0.194	0.071	---	0.12
10	0.83	1.50	0.162	0.071	---	0.09
11	0.92	1.60	0.173	0.071	---	0.10
12	1.00	1.80	0.194	0.071	---	0.12
13	1.08	2.20	0.238	0.071	---	0.17
14	1.17	2.20	0.238	0.071	---	0.17
15	1.25	2.20	0.238	0.071	---	0.17
16	1.33	2.00	0.216	0.071	---	0.15
17	1.42	2.60	0.281	0.071	---	0.21
18	1.50	2.70	0.292	0.071	---	0.22
19	1.58	2.40	0.259	0.071	---	0.19
20	1.67	2.70	0.292	0.071	---	0.22
21	1.75	3.30	0.356	0.071	---	0.29
22	1.83	3.10	0.335	0.071	---	0.26
23	1.92	2.90	0.313	0.071	---	0.24
24	2.00	3.00	0.324	0.071	---	0.25
25	2.08	3.10	0.335	0.071	---	0.26
26	2.17	4.20	0.454	0.071	---	0.38
27	2.25	5.00	0.540	0.071	---	0.47
28	2.33	3.50	0.378	0.071	---	0.31
29	2.42	6.80	0.734	0.071	---	0.66
30	2.50	7.30	0.788	0.071	---	0.72
31	2.58	8.20	0.886	0.071	---	0.81
32	2.67	5.90	0.637	0.071	---	0.57
33	2.75	2.00	0.216	0.071	---	0.15
34	2.83	1.80	0.194	0.071	---	0.12
35	2.92	1.80	0.194	0.071	---	0.12
36	3.00	0.60	0.065	0.071	0.012	0.05
Sum =		100.0			Sum =	8.3

Flood volume = Effective rainfall 0.69(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.221(Ac.Ft)
Total rainfall = 0.90(In)
Flood volume = 32170.9 Cubic Feet
Total soil loss = 9644.3 Cubic Feet

Peak flow rate of this hydrograph = 9.661(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0025	0.37	VQ				
0+10	0.0082	0.82	V Q				
0+15	0.0135	0.77	V Q				
0+20	0.0195	0.87	V Q				
0+25	0.0273	1.13	V Q				
0+30	0.0366	1.34	V Q				

sobona1t2d32

0+35	0.0461	1.39	V Q
0+40	0.0556	1.38	V Q
0+45	0.0664	1.56	V Q
0+50	0.0762	1.42	VQ
0+55	0.0849	1.27	VQ
1+ 0	0.0947	1.42	Q
1+ 5	0.1071	1.80	V Q
1+10	0.1216	2.10	V Q
1+15	0.1364	2.15	VQ
1+20	0.1504	2.04	Q
1+25	0.1658	2.24	Q
1+30	0.1844	2.70	VQ
1+35	0.2027	2.66	Q
1+40	0.2209	2.64	QV
1+45	0.2426	3.16	QV
1+50	0.2667	3.50	QV
1+55	0.2895	3.31	Q V
2+ 0	0.3116	3.21	Q V
2+ 5	0.3344	3.32	Q V
2+10	0.3622	4.02	Q V
2+15	0.3984	5.27	Q
2+20	0.4334	5.08	Q V
2+25	0.4749	6.02	QV
2+30	0.5334	8.49	V Q
2+35	0.5999	9.66	V Q
2+40	0.6625	9.08	VQ
2+45	0.6992	5.33	Q V
2+50	0.7147	2.25	Q V
2+55	0.7263	1.69	Q V
3+ 0	0.7347	1.22	Q V
3+ 5	0.7380	0.48	Q V
3+10	0.7385	0.07	Q V
3+15	0.7385	0.01	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt2d62.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	1.40	17.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	3.00	38.40

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 1.400(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.400(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt2d62

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.084	0.071	---	0.01
2	0.17	0.60	0.101	0.071	---	0.03
3	0.25	0.60	0.101	0.071	---	0.03
4	0.33	0.60	0.101	0.071	---	0.03
5	0.42	0.60	0.101	0.071	---	0.03
6	0.50	0.70	0.118	0.071	---	0.05
7	0.58	0.70	0.118	0.071	---	0.05
8	0.67	0.70	0.118	0.071	---	0.05
9	0.75	0.70	0.118	0.071	---	0.05
10	0.83	0.70	0.118	0.071	---	0.05
11	0.92	0.70	0.118	0.071	---	0.05
12	1.00	0.80	0.134	0.071	---	0.06
13	1.08	0.80	0.134	0.071	---	0.06
14	1.17	0.80	0.134	0.071	---	0.06
15	1.25	0.80	0.134	0.071	---	0.06
16	1.33	0.80	0.134	0.071	---	0.06
17	1.42	0.80	0.134	0.071	---	0.06
18	1.50	0.80	0.134	0.071	---	0.06
19	1.58	0.80	0.134	0.071	---	0.06
20	1.67	0.80	0.134	0.071	---	0.06
21	1.75	0.80	0.134	0.071	---	0.06
22	1.83	0.80	0.134	0.071	---	0.06
23	1.92	0.80	0.134	0.071	---	0.06
24	2.00	0.90	0.151	0.071	---	0.08
25	2.08	0.80	0.134	0.071	---	0.06
26	2.17	0.90	0.151	0.071	---	0.08
27	2.25	0.90	0.151	0.071	---	0.08
28	2.33	0.90	0.151	0.071	---	0.08
29	2.42	0.90	0.151	0.071	---	0.08
30	2.50	0.90	0.151	0.071	---	0.08
31	2.58	0.90	0.151	0.071	---	0.08
32	2.67	0.90	0.151	0.071	---	0.08
33	2.75	1.00	0.168	0.071	---	0.10
34	2.83	1.00	0.168	0.071	---	0.10
35	2.92	1.00	0.168	0.071	---	0.10
36	3.00	1.00	0.168	0.071	---	0.10
37	3.08	1.00	0.168	0.071	---	0.10
38	3.17	1.10	0.185	0.071	---	0.11
39	3.25	1.10	0.185	0.071	---	0.11
40	3.33	1.10	0.185	0.071	---	0.11
41	3.42	1.20	0.202	0.071	---	0.13
42	3.50	1.30	0.218	0.071	---	0.15
43	3.58	1.40	0.235	0.071	---	0.16
44	3.67	1.40	0.235	0.071	---	0.16
45	3.75	1.50	0.252	0.071	---	0.18
46	3.83	1.50	0.252	0.071	---	0.18
47	3.92	1.60	0.269	0.071	---	0.20
48	4.00	1.60	0.269	0.071	---	0.20
49	4.08	1.70	0.286	0.071	---	0.21
50	4.17	1.80	0.302	0.071	---	0.23
51	4.25	1.90	0.319	0.071	---	0.25
52	4.33	2.00	0.336	0.071	---	0.27
53	4.42	2.10	0.353	0.071	---	0.28
54	4.50	2.10	0.353	0.071	---	0.28
55	4.58	2.20	0.370	0.071	---	0.30
56	4.67	2.30	0.386	0.071	---	0.32
57	4.75	2.40	0.403	0.071	---	0.33
58	4.83	2.40	0.403	0.071	---	0.33
59	4.92	2.50	0.420	0.071	---	0.35
60	5.00	2.60	0.437	0.071	---	0.37
61	5.08	3.10	0.521	0.071	---	0.45
62	5.17	3.60	0.605	0.071	---	0.53

63	5.25	3.90	0.655	0.071	---	0.58
64	5.33	4.20	0.706	0.071	---	0.63
65	5.42	4.70	0.790	0.071	---	0.72
66	5.50	5.60	0.941	0.071	---	0.87
67	5.58	1.90	0.319	0.071	---	0.25
68	5.67	0.90	0.151	0.071	---	0.08
69	5.75	0.60	0.101	0.071	---	0.03
70	5.83	0.50	0.084	0.071	---	0.01
71	5.92	0.30	0.050	0.071	0.009	0.04
72	6.00	0.20	0.034	0.071	0.006	0.03
Sum =		100.0			Sum =	11.8

Flood volume = Effective rainfall 0.99(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)
Total soil loss = 0.41(In)
Total soil loss = 0.442(Ac.Ft)
Total rainfall = 1.40(In)
Flood volume = 45789.9 Cubic Feet
Total soil loss = 19256.8 Cubic Feet

Peak flow rate of this hydrograph = 9.980(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0005	0.07	Q
0+10	0.0022	0.24	Q
0+15	0.0047	0.37	VQ
0+20	0.0073	0.38	VQ
0+25	0.0100	0.39	VQ
0+30	0.0133	0.48	VQ
0+35	0.0173	0.59	V Q
0+40	0.0214	0.60	V Q
0+45	0.0256	0.60	V Q
0+50	0.0298	0.60	VQ
0+55	0.0339	0.60	VQ
1+ 0	0.0387	0.69	VQ
1+ 5	0.0442	0.80	V Q
1+10	0.0498	0.82	V Q
1+15	0.0555	0.82	VQ
1+20	0.0611	0.82	VQ
1+25	0.0668	0.82	VQ
1+30	0.0724	0.82	VQ
1+35	0.0781	0.82	VQ
1+40	0.0837	0.82	Q
1+45	0.0894	0.82	Q
1+50	0.0950	0.82	Q
1+55	0.1007	0.82	Q
2+ 0	0.1070	0.91	QV
2+ 5	0.1134	0.93	QV
2+10	0.1197	0.92	QV
2+15	0.1268	1.02	Q
2+20	0.1339	1.03	QV
2+25	0.1410	1.04	QV
2+30	0.1482	1.04	QV
2+35	0.1553	1.04	QV
2+40	0.1625	1.04	Q V
2+45	0.1702	1.13	Q V
2+50	0.1787	1.24	Q V
2+55	0.1874	1.25	Q V
3+ 0	0.1960	1.25	Q V
3+ 5	0.2046	1.25	Q V
3+10	0.2139	1.34	Q V
3+15	0.2239	1.45	Q V
3+20	0.2340	1.47	Q V
3+25	0.2447	1.56	Q V
3+30	0.2568	1.76	Q V
3+35	0.2704	1.97	Q V
3+40	0.2849	2.10	Q V
3+45	0.3001	2.21	Q V
3+50	0.3161	2.32	Q V
3+55	0.3328	2.42	Q V
4+ 0	0.3503	2.54	Q V
4+ 5	0.3684	2.64	Q V

sobona1t2d62

4+10	0.3880	2.84	
4+15	0.4091	3.06	
4+20	0.4316	3.27	
4+25	0.4557	3.49	
4+30	0.4806	3.62	
4+35	0.5062	3.73	
4+40	0.5333	3.93	
4+45	0.5618	4.14	
4+50	0.5912	4.27	
4+55	0.6213	4.38	
5+ 0	0.6529	4.58	
5+ 5	0.6883	5.15	
5+10	0.7307	6.16	
5+15	0.7793	7.05	
5+20	0.8326	7.74	
5+25	0.8917	8.58	
5+30	0.9604	9.98	
5+35	1.0138	7.76	
5+40	1.0342	2.96	
5+45	1.0415	1.05	
5+50	1.0441	0.38	
5+55	1.0464	0.35	
6+ 0	1.0494	0.43	
6+ 5	1.0509	0.22	
6+10	1.0512	0.03	
6+15	1.0512	0.00	

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt2d242.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 12.80(Ac.) = 0.020 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 12.80(Ac.) = 0.020 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	2.25	28.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
12.80	6.00	76.80

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 2.250(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.250(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
12.800	69.00	0.900

Total Area Entered = 12.80(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt2d242

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	5.301
2	0.167	388.361	50.563	6.523
3	0.250	582.541	7.110	0.917
4	0.333	776.721	1.235	0.159
			Sum = 100.000 Sum=	12.900

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.126	0.003	0.01
2	0.17	0.07	0.018	0.125	0.003	0.01
3	0.25	0.07	0.018	0.125	0.003	0.01
4	0.33	0.10	0.027	0.124	0.005	0.02
5	0.42	0.10	0.027	0.124	0.005	0.02
6	0.50	0.10	0.027	0.123	0.005	0.02
7	0.58	0.10	0.027	0.123	0.005	0.02
8	0.67	0.10	0.027	0.122	0.005	0.02
9	0.75	0.10	0.027	0.122	0.005	0.02
10	0.83	0.13	0.036	0.121	0.006	0.03
11	0.92	0.13	0.036	0.121	0.006	0.03
12	1.00	0.13	0.036	0.120	0.006	0.03
13	1.08	0.10	0.027	0.120	0.005	0.02
14	1.17	0.10	0.027	0.119	0.005	0.02
15	1.25	0.10	0.027	0.119	0.005	0.02
16	1.33	0.10	0.027	0.118	0.005	0.02
17	1.42	0.10	0.027	0.118	0.005	0.02
18	1.50	0.10	0.027	0.117	0.005	0.02
19	1.58	0.10	0.027	0.117	0.005	0.02
20	1.67	0.10	0.027	0.117	0.005	0.02
21	1.75	0.10	0.027	0.116	0.005	0.02
22	1.83	0.13	0.036	0.116	0.006	0.03
23	1.92	0.13	0.036	0.115	0.006	0.03
24	2.00	0.13	0.036	0.115	0.006	0.03
25	2.08	0.13	0.036	0.114	0.006	0.03
26	2.17	0.13	0.036	0.114	0.006	0.03
27	2.25	0.13	0.036	0.113	0.006	0.03
28	2.33	0.13	0.036	0.113	0.006	0.03
29	2.42	0.13	0.036	0.112	0.006	0.03
30	2.50	0.13	0.036	0.112	0.006	0.03
31	2.58	0.17	0.045	0.111	0.008	0.04
32	2.67	0.17	0.045	0.111	0.008	0.04
33	2.75	0.17	0.045	0.110	0.008	0.04
34	2.83	0.17	0.045	0.110	0.008	0.04
35	2.92	0.17	0.045	0.110	0.008	0.04
36	3.00	0.17	0.045	0.109	0.008	0.04
37	3.08	0.17	0.045	0.109	0.008	0.04
38	3.17	0.17	0.045	0.108	0.008	0.04
39	3.25	0.17	0.045	0.108	0.008	0.04
40	3.33	0.17	0.045	0.107	0.008	0.04
41	3.42	0.17	0.045	0.107	0.008	0.04
42	3.50	0.17	0.045	0.106	0.008	0.04
43	3.58	0.17	0.045	0.106	0.008	0.04
44	3.67	0.17	0.045	0.106	0.008	0.04
45	3.75	0.17	0.045	0.105	0.008	0.04
46	3.83	0.20	0.054	0.105	0.010	0.04
47	3.92	0.20	0.054	0.104	0.010	0.04
48	4.00	0.20	0.054	0.104	0.010	0.04
49	4.08	0.20	0.054	0.103	0.010	0.04
50	4.17	0.20	0.054	0.103	0.010	0.04
51	4.25	0.20	0.054	0.102	0.010	0.04
52	4.33	0.23	0.063	0.102	0.011	0.05
53	4.42	0.23	0.063	0.102	0.011	0.05
54	4.50	0.23	0.063	0.101	0.011	0.05
55	4.58	0.23	0.063	0.101	0.011	0.05
56	4.67	0.23	0.063	0.100	0.011	0.05
57	4.75	0.23	0.063	0.100	0.011	0.05
58	4.83	0.27	0.072	0.099	0.013	0.06
59	4.92	0.27	0.072	0.099	0.013	0.06
60	5.00	0.27	0.072	0.099	0.013	0.06
61	5.08	0.20	0.054	0.098	0.010	0.04
62	5.17	0.20	0.054	0.098	0.010	0.04

sobonalt2d242

63	5.25	0.20	0.054	0.097	0.010	0.04
64	5.33	0.23	0.063	0.097	0.011	0.05
65	5.42	0.23	0.063	0.096	0.011	0.05
66	5.50	0.23	0.063	0.096	0.011	0.05
67	5.58	0.27	0.072	0.096	0.013	0.06
68	5.67	0.27	0.072	0.095	0.013	0.06
69	5.75	0.27	0.072	0.095	0.013	0.06
70	5.83	0.27	0.072	0.094	0.013	0.06
71	5.92	0.27	0.072	0.094	0.013	0.06
72	6.00	0.27	0.072	0.093	0.013	0.06
73	6.08	0.30	0.081	0.093	0.015	0.07
74	6.17	0.30	0.081	0.093	0.015	0.07
75	6.25	0.30	0.081	0.092	0.015	0.07
76	6.33	0.30	0.081	0.092	0.015	0.07
77	6.42	0.30	0.081	0.091	0.015	0.07
78	6.50	0.30	0.081	0.091	0.015	0.07
79	6.58	0.33	0.090	0.091	0.016	0.07
80	6.67	0.33	0.090	0.090	0.016	0.07
81	6.75	0.33	0.090	0.090	---	0.00
82	6.83	0.33	0.090	0.089	---	0.00
83	6.92	0.33	0.090	0.089	---	0.00
84	7.00	0.33	0.090	0.089	---	0.00
85	7.08	0.33	0.090	0.088	---	0.00
86	7.17	0.33	0.090	0.088	---	0.00
87	7.25	0.33	0.090	0.087	---	0.00
88	7.33	0.37	0.099	0.087	---	0.01
89	7.42	0.37	0.099	0.087	---	0.01
90	7.50	0.37	0.099	0.086	---	0.01
91	7.58	0.40	0.108	0.086	---	0.02
92	7.67	0.40	0.108	0.085	---	0.02
93	7.75	0.40	0.108	0.085	---	0.02
94	7.83	0.43	0.117	0.085	---	0.03
95	7.92	0.43	0.117	0.084	---	0.03
96	8.00	0.43	0.117	0.084	---	0.03
97	8.08	0.50	0.135	0.083	---	0.05
98	8.17	0.50	0.135	0.083	---	0.05
99	8.25	0.50	0.135	0.083	---	0.05
100	8.33	0.50	0.135	0.082	---	0.05
101	8.42	0.50	0.135	0.082	---	0.05
102	8.50	0.50	0.135	0.082	---	0.05
103	8.58	0.53	0.144	0.081	---	0.06
104	8.67	0.53	0.144	0.081	---	0.06
105	8.75	0.53	0.144	0.080	---	0.06
106	8.83	0.57	0.153	0.080	---	0.07
107	8.92	0.57	0.153	0.080	---	0.07
108	9.00	0.57	0.153	0.079	---	0.07
109	9.08	0.63	0.171	0.079	---	0.09
110	9.17	0.63	0.171	0.078	---	0.09
111	9.25	0.63	0.171	0.078	---	0.09
112	9.33	0.67	0.180	0.078	---	0.10
113	9.42	0.67	0.180	0.077	---	0.10
114	9.50	0.67	0.180	0.077	---	0.10
115	9.58	0.70	0.189	0.077	---	0.11
116	9.67	0.70	0.189	0.076	---	0.11
117	9.75	0.70	0.189	0.076	---	0.11
118	9.83	0.73	0.198	0.076	---	0.12
119	9.92	0.73	0.198	0.075	---	0.12
120	10.00	0.73	0.198	0.075	---	0.12
121	10.08	0.50	0.135	0.074	---	0.06
122	10.17	0.50	0.135	0.074	---	0.06
123	10.25	0.50	0.135	0.074	---	0.06
124	10.33	0.50	0.135	0.073	---	0.06
125	10.42	0.50	0.135	0.073	---	0.06
126	10.50	0.50	0.135	0.073	---	0.06
127	10.58	0.67	0.180	0.072	---	0.11
128	10.67	0.67	0.180	0.072	---	0.11
129	10.75	0.67	0.180	0.072	---	0.11
130	10.83	0.67	0.180	0.071	---	0.11
131	10.92	0.67	0.180	0.071	---	0.11
132	11.00	0.67	0.180	0.071	---	0.11
133	11.08	0.63	0.171	0.070	---	0.10
134	11.17	0.63	0.171	0.070	---	0.10
135	11.25	0.63	0.171	0.069	---	0.10
136	11.33	0.63	0.171	0.069	---	0.10
137	11.42	0.63	0.171	0.069	---	0.10
138	11.50	0.63	0.171	0.068	---	0.10
139	11.58	0.57	0.153	0.068	---	0.08
140	11.67	0.57	0.153	0.068	---	0.09
141	11.75	0.57	0.153	0.067	---	0.09

142	11.83	0.60	0.162	0.067	---	0.09
143	11.92	0.60	0.162	0.067	---	0.10
144	12.00	0.60	0.162	0.066	---	0.10
145	12.08	0.83	0.225	0.066	---	0.16
146	12.17	0.83	0.225	0.066	---	0.16
147	12.25	0.83	0.225	0.065	---	0.16
148	12.33	0.87	0.234	0.065	---	0.17
149	12.42	0.87	0.234	0.065	---	0.17
150	12.50	0.87	0.234	0.064	---	0.17
151	12.58	0.93	0.252	0.064	---	0.19
152	12.67	0.93	0.252	0.064	---	0.19
153	12.75	0.93	0.252	0.064	---	0.19
154	12.83	0.97	0.261	0.063	---	0.20
155	12.92	0.97	0.261	0.063	---	0.20
156	13.00	0.97	0.261	0.063	---	0.20
157	13.08	1.13	0.306	0.062	---	0.24
158	13.17	1.13	0.306	0.062	---	0.24
159	13.25	1.13	0.306	0.062	---	0.24
160	13.33	1.13	0.306	0.061	---	0.24
161	13.42	1.13	0.306	0.061	---	0.25
162	13.50	1.13	0.306	0.061	---	0.25
163	13.58	0.77	0.207	0.060	---	0.15
164	13.67	0.77	0.207	0.060	---	0.15
165	13.75	0.77	0.207	0.060	---	0.15
166	13.83	0.77	0.207	0.059	---	0.15
167	13.92	0.77	0.207	0.059	---	0.15
168	14.00	0.77	0.207	0.059	---	0.15
169	14.08	0.90	0.243	0.059	---	0.18
170	14.17	0.90	0.243	0.058	---	0.18
171	14.25	0.90	0.243	0.058	---	0.19
172	14.33	0.87	0.234	0.058	---	0.18
173	14.42	0.87	0.234	0.057	---	0.18
174	14.50	0.87	0.234	0.057	---	0.18
175	14.58	0.87	0.234	0.057	---	0.18
176	14.67	0.87	0.234	0.056	---	0.18
177	14.75	0.87	0.234	0.056	---	0.18
178	14.83	0.83	0.225	0.056	---	0.17
179	14.92	0.83	0.225	0.056	---	0.17
180	15.00	0.83	0.225	0.055	---	0.17
181	15.08	0.80	0.216	0.055	---	0.16
182	15.17	0.80	0.216	0.055	---	0.16
183	15.25	0.80	0.216	0.054	---	0.16
184	15.33	0.77	0.207	0.054	---	0.15
185	15.42	0.77	0.207	0.054	---	0.15
186	15.50	0.77	0.207	0.054	---	0.15
187	15.58	0.63	0.171	0.053	---	0.12
188	15.67	0.63	0.171	0.053	---	0.12
189	15.75	0.63	0.171	0.053	---	0.12
190	15.83	0.63	0.171	0.053	---	0.12
191	15.92	0.63	0.171	0.052	---	0.12
192	16.00	0.63	0.171	0.052	---	0.12
193	16.08	0.13	0.036	0.052	0.006	0.03
194	16.17	0.13	0.036	0.051	0.006	0.03
195	16.25	0.13	0.036	0.051	0.006	0.03
196	16.33	0.13	0.036	0.051	0.006	0.03
197	16.42	0.13	0.036	0.051	0.006	0.03
198	16.50	0.13	0.036	0.050	0.006	0.03
199	16.58	0.10	0.027	0.050	0.005	0.02
200	16.67	0.10	0.027	0.050	0.005	0.02
201	16.75	0.10	0.027	0.050	0.005	0.02
202	16.83	0.10	0.027	0.049	0.005	0.02
203	16.92	0.10	0.027	0.049	0.005	0.02
204	17.00	0.10	0.027	0.049	0.005	0.02
205	17.08	0.17	0.045	0.049	0.008	0.04
206	17.17	0.17	0.045	0.048	0.008	0.04
207	17.25	0.17	0.045	0.048	0.008	0.04
208	17.33	0.17	0.045	0.048	0.008	0.04
209	17.42	0.17	0.045	0.048	0.008	0.04
210	17.50	0.17	0.045	0.047	0.008	0.04
211	17.58	0.17	0.045	0.047	0.008	0.04
212	17.67	0.17	0.045	0.047	0.008	0.04
213	17.75	0.17	0.045	0.047	0.008	0.04
214	17.83	0.13	0.036	0.047	0.006	0.03
215	17.92	0.13	0.036	0.046	0.006	0.03
216	18.00	0.13	0.036	0.046	0.006	0.03
217	18.08	0.13	0.036	0.046	0.006	0.03
218	18.17	0.13	0.036	0.046	0.006	0.03
219	18.25	0.13	0.036	0.045	0.006	0.03
220	18.33	0.13	0.036	0.045	0.006	0.03

221	18.42	0.13	0.036	0.045	0.006	0.03
222	18.50	0.13	0.036	0.045	0.006	0.03
223	18.58	0.10	0.027	0.045	0.005	0.02
224	18.67	0.10	0.027	0.044	0.005	0.02
225	18.75	0.10	0.027	0.044	0.005	0.02
226	18.83	0.07	0.018	0.044	0.003	0.01
227	18.92	0.07	0.018	0.044	0.003	0.01
228	19.00	0.07	0.018	0.043	0.003	0.01
229	19.08	0.10	0.027	0.043	0.005	0.02
230	19.17	0.10	0.027	0.043	0.005	0.02
231	19.25	0.10	0.027	0.043	0.005	0.02
232	19.33	0.13	0.036	0.043	0.006	0.03
233	19.42	0.13	0.036	0.042	0.006	0.03
234	19.50	0.13	0.036	0.042	0.006	0.03
235	19.58	0.10	0.027	0.042	0.005	0.02
236	19.67	0.10	0.027	0.042	0.005	0.02
237	19.75	0.10	0.027	0.042	0.005	0.02
238	19.83	0.07	0.018	0.041	0.003	0.01
239	19.92	0.07	0.018	0.041	0.003	0.01
240	20.00	0.07	0.018	0.041	0.003	0.01
241	20.08	0.10	0.027	0.041	0.005	0.02
242	20.17	0.10	0.027	0.041	0.005	0.02
243	20.25	0.10	0.027	0.041	0.005	0.02
244	20.33	0.10	0.027	0.040	0.005	0.02
245	20.42	0.10	0.027	0.040	0.005	0.02
246	20.50	0.10	0.027	0.040	0.005	0.02
247	20.58	0.10	0.027	0.040	0.005	0.02
248	20.67	0.10	0.027	0.040	0.005	0.02
249	20.75	0.10	0.027	0.040	0.005	0.02
250	20.83	0.07	0.018	0.039	0.003	0.01
251	20.92	0.07	0.018	0.039	0.003	0.01
252	21.00	0.07	0.018	0.039	0.003	0.01
253	21.08	0.10	0.027	0.039	0.005	0.02
254	21.17	0.10	0.027	0.039	0.005	0.02
255	21.25	0.10	0.027	0.039	0.005	0.02
256	21.33	0.07	0.018	0.038	0.003	0.01
257	21.42	0.07	0.018	0.038	0.003	0.01
258	21.50	0.07	0.018	0.038	0.003	0.01
259	21.58	0.10	0.027	0.038	0.005	0.02
260	21.67	0.10	0.027	0.038	0.005	0.02
261	21.75	0.10	0.027	0.038	0.005	0.02
262	21.83	0.07	0.018	0.038	0.003	0.01
263	21.92	0.07	0.018	0.038	0.003	0.01
264	22.00	0.07	0.018	0.037	0.003	0.01
265	22.08	0.10	0.027	0.037	0.005	0.02
266	22.17	0.10	0.027	0.037	0.005	0.02
267	22.25	0.10	0.027	0.037	0.005	0.02
268	22.33	0.07	0.018	0.037	0.003	0.01
269	22.42	0.07	0.018	0.037	0.003	0.01
270	22.50	0.07	0.018	0.037	0.003	0.01
271	22.58	0.07	0.018	0.037	0.003	0.01
272	22.67	0.07	0.018	0.036	0.003	0.01
273	22.75	0.07	0.018	0.036	0.003	0.01
274	22.83	0.07	0.018	0.036	0.003	0.01
275	22.92	0.07	0.018	0.036	0.003	0.01
276	23.00	0.07	0.018	0.036	0.003	0.01
277	23.08	0.07	0.018	0.036	0.003	0.01
278	23.17	0.07	0.018	0.036	0.003	0.01
279	23.25	0.07	0.018	0.036	0.003	0.01
280	23.33	0.07	0.018	0.036	0.003	0.01
281	23.42	0.07	0.018	0.036	0.003	0.01
282	23.50	0.07	0.018	0.036	0.003	0.01
283	23.58	0.07	0.018	0.036	0.003	0.01
284	23.67	0.07	0.018	0.036	0.003	0.01
285	23.75	0.07	0.018	0.036	0.003	0.01
286	23.83	0.07	0.018	0.035	0.003	0.01
287	23.92	0.07	0.018	0.035	0.003	0.01
288	24.00	0.07	0.018	0.035	0.003	0.01
Sum =		100.0			Sum =	18.0

Flood volume = Effective rainfall 1.50(In)
times area 12.8(Ac.)/[(In)/(Ft.)] = 1.6(Ac.Ft)
Total soil loss = 0.75(In)
Total soil loss = 0.798(Ac.Ft)
Total rainfall = 2.25(In)
Flood volume = 69795.7 Cubic Feet
Total soil loss = 34745.7 Cubic Feet

Peak flow rate of this hydrograph = 3.164(CFS)

---

sobonalt2d242

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0005	0.08	Q
0+10	0.0017	0.17	Q
0+15	0.0030	0.19	Q
0+20	0.0046	0.23	Q
0+25	0.0065	0.28	VQ
0+30	0.0085	0.28	VQ
0+35	0.0105	0.29	VQ
0+40	0.0124	0.29	VQ
0+45	0.0144	0.29	VQ
0+50	0.0166	0.32	VQ
0+55	0.0192	0.37	VQ
1+ 0	0.0218	0.38	VQ
1+ 5	0.0242	0.34	VQ
1+10	0.0262	0.29	VQ
1+15	0.0282	0.29	VQ
1+20	0.0301	0.29	VQ
1+25	0.0321	0.29	VQ
1+30	0.0341	0.29	VQ
1+35	0.0360	0.29	VQ
1+40	0.0380	0.29	VQ
1+45	0.0400	0.29	VQ
1+50	0.0422	0.32	Q
1+55	0.0448	0.37	Q
2+ 0	0.0474	0.38	Q
2+ 5	0.0500	0.38	Q
2+10	0.0526	0.38	Q
2+15	0.0553	0.38	Q
2+20	0.0579	0.38	Q
2+25	0.0605	0.38	Q
2+30	0.0631	0.38	Q
2+35	0.0660	0.42	Q
2+40	0.0693	0.47	Q
2+45	0.0725	0.48	Q
2+50	0.0758	0.48	Q
2+55	0.0791	0.48	Q
3+ 0	0.0824	0.48	QV
3+ 5	0.0857	0.48	QV
3+10	0.0889	0.48	QV
3+15	0.0922	0.48	QV
3+20	0.0955	0.48	QV
3+25	0.0988	0.48	QV
3+30	0.1021	0.48	QV
3+35	0.1053	0.48	QV
3+40	0.1086	0.48	QV
3+45	0.1119	0.48	QV
3+50	0.1154	0.52	Q
3+55	0.1193	0.56	Q
4+ 0	0.1233	0.57	QV
4+ 5	0.1272	0.57	QV
4+10	0.1311	0.57	QV
4+15	0.1351	0.57	QV
4+20	0.1393	0.61	QV
4+25	0.1438	0.66	QV
4+30	0.1484	0.67	QV
4+35	0.1530	0.67	QV
4+40	0.1576	0.67	QV
4+45	0.1622	0.67	Q V
4+50	0.1670	0.71	Q V
4+55	0.1722	0.75	QV
5+ 0	0.1775	0.76	QV
5+ 5	0.1822	0.68	Q V
5+10	0.1862	0.59	Q V
5+15	0.1902	0.57	Q V
5+20	0.1944	0.61	Q V
5+25	0.1989	0.66	Q V
5+30	0.2035	0.67	Q V
5+35	0.2084	0.71	Q V
5+40	0.2135	0.75	Q V
5+45	0.2188	0.76	Q V
5+50	0.2240	0.76	Q V

5+55	0.2293	0.76	
6+ 0	0.2345	0.76	
6+ 5	0.2400	0.80	
6+10	0.2459	0.85	
6+15	0.2518	0.86	
6+20	0.2577	0.86	
6+25	0.2636	0.86	
6+30	0.2695	0.86	
6+35	0.2757	0.90	
6+40	0.2822	0.94	
6+45	0.2860	0.56	
6+50	0.2866	0.08	
6+55	0.2868	0.02	
7+ 0	0.2869	0.01	
7+ 5	0.2870	0.02	
7+10	0.2872	0.03	
7+15	0.2874	0.03	
7+20	0.2880	0.08	
7+25	0.2890	0.15	
7+30	0.2901	0.16	
7+35	0.2916	0.21	
7+40	0.2935	0.28	
7+45	0.2955	0.29	
7+50	0.2979	0.35	
7+55	0.3007	0.41	
8+ 0	0.3036	0.42	
8+ 5	0.3072	0.53	
8+10	0.3117	0.65	
8+15	0.3163	0.67	
8+20	0.3210	0.68	
8+25	0.3257	0.68	
8+30	0.3304	0.69	
8+35	0.3355	0.74	
8+40	0.3410	0.80	
8+45	0.3466	0.82	
8+50	0.3526	0.87	
8+55	0.3591	0.93	
9+ 0	0.3656	0.95	
9+ 5	0.3728	1.05	
9+10	0.3809	1.17	
9+15	0.3891	1.19	
9+20	0.3977	1.25	
9+25	0.4067	1.31	
9+30	0.4158	1.32	
9+35	0.4253	1.38	
9+40	0.4353	1.44	
9+45	0.4453	1.46	
9+50	0.4557	1.51	
9+55	0.4665	1.57	
10+ 0	0.4774	1.59	
10+ 5	0.4861	1.26	
10+10	0.4920	0.85	
10+15	0.4974	0.80	
10+20	0.5029	0.79	
10+25	0.5084	0.80	
10+30	0.5139	0.80	
10+35	0.5211	1.04	
10+40	0.5304	1.34	
10+45	0.5399	1.39	
10+50	0.5496	1.40	
10+55	0.5593	1.41	
11+ 0	0.5690	1.41	
11+ 5	0.5784	1.37	
11+10	0.5874	1.31	
11+15	0.5964	1.31	
11+20	0.6054	1.31	
11+25	0.6145	1.32	
11+30	0.6236	1.32	
11+35	0.6321	1.23	
11+40	0.6398	1.12	
11+45	0.6474	1.10	
11+50	0.6553	1.15	
11+55	0.6637	1.22	
12+ 0	0.6721	1.23	
12+ 5	0.6829	1.57	
12+10	0.6966	1.98	
12+15	0.7107	2.05	
12+20	0.7252	2.11	
12+25	0.7402	2.17	

sobonalt2d242

12+30	0.7552	2.18	
12+35	0.7709	2.28	
12+40	0.7875	2.41	
12+45	0.8042	2.43	
12+50	0.8213	2.48	
12+55	0.8388	2.54	
13+ 0	0.8565	2.56	
13+ 5	0.8757	2.80	
13+10	0.8971	3.10	
13+15	0.9187	3.14	
13+20	0.9405	3.16	
13+25	0.9622	3.16	
13+30	0.9840	3.16	
13+35	1.0022	2.64	
13+40	1.0160	2.00	
13+45	1.0292	1.91	
13+50	1.0423	1.90	
13+55	1.0554	1.91	
14+ 0	1.0686	1.91	
14+ 5	1.0830	2.10	
14+10	1.0992	2.34	
14+15	1.1156	2.38	
14+20	1.1317	2.34	
14+25	1.1475	2.29	
14+30	1.1632	2.28	
14+35	1.1789	2.28	
14+40	1.1947	2.29	
14+45	1.2105	2.29	
14+50	1.2259	2.25	
14+55	1.2411	2.19	
15+ 0	1.2561	2.19	
15+ 5	1.2709	2.14	
15+10	1.2853	2.09	
15+15	1.2996	2.08	
15+20	1.3137	2.04	
15+25	1.3273	1.98	
15+30	1.3409	1.98	
15+35	1.3533	1.79	
15+40	1.3640	1.56	
15+45	1.3745	1.53	
15+50	1.3850	1.53	
15+55	1.3956	1.53	
16+ 0	1.4061	1.53	
16+ 5	1.4134	1.06	
16+10	1.4167	0.48	
16+15	1.4194	0.40	
16+20	1.4221	0.38	
16+25	1.4247	0.38	
16+30	1.4273	0.38	
16+35	1.4297	0.34	
16+40	1.4317	0.29	
16+45	1.4337	0.29	
16+50	1.4356	0.29	
16+55	1.4376	0.29	
17+ 0	1.4396	0.29	
17+ 5	1.4421	0.36	
17+10	1.4452	0.46	
17+15	1.4485	0.47	
17+20	1.4518	0.48	
17+25	1.4551	0.48	
17+30	1.4584	0.48	
17+35	1.4616	0.48	
17+40	1.4649	0.48	
17+45	1.4682	0.48	
17+50	1.4712	0.44	
17+55	1.4739	0.39	
18+ 0	1.4765	0.38	
18+ 5	1.4791	0.38	
18+10	1.4818	0.38	
18+15	1.4844	0.38	
18+20	1.4870	0.38	
18+25	1.4896	0.38	
18+30	1.4923	0.38	
18+35	1.4946	0.34	
18+40	1.4966	0.29	
18+45	1.4986	0.29	
18+50	1.5003	0.25	
18+55	1.5017	0.20	
19+ 0	1.5030	0.19	

19+ 5	1.5046	0.23	Q	|	|	|	V |
19+10	1.5065	0.28	|Q	|	|	|	V |
19+15	1.5084	0.28	|Q	|	|	|	V |
19+20	1.5107	0.32	|Q	|	|	|	V |
19+25	1.5133	0.37	|Q	|	|	|	V |
19+30	1.5159	0.38	|Q	|	|	|	V |
19+35	1.5182	0.34	|Q	|	|	|	V |
19+40	1.5202	0.29	|Q	|	|	|	V |
19+45	1.5222	0.29	|Q	|	|	|	V |
19+50	1.5239	0.25	Q	|	|	|	V |
19+55	1.5253	0.20	Q	|	|	|	V |
20+ 0	1.5266	0.19	Q	|	|	|	V |
20+ 5	1.5282	0.23	Q	|	|	|	V |
20+10	1.5301	0.28	|Q	|	|	|	V |
20+15	1.5321	0.28	|Q	|	|	|	V |
20+20	1.5340	0.29	|Q	|	|	|	V |
20+25	1.5360	0.29	|Q	|	|	|	V |
20+30	1.5380	0.29	|Q	|	|	|	V |
20+35	1.5399	0.29	|Q	|	|	|	V |
20+40	1.5419	0.29	|Q	|	|	|	V |
20+45	1.5439	0.29	|Q	|	|	|	V |
20+50	1.5456	0.25	Q	|	|	|	V |
20+55	1.5469	0.20	Q	|	|	|	V |
21+ 0	1.5483	0.19	Q	|	|	|	V |
21+ 5	1.5498	0.23	Q	|	|	|	V |
21+10	1.5518	0.28	|Q	|	|	|	V |
21+15	1.5537	0.28	|Q	|	|	|	V |
21+20	1.5554	0.25	Q	|	|	|	V |
21+25	1.5568	0.20	Q	|	|	|	V |
21+30	1.5581	0.19	Q	|	|	|	V |
21+35	1.5597	0.23	Q	|	|	|	V |
21+40	1.5616	0.28	|Q	|	|	|	V |
21+45	1.5636	0.28	|Q	|	|	|	V |
21+50	1.5652	0.25	Q	|	|	|	V |
21+55	1.5666	0.20	Q	|	|	|	V |
22+ 0	1.5679	0.19	Q	|	|	|	V |
22+ 5	1.5695	0.23	Q	|	|	|	V |
22+10	1.5714	0.28	|Q	|	|	|	V |
22+15	1.5734	0.28	|Q	|	|	|	V |
22+20	1.5751	0.25	Q	|	|	|	V |
22+25	1.5765	0.20	Q	|	|	|	V |
22+30	1.5778	0.19	Q	|	|	|	V |
22+35	1.5791	0.19	Q	|	|	|	V |
22+40	1.5804	0.19	Q	|	|	|	V |
22+45	1.5817	0.19	Q	|	|	|	V |
22+50	1.5830	0.19	Q	|	|	|	V |
22+55	1.5843	0.19	Q	|	|	|	V |
23+ 0	1.5856	0.19	Q	|	|	|	V |
23+ 5	1.5870	0.19	Q	|	|	|	V |
23+10	1.5883	0.19	Q	|	|	|	V |
23+15	1.5896	0.19	Q	|	|	|	V |
23+20	1.5909	0.19	Q	|	|	|	V |
23+25	1.5922	0.19	Q	|	|	|	V |
23+30	1.5935	0.19	Q	|	|	|	V |
23+35	1.5948	0.19	Q	|	|	|	V |
23+40	1.5961	0.19	Q	|	|	|	V |
23+45	1.5975	0.19	Q	|	|	|	V |
23+50	1.5988	0.19	Q	|	|	|	V |
23+55	1.6001	0.19	Q	|	|	|	V |
24+ 0	1.6014	0.19	Q	|	|	|	V |
24+ 5	1.6022	0.11	Q	|	|	|	V |
24+10	1.6023	0.02	Q	|	|	|	V |
24+15	1.6023	0.00	Q	|	|	|	V |

ALTERNATIVE NO. 3

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt3d12.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	0.55	3.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	1.20	7.08

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.550(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.550(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	2.443
2	0.167	388.361	50.563	3.006
3	0.250	582.541	7.110	0.423
4	0.333	776.721	1.235	0.073
		Sum = 100.000	Sum=	5.946

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.277	0.071	---	0.21
2	0.17	4.30	0.284	0.071	---	0.21
3	0.25	5.00	0.330	0.071	---	0.26
4	0.33	5.00	0.330	0.071	---	0.26
5	0.42	5.80	0.383	0.071	---	0.31
6	0.50	6.50	0.429	0.071	---	0.36
7	0.58	7.40	0.488	0.071	---	0.42
8	0.67	8.60	0.568	0.071	---	0.50
9	0.75	12.30	0.812	0.071	---	0.74
10	0.83	29.10	1.920	0.071	---	1.85
11	0.92	6.80	0.449	0.071	---	0.38
12	1.00	5.00	0.330	0.071	---	0.26
Sum =		100.0			Sum =	5.7

Flood volume = Effective rainfall 0.48(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.035(Ac.Ft)
Total rainfall = 0.55(In)
Flood volume = 10261.7 Cubic Feet
Total soil loss = 1517.0 Cubic Feet

Peak flow rate of this hydrograph = 6.991(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0035	0.50	V Q
0+10	0.0113	1.14	V Q
0+15	0.0207	1.36	V Q
0+20	0.0312	1.52	VQ
0+25	0.0427	1.67	QV
0+30	0.0560	1.94	Q V
0+35	0.0715	2.25	Q V
0+40	0.0897	2.64	Q V
0+45	0.1139	3.51	Q V
0+50	0.1620	6.99	Q
0+55	0.2091	6.84	Q V
1+ 0	0.2271	2.61	Q V
1+ 5	0.2345	1.08	Q V
1+10	0.2354	0.14	Q V
1+15	0.2356	0.02	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt3d32.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	0.90	5.31

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	2.10	12.39

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 0.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 0.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	2.443
2	0.167	388.361	50.563	3.006
3	0.250	582.541	7.110	0.423
4	0.333	776.721	1.235	0.073
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.140	0.071	---	0.07
2	0.17	1.30	0.140	0.071	---	0.07
3	0.25	1.10	0.119	0.071	---	0.05
4	0.33	1.50	0.162	0.071	---	0.09
5	0.42	1.50	0.162	0.071	---	0.09
6	0.50	1.80	0.194	0.071	---	0.12
7	0.58	1.50	0.162	0.071	---	0.09
8	0.67	1.80	0.194	0.071	---	0.12
9	0.75	1.80	0.194	0.071	---	0.12
10	0.83	1.50	0.162	0.071	---	0.09
11	0.92	1.60	0.173	0.071	---	0.10
12	1.00	1.80	0.194	0.071	---	0.12
13	1.08	2.20	0.238	0.071	---	0.17
14	1.17	2.20	0.238	0.071	---	0.17
15	1.25	2.20	0.238	0.071	---	0.17
16	1.33	2.00	0.216	0.071	---	0.15
17	1.42	2.60	0.281	0.071	---	0.21
18	1.50	2.70	0.292	0.071	---	0.22
19	1.58	2.40	0.259	0.071	---	0.19
20	1.67	2.70	0.292	0.071	---	0.22
21	1.75	3.30	0.356	0.071	---	0.29
22	1.83	3.10	0.335	0.071	---	0.26
23	1.92	2.90	0.313	0.071	---	0.24
24	2.00	3.00	0.324	0.071	---	0.25
25	2.08	3.10	0.335	0.071	---	0.26
26	2.17	4.20	0.454	0.071	---	0.38
27	2.25	5.00	0.540	0.071	---	0.47
28	2.33	3.50	0.378	0.071	---	0.31
29	2.42	6.80	0.734	0.071	---	0.66
30	2.50	7.30	0.788	0.071	---	0.72
31	2.58	8.20	0.886	0.071	---	0.81
32	2.67	5.90	0.637	0.071	---	0.57
33	2.75	2.00	0.216	0.071	---	0.15
34	2.83	1.80	0.194	0.071	---	0.12
35	2.92	1.80	0.194	0.071	---	0.12
36	3.00	0.60	0.065	0.071	0.012	0.05
Sum =		100.0			Sum =	8.3

Flood volume = Effective rainfall 0.69(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.102(Ac.Ft)
Total rainfall = 0.90(In)
Flood volume = 14829.4 Cubic Feet
Total soil loss = 4445.4 Cubic Feet

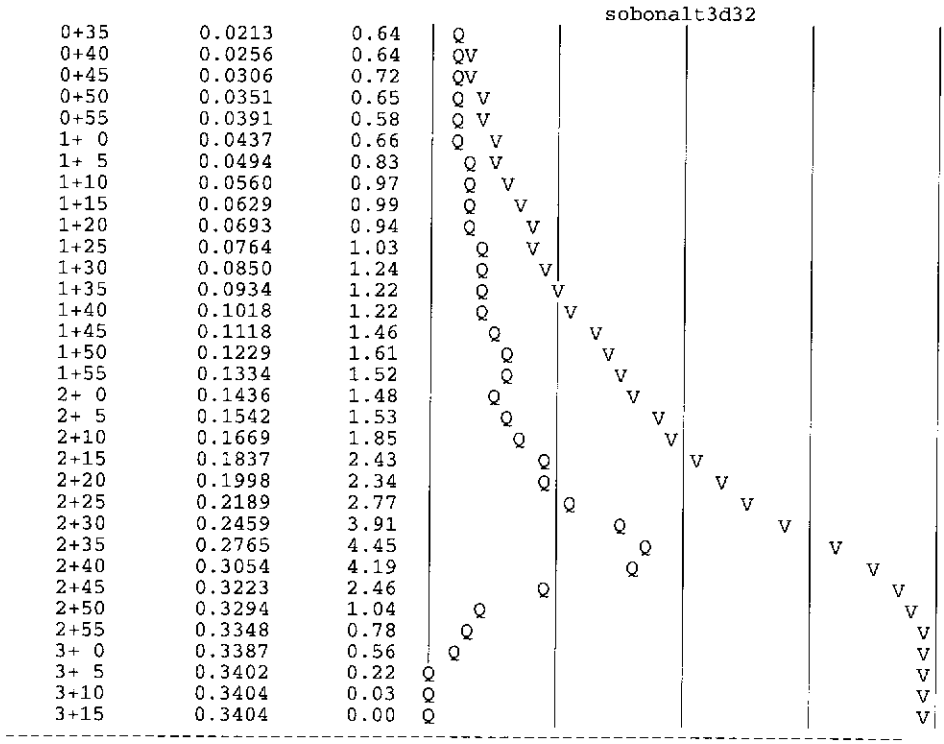
Peak flow rate of this hydrograph = 4.453(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0012	0.17	Q				
0+10	0.0038	0.38	VQ				
0+15	0.0062	0.36	VQ				
0+20	0.0090	0.40	Q				
0+25	0.0126	0.52	VQ				
0+30	0.0169	0.62	VQ				



0+35	0.0213	0.64	
0+40	0.0256	0.64	
0+45	0.0306	0.72	
0+50	0.0351	0.65	
0+55	0.0391	0.58	
1+ 0	0.0437	0.66	
1+ 5	0.0494	0.83	
1+10	0.0560	0.97	
1+15	0.0629	0.99	
1+20	0.0693	0.94	
1+25	0.0764	1.03	
1+30	0.0850	1.24	
1+35	0.0934	1.22	
1+40	0.1018	1.22	
1+45	0.1118	1.46	
1+50	0.1229	1.61	
1+55	0.1334	1.52	
2+ 0	0.1436	1.48	
2+ 5	0.1542	1.53	
2+10	0.1669	1.85	
2+15	0.1837	2.43	
2+20	0.1998	2.34	
2+25	0.2189	2.77	
2+30	0.2459	3.91	
2+35	0.2765	4.45	
2+40	0.3054	4.19	
2+45	0.3223	2.46	
2+50	0.3294	1.04	
2+55	0.3348	0.78	
3+ 0	0.3387	0.56	
3+ 5	0.3402	0.22	
3+10	0.3404	0.03	
3+15	0.3404	0.00	

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt3d62.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	1.40	8.26

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	3.00	17.70

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 1.400(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.400(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt3d62

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	2.443
2	0.167	388.361	50.563	3.006
3	0.250	582.541	7.110	0.423
4	0.333	776.721	1.235	0.073
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.084	0.071	---	0.01
2	0.17	0.60	0.101	0.071	---	0.03
3	0.25	0.60	0.101	0.071	---	0.03
4	0.33	0.60	0.101	0.071	---	0.03
5	0.42	0.60	0.101	0.071	---	0.03
6	0.50	0.70	0.118	0.071	---	0.05
7	0.58	0.70	0.118	0.071	---	0.05
8	0.67	0.70	0.118	0.071	---	0.05
9	0.75	0.70	0.118	0.071	---	0.05
10	0.83	0.70	0.118	0.071	---	0.05
11	0.92	0.70	0.118	0.071	---	0.05
12	1.00	0.80	0.134	0.071	---	0.06
13	1.08	0.80	0.134	0.071	---	0.06
14	1.17	0.80	0.134	0.071	---	0.06
15	1.25	0.80	0.134	0.071	---	0.06
16	1.33	0.80	0.134	0.071	---	0.06
17	1.42	0.80	0.134	0.071	---	0.06
18	1.50	0.80	0.134	0.071	---	0.06
19	1.58	0.80	0.134	0.071	---	0.06
20	1.67	0.80	0.134	0.071	---	0.06
21	1.75	0.80	0.134	0.071	---	0.06
22	1.83	0.80	0.134	0.071	---	0.06
23	1.92	0.80	0.134	0.071	---	0.06
24	2.00	0.90	0.151	0.071	---	0.08
25	2.08	0.80	0.134	0.071	---	0.06
26	2.17	0.90	0.151	0.071	---	0.08
27	2.25	0.90	0.151	0.071	---	0.08
28	2.33	0.90	0.151	0.071	---	0.08
29	2.42	0.90	0.151	0.071	---	0.08
30	2.50	0.90	0.151	0.071	---	0.08
31	2.58	0.90	0.151	0.071	---	0.08
32	2.67	0.90	0.151	0.071	---	0.08
33	2.75	1.00	0.168	0.071	---	0.10
34	2.83	1.00	0.168	0.071	---	0.10
35	2.92	1.00	0.168	0.071	---	0.10
36	3.00	1.00	0.168	0.071	---	0.10
37	3.08	1.00	0.168	0.071	---	0.10
38	3.17	1.10	0.185	0.071	---	0.11
39	3.25	1.10	0.185	0.071	---	0.11
40	3.33	1.10	0.185	0.071	---	0.11
41	3.42	1.20	0.202	0.071	---	0.13
42	3.50	1.30	0.218	0.071	---	0.15
43	3.58	1.40	0.235	0.071	---	0.16
44	3.67	1.40	0.235	0.071	---	0.16
45	3.75	1.50	0.252	0.071	---	0.18
46	3.83	1.50	0.252	0.071	---	0.18
47	3.92	1.60	0.269	0.071	---	0.20
48	4.00	1.60	0.269	0.071	---	0.20
49	4.08	1.70	0.286	0.071	---	0.21
50	4.17	1.80	0.302	0.071	---	0.23
51	4.25	1.90	0.319	0.071	---	0.25
52	4.33	2.00	0.336	0.071	---	0.27
53	4.42	2.10	0.353	0.071	---	0.28
54	4.50	2.10	0.353	0.071	---	0.28
55	4.58	2.20	0.370	0.071	---	0.30
56	4.67	2.30	0.386	0.071	---	0.32
57	4.75	2.40	0.403	0.071	---	0.33
58	4.83	2.40	0.403	0.071	---	0.33
59	4.92	2.50	0.420	0.071	---	0.35
60	5.00	2.60	0.437	0.071	---	0.37
61	5.08	3.10	0.521	0.071	---	0.45
62	5.17	3.60	0.605	0.071	---	0.53

63	5.25	3.90	0.655	0.071	---	0.58
64	5.33	4.20	0.706	0.071	---	0.63
65	5.42	4.70	0.790	0.071	---	0.72
66	5.50	5.60	0.941	0.071	---	0.87
67	5.58	1.90	0.319	0.071	---	0.25
68	5.67	0.90	0.151	0.071	---	0.08
69	5.75	0.60	0.101	0.071	---	0.03
70	5.83	0.50	0.084	0.071	---	0.01
71	5.92	0.30	0.050	0.071	0.009	0.04
72	6.00	0.20	0.034	0.071	0.006	0.03
Sum =		100.0			Sum =	11.8

Flood volume = Effective rainfall 0.99(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 0.41(In)
Total soil loss = 0.204(Ac.Ft)
Total rainfall = 1.40(In)
Flood volume = 21107.0 Cubic Feet
Total soil loss = 8876.2 Cubic Feet

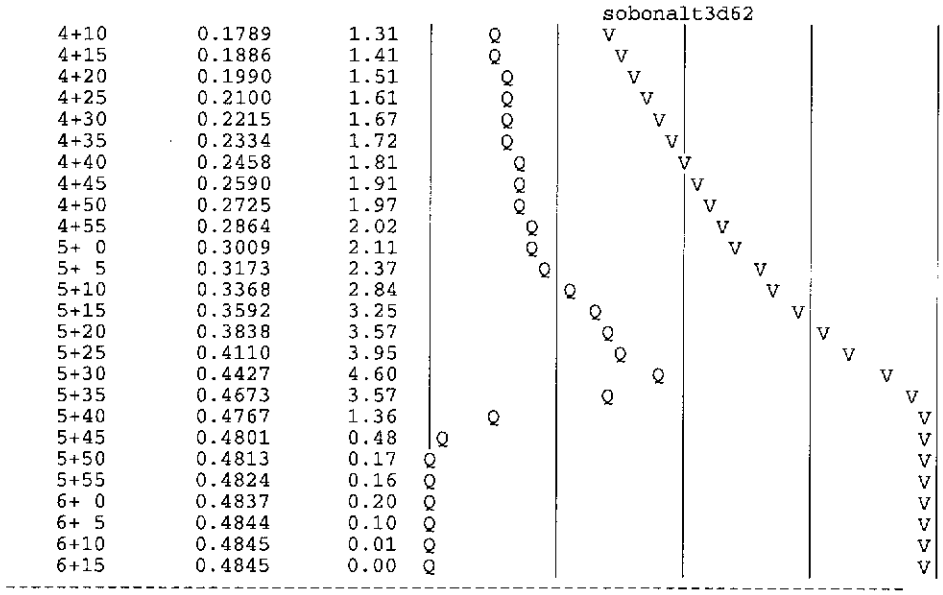
Peak flow rate of this hydrograph = 4.600(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0002	0.03	Q
0+10	0.0010	0.11	Q
0+15	0.0022	0.17	Q
0+20	0.0034	0.18	Q
0+25	0.0046	0.18	Q
0+30	0.0061	0.22	Q
0+35	0.0080	0.27	VQ
0+40	0.0099	0.28	VQ
0+45	0.0118	0.28	VQ
0+50	0.0137	0.28	Q
0+55	0.0156	0.28	Q
1+ 0	0.0178	0.32	Q
1+ 5	0.0204	0.37	Q
1+10	0.0230	0.38	Q
1+15	0.0256	0.38	QV
1+20	0.0282	0.38	QV
1+25	0.0308	0.38	QV
1+30	0.0334	0.38	QV
1+35	0.0360	0.38	QV
1+40	0.0386	0.38	Q V
1+45	0.0412	0.38	Q V
1+50	0.0438	0.38	Q V
1+55	0.0464	0.38	Q V
2+ 0	0.0493	0.42	Q V
2+ 5	0.0523	0.43	Q V
2+10	0.0552	0.43	Q V
2+15	0.0584	0.47	Q V
2+20	0.0617	0.48	Q V
2+25	0.0650	0.48	Q V
2+30	0.0683	0.48	Q V
2+35	0.0716	0.48	Q V
2+40	0.0749	0.48	Q V
2+45	0.0785	0.52	Q V
2+50	0.0824	0.57	Q V
2+55	0.0864	0.58	Q V
3+ 0	0.0903	0.58	Q V
3+ 5	0.0943	0.58	Q V
3+10	0.0986	0.62	Q V
3+15	0.1032	0.67	Q V
3+20	0.1079	0.68	Q V
3+25	0.1128	0.72	Q V
3+30	0.1184	0.81	Q V
3+35	0.1247	0.91	Q V
3+40	0.1313	0.97	Q V
3+45	0.1383	1.02	Q V
3+50	0.1457	1.07	Q V
3+55	0.1534	1.12	Q V
4+ 0	0.1615	1.17	Q V
4+ 5	0.1698	1.22	Q V


sobonalt3d62
4+10 0.1789 1.31
4+15 0.1886 1.41
4+20 0.1990 1.51
4+25 0.2100 1.61
4+30 0.2215 1.67
4+35 0.2334 1.72
4+40 0.2458 1.81
4+45 0.2590 1.91
4+50 0.2725 1.97
4+55 0.2864 2.02
5+ 0 0.3009 2.11
5+ 5 0.3173 2.37
5+10 0.3368 2.84
5+15 0.3592 3.25
5+20 0.3838 3.57
5+25 0.4110 3.95
5+30 0.4427 4.60
5+35 0.4673 3.57
5+40 0.4767 1.36
5+45 0.4801 0.48
5+50 0.4813 0.17
5+55 0.4824 0.16
6+ 0 0.4837 0.20
6+ 5 0.4844 0.10
6+10 0.4845 0.01
6+15 0.4845 0.00

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt3d242.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 5.90(Ac.) = 0.009 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 5.90(Ac.) = 0.009 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	2.25	13.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
5.90	6.00	35.40

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 2.250(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.250(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
5.900	69.00	0.900

Total Area Entered = 5.90(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt3d242

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	2.443
2	0.167	388.361	50.563	3.006
3	0.250	582.541	7.110	0.423
4	0.333	776.721	1.235	0.073
			Sum = 100.000 Sum=	5.946

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.126	0.003	0.01
2	0.17	0.07	0.018	0.125	0.003	0.01
3	0.25	0.07	0.018	0.125	0.003	0.01
4	0.33	0.10	0.027	0.124	0.005	0.02
5	0.42	0.10	0.027	0.124	0.005	0.02
6	0.50	0.10	0.027	0.123	0.005	0.02
7	0.58	0.10	0.027	0.123	0.005	0.02
8	0.67	0.10	0.027	0.122	0.005	0.02
9	0.75	0.10	0.027	0.122	0.005	0.02
10	0.83	0.13	0.036	0.121	0.006	0.03
11	0.92	0.13	0.036	0.121	0.006	0.03
12	1.00	0.13	0.036	0.120	0.006	0.03
13	1.08	0.10	0.027	0.120	0.005	0.02
14	1.17	0.10	0.027	0.119	0.005	0.02
15	1.25	0.10	0.027	0.119	0.005	0.02
16	1.33	0.10	0.027	0.118	0.005	0.02
17	1.42	0.10	0.027	0.118	0.005	0.02
18	1.50	0.10	0.027	0.117	0.005	0.02
19	1.58	0.10	0.027	0.117	0.005	0.02
20	1.67	0.10	0.027	0.117	0.005	0.02
21	1.75	0.10	0.027	0.116	0.005	0.02
22	1.83	0.13	0.036	0.116	0.006	0.03
23	1.92	0.13	0.036	0.115	0.006	0.03
24	2.00	0.13	0.036	0.115	0.006	0.03
25	2.08	0.13	0.036	0.114	0.006	0.03
26	2.17	0.13	0.036	0.114	0.006	0.03
27	2.25	0.13	0.036	0.113	0.006	0.03
28	2.33	0.13	0.036	0.113	0.006	0.03
29	2.42	0.13	0.036	0.112	0.006	0.03
30	2.50	0.13	0.036	0.112	0.006	0.03
31	2.58	0.17	0.045	0.111	0.008	0.04
32	2.67	0.17	0.045	0.111	0.008	0.04
33	2.75	0.17	0.045	0.110	0.008	0.04
34	2.83	0.17	0.045	0.110	0.008	0.04
35	2.92	0.17	0.045	0.110	0.008	0.04
36	3.00	0.17	0.045	0.109	0.008	0.04
37	3.08	0.17	0.045	0.109	0.008	0.04
38	3.17	0.17	0.045	0.108	0.008	0.04
39	3.25	0.17	0.045	0.108	0.008	0.04
40	3.33	0.17	0.045	0.107	0.008	0.04
41	3.42	0.17	0.045	0.107	0.008	0.04
42	3.50	0.17	0.045	0.106	0.008	0.04
43	3.58	0.17	0.045	0.106	0.008	0.04
44	3.67	0.17	0.045	0.106	0.008	0.04
45	3.75	0.17	0.045	0.105	0.008	0.04
46	3.83	0.20	0.054	0.105	0.010	0.04
47	3.92	0.20	0.054	0.104	0.010	0.04
48	4.00	0.20	0.054	0.104	0.010	0.04
49	4.08	0.20	0.054	0.103	0.010	0.04
50	4.17	0.20	0.054	0.103	0.010	0.04
51	4.25	0.20	0.054	0.102	0.010	0.04
52	4.33	0.23	0.063	0.102	0.011	0.05
53	4.42	0.23	0.063	0.102	0.011	0.05
54	4.50	0.23	0.063	0.101	0.011	0.05
55	4.58	0.23	0.063	0.101	0.011	0.05
56	4.67	0.23	0.063	0.100	0.011	0.05
57	4.75	0.23	0.063	0.100	0.011	0.05
58	4.83	0.27	0.072	0.099	0.013	0.06
59	4.92	0.27	0.072	0.099	0.013	0.06
60	5.00	0.27	0.072	0.099	0.013	0.06
61	5.08	0.20	0.054	0.098	0.010	0.04
62	5.17	0.20	0.054	0.098	0.010	0.04

63	5.25	0.20	0.054	0.097	0.010	0.04
64	5.33	0.23	0.063	0.097	0.011	0.05
65	5.42	0.23	0.063	0.096	0.011	0.05
66	5.50	0.23	0.063	0.096	0.011	0.05
67	5.58	0.27	0.072	0.096	0.013	0.06
68	5.67	0.27	0.072	0.095	0.013	0.06
69	5.75	0.27	0.072	0.095	0.013	0.06
70	5.83	0.27	0.072	0.094	0.013	0.06
71	5.92	0.27	0.072	0.094	0.013	0.06
72	6.00	0.27	0.072	0.093	0.013	0.06
73	6.08	0.30	0.081	0.093	0.015	0.07
74	6.17	0.30	0.081	0.093	0.015	0.07
75	6.25	0.30	0.081	0.092	0.015	0.07
76	6.33	0.30	0.081	0.092	0.015	0.07
77	6.42	0.30	0.081	0.091	0.015	0.07
78	6.50	0.30	0.081	0.091	0.015	0.07
79	6.58	0.33	0.090	0.091	0.016	0.07
80	6.67	0.33	0.090	0.090	0.016	0.07
81	6.75	0.33	0.090	0.090	---	0.00
82	6.83	0.33	0.090	0.089	---	0.00
83	6.92	0.33	0.090	0.089	---	0.00
84	7.00	0.33	0.090	0.089	---	0.00
85	7.08	0.33	0.090	0.088	---	0.00
86	7.17	0.33	0.090	0.088	---	0.00
87	7.25	0.33	0.090	0.087	---	0.00
88	7.33	0.37	0.099	0.087	---	0.01
89	7.42	0.37	0.099	0.087	---	0.01
90	7.50	0.37	0.099	0.086	---	0.01
91	7.58	0.40	0.108	0.086	---	0.02
92	7.67	0.40	0.108	0.085	---	0.02
93	7.75	0.40	0.108	0.085	---	0.02
94	7.83	0.43	0.117	0.085	---	0.03
95	7.92	0.43	0.117	0.084	---	0.03
96	8.00	0.43	0.117	0.084	---	0.03
97	8.08	0.50	0.135	0.083	---	0.05
98	8.17	0.50	0.135	0.083	---	0.05
99	8.25	0.50	0.135	0.083	---	0.05
100	8.33	0.50	0.135	0.082	---	0.05
101	8.42	0.50	0.135	0.082	---	0.05
102	8.50	0.50	0.135	0.082	---	0.05
103	8.58	0.53	0.144	0.081	---	0.06
104	8.67	0.53	0.144	0.081	---	0.06
105	8.75	0.53	0.144	0.080	---	0.06
106	8.83	0.57	0.153	0.080	---	0.07
107	8.92	0.57	0.153	0.080	---	0.07
108	9.00	0.57	0.153	0.079	---	0.07
109	9.08	0.63	0.171	0.079	---	0.09
110	9.17	0.63	0.171	0.078	---	0.09
111	9.25	0.63	0.171	0.078	---	0.09
112	9.33	0.67	0.180	0.078	---	0.10
113	9.42	0.67	0.180	0.077	---	0.10
114	9.50	0.67	0.180	0.077	---	0.10
115	9.58	0.70	0.189	0.077	---	0.11
116	9.67	0.70	0.189	0.076	---	0.11
117	9.75	0.70	0.189	0.076	---	0.11
118	9.83	0.73	0.198	0.076	---	0.12
119	9.92	0.73	0.198	0.075	---	0.12
120	10.00	0.73	0.198	0.075	---	0.12
121	10.08	0.50	0.135	0.074	---	0.06
122	10.17	0.50	0.135	0.074	---	0.06
123	10.25	0.50	0.135	0.074	---	0.06
124	10.33	0.50	0.135	0.073	---	0.06
125	10.42	0.50	0.135	0.073	---	0.06
126	10.50	0.50	0.135	0.073	---	0.06
127	10.58	0.67	0.180	0.072	---	0.11
128	10.67	0.67	0.180	0.072	---	0.11
129	10.75	0.67	0.180	0.072	---	0.11
130	10.83	0.67	0.180	0.071	---	0.11
131	10.92	0.67	0.180	0.071	---	0.11
132	11.00	0.67	0.180	0.071	---	0.11
133	11.08	0.63	0.171	0.070	---	0.10
134	11.17	0.63	0.171	0.070	---	0.10
135	11.25	0.63	0.171	0.069	---	0.10
136	11.33	0.63	0.171	0.069	---	0.10
137	11.42	0.63	0.171	0.069	---	0.10
138	11.50	0.63	0.171	0.068	---	0.10
139	11.58	0.57	0.153	0.068	---	0.08
140	11.67	0.57	0.153	0.068	---	0.09
141	11.75	0.57	0.153	0.067	---	0.09

142	11.83	0.60	0.162	0.067	---	0.09
143	11.92	0.60	0.162	0.067	---	0.10
144	12.00	0.60	0.162	0.066	---	0.10
145	12.08	0.83	0.225	0.066	---	0.16
146	12.17	0.83	0.225	0.066	---	0.16
147	12.25	0.83	0.225	0.065	---	0.16
148	12.33	0.87	0.234	0.065	---	0.17
149	12.42	0.87	0.234	0.065	---	0.17
150	12.50	0.87	0.234	0.064	---	0.17
151	12.58	0.93	0.252	0.064	---	0.19
152	12.67	0.93	0.252	0.064	---	0.19
153	12.75	0.93	0.252	0.064	---	0.19
154	12.83	0.97	0.261	0.063	---	0.20
155	12.92	0.97	0.261	0.063	---	0.20
156	13.00	0.97	0.261	0.063	---	0.20
157	13.08	1.13	0.306	0.062	---	0.24
158	13.17	1.13	0.306	0.062	---	0.24
159	13.25	1.13	0.306	0.062	---	0.24
160	13.33	1.13	0.306	0.061	---	0.24
161	13.42	1.13	0.306	0.061	---	0.25
162	13.50	1.13	0.306	0.061	---	0.25
163	13.58	0.77	0.207	0.060	---	0.15
164	13.67	0.77	0.207	0.060	---	0.15
165	13.75	0.77	0.207	0.060	---	0.15
166	13.83	0.77	0.207	0.059	---	0.15
167	13.92	0.77	0.207	0.059	---	0.15
168	14.00	0.77	0.207	0.059	---	0.15
169	14.08	0.90	0.243	0.059	---	0.18
170	14.17	0.90	0.243	0.058	---	0.18
171	14.25	0.90	0.243	0.058	---	0.19
172	14.33	0.87	0.234	0.058	---	0.18
173	14.42	0.87	0.234	0.057	---	0.18
174	14.50	0.87	0.234	0.057	---	0.18
175	14.58	0.87	0.234	0.057	---	0.18
176	14.67	0.87	0.234	0.056	---	0.18
177	14.75	0.87	0.234	0.056	---	0.18
178	14.83	0.83	0.225	0.056	---	0.17
179	14.92	0.83	0.225	0.056	---	0.17
180	15.00	0.83	0.225	0.055	---	0.17
181	15.08	0.80	0.216	0.055	---	0.16
182	15.17	0.80	0.216	0.055	---	0.16
183	15.25	0.80	0.216	0.054	---	0.16
184	15.33	0.77	0.207	0.054	---	0.15
185	15.42	0.77	0.207	0.054	---	0.15
186	15.50	0.77	0.207	0.054	---	0.15
187	15.58	0.63	0.171	0.053	---	0.12
188	15.67	0.63	0.171	0.053	---	0.12
189	15.75	0.63	0.171	0.053	---	0.12
190	15.83	0.63	0.171	0.053	---	0.12
191	15.92	0.63	0.171	0.052	---	0.12
192	16.00	0.63	0.171	0.052	---	0.12
193	16.08	0.13	0.036	0.052	0.006	0.03
194	16.17	0.13	0.036	0.051	0.006	0.03
195	16.25	0.13	0.036	0.051	0.006	0.03
196	16.33	0.13	0.036	0.051	0.006	0.03
197	16.42	0.13	0.036	0.051	0.006	0.03
198	16.50	0.13	0.036	0.050	0.006	0.03
199	16.58	0.10	0.027	0.050	0.005	0.02
200	16.67	0.10	0.027	0.050	0.005	0.02
201	16.75	0.10	0.027	0.050	0.005	0.02
202	16.83	0.10	0.027	0.049	0.005	0.02
203	16.92	0.10	0.027	0.049	0.005	0.02
204	17.00	0.10	0.027	0.049	0.005	0.02
205	17.08	0.17	0.045	0.049	0.008	0.04
206	17.17	0.17	0.045	0.048	0.008	0.04
207	17.25	0.17	0.045	0.048	0.008	0.04
208	17.33	0.17	0.045	0.048	0.008	0.04
209	17.42	0.17	0.045	0.048	0.008	0.04
210	17.50	0.17	0.045	0.047	0.008	0.04
211	17.58	0.17	0.045	0.047	0.008	0.04
212	17.67	0.17	0.045	0.047	0.008	0.04
213	17.75	0.17	0.045	0.047	0.008	0.04
214	17.83	0.13	0.036	0.047	0.006	0.03
215	17.92	0.13	0.036	0.046	0.006	0.03
216	18.00	0.13	0.036	0.046	0.006	0.03
217	18.08	0.13	0.036	0.046	0.006	0.03
218	18.17	0.13	0.036	0.046	0.006	0.03
219	18.25	0.13	0.036	0.045	0.006	0.03
220	18.33	0.13	0.036	0.045	0.006	0.03

221	18.42	0.13	0.036	0.045	0.006	0.03
222	18.50	0.13	0.036	0.045	0.006	0.03
223	18.58	0.10	0.027	0.045	0.005	0.02
224	18.67	0.10	0.027	0.044	0.005	0.02
225	18.75	0.10	0.027	0.044	0.005	0.02
226	18.83	0.07	0.018	0.044	0.003	0.01
227	18.92	0.07	0.018	0.044	0.003	0.01
228	19.00	0.07	0.018	0.043	0.003	0.01
229	19.08	0.10	0.027	0.043	0.005	0.02
230	19.17	0.10	0.027	0.043	0.005	0.02
231	19.25	0.10	0.027	0.043	0.005	0.02
232	19.33	0.13	0.036	0.043	0.006	0.03
233	19.42	0.13	0.036	0.042	0.006	0.03
234	19.50	0.13	0.036	0.042	0.006	0.03
235	19.58	0.10	0.027	0.042	0.005	0.02
236	19.67	0.10	0.027	0.042	0.005	0.02
237	19.75	0.10	0.027	0.042	0.005	0.02
238	19.83	0.07	0.018	0.041	0.003	0.01
239	19.92	0.07	0.018	0.041	0.003	0.01
240	20.00	0.07	0.018	0.041	0.003	0.01
241	20.08	0.10	0.027	0.041	0.005	0.02
242	20.17	0.10	0.027	0.041	0.005	0.02
243	20.25	0.10	0.027	0.041	0.005	0.02
244	20.33	0.10	0.027	0.040	0.005	0.02
245	20.42	0.10	0.027	0.040	0.005	0.02
246	20.50	0.10	0.027	0.040	0.005	0.02
247	20.58	0.10	0.027	0.040	0.005	0.02
248	20.67	0.10	0.027	0.040	0.005	0.02
249	20.75	0.10	0.027	0.040	0.005	0.02
250	20.83	0.07	0.018	0.039	0.003	0.01
251	20.92	0.07	0.018	0.039	0.003	0.01
252	21.00	0.07	0.018	0.039	0.003	0.01
253	21.08	0.10	0.027	0.039	0.005	0.02
254	21.17	0.10	0.027	0.039	0.005	0.02
255	21.25	0.10	0.027	0.039	0.005	0.02
256	21.33	0.07	0.018	0.038	0.003	0.01
257	21.42	0.07	0.018	0.038	0.003	0.01
258	21.50	0.07	0.018	0.038	0.003	0.01
259	21.58	0.10	0.027	0.038	0.005	0.02
260	21.67	0.10	0.027	0.038	0.005	0.02
261	21.75	0.10	0.027	0.038	0.005	0.02
262	21.83	0.07	0.018	0.038	0.003	0.01
263	21.92	0.07	0.018	0.038	0.003	0.01
264	22.00	0.07	0.018	0.037	0.003	0.01
265	22.08	0.10	0.027	0.037	0.005	0.02
266	22.17	0.10	0.027	0.037	0.005	0.02
267	22.25	0.10	0.027	0.037	0.005	0.02
268	22.33	0.07	0.018	0.037	0.003	0.01
269	22.42	0.07	0.018	0.037	0.003	0.01
270	22.50	0.07	0.018	0.037	0.003	0.01
271	22.58	0.07	0.018	0.037	0.003	0.01
272	22.67	0.07	0.018	0.036	0.003	0.01
273	22.75	0.07	0.018	0.036	0.003	0.01
274	22.83	0.07	0.018	0.036	0.003	0.01
275	22.92	0.07	0.018	0.036	0.003	0.01
276	23.00	0.07	0.018	0.036	0.003	0.01
277	23.08	0.07	0.018	0.036	0.003	0.01
278	23.17	0.07	0.018	0.036	0.003	0.01
279	23.25	0.07	0.018	0.036	0.003	0.01
280	23.33	0.07	0.018	0.036	0.003	0.01
281	23.42	0.07	0.018	0.036	0.003	0.01
282	23.50	0.07	0.018	0.036	0.003	0.01
283	23.58	0.07	0.018	0.036	0.003	0.01
284	23.67	0.07	0.018	0.036	0.003	0.01
285	23.75	0.07	0.018	0.036	0.003	0.01
286	23.83	0.07	0.018	0.035	0.003	0.01
287	23.92	0.07	0.018	0.035	0.003	0.01
288	24.00	0.07	0.018	0.035	0.003	0.01
Sum =		100.0			Sum =	18.0

Flood volume = Effective rainfall 1.50(In)
times area 5.9(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)
Total soil loss = 0.75(In)
Total soil loss = 0.368(Ac.Ft)
Total rainfall = 2.25(In)
Flood volume = 32172.1 Cubic Feet
Total soil loss = 16015.6 Cubic Feet

Peak flow rate of this hydrograph = 1.458(CFS)

---

sobonalt3d242

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0002	0.04	Q
0+10	0.0008	0.08	Q
0+15	0.0014	0.09	Q
0+20	0.0021	0.11	Q
0+25	0.0030	0.13	Q
0+30	0.0039	0.13	Q
0+35	0.0048	0.13	Q
0+40	0.0057	0.13	Q
0+45	0.0066	0.13	Q
0+50	0.0077	0.15	Q
0+55	0.0089	0.17	Q
1+ 0	0.0101	0.18	Q
1+ 5	0.0111	0.16	Q
1+10	0.0121	0.14	Q
1+15	0.0130	0.13	Q
1+20	0.0139	0.13	Q
1+25	0.0148	0.13	Q
1+30	0.0157	0.13	Q
1+35	0.0166	0.13	Q
1+40	0.0175	0.13	Q
1+45	0.0184	0.13	Q
1+50	0.0195	0.15	QV
1+55	0.0206	0.17	QV
2+ 0	0.0218	0.18	QV
2+ 5	0.0231	0.18	QV
2+10	0.0243	0.18	QV
2+15	0.0255	0.18	QV
2+20	0.0267	0.18	QV
2+25	0.0279	0.18	QV
2+30	0.0291	0.18	QV
2+35	0.0304	0.19	QV
2+40	0.0319	0.22	QV
2+45	0.0334	0.22	QV
2+50	0.0349	0.22	QV
2+55	0.0365	0.22	QV
3+ 0	0.0380	0.22	Q V
3+ 5	0.0395	0.22	Q V
3+10	0.0410	0.22	Q V
3+15	0.0425	0.22	Q V
3+20	0.0440	0.22	Q V
3+25	0.0455	0.22	Q V
3+30	0.0470	0.22	Q V
3+35	0.0486	0.22	Q V
3+40	0.0501	0.22	Q V
3+45	0.0516	0.22	Q V
3+50	0.0532	0.24	Q V
3+55	0.0550	0.26	QV
4+ 0	0.0568	0.26	Q V
4+ 5	0.0586	0.26	Q V
4+10	0.0604	0.26	Q V
4+15	0.0623	0.26	Q V
4+20	0.0642	0.28	Q V
4+25	0.0663	0.30	Q V
4+30	0.0684	0.31	Q V
4+35	0.0705	0.31	Q V
4+40	0.0726	0.31	Q V
4+45	0.0747	0.31	Q V
4+50	0.0770	0.33	Q V
4+55	0.0794	0.35	Q V
5+ 0	0.0818	0.35	Q V
5+ 5	0.0840	0.32	Q V
5+10	0.0858	0.27	Q V
5+15	0.0877	0.26	Q V
5+20	0.0896	0.28	Q V
5+25	0.0917	0.30	Q V
5+30	0.0938	0.31	Q V
5+35	0.0960	0.33	Q V
5+40	0.0984	0.35	Q V
5+45	0.1008	0.35	Q V
5+50	0.1033	0.35	Q V

5+55	0.1057	0.35	Q V
6+ 0	0.1081	0.35	Q V
6+ 5	0.1106	0.37	Q V
6+10	0.1133	0.39	Q V
6+15	0.1161	0.39	Q V
6+20	0.1188	0.40	Q V
6+25	0.1215	0.40	Q V
6+30	0.1242	0.40	Q V
6+35	0.1271	0.41	Q V
6+40	0.1301	0.44	Q V
6+45	0.1319	0.26	Q V
6+50	0.1321	0.04	Q V
6+55	0.1322	0.01	Q V
7+ 0	0.1322	0.01	Q V
7+ 5	0.1323	0.01	Q V
7+10	0.1324	0.01	Q V
7+15	0.1325	0.01	Q V
7+20	0.1327	0.04	Q V
7+25	0.1332	0.07	Q V
7+30	0.1337	0.07	Q V
7+35	0.1344	0.10	Q V
7+40	0.1353	0.13	Q V
7+45	0.1362	0.13	Q V
7+50	0.1373	0.16	Q V
7+55	0.1386	0.19	Q V
8+ 0	0.1399	0.20	Q V
8+ 5	0.1416	0.24	Q V
8+10	0.1437	0.30	Q V
8+15	0.1458	0.31	Q V
8+20	0.1479	0.31	Q V
8+25	0.1501	0.31	Q V
8+30	0.1523	0.32	Q V
8+35	0.1546	0.34	Q V
8+40	0.1572	0.37	Q V
8+45	0.1598	0.38	Q V
8+50	0.1625	0.40	Q V
8+55	0.1655	0.43	Q V
9+ 0	0.1685	0.44	Q V
9+ 5	0.1718	0.48	Q V
9+10	0.1756	0.54	Q V
9+15	0.1794	0.55	Q V
9+20	0.1833	0.58	Q V
9+25	0.1875	0.60	Q V
9+30	0.1917	0.61	Q V
9+35	0.1961	0.64	Q V
9+40	0.2006	0.66	Q V
9+45	0.2053	0.67	Q V
9+50	0.2100	0.70	Q V
9+55	0.2150	0.72	Q V
10+ 0	0.2201	0.73	Q V
10+ 5	0.2241	0.58	Q V
10+10	0.2268	0.39	Q V
10+15	0.2293	0.37	Q V
10+20	0.2318	0.37	Q V
10+25	0.2343	0.37	Q V
10+30	0.2369	0.37	Q V
10+35	0.2402	0.48	Q V
10+40	0.2445	0.62	Q V
10+45	0.2489	0.64	Q V
10+50	0.2533	0.65	Q V
10+55	0.2578	0.65	Q V
11+ 0	0.2623	0.65	Q V
11+ 5	0.2666	0.63	Q V
11+10	0.2708	0.60	Q V
11+15	0.2749	0.60	Q V
11+20	0.2791	0.60	Q V
11+25	0.2833	0.61	Q V
11+30	0.2874	0.61	Q V
11+35	0.2914	0.57	Q V
11+40	0.2949	0.51	Q V
11+45	0.2984	0.51	Q V
11+50	0.3021	0.53	Q V
11+55	0.3059	0.56	Q V
12+ 0	0.3098	0.57	Q V
12+ 5	0.3148	0.72	Q V
12+10	0.3211	0.91	Q V
12+15	0.3276	0.94	Q V
12+20	0.3343	0.97	Q V
12+25	0.3412	1.00	Q V

sobonalt3d242

12+30	0.3481	1.01	
12+35	0.3554	1.05	
12+40	0.3630	1.11	
12+45	0.3707	1.12	
12+50	0.3786	1.14	
12+55	0.3867	1.17	
13+ 0	0.3948	1.18	
13+ 5	0.4037	1.29	
13+10	0.4135	1.43	
13+15	0.4235	1.45	
13+20	0.4335	1.45	
13+25	0.4435	1.46	
13+30	0.4536	1.46	
13+35	0.4620	1.22	
13+40	0.4683	0.92	
13+45	0.4744	0.88	
13+50	0.4804	0.88	
13+55	0.4865	0.88	
14+ 0	0.4925	0.88	
14+ 5	0.4992	0.97	
14+10	0.5067	1.08	
14+15	0.5142	1.10	
14+20	0.5217	1.08	
14+25	0.5289	1.05	
14+30	0.5362	1.05	
14+35	0.5434	1.05	
14+40	0.5507	1.05	
14+45	0.5580	1.06	
14+50	0.5651	1.04	
14+55	0.5721	1.01	
15+ 0	0.5790	1.01	
15+ 5	0.5858	0.99	
15+10	0.5924	0.96	
15+15	0.5991	0.96	
15+20	0.6055	0.94	
15+25	0.6118	0.91	
15+30	0.6181	0.91	
15+35	0.6238	0.82	
15+40	0.6287	0.72	
15+45	0.6336	0.70	
15+50	0.6384	0.70	
15+55	0.6433	0.71	
16+ 0	0.6481	0.71	
16+ 5	0.6515	0.49	
16+10	0.6530	0.22	
16+15	0.6543	0.18	
16+20	0.6555	0.18	
16+25	0.6567	0.18	
16+30	0.6579	0.18	
16+35	0.6590	0.16	
16+40	0.6599	0.14	
16+45	0.6608	0.13	
16+50	0.6618	0.13	
16+55	0.6627	0.13	
17+ 0	0.6636	0.13	
17+ 5	0.6647	0.17	
17+10	0.6662	0.21	
17+15	0.6677	0.22	
17+20	0.6692	0.22	
17+25	0.6707	0.22	
17+30	0.6722	0.22	
17+35	0.6737	0.22	
17+40	0.6752	0.22	
17+45	0.6768	0.22	
17+50	0.6781	0.20	
17+55	0.6794	0.18	
18+ 0	0.6806	0.18	
18+ 5	0.6818	0.18	
18+10	0.6830	0.18	
18+15	0.6842	0.18	
18+20	0.6854	0.18	
18+25	0.6866	0.18	
18+30	0.6878	0.18	
18+35	0.6889	0.16	
18+40	0.6899	0.14	
18+45	0.6908	0.13	
18+50	0.6916	0.11	
18+55	0.6922	0.09	
19+ 0	0.6928	0.09	

19+ 5	0.6935	0.11	Q	V
19+10	0.6944	0.13	Q	V
19+15	0.6953	0.13	Q	V
19+20	0.6963	0.15	Q	V
19+25	0.6975	0.17	Q	V
19+30	0.6987	0.18	Q	V
19+35	0.6998	0.16	Q	V
19+40	0.7008	0.14	Q	V
19+45	0.7017	0.13	Q	V
19+50	0.7024	0.11	Q	V
19+55	0.7031	0.09	Q	V
20+ 0	0.7037	0.09	Q	V
20+ 5	0.7044	0.11	Q	V
20+10	0.7053	0.13	Q	V
20+15	0.7062	0.13	Q	V
20+20	0.7071	0.13	Q	V
20+25	0.7080	0.13	Q	V
20+30	0.7089	0.13	Q	V
20+35	0.7098	0.13	Q	V
20+40	0.7107	0.13	Q	V
20+45	0.7116	0.13	Q	V
20+50	0.7124	0.11	Q	V
20+55	0.7131	0.09	Q	V
21+ 0	0.7137	0.09	Q	V
21+ 5	0.7144	0.11	Q	V
21+10	0.7153	0.13	Q	V
21+15	0.7162	0.13	Q	V
21+20	0.7170	0.11	Q	V
21+25	0.7176	0.09	Q	V
21+30	0.7182	0.09	Q	V
21+35	0.7189	0.11	Q	V
21+40	0.7198	0.13	Q	V
21+45	0.7207	0.13	Q	V
21+50	0.7215	0.11	Q	V
21+55	0.7221	0.09	Q	V
22+ 0	0.7227	0.09	Q	V
22+ 5	0.7235	0.11	Q	V
22+10	0.7243	0.13	Q	V
22+15	0.7252	0.13	Q	V
22+20	0.7260	0.11	Q	V
22+25	0.7267	0.09	Q	V
22+30	0.7273	0.09	Q	V
22+35	0.7279	0.09	Q	V
22+40	0.7285	0.09	Q	V
22+45	0.7291	0.09	Q	V
22+50	0.7297	0.09	Q	V
22+55	0.7303	0.09	Q	V
23+ 0	0.7309	0.09	Q	V
23+ 5	0.7315	0.09	Q	V
23+10	0.7321	0.09	Q	V
23+15	0.7327	0.09	Q	V
23+20	0.7333	0.09	Q	V
23+25	0.7339	0.09	Q	V
23+30	0.7345	0.09	Q	V
23+35	0.7351	0.09	Q	V
23+40	0.7357	0.09	Q	V
23+45	0.7363	0.09	Q	V
23+50	0.7369	0.09	Q	V
23+55	0.7376	0.09	Q	V
24+ 0	0.7382	0.09	Q	V
24+ 5	0.7385	0.05	Q	V
24+10	0.7386	0.01	Q	V
24+15	0.7386	0.00	Q	V

ALTERNATIVE NO. 4 (PREFERRED ALTERATIVE)

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt4d12.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	0.55	8.97

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	1.20	19.56

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.550(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.550(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.550(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
		Sum = 100.000	Sum=	16.427

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.277	0.071	---	0.21
2	0.17	4.30	0.284	0.071	---	0.21
3	0.25	5.00	0.330	0.071	---	0.26
4	0.33	5.00	0.330	0.071	---	0.26
5	0.42	5.80	0.383	0.071	---	0.31
6	0.50	6.50	0.429	0.071	---	0.36
7	0.58	7.40	0.488	0.071	---	0.42
8	0.67	8.60	0.568	0.071	---	0.50
9	0.75	12.30	0.812	0.071	---	0.74
10	0.83	29.10	1.920	0.071	---	1.85
11	0.92	6.80	0.449	0.071	---	0.38
12	1.00	5.00	0.330	0.071	---	0.26
Sum =		100.0			Sum =	5.7

Flood volume = Effective rainfall 0.48(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)
Total soil loss = 0.07(In)
Total soil loss = 0.096(Ac.Ft)
Total rainfall = 0.55(In)
Flood volume = 28347.1 Cubic Feet
Total soil loss = 4191.1 Cubic Feet

Peak flow rate of this hydrograph = 19.313(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0096	1.39	V Q
0+10	0.0313	3.15	V Q
0+15	0.0572	3.76	V Q
0+20	0.0861	4.19	V Q
0+25	0.1178	4.61	V Q
0+30	0.1548	5.37	VQ
0+35	0.1976	6.21	Q
0+40	0.2479	7.31	QV
0+45	0.3146	9.69	Q
0+50	0.4476	19.31	V Q
0+55	0.5777	18.89	V Q
1+ 0	0.6273	7.20	Q V
1+ 5	0.6478	2.97	Q V
1+10	0.6504	0.38	Q V
1+15	0.6508	0.05	Q V

sobonalt4d242

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt4d242.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	2.25	36.68

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	6.00	97.80

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.250(In)
Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 2.250(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.250(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt4d242

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
			Sum = 100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.126	0.003	0.01
2	0.17	0.07	0.018	0.125	0.003	0.01
3	0.25	0.07	0.018	0.125	0.003	0.01
4	0.33	0.10	0.027	0.124	0.005	0.02
5	0.42	0.10	0.027	0.124	0.005	0.02
6	0.50	0.10	0.027	0.123	0.005	0.02
7	0.58	0.10	0.027	0.123	0.005	0.02
8	0.67	0.10	0.027	0.122	0.005	0.02
9	0.75	0.10	0.027	0.122	0.005	0.02
10	0.83	0.13	0.036	0.121	0.006	0.03
11	0.92	0.13	0.036	0.121	0.006	0.03
12	1.00	0.13	0.036	0.120	0.006	0.03
13	1.08	0.10	0.027	0.120	0.005	0.02
14	1.17	0.10	0.027	0.119	0.005	0.02
15	1.25	0.10	0.027	0.119	0.005	0.02
16	1.33	0.10	0.027	0.118	0.005	0.02
17	1.42	0.10	0.027	0.118	0.005	0.02
18	1.50	0.10	0.027	0.117	0.005	0.02
19	1.58	0.10	0.027	0.117	0.005	0.02
20	1.67	0.10	0.027	0.117	0.005	0.02
21	1.75	0.10	0.027	0.116	0.005	0.02
22	1.83	0.13	0.036	0.116	0.006	0.03
23	1.92	0.13	0.036	0.115	0.006	0.03
24	2.00	0.13	0.036	0.115	0.006	0.03
25	2.08	0.13	0.036	0.114	0.006	0.03
26	2.17	0.13	0.036	0.114	0.006	0.03
27	2.25	0.13	0.036	0.113	0.006	0.03
28	2.33	0.13	0.036	0.113	0.006	0.03
29	2.42	0.13	0.036	0.112	0.006	0.03
30	2.50	0.13	0.036	0.112	0.006	0.03
31	2.58	0.17	0.045	0.111	0.008	0.04
32	2.67	0.17	0.045	0.111	0.008	0.04
33	2.75	0.17	0.045	0.110	0.008	0.04
34	2.83	0.17	0.045	0.110	0.008	0.04
35	2.92	0.17	0.045	0.110	0.008	0.04
36	3.00	0.17	0.045	0.109	0.008	0.04
37	3.08	0.17	0.045	0.109	0.008	0.04
38	3.17	0.17	0.045	0.108	0.008	0.04
39	3.25	0.17	0.045	0.108	0.008	0.04
40	3.33	0.17	0.045	0.107	0.008	0.04
41	3.42	0.17	0.045	0.107	0.008	0.04
42	3.50	0.17	0.045	0.106	0.008	0.04
43	3.58	0.17	0.045	0.106	0.008	0.04
44	3.67	0.17	0.045	0.106	0.008	0.04
45	3.75	0.17	0.045	0.105	0.008	0.04
46	3.83	0.20	0.054	0.105	0.010	0.04
47	3.92	0.20	0.054	0.104	0.010	0.04
48	4.00	0.20	0.054	0.104	0.010	0.04
49	4.08	0.20	0.054	0.103	0.010	0.04
50	4.17	0.20	0.054	0.103	0.010	0.04
51	4.25	0.20	0.054	0.102	0.010	0.04
52	4.33	0.23	0.063	0.102	0.011	0.05
53	4.42	0.23	0.063	0.102	0.011	0.05
54	4.50	0.23	0.063	0.101	0.011	0.05
55	4.58	0.23	0.063	0.101	0.011	0.05
56	4.67	0.23	0.063	0.100	0.011	0.05
57	4.75	0.23	0.063	0.100	0.011	0.05
58	4.83	0.27	0.072	0.099	0.013	0.06
59	4.92	0.27	0.072	0.099	0.013	0.06
60	5.00	0.27	0.072	0.099	0.013	0.06
61	5.08	0.20	0.054	0.098	0.010	0.04
62	5.17	0.20	0.054	0.098	0.010	0.04

63	5.25	0.20	0.054	0.097	0.010	0.04
64	5.33	0.23	0.063	0.097	0.011	0.05
65	5.42	0.23	0.063	0.096	0.011	0.05
66	5.50	0.23	0.063	0.096	0.011	0.05
67	5.58	0.27	0.072	0.096	0.013	0.06
68	5.67	0.27	0.072	0.095	0.013	0.06
69	5.75	0.27	0.072	0.095	0.013	0.06
70	5.83	0.27	0.072	0.094	0.013	0.06
71	5.92	0.27	0.072	0.094	0.013	0.06
72	6.00	0.27	0.072	0.093	0.013	0.06
73	6.08	0.30	0.081	0.093	0.015	0.07
74	6.17	0.30	0.081	0.093	0.015	0.07
75	6.25	0.30	0.081	0.092	0.015	0.07
76	6.33	0.30	0.081	0.092	0.015	0.07
77	6.42	0.30	0.081	0.091	0.015	0.07
78	6.50	0.30	0.081	0.091	0.015	0.07
79	6.58	0.33	0.090	0.091	0.016	0.07
80	6.67	0.33	0.090	0.090	0.016	0.07
81	6.75	0.33	0.090	0.090	---	0.00
82	6.83	0.33	0.090	0.089	---	0.00
83	6.92	0.33	0.090	0.089	---	0.00
84	7.00	0.33	0.090	0.089	---	0.00
85	7.08	0.33	0.090	0.088	---	0.00
86	7.17	0.33	0.090	0.088	---	0.00
87	7.25	0.33	0.090	0.087	---	0.00
88	7.33	0.37	0.099	0.087	---	0.01
89	7.42	0.37	0.099	0.087	---	0.01
90	7.50	0.37	0.099	0.086	---	0.01
91	7.58	0.40	0.108	0.086	---	0.02
92	7.67	0.40	0.108	0.085	---	0.02
93	7.75	0.40	0.108	0.085	---	0.02
94	7.83	0.43	0.117	0.085	---	0.03
95	7.92	0.43	0.117	0.084	---	0.03
96	8.00	0.43	0.117	0.084	---	0.03
97	8.08	0.50	0.135	0.083	---	0.05
98	8.17	0.50	0.135	0.083	---	0.05
99	8.25	0.50	0.135	0.083	---	0.05
100	8.33	0.50	0.135	0.082	---	0.05
101	8.42	0.50	0.135	0.082	---	0.05
102	8.50	0.50	0.135	0.082	---	0.05
103	8.58	0.53	0.144	0.081	---	0.06
104	8.67	0.53	0.144	0.081	---	0.06
105	8.75	0.53	0.144	0.080	---	0.06
106	8.83	0.57	0.153	0.080	---	0.07
107	8.92	0.57	0.153	0.080	---	0.07
108	9.00	0.57	0.153	0.079	---	0.07
109	9.08	0.63	0.171	0.079	---	0.09
110	9.17	0.63	0.171	0.078	---	0.09
111	9.25	0.63	0.171	0.078	---	0.09
112	9.33	0.67	0.180	0.078	---	0.10
113	9.42	0.67	0.180	0.077	---	0.10
114	9.50	0.67	0.180	0.077	---	0.10
115	9.58	0.70	0.189	0.077	---	0.11
116	9.67	0.70	0.189	0.076	---	0.11
117	9.75	0.70	0.189	0.076	---	0.11
118	9.83	0.73	0.198	0.076	---	0.12
119	9.92	0.73	0.198	0.075	---	0.12
120	10.00	0.73	0.198	0.075	---	0.12
121	10.08	0.50	0.135	0.074	---	0.06
122	10.17	0.50	0.135	0.074	---	0.06
123	10.25	0.50	0.135	0.074	---	0.06
124	10.33	0.50	0.135	0.073	---	0.06
125	10.42	0.50	0.135	0.073	---	0.06
126	10.50	0.50	0.135	0.073	---	0.06
127	10.58	0.67	0.180	0.072	---	0.11
128	10.67	0.67	0.180	0.072	---	0.11
129	10.75	0.67	0.180	0.072	---	0.11
130	10.83	0.67	0.180	0.071	---	0.11
131	10.92	0.67	0.180	0.071	---	0.11
132	11.00	0.67	0.180	0.071	---	0.11
133	11.08	0.63	0.171	0.070	---	0.10
134	11.17	0.63	0.171	0.070	---	0.10
135	11.25	0.63	0.171	0.069	---	0.10
136	11.33	0.63	0.171	0.069	---	0.10
137	11.42	0.63	0.171	0.069	---	0.10
138	11.50	0.63	0.171	0.068	---	0.10
139	11.58	0.57	0.153	0.068	---	0.08
140	11.67	0.57	0.153	0.068	---	0.09
141	11.75	0.57	0.153	0.067	---	0.09

142	11.83	0.60	0.162	0.067	---	0.09
143	11.92	0.60	0.162	0.067	---	0.10
144	12.00	0.60	0.162	0.066	---	0.10
145	12.08	0.83	0.225	0.066	---	0.16
146	12.17	0.83	0.225	0.066	---	0.16
147	12.25	0.83	0.225	0.065	---	0.16
148	12.33	0.87	0.234	0.065	---	0.17
149	12.42	0.87	0.234	0.065	---	0.17
150	12.50	0.87	0.234	0.064	---	0.17
151	12.58	0.93	0.252	0.064	---	0.19
152	12.67	0.93	0.252	0.064	---	0.19
153	12.75	0.93	0.252	0.064	---	0.19
154	12.83	0.97	0.261	0.063	---	0.20
155	12.92	0.97	0.261	0.063	---	0.20
156	13.00	0.97	0.261	0.063	---	0.20
157	13.08	1.13	0.306	0.062	---	0.24
158	13.17	1.13	0.306	0.062	---	0.24
159	13.25	1.13	0.306	0.062	---	0.24
160	13.33	1.13	0.306	0.061	---	0.24
161	13.42	1.13	0.306	0.061	---	0.25
162	13.50	1.13	0.306	0.061	---	0.25
163	13.58	0.77	0.207	0.060	---	0.15
164	13.67	0.77	0.207	0.060	---	0.15
165	13.75	0.77	0.207	0.060	---	0.15
166	13.83	0.77	0.207	0.059	---	0.15
167	13.92	0.77	0.207	0.059	---	0.15
168	14.00	0.77	0.207	0.059	---	0.15
169	14.08	0.90	0.243	0.059	---	0.18
170	14.17	0.90	0.243	0.058	---	0.18
171	14.25	0.90	0.243	0.058	---	0.19
172	14.33	0.87	0.234	0.058	---	0.18
173	14.42	0.87	0.234	0.057	---	0.18
174	14.50	0.87	0.234	0.057	---	0.18
175	14.58	0.87	0.234	0.057	---	0.18
176	14.67	0.87	0.234	0.056	---	0.18
177	14.75	0.87	0.234	0.056	---	0.18
178	14.83	0.83	0.225	0.056	---	0.17
179	14.92	0.83	0.225	0.056	---	0.17
180	15.00	0.83	0.225	0.055	---	0.17
181	15.08	0.80	0.216	0.055	---	0.16
182	15.17	0.80	0.216	0.055	---	0.16
183	15.25	0.80	0.216	0.054	---	0.16
184	15.33	0.77	0.207	0.054	---	0.15
185	15.42	0.77	0.207	0.054	---	0.15
186	15.50	0.77	0.207	0.054	---	0.15
187	15.58	0.63	0.171	0.053	---	0.12
188	15.67	0.63	0.171	0.053	---	0.12
189	15.75	0.63	0.171	0.053	---	0.12
190	15.83	0.63	0.171	0.053	---	0.12
191	15.92	0.63	0.171	0.052	---	0.12
192	16.00	0.63	0.171	0.052	---	0.12
193	16.08	0.13	0.036	0.052	0.006	0.03
194	16.17	0.13	0.036	0.051	0.006	0.03
195	16.25	0.13	0.036	0.051	0.006	0.03
196	16.33	0.13	0.036	0.051	0.006	0.03
197	16.42	0.13	0.036	0.051	0.006	0.03
198	16.50	0.13	0.036	0.050	0.006	0.03
199	16.58	0.10	0.027	0.050	0.005	0.02
200	16.67	0.10	0.027	0.050	0.005	0.02
201	16.75	0.10	0.027	0.050	0.005	0.02
202	16.83	0.10	0.027	0.049	0.005	0.02
203	16.92	0.10	0.027	0.049	0.005	0.02
204	17.00	0.10	0.027	0.049	0.005	0.02
205	17.08	0.17	0.045	0.049	0.008	0.04
206	17.17	0.17	0.045	0.048	0.008	0.04
207	17.25	0.17	0.045	0.048	0.008	0.04
208	17.33	0.17	0.045	0.048	0.008	0.04
209	17.42	0.17	0.045	0.048	0.008	0.04
210	17.50	0.17	0.045	0.047	0.008	0.04
211	17.58	0.17	0.045	0.047	0.008	0.04
212	17.67	0.17	0.045	0.047	0.008	0.04
213	17.75	0.17	0.045	0.047	0.008	0.04
214	17.83	0.13	0.036	0.047	0.006	0.03
215	17.92	0.13	0.036	0.046	0.006	0.03
216	18.00	0.13	0.036	0.046	0.006	0.03
217	18.08	0.13	0.036	0.046	0.006	0.03
218	18.17	0.13	0.036	0.046	0.006	0.03
219	18.25	0.13	0.036	0.045	0.006	0.03
220	18.33	0.13	0.036	0.045	0.006	0.03

221	18.42	0.13	0.036	0.045	0.006	0.03
222	18.50	0.13	0.036	0.045	0.006	0.03
223	18.58	0.10	0.027	0.045	0.005	0.02
224	18.67	0.10	0.027	0.044	0.005	0.02
225	18.75	0.10	0.027	0.044	0.005	0.02
226	18.83	0.07	0.018	0.044	0.003	0.01
227	18.92	0.07	0.018	0.044	0.003	0.01
228	19.00	0.07	0.018	0.043	0.003	0.01
229	19.08	0.10	0.027	0.043	0.005	0.02
230	19.17	0.10	0.027	0.043	0.005	0.02
231	19.25	0.10	0.027	0.043	0.005	0.02
232	19.33	0.13	0.036	0.043	0.006	0.03
233	19.42	0.13	0.036	0.042	0.006	0.03
234	19.50	0.13	0.036	0.042	0.006	0.03
235	19.58	0.10	0.027	0.042	0.005	0.02
236	19.67	0.10	0.027	0.042	0.005	0.02
237	19.75	0.10	0.027	0.042	0.005	0.02
238	19.83	0.07	0.018	0.041	0.003	0.01
239	19.92	0.07	0.018	0.041	0.003	0.01
240	20.00	0.07	0.018	0.041	0.003	0.01
241	20.08	0.10	0.027	0.041	0.005	0.02
242	20.17	0.10	0.027	0.041	0.005	0.02
243	20.25	0.10	0.027	0.041	0.005	0.02
244	20.33	0.10	0.027	0.040	0.005	0.02
245	20.42	0.10	0.027	0.040	0.005	0.02
246	20.50	0.10	0.027	0.040	0.005	0.02
247	20.58	0.10	0.027	0.040	0.005	0.02
248	20.67	0.10	0.027	0.040	0.005	0.02
249	20.75	0.10	0.027	0.040	0.005	0.02
250	20.83	0.07	0.018	0.039	0.003	0.01
251	20.92	0.07	0.018	0.039	0.003	0.01
252	21.00	0.07	0.018	0.039	0.003	0.01
253	21.08	0.10	0.027	0.039	0.005	0.02
254	21.17	0.10	0.027	0.039	0.005	0.02
255	21.25	0.10	0.027	0.039	0.005	0.02
256	21.33	0.07	0.018	0.038	0.003	0.01
257	21.42	0.07	0.018	0.038	0.003	0.01
258	21.50	0.07	0.018	0.038	0.003	0.01
259	21.58	0.10	0.027	0.038	0.005	0.02
260	21.67	0.10	0.027	0.038	0.005	0.02
261	21.75	0.10	0.027	0.038	0.005	0.02
262	21.83	0.07	0.018	0.038	0.003	0.01
263	21.92	0.07	0.018	0.038	0.003	0.01
264	22.00	0.07	0.018	0.037	0.003	0.01
265	22.08	0.10	0.027	0.037	0.005	0.02
266	22.17	0.10	0.027	0.037	0.005	0.02
267	22.25	0.10	0.027	0.037	0.005	0.02
268	22.33	0.07	0.018	0.037	0.003	0.01
269	22.42	0.07	0.018	0.037	0.003	0.01
270	22.50	0.07	0.018	0.037	0.003	0.01
271	22.58	0.07	0.018	0.037	0.003	0.01
272	22.67	0.07	0.018	0.036	0.003	0.01
273	22.75	0.07	0.018	0.036	0.003	0.01
274	22.83	0.07	0.018	0.036	0.003	0.01
275	22.92	0.07	0.018	0.036	0.003	0.01
276	23.00	0.07	0.018	0.036	0.003	0.01
277	23.08	0.07	0.018	0.036	0.003	0.01
278	23.17	0.07	0.018	0.036	0.003	0.01
279	23.25	0.07	0.018	0.036	0.003	0.01
280	23.33	0.07	0.018	0.036	0.003	0.01
281	23.42	0.07	0.018	0.036	0.003	0.01
282	23.50	0.07	0.018	0.036	0.003	0.01
283	23.58	0.07	0.018	0.036	0.003	0.01
284	23.67	0.07	0.018	0.036	0.003	0.01
285	23.75	0.07	0.018	0.036	0.003	0.01
286	23.83	0.07	0.018	0.035	0.003	0.01
287	23.92	0.07	0.018	0.035	0.003	0.01
288	24.00	0.07	0.018	0.035	0.003	0.01
Sum =		100.0			Sum =	18.0

Flood volume = Effective rainfall 1.50(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 2.0(Ac.Ft)
Total soil loss = 0.75(In)
Total soil loss = 1.016(Ac.Ft)
Total rainfall = 2.25(In)
Flood volume = 88879.6 Cubic Feet
Total soil loss = 44246.4 Cubic Feet

Peak flow rate of this hydrograph = 4.029(CFS)

---

sobonalt4d242

++

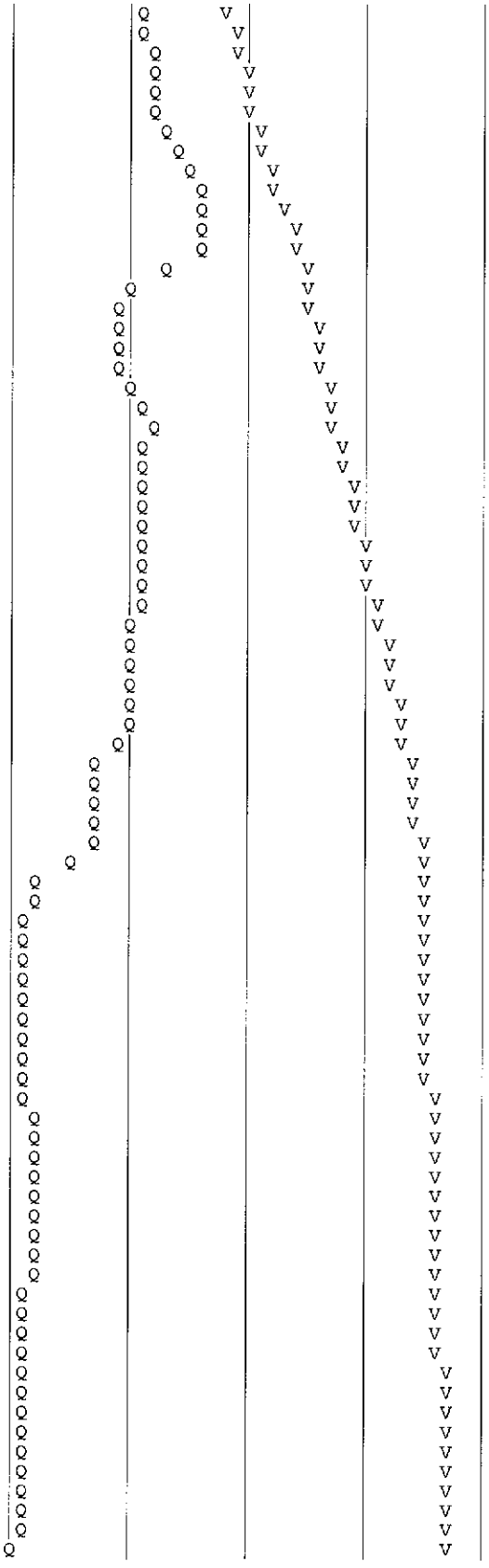
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0007	0.10	Q				
0+10	0.0022	0.22	Q				
0+15	0.0039	0.24	Q				
0+20	0.0059	0.29	VQ				
0+25	0.0083	0.35	VQ				
0+30	0.0108	0.36	VQ				
0+35	0.0133	0.36	VQ				
0+40	0.0158	0.36	VQ				
0+45	0.0183	0.36	VQ				
0+50	0.0212	0.41	VQ				
0+55	0.0245	0.48	VQ				
1+ 0	0.0278	0.48	VQ				
1+ 5	0.0308	0.44	VQ				
1+10	0.0334	0.37	VQ				
1+15	0.0359	0.37	VQ				
1+20	0.0384	0.36	VQ				
1+25	0.0409	0.36	VQ				
1+30	0.0434	0.36	VQ				
1+35	0.0459	0.36	VQ				
1+40	0.0484	0.36	VQ				
1+45	0.0509	0.36	VQ				
1+50	0.0538	0.41	Q				
1+55	0.0570	0.48	Q				
2+ 0	0.0604	0.48	Q				
2+ 5	0.0637	0.49	Q				
2+10	0.0670	0.49	Q				
2+15	0.0704	0.49	Q				
2+20	0.0737	0.49	Q				
2+25	0.0771	0.49	Q				
2+30	0.0804	0.49	Q				
2+35	0.0841	0.54	VQ				
2+40	0.0882	0.60	VQ				
2+45	0.0924	0.60	VQ				
2+50	0.0965	0.61	VQ				
2+55	0.1007	0.61	VQ				
3+ 0	0.1049	0.61	Q				
3+ 5	0.1091	0.61	Q				
3+10	0.1133	0.61	Q				
3+15	0.1174	0.61	Q				
3+20	0.1216	0.61	Q				
3+25	0.1258	0.61	Q				
3+30	0.1300	0.61	Q				
3+35	0.1341	0.61	Q				
3+40	0.1383	0.61	Q				
3+45	0.1425	0.61	Q				
3+50	0.1470	0.66	Q				
3+55	0.1520	0.72	Q				
4+ 0	0.1570	0.73	QV				
4+ 5	0.1620	0.73	QV				
4+10	0.1670	0.73	QV				
4+15	0.1720	0.73	QV				
4+20	0.1773	0.78	Q				
4+25	0.1831	0.84	Q				
4+30	0.1890	0.85	Q				
4+35	0.1948	0.85	Q				
4+40	0.2007	0.85	Q				
4+45	0.2065	0.85	QV				
4+50	0.2127	0.90	QV				
4+55	0.2193	0.96	QV				
5+ 0	0.2260	0.97	QV				
5+ 5	0.2320	0.87	QV				
5+10	0.2371	0.75	Q V				
5+15	0.2422	0.73	Q V				
5+20	0.2475	0.78	QV				
5+25	0.2533	0.84	QV				
5+30	0.2591	0.85	Q V				
5+35	0.2653	0.90	Q V				
5+40	0.2719	0.96	Q V				
5+45	0.2786	0.97	Q V				
5+50	0.2853	0.97	Q V				

5+55	0.2920	0.97	
6+ 0	0.2987	0.97	
6+ 5	0.3057	1.02	
6+10	0.3131	1.08	
6+15	0.3206	1.09	
6+20	0.3282	1.09	
6+25	0.3357	1.09	
6+30	0.3432	1.09	
6+35	0.3511	1.14	
6+40	0.3593	1.20	
6+45	0.3643	0.71	
6+50	0.3650	0.11	
6+55	0.3652	0.03	
7+ 0	0.3653	0.02	
7+ 5	0.3655	0.03	
7+10	0.3657	0.03	
7+15	0.3660	0.04	
7+20	0.3667	0.11	
7+25	0.3680	0.19	
7+30	0.3694	0.20	
7+35	0.3713	0.27	
7+40	0.3737	0.35	
7+45	0.3763	0.37	
7+50	0.3793	0.44	
7+55	0.3829	0.52	
8+ 0	0.3866	0.54	
8+ 5	0.3912	0.67	
8+10	0.3969	0.82	
8+15	0.4028	0.85	
8+20	0.4087	0.86	
8+25	0.4147	0.87	
8+30	0.4207	0.87	
8+35	0.4272	0.94	
8+40	0.4342	1.02	
8+45	0.4414	1.04	
8+50	0.4490	1.11	
8+55	0.4572	1.19	
9+ 0	0.4655	1.21	
9+ 5	0.4747	1.34	
9+10	0.4850	1.49	
9+15	0.4955	1.52	
9+20	0.5064	1.59	
9+25	0.5179	1.67	
9+30	0.5295	1.69	
9+35	0.5416	1.76	
9+40	0.5543	1.84	
9+45	0.5670	1.85	
9+50	0.5803	1.92	
9+55	0.5941	2.00	
10+ 0	0.6080	2.02	
10+ 5	0.6190	1.60	
10+10	0.6265	1.08	
10+15	0.6335	1.02	
10+20	0.6404	1.01	
10+25	0.6474	1.01	
10+30	0.6544	1.02	
10+35	0.6636	1.33	
10+40	0.6754	1.71	
10+45	0.6876	1.77	
10+50	0.6998	1.78	
10+55	0.7122	1.79	
11+ 0	0.7245	1.80	
11+ 5	0.7365	1.74	
11+10	0.7480	1.67	
11+15	0.7595	1.67	
11+20	0.7710	1.67	
11+25	0.7825	1.68	
11+30	0.7941	1.68	
11+35	0.8049	1.57	
11+40	0.8147	1.42	
11+45	0.8244	1.41	
11+50	0.8345	1.47	
11+55	0.8451	1.55	
12+ 0	0.8559	1.56	
12+ 5	0.8697	2.00	
12+10	0.8871	2.53	
12+15	0.9050	2.61	
12+20	0.9235	2.68	
12+25	0.9425	2.76	

sobonalt4d242

12+30	0.9617	2.78	
12+35	0.9817	2.91	
12+40	1.0028	3.06	
12+45	1.0241	3.09	
12+50	1.0459	3.16	
12+55	1.0682	3.24	
13+ 0	1.0906	3.26	
13+ 5	1.1152	3.57	
13+10	1.1424	3.95	
13+15	1.1700	4.00	
13+20	1.1976	4.02	
13+25	1.2253	4.02	
13+30	1.2531	4.03	
13+35	1.2763	3.37	
13+40	1.2938	2.55	
13+45	1.3106	2.44	
13+50	1.3273	2.42	
13+55	1.3440	2.43	
14+ 0	1.3607	2.43	
14+ 5	1.3792	2.68	
14+10	1.3997	2.98	
14+15	1.4206	3.03	
14+20	1.4411	2.98	
14+25	1.4612	2.91	
14+30	1.4812	2.91	
14+35	1.5013	2.91	
14+40	1.5213	2.91	
14+45	1.5414	2.92	
14+50	1.5611	2.86	
14+55	1.5804	2.79	
15+ 0	1.5996	2.79	
15+ 5	1.6184	2.73	
15+10	1.6367	2.66	
15+15	1.6550	2.65	
15+20	1.6728	2.60	
15+25	1.6902	2.53	
15+30	1.7076	2.52	
15+35	1.7233	2.28	
15+40	1.7369	1.98	
15+45	1.7503	1.95	
15+50	1.7637	1.94	
15+55	1.7771	1.95	
16+ 0	1.7906	1.95	
16+ 5	1.7999	1.35	
16+10	1.8041	0.61	
16+15	1.8076	0.50	
16+20	1.8109	0.49	
16+25	1.8142	0.49	
16+30	1.8176	0.49	
16+35	1.8206	0.44	
16+40	1.8231	0.37	
16+45	1.8257	0.37	
16+50	1.8282	0.36	
16+55	1.8307	0.36	
17+ 0	1.8332	0.36	
17+ 5	1.8364	0.46	
17+10	1.8404	0.59	
17+15	1.8446	0.60	
17+20	1.8487	0.61	
17+25	1.8529	0.61	
17+30	1.8571	0.61	
17+35	1.8613	0.61	
17+40	1.8655	0.61	
17+45	1.8696	0.61	
17+50	1.8735	0.56	
17+55	1.8769	0.50	
18+ 0	1.8802	0.49	
18+ 5	1.8836	0.49	
18+10	1.8869	0.49	
18+15	1.8903	0.49	
18+20	1.8936	0.49	
18+25	1.8969	0.49	
18+30	1.9003	0.49	
18+35	1.9033	0.44	
18+40	1.9058	0.37	
18+45	1.9084	0.37	
18+50	1.9105	0.31	
18+55	1.9123	0.25	
19+ 0	1.9139	0.24	

19+ 5	1.9160	0.29	Q				V
19+10	1.9184	0.35	Q				V
19+15	1.9209	0.36	Q				V
19+20	1.9237	0.41	Q				V
19+25	1.9270	0.48	Q				V
19+30	1.9303	0.48	Q				V
19+35	1.9333	0.44	Q				V
19+40	1.9359	0.37	Q				V
19+45	1.9384	0.37	Q				V
19+50	1.9406	0.31	Q				V
19+55	1.9423	0.25	Q				V
20+ 0	1.9440	0.24	Q				V
20+ 5	1.9460	0.29	Q				V
20+10	1.9485	0.35	Q				V
20+15	1.9510	0.36	Q				V
20+20	1.9535	0.36	Q				V
20+25	1.9560	0.36	Q				V
20+30	1.9585	0.36	Q				V
20+35	1.9610	0.36	Q				V
20+40	1.9635	0.36	Q				V
20+45	1.9660	0.36	Q				V
20+50	1.9682	0.31	Q				V
20+55	1.9699	0.25	Q				V
21+ 0	1.9716	0.24	Q				V
21+ 5	1.9736	0.29	Q				V
21+10	1.9760	0.35	Q				V
21+15	1.9785	0.36	Q				V
21+20	1.9807	0.31	Q				V
21+25	1.9824	0.25	Q				V
21+30	1.9841	0.24	Q				V
21+35	1.9861	0.29	Q				V
21+40	1.9886	0.35	Q				V
21+45	1.9911	0.36	Q				V
21+50	1.9932	0.31	Q				V
21+55	1.9950	0.25	Q				V
22+ 0	1.9966	0.24	Q				V
22+ 5	1.9987	0.29	Q				V
22+10	2.0011	0.35	Q				V
22+15	2.0036	0.36	Q				V
22+20	2.0058	0.31	Q				V
22+25	2.0075	0.25	Q				V
22+30	2.0092	0.24	Q				V
22+35	2.0108	0.24	Q				V
22+40	2.0125	0.24	Q				V
22+45	2.0142	0.24	Q				V
22+50	2.0159	0.24	Q				V
22+55	2.0175	0.24	Q				V
23+ 0	2.0192	0.24	Q				V
23+ 5	2.0209	0.24	Q				V
23+10	2.0225	0.24	Q				V
23+15	2.0242	0.24	Q				V
23+20	2.0259	0.24	Q				V
23+25	2.0276	0.24	Q				V
23+30	2.0292	0.24	Q				V
23+35	2.0309	0.24	Q				V
23+40	2.0326	0.24	Q				V
23+45	2.0342	0.24	Q				V
23+50	2.0359	0.24	Q				V
23+55	2.0376	0.24	Q				V
24+ 0	2.0393	0.24	Q				V
24+ 5	2.0402	0.14	Q				V
24+10	2.0404	0.02	Q				V
24+15	2.0404	0.00	Q				V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt4d32.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	0.90	14.67

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	2.10	34.23

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.900(In)
Area Averaged 100-Year Rainfall = 2.100(In)

Point rain (area averaged) = 0.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 0.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	194.180	41.092	6.750
2	0.167	388.361	50.563	8.306
3	0.250	582.541	7.110	1.168
4	0.333	776.721	1.235	0.203
			Sum = 100.000 Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.140	0.071	---	0.07
2	0.17	1.30	0.140	0.071	---	0.07
3	0.25	1.10	0.119	0.071	---	0.05
4	0.33	1.50	0.162	0.071	---	0.09
5	0.42	1.50	0.162	0.071	---	0.09
6	0.50	1.80	0.194	0.071	---	0.12
7	0.58	1.50	0.162	0.071	---	0.09
8	0.67	1.80	0.194	0.071	---	0.12
9	0.75	1.80	0.194	0.071	---	0.12
10	0.83	1.50	0.162	0.071	---	0.09
11	0.92	1.60	0.173	0.071	---	0.10
12	1.00	1.80	0.194	0.071	---	0.12
13	1.08	2.20	0.238	0.071	---	0.17
14	1.17	2.20	0.238	0.071	---	0.17
15	1.25	2.20	0.238	0.071	---	0.17
16	1.33	2.00	0.216	0.071	---	0.15
17	1.42	2.60	0.281	0.071	---	0.21
18	1.50	2.70	0.292	0.071	---	0.22
19	1.58	2.40	0.259	0.071	---	0.19
20	1.67	2.70	0.292	0.071	---	0.22
21	1.75	3.30	0.356	0.071	---	0.29
22	1.83	3.10	0.335	0.071	---	0.26
23	1.92	2.90	0.313	0.071	---	0.24
24	2.00	3.00	0.324	0.071	---	0.25
25	2.08	3.10	0.335	0.071	---	0.26
26	2.17	4.20	0.454	0.071	---	0.38
27	2.25	5.00	0.540	0.071	---	0.47
28	2.33	3.50	0.378	0.071	---	0.31
29	2.42	6.80	0.734	0.071	---	0.66
30	2.50	7.30	0.788	0.071	---	0.72
31	2.58	8.20	0.886	0.071	---	0.81
32	2.67	5.90	0.637	0.071	---	0.57
33	2.75	2.00	0.216	0.071	---	0.15
34	2.83	1.80	0.194	0.071	---	0.12
35	2.92	1.80	0.194	0.071	---	0.12
36	3.00	0.60	0.065	0.071	0.012	0.05
Sum =		100.0			Sum =	8.3

Flood volume = Effective rainfall 0.69(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.282(Ac.Ft)
Total rainfall = 0.90(In)
Flood volume = 40966.9 Cubic Feet
Total soil loss = 12281.4 Cubic Feet

Peak flow rate of this hydrograph = 12.303(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0032	0.47	Q
0+10	0.0105	1.05	V Q
0+15	0.0172	0.98	VQ
0+20	0.0249	1.11	VQ
0+25	0.0348	1.44	VQ
0+30	0.0466	1.71	V Q

sobonalt4d32

0+35	0.0587	1.77	VQ
0+40	0.0708	1.75	Q
0+45	0.0846	1.99	Q
0+50	0.0970	1.81	QV
0+55	0.1081	1.62	QV
1+ 0	0.1206	1.81	Q V
1+ 5	0.1364	2.29	QV
1+10	0.1548	2.68	QV
1+15	0.1736	2.73	Q V
1+20	0.1915	2.59	Q V
1+25	0.2112	2.85	Q V
1+30	0.2348	3.44	Q V
1+35	0.2581	3.38	Q V
1+40	0.2812	3.36	Q V
1+45	0.3090	4.03	Q V
1+50	0.3396	4.45	Q V
1+55	0.3686	4.21	Q V
2+ 0	0.3968	4.09	Q V
2+ 5	0.4259	4.22	Q V
2+10	0.4612	5.12	Q V
2+15	0.5074	6.71	Q V
2+20	0.5520	6.47	Q V
2+25	0.6047	7.66	Q V
2+30	0.6792	10.81	Q V
2+35	0.7639	12.30	Q V
2+40	0.8436	11.57	Q V
2+45	0.8903	6.78	Q V
2+50	0.9101	2.87	Q V
2+55	0.9248	2.15	Q V
3+ 0	0.9356	1.56	Q V
3+ 5	0.9398	0.61	Q V
3+10	0.9404	0.09	Q V
3+15	0.9405	0.01	Q V

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version 6.1
Study date 04/09/08 File: sobonalt4d62.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Engineering Resources of Southern California, Inc. - S/N 685

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 16.30(Ac.) = 0.025 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 16.30(Ac.) = 0.025 Sq. Mi.
Length along longest watercourse = 1200.00(Ft.)
Length along longest watercourse measured to centroid = 700.00(Ft.)
Length along longest watercourse = 0.227 Mi.
Length along longest watercourse measured to centroid = 0.133 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 66.0000 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.043 Hr.
Lag time = 2.57 Min.
25% of lag time = 0.64 Min.
40% of lag time = 1.03 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	1.40	22.82

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
16.30	3.00	48.90

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.400(In)
Area Averaged 100-Year Rainfall = 3.000(In)

Point rain (area averaged) = 1.400(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.400(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
16.300	69.00	0.900

Total Area Entered = 16.30(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	69.0	0.373	0.900	0.071	1.000	0.071
					Sum (F) =	0.071

Area averaged mean soil loss (F) (In/Hr) = 0.071
Minimum soil loss rate ((In/Hr)) = 0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h

sobonalt4d62

FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.083	194.180	41.092		6.750
2	0.167	388.361	50.563		8.306
3	0.250	582.541	7.110		1.168
4	0.333	776.721	1.235		0.203
			Sum = 100.000	Sum=	16.427

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.084	0.071	---	0.01
2	0.17	0.60	0.101	0.071	---	0.03
3	0.25	0.60	0.101	0.071	---	0.03
4	0.33	0.60	0.101	0.071	---	0.03
5	0.42	0.60	0.101	0.071	---	0.03
6	0.50	0.70	0.118	0.071	---	0.05
7	0.58	0.70	0.118	0.071	---	0.05
8	0.67	0.70	0.118	0.071	---	0.05
9	0.75	0.70	0.118	0.071	---	0.05
10	0.83	0.70	0.118	0.071	---	0.05
11	0.92	0.70	0.118	0.071	---	0.05
12	1.00	0.80	0.134	0.071	---	0.06
13	1.08	0.80	0.134	0.071	---	0.06
14	1.17	0.80	0.134	0.071	---	0.06
15	1.25	0.80	0.134	0.071	---	0.06
16	1.33	0.80	0.134	0.071	---	0.06
17	1.42	0.80	0.134	0.071	---	0.06
18	1.50	0.80	0.134	0.071	---	0.06
19	1.58	0.80	0.134	0.071	---	0.06
20	1.67	0.80	0.134	0.071	---	0.06
21	1.75	0.80	0.134	0.071	---	0.06
22	1.83	0.80	0.134	0.071	---	0.06
23	1.92	0.80	0.134	0.071	---	0.06
24	2.00	0.90	0.151	0.071	---	0.08
25	2.08	0.80	0.134	0.071	---	0.06
26	2.17	0.90	0.151	0.071	---	0.08
27	2.25	0.90	0.151	0.071	---	0.08
28	2.33	0.90	0.151	0.071	---	0.08
29	2.42	0.90	0.151	0.071	---	0.08
30	2.50	0.90	0.151	0.071	---	0.08
31	2.58	0.90	0.151	0.071	---	0.08
32	2.67	0.90	0.151	0.071	---	0.08
33	2.75	1.00	0.168	0.071	---	0.10
34	2.83	1.00	0.168	0.071	---	0.10
35	2.92	1.00	0.168	0.071	---	0.10
36	3.00	1.00	0.168	0.071	---	0.10
37	3.08	1.00	0.168	0.071	---	0.10
38	3.17	1.10	0.185	0.071	---	0.11
39	3.25	1.10	0.185	0.071	---	0.11
40	3.33	1.10	0.185	0.071	---	0.11
41	3.42	1.20	0.202	0.071	---	0.13
42	3.50	1.30	0.218	0.071	---	0.15
43	3.58	1.40	0.235	0.071	---	0.16
44	3.67	1.40	0.235	0.071	---	0.16
45	3.75	1.50	0.252	0.071	---	0.18
46	3.83	1.50	0.252	0.071	---	0.18
47	3.92	1.60	0.269	0.071	---	0.20
48	4.00	1.60	0.269	0.071	---	0.20
49	4.08	1.70	0.286	0.071	---	0.21
50	4.17	1.80	0.302	0.071	---	0.23
51	4.25	1.90	0.319	0.071	---	0.25
52	4.33	2.00	0.336	0.071	---	0.27
53	4.42	2.10	0.353	0.071	---	0.28
54	4.50	2.10	0.353	0.071	---	0.28
55	4.58	2.20	0.370	0.071	---	0.30
56	4.67	2.30	0.386	0.071	---	0.32
57	4.75	2.40	0.403	0.071	---	0.33
58	4.83	2.40	0.403	0.071	---	0.33
59	4.92	2.50	0.420	0.071	---	0.35
60	5.00	2.60	0.437	0.071	---	0.37
61	5.08	3.10	0.521	0.071	---	0.45
62	5.17	3.60	0.605	0.071	---	0.53

63	5.25	3.90	0.655	0.071	---	0.58
64	5.33	4.20	0.706	0.071	---	0.63
65	5.42	4.70	0.790	0.071	---	0.72
66	5.50	5.60	0.941	0.071	---	0.87
67	5.58	1.90	0.319	0.071	---	0.25
68	5.67	0.90	0.151	0.071	---	0.08
69	5.75	0.60	0.101	0.071	---	0.03
70	5.83	0.50	0.084	0.071	---	0.01
71	5.92	0.30	0.050	0.071	0.009	0.04
72	6.00	0.20	0.034	0.071	0.006	0.03
Sum =		100.0			Sum =	11.8

Flood volume = Effective rainfall 0.99(In)
times area 16.3(Ac.)/[(In)/(Ft.)] = 1.3(Ac.Ft)
Total soil loss = 0.41(In)
Total soil loss = 0.563(Ac.Ft)
Total rainfall = 1.40(In)
Flood volume = 58309.6 Cubic Feet
Total soil loss = 24522.4 Cubic Feet

Peak flow rate of this hydrograph = 12.709(CFS)

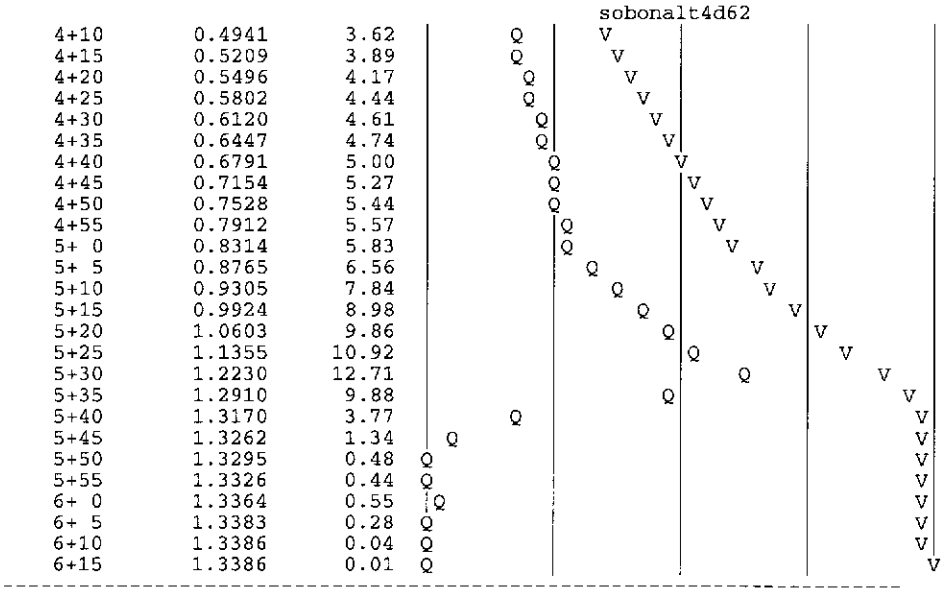
++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0006	0.09	Q
0+10	0.0028	0.31	Q
0+15	0.0060	0.47	Q
0+20	0.0093	0.49	Q
0+25	0.0127	0.49	Q
0+30	0.0169	0.61	VQ
0+35	0.0220	0.75	VQ
0+40	0.0273	0.77	VQ
0+45	0.0326	0.77	VQ
0+50	0.0379	0.77	Q
0+55	0.0432	0.77	Q
1+ 0	0.0493	0.88	Q
1+ 5	0.0563	1.02	VQ
1+10	0.0635	1.04	VQ
1+15	0.0707	1.04	Q
1+20	0.0779	1.04	Q
1+25	0.0851	1.04	Q
1+30	0.0923	1.04	Q
1+35	0.0994	1.04	Q
1+40	0.1066	1.04	QV
1+45	0.1138	1.04	QV
1+50	0.1210	1.04	QV
1+55	0.1282	1.04	QV
2+ 0	0.1362	1.16	Q V
2+ 5	0.1444	1.18	Q V
2+10	0.1525	1.18	Q V
2+15	0.1614	1.30	Q V
2+20	0.1705	1.32	Q V
2+25	0.1796	1.32	Q V
2+30	0.1887	1.32	Q V
2+35	0.1978	1.32	Q V
2+40	0.2069	1.32	Q V
2+45	0.2168	1.43	Q V
2+50	0.2276	1.57	Q V
2+55	0.2386	1.59	Q V
3+ 0	0.2496	1.60	Q V
3+ 5	0.2606	1.60	Q V
3+10	0.2724	1.71	Q V
3+15	0.2851	1.85	Q V
3+20	0.2980	1.87	Q V
3+25	0.3116	1.99	Q V
3+30	0.3271	2.24	Q V
3+35	0.3444	2.51	Q V
3+40	0.3628	2.67	Q V
3+45	0.3822	2.81	Q V
3+50	0.4025	2.95	Q V
3+55	0.4238	3.09	Q V
4+ 0	0.4460	3.23	Q V
4+ 5	0.4692	3.36	Q V

sobonalt4d62



4+10	0.4941	3.62	
4+15	0.5209	3.89	
4+20	0.5496	4.17	
4+25	0.5802	4.44	
4+30	0.6120	4.61	
4+35	0.6447	4.74	
4+40	0.6791	5.00	
4+45	0.7154	5.27	
4+50	0.7528	5.44	
4+55	0.7912	5.57	
5+ 0	0.8314	5.83	
5+ 5	0.8765	6.56	
5+10	0.9305	7.84	
5+15	0.9924	8.98	
5+20	1.0603	9.86	
5+25	1.1355	10.92	
5+30	1.2230	12.71	
5+35	1.2910	9.88	
5+40	1.3170	3.77	
5+45	1.3262	1.34	
5+50	1.3295	0.48	
5+55	1.3326	0.44	
6+ 0	1.3364	0.55	
6+ 5	1.3383	0.28	
6+10	1.3386	0.04	
6+15	1.3386	0.01	

HYDRAULIC CALCULATIONS

EXISTING DRAINAGE FACILITIES

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE 4-10-08
JOB NO
BY RA
CK'D
SHEET OF

Hydraulic Capacity for the existing 63"W x43"H Arch Pipe For Juaro Canyon Creek at Soboba Rd.

Assume $\frac{HW}{D} = \frac{6.6'}{3.58'} = 1.84$

Per Fig. 36 Bureau of Public Roads, Jan. 1963

$Q_{CAP.} = 140$ CFS

$Q_{100} = 770$ CFS

Design culvert crossing for $Q = 770 - 140 = 630$ CFS

$\frac{HW}{D} = \frac{6'}{4'} = 1.25$

$\frac{Q}{L} = 30$ CFS/LF

$\frac{630 \text{ CFS}}{30 \text{ CFS/LF}} = 21.0'$

Construct additional 3-7'x4' RCB For Juaro Canyon Creek crossing Soboba Road.

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE
JOB NO
BY
CK'D
SHEET OF

Hydraulic Capacity For the existing 24" HDPE Culvert Crossing Soboba Rd. South of Lake Park Dr. Discharging into Wet Pond.

$$\frac{HW}{D} = \frac{3.0}{2.0} = 1.5$$

Per Fig. 33, Bureau of Public Roads, Jan. 1963

$$Q_{cap.} = 20 \text{ CFS}$$

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE 4-10-08
JOB NO
BY NA
CK'D
SHEET OF

Hydraulic Capacity For The existing 3-48" Diameter Culverts Crossing Sobobo Rd. Just north of Lake Park Drive

3-48" CMP

$$\frac{HW}{D} = \frac{5}{4} = 1.25$$

Per Fig. 33, Bureau of Public Roads, Jan. 1963

$$Q_{CAP./48"\,PIPE} = 90 \text{ CFS}$$

$$3 \times 90 \text{ CFS} = 270 \text{ CFS}$$

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE
JOB NO
BY
CK'D
SHEET OF

Hydraulic Capacity for the existing 10'x7' RCB Crossing Sobroba Rd., North of Lake Park Dr.

1 - 10'W x 7'H RCB

$$\frac{HW}{D} = \frac{8.5}{7} = 1.2$$

Per Fig. 37, Bureau of Public Roads, Jan. 1963

$$\frac{Q_{CAP}}{LF} = 70 \text{ CFS}$$

$$70 \text{ CFS} \times 10' = 700 \text{ CFS}$$

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE 4-10-08
JOB NO
BY NA
CK'D
SHEET OF

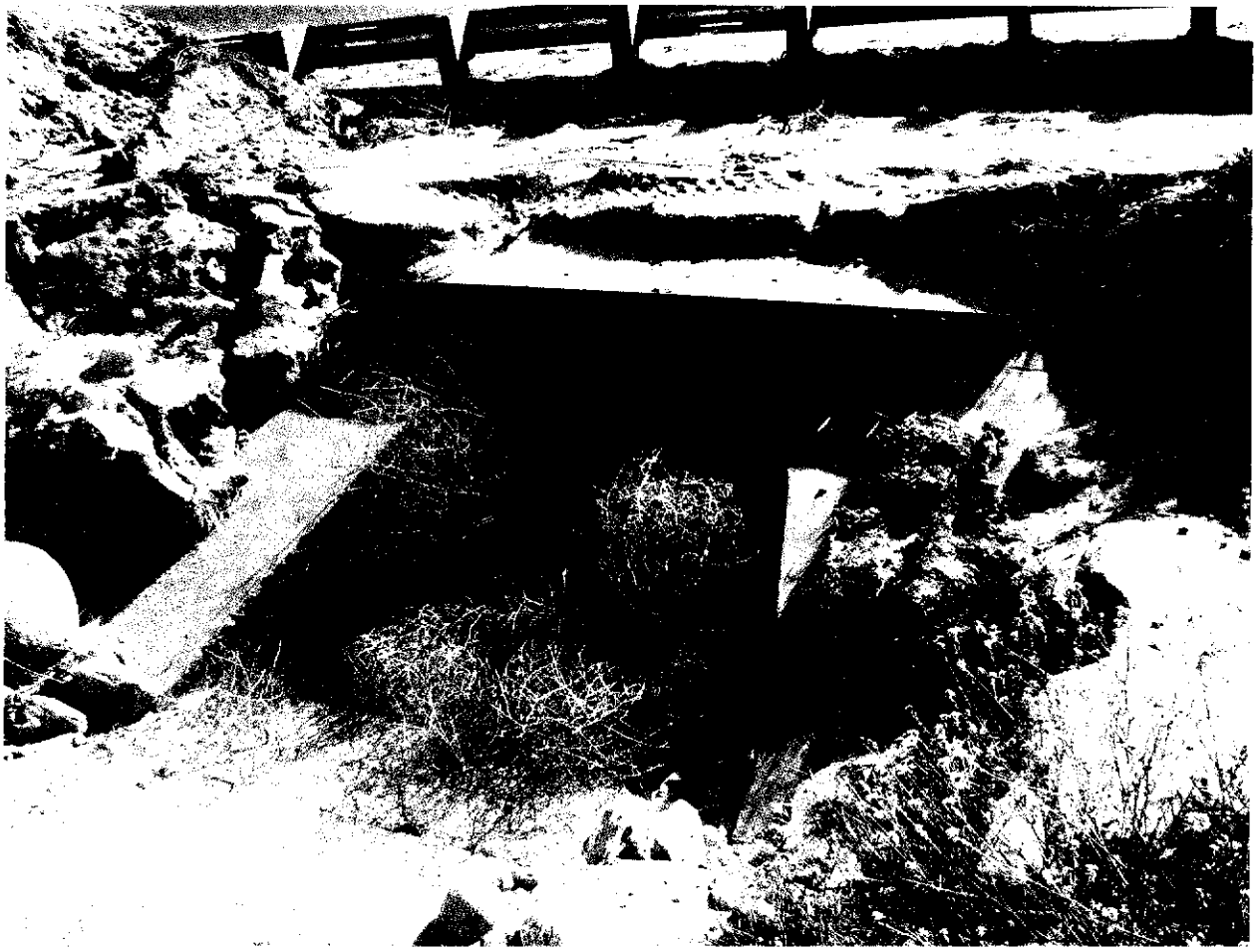
Hydraulic Capacity for Existing 84" RCP Across Soboba Golf Course Country Club.

1 - 84" RCP

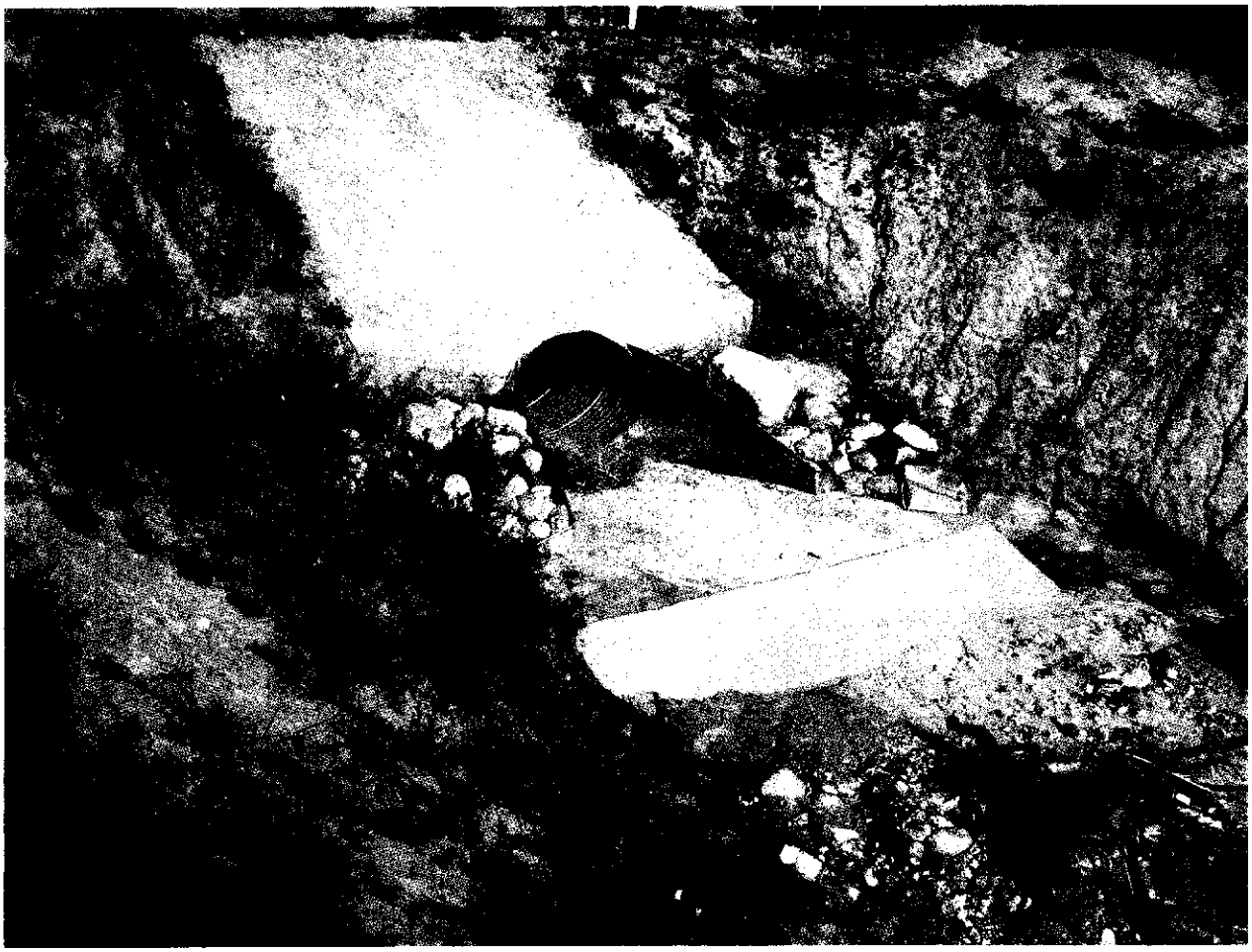
$\frac{HW}{D} = \frac{9'}{7'} = 1.3 \pm$

Per Fig 33, Bureau of Public Roads, Jan. 1963

$Q_{CAP} = 400$ CFS



1 - 63" x 43" Arch Pipe
(W X H)
at Juaro Canyon Creek and Soboba Road (upstream side)



1 - 63"W X 43"H (Arch Pipe)
For Juaro Canyon Creek at Soboba Road (downstream side)

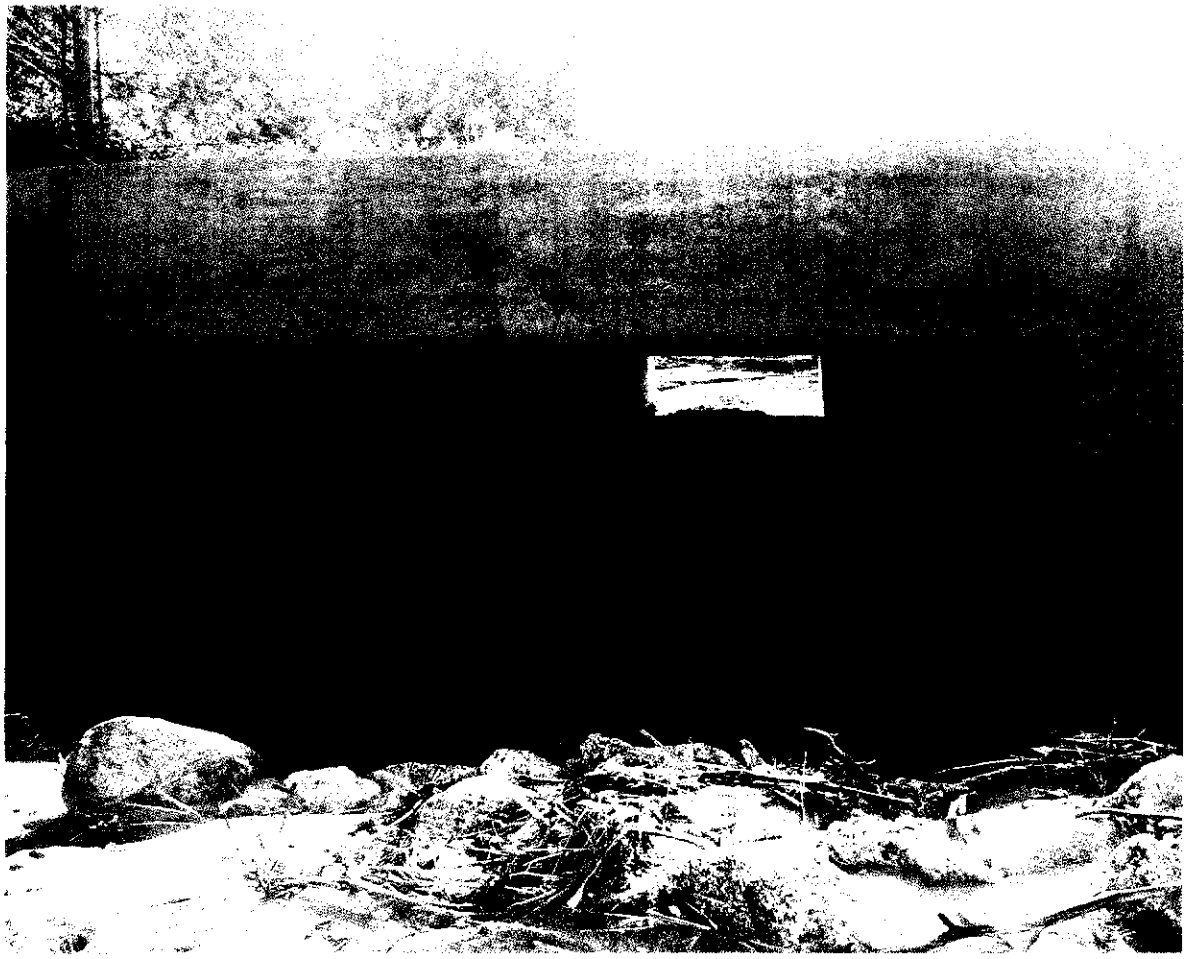
1 - 24" HDPE
Crossing Soboba Road south of Lake Park Drive
Discharging into wet pond

Wet Pond

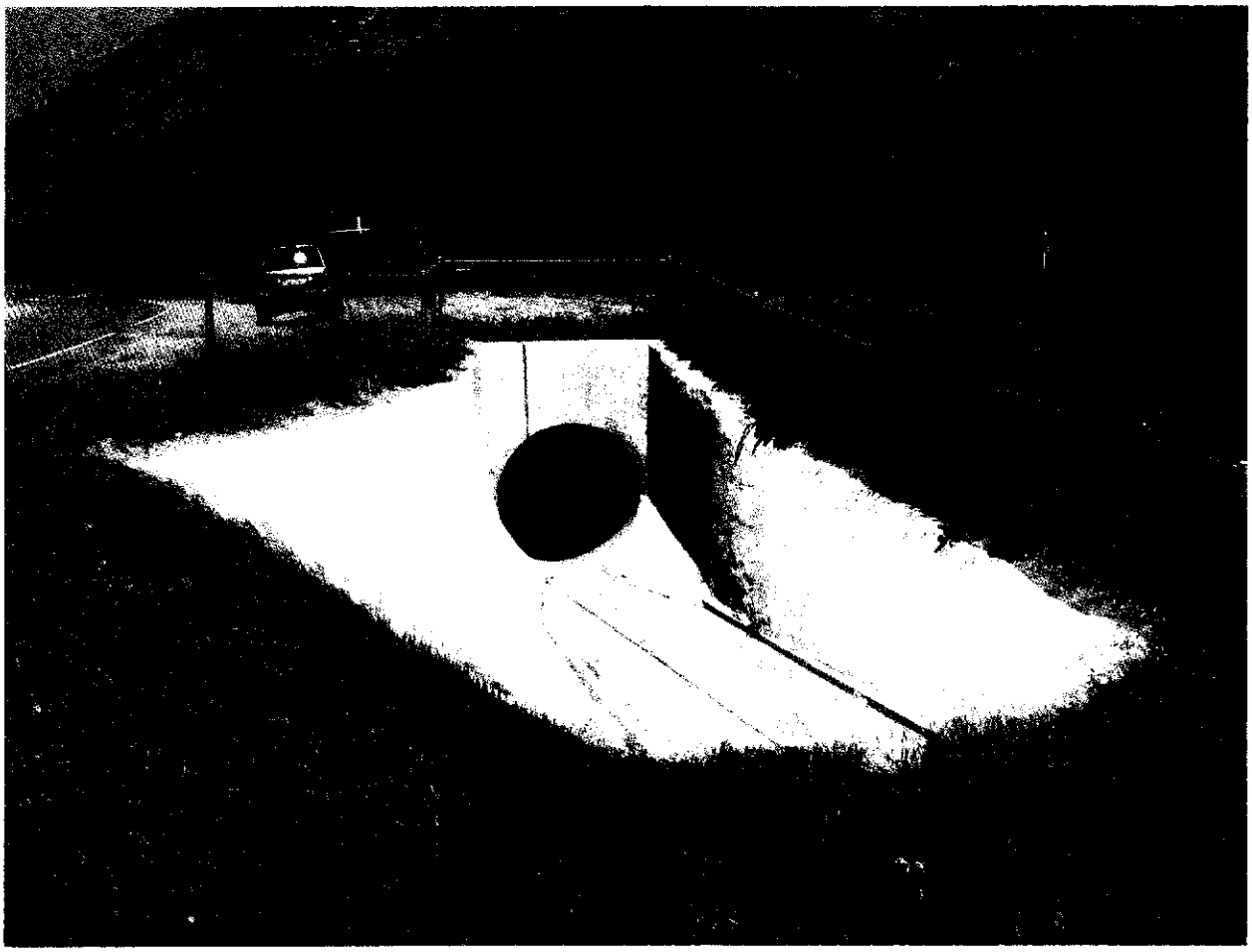
3 - 48-inch CMP

SOBOBA ROAD LAKE PARK DRIVE

3 - 48-inch CMP



1 - 10'W x 7'H RCB



1 - 34-inch RCP

1 - 84-inch RCP West of Soboba Road

Concrete Trap Channel and 1 - 84-inch RCP
along west side of Soboba Road by Soboba Golf Course County Club

PROPOSED DRAINAGE FACILITIES

IE ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE 4-10-08
JOB NO
BY AA
CK'D
SHEET OF

Area A-2

Proposed Culvert Crossing For offsite Area A-2

$Q_{100} = 34$ CFS

$\frac{HW}{D} = \frac{3.75}{2.5} = 1.5$

$Q_{Cap.\ 30"RCP} = 35$ CFS

USE 1-30" RCP TO Convey offsite Flows From Area A-2

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE 4-10-08
JOB NO
BY LA
CK'D
SHEET OF

Area A-4

$Q_{100} = 169$ CFS

Assume $\frac{HW}{D} = 1.5$

$Q_{Cap.}$ = 57 CFS
36" Culvert

Use 3-36" Culverts

3 x 57 CFS = 171 CFS > 169 CFS ✓

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE 4-10-08
JOB NO
BY RA
CK'D
SHEET OF

Proposed Concrete Lined Channel along The West side of Soboba Rd

Q_{100} ($A_2 + A_3 + A_4$) = 279 CFS

Construct a Concrete lined trap. Channel to convey the above Flows along The West side of Soboba Rd. toward Lake Park Dr.

Q_{100} = 279 CFS

W = 10' D = 3' Z = 1.5 S = 0.007

Q_{cap} = 589 CFS > 279 CFS ✓ O.K

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE 4-10-08
JOB NO
BY
CK'D
SHEET OF

Area A-5

Q_{100} = 361 CFS

$Q_{cap.}$ for existing 3-48" CMP = 270 CFS

$Q_{cap./48"CMP}$ = 90 CFS

Construct an additional 48" CMP across Soboba Rd. North of Lake Park Dr

Q_{cap} = 90 cfs + 270 cfs = 360 cfs OK ✓

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE 4-10-08
JOB NO
BY
CK'D
SHEET OF

Area A-6 & A-7
Toward existing 10'x7' RCB

$Q_{100} = 69 + 797 = 866$ CFS

$Q_{Cap.-Ex.10'Wx7'RCB} = 700$ CFS

Provide an additional capacity for:

$866 - 700 = 166$ CFS

Construct 1-48" RCP.

$\frac{HW}{D} = \frac{8.5}{4} = 2.13$

$Q_{Cap.-48"} = 166$ CFS ✓

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE 4-10-08
JOB NO
BY
CK'D
SHEET OF

Area A-8
Tributary to Exist. 84" RCP.

$Q_{100} = 306$ CFS

$Q_{Cap.\ 1-84"\ RCP} = 400$ CFS > 306 CFS ✓ OK

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

DATE 4-10-08
JOB NO
BY
CK'D
SHEET OF

Proposed Culvert Crossing For Lake Park Drive:

$Q_{100}(A_2+A_3+A_4)$ + Q_{100} (onsite - existing) =

OFFSITE FLOWS = (34 + 76 + 169) = 279

ONSITE FLOWS ↓

$Q_{100} = 279 + 44.3 = 323.3$ ALT. NO. 1 = 44.3 CFS

$Q_{100} = 279 + 35.5 = 314.5$ ALT. NO. 2 = 35.5 CFS

$Q_{100} = 279 + 16.4 = 295.4$ ALT. NO. 3 = 16.4 CFS

$Q_{100} = 279 + 45.2 = 324.2$ ALT. NO. 4 = 45.2 CFS (Pref. ALT.)

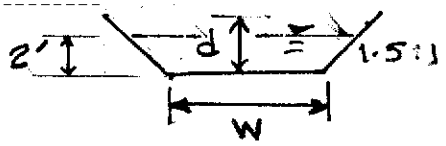
Construct 3-60" RCP

$\frac{HW}{D} = \frac{5.5'}{5'} = 1.1$

Q = 140 CFS

3 x 140 CFS = 420 CFS > 324 CFS ✓ O.K

```
**************************************************************************
              HYDRAULIC ELEMENTS - I  PROGRAM PACKAGE
      (C) Copyright 1982-2003 Advanced Engineering Software (aes)
          Ver. 9.0  Release Date: 01/01/2003  License ID 1241

                        Analysis prepared by:

              ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA
                      3550 E. FLORIDA AVE. SUITE B
                           HEMET, CA, 92544
                           (909)765-6622

--------------------------------------------------------------------------
  TIME/DATE OF STUDY: 15:45 04/11/2008
==========================================================================
 Problem Descriptions: concrete lined open channel to convey
 flows along the west side of Soboba Road
 & the south side of Lake Park Drive.
**************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
--------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =     1.50
            Z2(HORIZONTAL/VERTICAL) =     1.50
    BASEWIDTH(FEET) =     10.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.007000
    UNIFORM FLOW(CFS) =      280.00
    MANNINGS FRICTION FACTOR = 0.0150
==========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
--------------------------------------------------------------------------
    >>>>> NORMAL DEPTH(FEET) =    1.99
    FLOW TOP-WIDTH(FEET) =         15.96
    FLOW AREA(SQUARE FEET) =           25.77
    HYDRAULIC DEPTH(FEET) =      1.61
    FLOW AVERAGE VELOCITY(FEET/SEC.) =     10.87
    UNIFORM FROUDE NUMBER =     1.507
    PRESSURE + MOMENTUM(POUNDS) =          7370.10
    AVERAGED VELOCITY HEAD(FEET) =       1.833
    SPECIFIC ENERGY(FEET) =       3.819
==========================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
--------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =         17.61
    CRITICAL FLOW AREA(SQUARE FEET) =           35.00
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      1.99
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =      8.00
    CRITICAL DEPTH(FEET) =      2.54
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =          6855.44
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =       0.994
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =       3.529
==========================================================================

 Problem Descriptions:


**************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
--------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =    3.00
    CHANNEL Z1(HORIZONTAL/VERTICAL) =     1.50
            Z2(HORIZONTAL/VERTICAL) =     1.50
    BASEWIDTH(FEET) =     10.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.007000
    MANNINGS FRICTION FACTOR = 0.0150
==========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
--------------------------------------------------------------------------
    >>>>> NORMAL DEPTH FLOW(CFS) =     589.32
    FLOW TOP-WIDTH(FEET) =         19.00
    FLOW AREA(SQUARE FEET) =           43.50
    HYDRAULIC DEPTH(FEET) =      2.29
    FLOW AVERAGE VELOCITY(FEET/SEC.) =     13.55
    UNIFORM FROUDE NUMBER =     1.578
    PRESSURE + MOMENTUM(POUNDS) =          19122.33
    AVERAGED VELOCITY HEAD(FEET) =       2.850
    SPECIFIC ENERGY(FEET) =       5.850
```

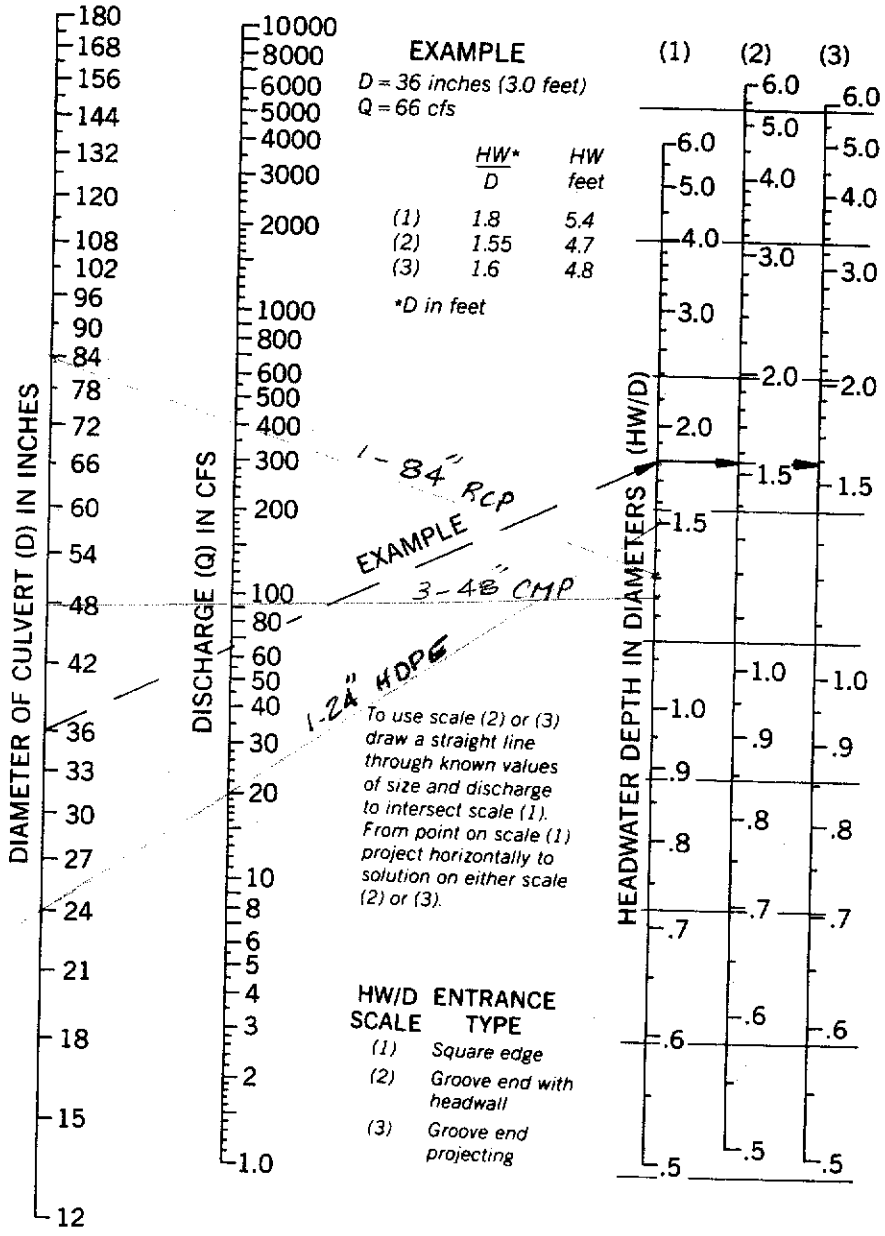


W = 10'
d = 3'

```
===============================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
-------------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =         21.67
    CRITICAL FLOW AREA(SQUARE FEET) =           61.59
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      2.84
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =      9.57
    CRITICAL DEPTH(FEET) =      3.89
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =         17483.89
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =       1.421
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =       5.311
===============================================================================
```

Figure 33

HEADWATER DEPTH FOR CIRCULAR CONCRETE PIPE CULVERTS WITH INLET CONTROL



BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER SCALES 2&3
REVISED MAY 1964

Figure 36

HEADWATER DEPTH FOR CONCRETE ARCH CULVERTS WITH INLET CONTROL

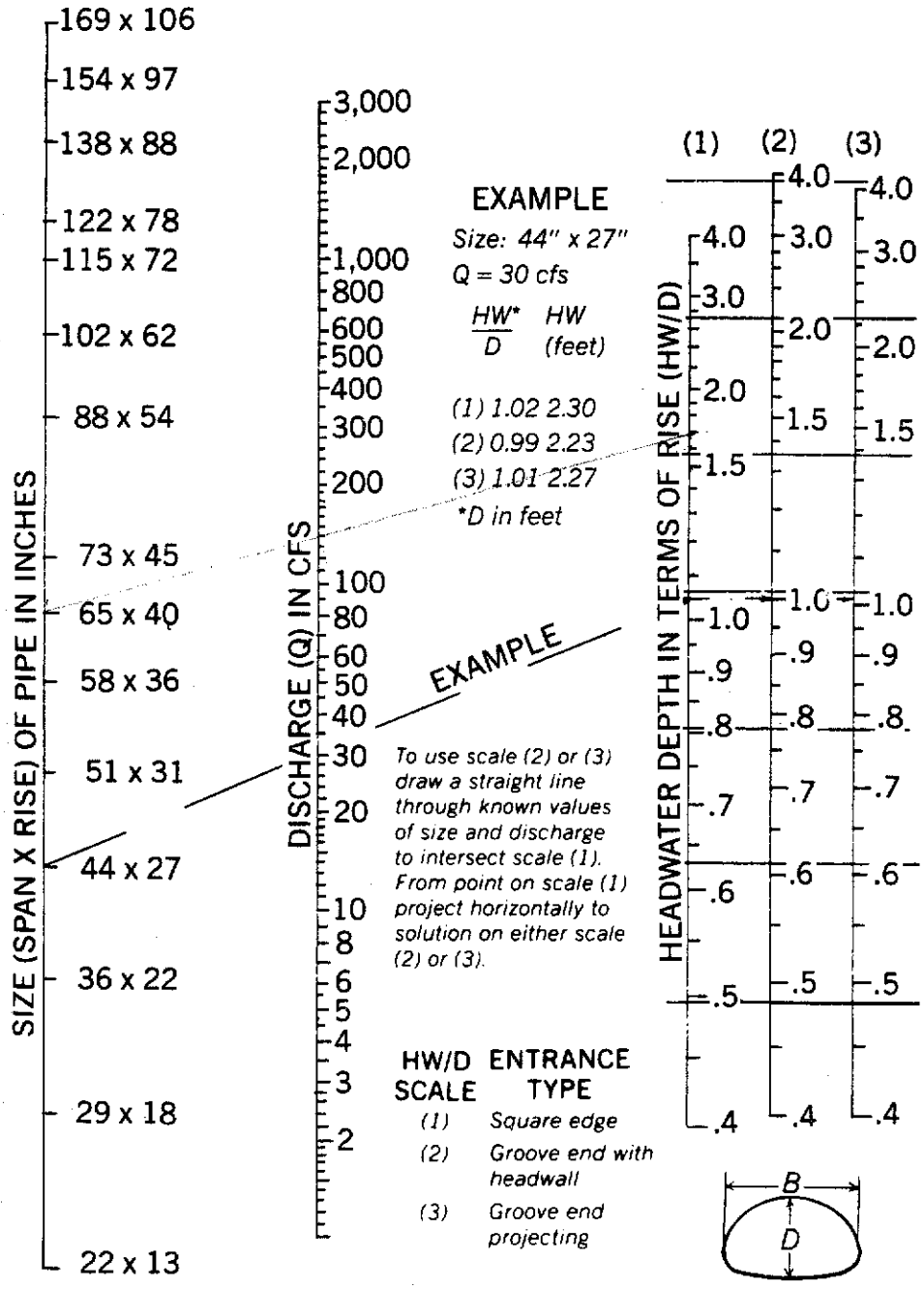
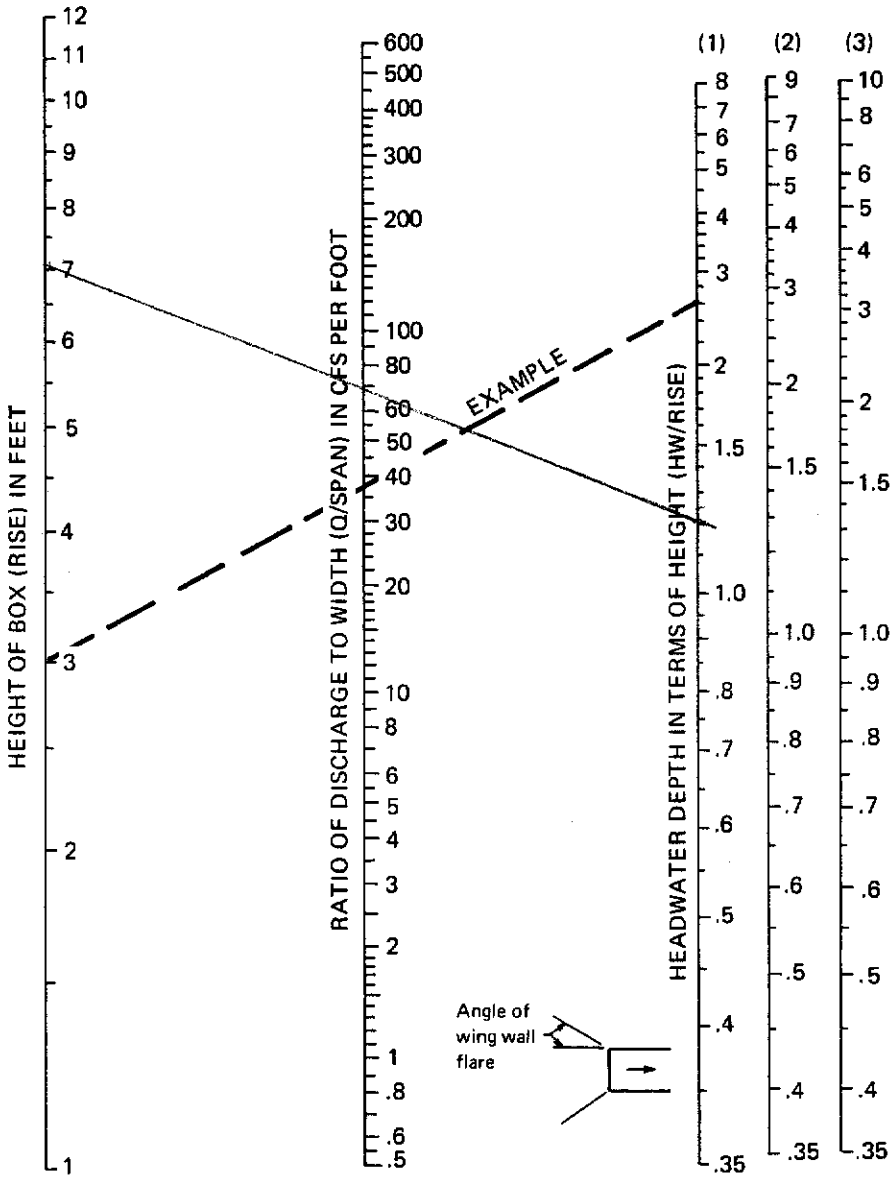


Figure 37

HEADWATER DEPTH FOR CONCRETE BOX CULVERTS WITH INLET CONTROL



EXAMPLE

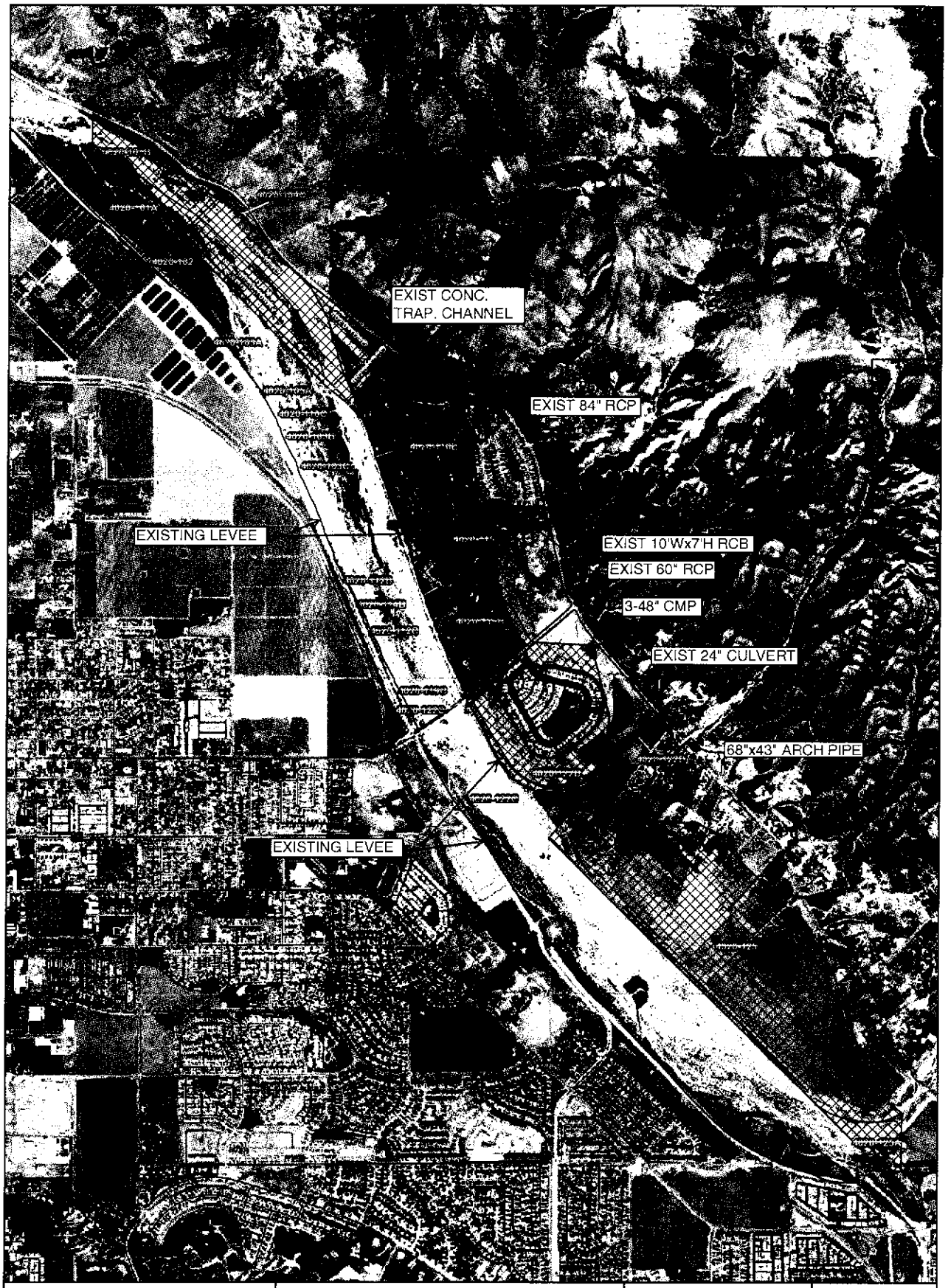
6' x 3' Box Q = 225 cfs
Q/Span = 37.5 cfs/ft

Inlet	HW/Rise	HW ft
(1)	2.6	7.8

HW/Rise SCALE	WING WALL FLARE
(1)	30° to 75°
(2)	90° and 15°
(3)	0° (extensions of sides)

To use scale (2) or (3) project horizontally to scale (1), then use straight inclined line through rise and Q scales, or reverse as illustrated.

BUREAU OF PUBLIC ROADS - JAN 1963



Flood Control Parcel Boundary
Flood Control Easement
Fee Parcel
PLSS Section Boundary

Soboba Band of Luiseño Indians Flood Control Easement and Fee Parcel Boundaries

N
W E
S

0 0.1 0.2 0.3 0.4 0.5
Miles

ENTRIX

DRAFT June 2007
Attorney-Client Communication
Confidential, Privileged Information

Appendix K:

EMWD Will-Serve Letter (New Appendix)

EASTERN MUNICIPAL WATER DISTRICT
SINCE 1950

Board of Directors

President
Ronald W. Sullivan

Vice President and Treasurer
Joseph J. Kuebler, CPA

Philip E. Paule
Randy A. Record
David J. Slawson

Board Secretary
Rosemarie V. Howell

General Manager
Anthony J. Pack

Director of the Metropolitan Water District of So. Calif.
Randy A. Record

Legal Counsel
Redwine and Sherrill

March 5, 2010

Rosemary Salgado, Acting Chairperson
Soboba Band of Luiseño Indians
PO Box 487
San Jacinto CA 92581

Re: Proposed Sewer Service to Soboba Hotel / Casino

Dear Ms. Salgado:

Eastern Municipal Water District currently has the capacity to accommodate Sewer service to the subject project, based on your estimated sewer average daily flow of 313,000 gallons per day.

The provisions of service are contingent upon the developer completing the necessary arrangements in accordance with EMWD rules and regulations. Accordingly, the developer is asked to contact EMWD's New Business Development Department early in the entitlement process to determine the necessary arrangements for service, and to receive direction on the preparation of a facility Plan-of-Service, which is required prior to final engineering. Further arrangements for Sewer service from EMWD may also include plan check, facility construction, inspection, and payment of financial participation charges.

EMWD's ability to serve is subject to limiting conditions, such as regulatory requirements, legal issues, or conditions beyond EMWD's control.

When you are ready to proceed with this project, please contact Fred Azimie, New Business Development Department, at (951) 928-1777, ext 4447.

Sincerely,

Anthony J. Pack
General Manager
Eastern Municipal Water District

c: Director Randy Record / EMWD
Director Phillip Paule / EMWD
Gerald Shoaf
Karl Johnson /Luebben Johnson & Barnhouse LLP
7424 4th Street NW
Los Ranchos de Albuquerque, NM 87107