APPENDIX F

Hydrology and Water Quality

APPENDIX F-1

Interpretive Report for Infiltration System Design

INTERPRETIVE REPORT

FOR INFILTRATION SYSTEM DESIGN, PROPOSED WESTPARK PROMENADE DEVELOPMENT, ASSESSOR'S PARCEL NUMBER 376-410-025, 376-410-013, AND 376-410-023, LOCATED NORTH OF CATT ROAD AND EAST OF INTERSTATE 15 (I-15), CITY OF WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA

PROJECT NO. 13351-11A

ISSUED: AUGUST 6, 2013

August 6, 2013 Project No. 13351-11A

Mr. James Kieckhafer
GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC.
6201 Oak Canyon, Suite 200
Irvine, CA 92618

Subject: Interpretive Report for Infiltration System Design, Proposed Westpark Promenade Development, Assessor's Parcel Number 376-410-025, 376-410-013, and 376-410-023, Located North of Catt Road and East of Interstate 15 (I-15), City of Wildomar, Riverside County, California

Earth-Strata, Inc. is pleased to present this interpretive report for the proposed commercial and residential development, located north of Catt Road and East of Interstate 15 (I-15), in the City of Wildomar, Riverside County, California. The purpose of our study was to determine the infiltration rates and physical characteristics of the subsurface earth materials within the proposed development. We have provided guidelines for the design of onsite bio swale retention systems, where applicable. This study is intended to provide onsite percolation rates for the earth materials at the approximate depth near the proposed retention basins.

PROPERTY DESCRIPTION

The subject property is located in the City of Wildomare, Riverside County, California (see Figure 1). The subject property consists of an undeveloped parcel of land with relatively hilly and flat terrain. The subject property is underlain by alluvium and Pauba Formation bedrock.

PROPOSED CONSTRUCTION

Based on information provided by you, the proposed development will consists of numerous buildings which includes interior driveways, utilities and three or more on-site retention basins located along the perimeter of the proposed development.

SUBSURFACE EXPLORATION AND PERCOLATION TESTING

SUBSURFACE EXPLORATION

Subsurface exploration of the subject site consisted of 4 exploratory excavations to a depth of 5 feet, conducted on June 15, 2013. The exploratory holes were excavated to evaluate insitu permeability rates. The boring logs are presented in Appendix A. The approximate location of the exploratory excavations are shown on the attached Percolation Location Map, Plate 1.

EARTH MATERIALS

A general description of the earth materials observed on site is provided below.

- Quaternary Alluvium (map symbol Qal): Quaternary alluvium was encountered to a maximum depth of 5 feet. These alluvial deposits consist predominately of interlayered light brown to brown, fine to coarse

grained clayey sand, and occasional sandy silt. These deposits were generally noted to be in a slightly moist to moist, loose to medium dense state.

Quaternary Pauba Sandstone (Qps): Quaternary Pauba Sandstone was encountered below the alluvium to a maximum depth of explored. This bedrock unit consists predominately of interbedded gray to medium brown, fine to medium grained silty sand, fine to coarse grained sandstone, with occasional siltstone and claystone layers.

GROUNDWATER

Groundwater was not observed within the exploratory excavations.

PERCOLATION TESTING

The continuous presoak test method was utilized to perform a total of four (4) percolation tests on June 15, 2013 to evaluate near surface percolation rates in order to estimate the amount of storm water runoff that can percolate into the onsite bio swale retention basins. The percolation tests were performed in general accordance with the requirements of insitu percolation testing.

The percolation tests were performed within 8 inch perforated pipes, 4.3 to 5 feet deep. The locations of the percolation test holes are indicated on the attached Percolation Location Map, Plate 1. The percolation test holes were located by property boundary measurement on the site plan and by using geographic features. For the continuous presoak testing method, the pipe was filled with water and allowed to stand.

After the presoak, testing was performed by adjusting the water level to near the top of the pipe. The drop in water level was measured from a fixed initial reference point for more reliable readings, with measurements having an accuracy of 1/8-inch. After each measurement, the water level was brought up to the original test level. Percolation test data recorded in the field is summarized in the following table and is included within Appendix A.

PERCOLATION TEST SUMMARY

TEST NUMBER	PERCOLATION HOLE DEPTH (ft.)	PERCOLATION RATE (mpi)	DESCRIPTION
P-1	5	170	Clayey Silt
P-2	5	275	Clayey Silt
P-3	4.3	153	Clayey Sand
P-4	5	23	Silty Sand

The percolation test rates ranged from 23 to 275 minutes per sec (mpi).

CONCLUSIONS AND RECOMMENDATIONS

Based on the data presented in this report and the recommendations set forth herein, it is the opinion of Earth-Strata that the retention basins cannot be designed for the infiltration rates measured. The infiltration rates are extremely slow.

GRADING PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of **GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC** and their authorized representative. It likely does not contain sufficient information for other parties or other uses. Earth-Strata should be engaged to review the final design plans and specifications prior to construction. This is to verify that the recommendations contained in this report have been properly incorporated into the project plans and specifications. Should Earth-Strata not be accorded the opportunity to review the project plans and specifications, we are not responsibility for misinterpretation of our recommendations.

Earth-Strata should be retained to provide observations during construction to validate this report. In order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

Earth-Strata should review any changes in the project and modify and approve in writing the conclusions and recommendations of this report. This report and the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions encountered during grading or construction operations appear to be different than those indicated in this report, this office should be notified immediately, as revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Earth materials vary in type, strength, and other geotechnical properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the subject property. No practical study can completely eliminate uncertainty with regard to the anticipated geotechnical conditions in connection with a subject property. The conclusions and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by Earth-Strata during construction. This report is considered valid for a period of one year from the time the report was issued.

This report was prepared with the understanding that it is the responsibility of the owner or their representative, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should properly implement the conclusions and recommendations during grading and construction, and notify the owner if they consider any of the recommendations presented herein to be unsafe or unsuitable.

Respectfully submitted,

EARTH-STRATA, INC.

Stephen M. Poole, PE 40219
President
Principal Engineer

SMP/am

Distribution: (4) Addressee

Attachments: Figure 1 – Vicinity Map *(Rear of Text)*
Appendix A – Exploratory Logs *(Rear of Text)*
Appendix B – Percolation Test Sheets *(Rear of Text)*
Plate 1 – Percolation Location Map *(Rear of Text)*

FIGURE 1

VICINITY MAP

APPENDIX A

EXPLORATORY LOGS

Earth - Strata, Inc.
Geotechnical, Environmental and Materials Testing Consultants
BETTER PEOPLE • BETTER SERVICE • BETTER RESULTS

SYMBOLS AND TERMS USED ON LOGS

The No. 200 Standard Sieve is about the smallest particle visible to the naked eye.

Coarse-grained Soils >½ of materials larger than #200 sieve	**GRAVELS** Higher percentage of coarse fraction is larger than #4 sieve	Clean Gravels (less than 5% fines)		**GW**	Well-graded gravels, little or no fines
				GP	Poorly-graded gravels, little or no fines
		5 – 12% fines		**GW-GM**	Well-graded gravel with silt
				GW-GC	Well-graded gravel with clay
				GP-GM	Poorly-graded gravel with silt
				GP-GC	Poorly-graded gravel with clay
		Gravels with fines	PI < 4	**GM**	Silty Gravels
			PI > 7	**GC**	Clayey Gravels
	SANDS Higher percentage of coarse fraction is smaller than #4 sieve	Clean Sands (less than 5% fines)		**SW**	Well-graded sands, little or no fines
				SP	Poorly-graded sands, little or no fines
		5 – 12% fines		**SW-SM**	Well-graded sand with silt
				SW-SC	Well-graded sand with clay
				SP-SM	Poorly-graded sand with silt
				SP-SC	Poorly-graded sand with clay
		Sands with fines	PI < 4	**SM**	Silty Sands
			PI > 7	**SC**	Clayey Sands
			PI 4-7	**SC-SM**	Silty clayey sands
Fine-grained Soils ≥½ of materials smaller than #200 sieve	**SILTS & CLAYS** Liquid Limit Less Than 50		PI < 4	**ML**	Inorganic silts & sandy silts
			PI > 7	**CL**	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			PI 4-7	**ML-CL**	Silts & clays of low plasticity, sandy silty clay, silty clay
	SILTS & CLAYS Liquid Limit Greater Than 50			**MH**	Inorganic silts, micaceous or diatomaceous silt, sandy silt
				CH	Inorganic clays of high plasticity, fat clays, sandy clays, gravelly clays
				OH	Organic silts and clays of medium-to-high plasticity
Highly Organic Soils				**PT**	Peat, humus swamp soils with higher organic content

Symbols	
	Ring Sample
	SPT Sample
NR	No Recovery
▽	Groundwater

Grain Size

Description		Sieve Size	Grain Size	Approximate Size
Boulders		>12"	>12"	Larger than basketball-sized
Cobbles		3-12"	3-12"	Fist-sized to basketball-sized
Gravel	Coarse	¾-3"	¾-3"	Thumb-sized to fist-sized
	Fine	#4-¾"	0.19-0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10-#4	0.079-0.19"	Rock salt-sized to pea-sized
	Medium	#40-#10	0.017-0.079"	Sugar-sized to rock salt-sized
	Fine	#200-#40	0.0029-0.017"	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029"	Flour-sized and smaller

Moisture Content
Slightly Moist
Moist
Very Moist
Wet

Consistency – Fine Grained Soils

Apparent Density	SPT (# blows/foot)	Modified CA Sampler (# blows/foot)	Field Test
Very Soft	<1	<2	Easily penetrated by thumb; exudes between thumb and fingers when squeezed in hand
Soft	2-3	3-6	Easily penetrated one inch by thumb; molded by light finger pressure
Medium Stiff	4-6	7-12	Penetrated over ½ inch by thumb with moderate effort; molded by strong finger pressure
Stiff	7-10	13-15	Indented about ½ inch by thumb but penetrated only with great effort
Very Stiff	11-20	16-30	Readily indented thumbnail
Hard	>20	>30	Indented with difficulty by thumbnail

Relative Density – Coarse Grained Soils

Apparent Density	SPT (# blows/foot)	Modified CA Sampler (# blows/foot)	Field Test
Very Loose	<2	<4	Easily penetrated with ½ inch reinforcing rod pushed by hand
Loose	3-5	4-10	Easily penetrated with ½ inch reinforcing rod pushed by hand
Medium Dense	6-15	11-30	Easily penetrated 1-foot with ½ inch reinforcing rod driven with a 5-lb hammer
Dense	16-25	31-50	Difficult to penetrate 1-foot with ½ inch reinforcing rod driven with a 5-lb hammer
Very Dense	>25	>50	Penetrated only a few inches with ½ inch reinforcing rod driven with a 5-lb hammer

Geotechnical Boring Log P-1

Date: June 17, 2013	**Project Name: Westpark Promenade** **Page: 1 of 1**
Project Number: 13351-11A	**Logged By: SMP**
Drilling Company: Drilling It	**Type of Rig: CME 45B**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft):	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SM	Silty SAND; reddish brown, slightly moist
					SC	Clayey SILT; light brown, moist
5						**E.O.B. @ 5 Feet**
						No Groundwater
10						
15						
20						
25						
30						

Geotechnical Boring Log P-2

Date: June 17, 2013	**Project Name: Westpark Promenade** **Page: 1 of 1**
Project Number: 13351-11A	**Logged By: SMP**
Drilling Company: Drilling It	**Type of Rig: CME 45B**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft):	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SM	Silty SAND; dark brown, slightly moist
					SC	Clayey SILT; dark brown, moist
5						**E.O.B. @ 5 Feet**
						No Groundwater
10						
15						
20						
25						
30						

Geotechnical Boring Log P-3

Date: June 17, 2013	**Project Name: Westpark Promenade** **Page: 1 of 1**
Project Number: 13351-11A	**Logged By: SMP**
Drilling Company: Drilling It	**Type of Rig: CME 45B**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft):	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SC	Clayey SAND; light brown, slightly moist
5						**E.O.B. @ 5 Feet**
						No Groundwater
10						
15						
20						
25						
30						

Geotechnical Boring Log P-4

Date: June 17, 2013	**Project Name: Westpark Promenade** **Page: 1 of 1**
Project Number: 13351-11A	**Logged By: SMP**
Drilling Company: Drilling It	**Type of Rig: CME 45B**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft):	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SM	Silty SAND; reddish brown, slightly moist
5						**E.O.B. @ 5 Feet**
						No Groundwater
10						
15						
20						
25						
30						

APPENDIX B

PERCOLATION TEST SHEETS

PERCOLATION DATA SHEET

Job Number:	13351-11A	Check for Sandy Soil Criteria Tested By:	MWG
Project:	Westpark Promenade	Actual Percolation Tested By:	MWG
Test Hole Number:	P-1	Test Hole Diameter (inches):	8
Soil Classification:	Clayey Sand	Date of Presoak:	6/17/2013
Depth of Test Hole (ft):	5	Date Tested:	6/18/2013

NORMAL OR SANDY SOIL CRITERIA TEST

Time	*Time Interval (min)*	*Total Elapsed Time (min)*	*Initial Water Level (inches)*	*Final Water Level (inches)*	*▲in Water Level (inches)*	*Percolation Rate (min/inch)*
7:35 8:05	30	30	54¼	54¾	½	60
8:05 8:35	30	60	54¾	54¾	0	-
8:35 9:05	30	90	54¾	55	¼	120
9:05 9:35	30	120	55	55	0	-
9:35 10:05	30	150	55	55	0	-
10:05 10:35	98	248	55	55¼	¼	392
10:35 11:05	57	305	55¼	56	¾	76
11:05 11:35	170	475	56	57	1	170

PERCOLATION DATA SHEET

Job Number:	13351-11A	Check for Sandy Soil Criteria Tested By:	MWG
Project:	Westpark Promenade	Actual Percolation Tested By:	MWG
Test Hole Number:	P-2	Test Hole Diameter (inches):	8
Soil Classification:	Clayey Sand	Date of Presoak:	6/17/2013
Depth of Test Hole (ft):	5	Date Tested:	6/18/2013

NORMAL OR SANDY SOIL CRITERIA TEST

Time	*Time Interval (min)*	*Total Elapsed Time (min)*	*Initial Water Level (inches)*	*Final Water Level (inches)*	*▲in Water Level (inches)*	*Percolation Rate (min/inch)*
7:38 8:08	30	30	51¾	51¾	0	-
8:08 8:38	30	60	51¾	51⅞	⅛	240
8:38 9:08	30	90	51⅞	51⅞	0	-
9:08 9:38	30	120	51⅞	52	⅛	240
9:38 10:08	30	150	52	52	0	-
10:08 10:38	97	247	52	52½	½	194
10:38 11:08	175	422	52½	53½	1	175
11:08 11:38	172	594	53½	54⅛	⅝	275

PERCOLATION DATA SHEET

Job Number:	13351-11A	Check for Sandy Soil Criteria Tested By:	MWG
Project:	Westpark Promenade	Actual Percolation Tested By:	MWG
Test Hole Number:	P-3	Test Hole Diameter (inches):	8
Soil Classification:	Clayey Sand	Date of Presoak:	6/17/2013
Depth of Test Hole (ft):	4.3	Date Tested:	6/18/2013

NORMAL OR SANDY SOIL CRITERIA TEST

Time	*Time Interval (min)*	*Total Elapsed Time (min)*	*Initial Water Level (inches)*	*Final Water Level (inches)*	*▲in Water Level (inches)*	*Percolation Rate (min/inch)*
7:42 8:12	30	30	41	41⅞	⅞	34
8:12 8:42	30	60	41⅞	42⅜	½	60
8:42 9:12	30	90	42⅜	42⅜	0	-
9:12 9:42	30	120	42⅜	42½	⅛	240
9:42 10:12	30	150	42½	42⅝	⅛	240
10:12 10:42	90	240	42⅝	43¼	⅝	144
10:42 11:12	175	415	43¼	45	¾	233
11:12 11:42	172	587	45	46⅛	1⅛	153

PERCOLATION DATA SHEET

Job Number:	13351-11A	Check for Sandy Soil Criteria Tested By:	MWG
Project:	Westpark Promenade	Actual Percolation Tested By:	MWG
Test Hole Number:	P-4	Test Hole Diameter (inches):	8
Soil Classification:	Clayey Sand	Date of Presoak:	6/17/2013
Depth of Test Hole (ft):	5	Date Tested:	6/18/2013

NORMAL OR SANDY SOIL CRITERIA TEST

Time	*Time Interval (min)*	*Total Elapsed Time (min)*	*Initial Water Level (inches)*	*Final Water Level (inches)*	*▲in Water Level (inches)*	*Percolation Rate (min/inch)*
7:45 8:15	30	30	51¼	55	¾	40
8:15 8:45	30	60	55	58	3	10
8:45 9:15	30	90	52	55	3	10
9:15 9:45	30	120	55	57	2	15
9:45 10:15	30	150	54⅝	56⅜	1¾	17
10:15 10:45	90	240	53⅜	60	3⅝	25
10:45 11:15	171	411	51⅛	60	8⅞	19
11:15 11:45	175	586	52⅜	60	7⅝	23

APPENDIX F-2

Preliminary Water Quality Management Plan

Pacific Coast Land Consultants, Inc.

Civil Engineering • Land Planning • Land Surveying

PRELIMINARY
Water Quality Management Plan

FOR

Westpark Promenade
Wildomar, California

Prepared for:
GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC
6201 OAK CANYON, SUITE 250
IRVINE, CALIFORNIA 92618
JIM KIECKHAFER
949-270-7800

Prepared by:
PACIFIC COAST LAND CONSULTANTS
25096 JEFFERSON AVE STE D
MURRIETA, CALIFORNIA 92562
951-698-1350
PREPARED BY TRAVIS P. VINCENT JR.
RCE 37356

WQMP PREPARATION DATE:
JANUARY 5, 2015

REVISED APRIL 14, 2016

OWNER'S CERTIFICATION

This PRELIMINARY project- specific Water Quality Management Plan (WQMP) has been prepared for: **GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC** by Pacific Coast Land Consultants, Inc for the project known as **WESTPARK PROMENADE.** This PRELIMINARY-WQMP is intended to comply with the requirements of the City of Wildomar, which includes the requirement for the preparation and implementation of a project-specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of this PRELIMINARY WQMP. The undersigned is aware that implementation of this PRELIMINARY WQMP is enforceable under City of Wildomar Water Quality Ordinance (Municipal Code Section 13.12.060)

If the undersigned transfers its interest in the subject property/project, its successor in interest the undersigned shall notify the successor in interest of its responsibility to implement this PRELIMINARY WQMP.

"I certify under penalty of law that the provision of this PRELIMINARY WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
JAMES C. KIECKHAFER	**MANAGING DIRECTOR**
Owner's Printed Name	Owner's Title/Position

GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC
6201 OAK CANYON, SUITE 250
Irvine, CA 92618
949-270-7800

TABLE OF CONTENTS

I. Project Description 1
II. Site Characterization 3
III. Pollutants of Concern 4
IV. Hydrologic Conditions of Concern 5
V. Best Management Practices 6
V.1 Site Design BMPs 6
V.2 Source Control BMPs 9
V.3 Treatment Control BMPs 12
V.4 Equivalent Treatment Control Alternatives 14
V.5 Regionally-Based Treatment Control BMPs 14
VI. Operation and Maintenance Responsibility for Treatment Control BMPs 15
VII. Funding 21

APPENDICES

A. CONDITIONS OF APPROVAL
B. VICINITY MAP AND SITE PLAN
C. SUPPORTING DETAIL RELATED TO HYDRAULIC CONDITIONS OF CONCERN
D. EDUCATIONAL MATERIALS
E. SOILS REPORT AND PERCOLATION TEST RESULTS
F. TREATMENT CONTROL BMP SIZING CALCULATIONS AND DESIGN DETAILS
G. AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS AND OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS FINAL PROJECT- SPECIFIC WQMP
H. PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS

I. Project Description

The project is located on approximately 27 acres of vacant land bordered by I-15 to the west, an existing residential development to the north and east and Clinton Keith Road to the south.

The project will consist of development of 23 condominium buildings, future retail and restaurant uses. There will be two recreation centers containing swimming pools, spas, and club house/gym amenities spread throughout the project. In addition to these, small park areas will be located throughout the project.

Access to the project will be from the extension of Westpark Street southerly from the north to Catt Street. Copper Court will be extended westerly from the east; however it will be gated to provide emergency vehicle access only. Pedestrian access will be encouraged at this location.

The project currently accepts drainage from the adjacent residential developments in the form of open ended RCP storm drains outletting onto rock aprons. Storm flows from these offsite systems then flow out onto the vacant, undeveloped land. The general drainage direction for the existing condition is from east to west. Along the west side of the project, there are 3 concrete headwalls that accept surface flows from the project site and transmit these flows under I-15 to the west side of I-15 where they continue to Murrieta Creek.

The project will extend an existing 54" storm drain in Westpark Street to transmit the offsite flows to the northern most of the threes existing concrete inlet structures previously described. For the project itself, a series of onsite storm drain systems will be constructed. Catch basins will be fitted with inserts designed to capture larger floatables and debris, as well as providing some filtration of hydrocarbons. Underground filtration/storage structures or bioretention system with underdrain will be constructed to treat the regulatory water quality volume. Detention system outlets will be fitted with restrictor plates to limit outlet flows to no more than the pre-development condition. The soil characteristics are such that infiltration is too low to be utilized for infiltration so the structures will be founded on porous material containing under drains to direct filtered water to the storm drain system.

Roof drains will be directed to landscape areas where practical. In areas where not practical, they will spill onto impervious surfaces and become part of the surface flows collected and treated in the storm drain system.

The development will generate trash and debris during and after construction is complete. All wastes generated on the site will be removed by a licensed collector.
(*See Appendix B – Site Plan*)

Appendix G contains a "Declaration of Water Quality Management Plan Restrictive Covenant" to ensure ongoing operation, maintenance, funding, transfer and implementation of this WQMP.

Project Owner: **GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC**
6201 OAK CANYON, SUITE 250
IRVINE, CALIFORNIA 92618
949-270-7800

WQMP Preparer: **PACIFIC COAST LAND CONSULTANTS**
25096 JEFFERSON AVE SUITE -D
MURRIETA CALIFORNIA 92562
951-698-1350 // FAX 951-698-8957
CONTACT: TRAVIS P. VINCENT JR., PE
PROJECT MANAGER

Project Site Address: Westpark Street, Wildomar, CA 92595

Planning Area/ Community Name: Westpark Promenade

APN Number(s): 376-410-013, 022, 023

Thomas Bros. Map: Riverside County Pg 897-F7

Project Watershed: Santa Margarita River

Sub-watershed: Wildomar

Project Site Size: 27.6 acres

Standard Industrial Classification (SIC) Code: 6512, 6513, 6514

Formation of Home Owners' Association (HOA) or Property Owners Association (POA): YES

Additional Permits/Approvals required for the Project:

AGENCY	Permit required (yes or no)
State Department of Fish and Game, 1601 Streambed Alteration agreement	No - Pending
State Water Resources Control Board, Clean Water Act (CWA) section 401 Water Quality Certification	No - Pending
US Army Corps of Engineers, CWA section 404 permit	No - Pending
US Fish and Wildlife, Endangered Species Act section 7 biological opinion	No - Pending
Other State Water Resources Control Board General Construction Activities Stormwater Permit	Yes
City of Wildomar – Grading Permit	Yes
City of Wildomar – Building and Safety Permit	Yes
California Department of Transporation (Caltrans) – Encroachment Permit	Yes

II. Site Characterization

Land Use Designation or Zoning:	CO (Commercial)
Current Property/ Land Use:	Vacant
Proposed Property / land Use:	Apartments, Multi-Family Residential, Commercial/Restaurant
Availability of Soils Report:	Yes
Phase 1 Site Assessment:	None Required

Receiving Waters for Urban Runoff from Site

Receiving Waters	303(d)List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
MURRIETA CREEK {SA 2.32}	CHLORPYRIFOS (PESTICIDES) IRON, COPPER (METALS) MANGANESE NITROGEN (NUTRIENTS) TOXICITY	MUN,AGR,IND,PROC, GWR, REC1,REC2,WARM, WILD	NOT A RARE WATER BODY {APPROX. 1 MILE FROM SITE}
SANTA MARGARITA RIVER – UPPER {HU2.22,2.21}	ENTEROCOCUS FECAL COLIFORM (BACTERIA) PHOSPHORUS, TOTAL NITROGEN (NUTRIENTS)	MUN, AGR, IND, PROC, REC1, REC2, WARM, COLD, WILD, RARE	A RARE WATER BODY {APPROX. 8 MILES FROM SITE}
SANTA MARGARITA RIVER – LOWER {HU2.11, 2.12, 2.13}	ENTEROCOCUS FECAL COLIFORM (BACTERIA) PHOSPHORUS, TOTAL NITROGEN (NUTRIENTS)	MUN, AGR, IND, PROC, REC1, REC2, WARM, COLD, WILD, RARE	A RARE WATER BODY {APPROX. 22.5 MILES FROM SITE}
SANTA MARGARITA LAGOON {HU-2.11}	EUTROPHIC {NUTRIENTS AND OXYGEN DEMANDING SUBSTANCES}	REC1, REC2, EST, WILD, RARE, MAR, MIGR, SPWN	A RARE WATER BODY {APPROX. 25 MILES FROM SITE}
PACIFIC OCEAN	NONE	IND, NAV, REC1, REC2, COMM, BIOL, WILD, RARE, MAR, AQUA, MIGR, SPWN, SHELL	A RARE WATER BODY {APPROX. 39 MILES FROM SITE}

III. Pollutants of Concern

Urban Runoff Pollutants: Sediments/Turbidity-P, Nutrients-P, Organic/Compounds-P, Trash & Debris-P, Oxygen Demanding Substances-P, Bacteria & Viruses-P, Oil & Grease-P, Pesticides-P, Metals-P
P-Potential, N-Not Expected

Site Specific Pollutants of Concern:

1. Nutrients
2. Oxygen Demanding Substances
3. Bacteria & Viruses
4. Pesticides
5. Metals

IV. Hydrologic Conditions of Concern

Impacts to the hydrologic regime resulting from the Project may include increased runoff volume and velocity; reduced infiltration; increased flow frequency, duration, and peaks; faster time to reach peak flow; and water quality degradation. Under certain circumstances, changes could also result in the reduction in the amount of available sediment for transport; storm flows could fill this sediment-carrying capacity by eroding the downstream channel. These changes have the potential to permanently impact downstream channels and habitat integrity. A change to the hydrologic regime of a Project's site would be considered a hydrologic condition of concern if the change would have a significant impact on downstream erosion compared to the pre-development condition or have significant impacts on stream habitat, alone or as part of a cumulative impact from development in the watershed.

This project- specific WQMP must address the issue of Hydrologic Conditions of Concern unless one of the following conditions is met:

- **Condition A:** Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4; the discharge is in full compliance with Co-Permittee requirements for connections and discharges to the MS4 (including both quality and quantity requirements); the discharge would not significantly impact stream habitat in proximate Receiving Waters; and the discharge is authorized by the Co-Permittee.

- **Condition B:** The project disturbs less than 1 acre. The disturbed area calculation should include all disturbances associated with larger plans of development.

- **Condition C:** The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by minimizing impervious area on a site and incorporating other site-design concepts that mimic pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the Co-Permittee.

This Project meets the following condition: Condition C

The project meets Condition C of the Riverside County Water Quality Management Plan for urban runoff dated 10/22/12, flows are mitigated on-site and reduced to below or near existing condition prior to release in the storm drain system as required by the Copermitee.

The project will convey existing off-site flows through the project and connect to the existing concrete inlet structures in Cal Trans right of way to the west. On-site flows will be collected in storm drains and conveyed to the detention/filtration systems and mitigated flows will outlet to the same existing inlet structures. Catch Basins will be fitted with inserts to capture larger floatables and debris, as well as providing some filtration of hydrocarbons. Outlet structures from onsite systems are designed to limit outlet flow to within 5% of predevelopment conditions.

(*See Appendix C – Supporting Detail Related to Hydrologic Conditions of Concern*)

V. Best Management Practices

V.1 Site Design BMPs

Table 1. Site Design BMPs

Design Concept	Technique	Specific BMP	Included		
			Yes	No	N/A
Site Design Concept 1	*Minimize Urban Runoff*	1. Maximize the permeable area (See Section 4.5.1 of the WQMP).	(1)		
		Incorporate landscaped buffer areas between sidewalks and streets.	(2)		
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	(3)		
		Use natural drainage systems.		(4)	
		Where soils conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration.		(5)	
		Construct onsite ponding areas or retention facilities to increase opportunities for infiltration consistent with vector control objectives.		(5)	
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required to describe BMP and how it addresses Site Design concept).	(6)		

(1) The site will incorporate landscaping percentage greater than the minimum required by the City Guidelines. All parking spaces are incorporating a two foot overhang to reduce paving area and increase landscape area. Minimum width meandering walkways are being used to increase the pervious landscape areas.

(2) Westpark Street includes a landscaped parkway adjacent to the curb and gutter and the right of way. A landscape buffer will be utilized onsite wherever possible.

(3) The site development will plant native/drought tolerant trees and shrubs as part of the site landscape concept. This site design concept can be achieved.

(4) The site will consist of developing the entire project acreage so all existing natural drainage systems will be altered.

(5) The project site does not meet minimum infiltration rates and is not suitable for infiltration, see Appendix E.

(6) The project proposes to use underground detention/filtration and bioretention systems with underdrains.

Table 1. Site Design BMPs (Cont'd)

Design Concept	Technique	Specific BMP	Included		
			Yes	No	N/A
Site Design Concept 2	*Minimize Impervious Footprint*	Maximize the permeable area (See Section 4.5.1 of the WQMP).	(1)		
		Construct walkways, trails, patios, overflow parking lots, alleys, driveways, low-traffic streets and other low -traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials.	(2)		
		Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walk able environment for pedestrians are not compromised.	(3)		
		Reduce widths of street where off-street parking is available.		(4)	
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.	(5)		
Site Design Concept 3	*Conserve Natural Areas*	Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).	(6)		
		Conserve natural areas (See WQMP Section 4.5.1).		(7)	
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	(8)		
		Use natural drainage systems.		(7)	
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).		(9)	

(1) The site will incorporate landscaping percentage greater than the minimum required by the City Guidelines. All parking spaces are incorporating a two foot overhang to reduce paving area and increase landscape area. Minimum width meandering walkways are being used to increase the pervious landscape areas.
(2) The project site does not meet minimum infiltration rates and is not suitable for infiltration, see Appendix E.
(3) The driveways will be constructed to minimum width as required by the City departments.
(4) Streets are to be constructed to the minimum City requirements.
(5) No decorative pavement proposed in landscape areas.
(6) On site retention/filtration and bioretention systems with underdrains is proposed for the appropriate treatment
(7) The site will consist of developing the entire project acreage so all existing natural drainage systems will be altered.
(8) The site development will plant native/drought tolerant trees and shrubs.
(9) None proposed.

Table 1 Site design BMPs (Cont'd)

Design Concept	Technique	Specific BMP	Included		
			Yes	No	N/A
Site Design Concept 4	*Minimize Directly Connected Impervious Areas (DCIAs)*	Residential and commercial sites must be designed to contain and infiltrate roof runoff, or direct roof runoff to vegetative swales or buffer areas, where feasible.	(1)		
		Where landscaping is proposed, drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.	(2)		
		Increase the use of vegetated drainage swales in lieu of underground piping or imperviously lined swales.	(3)		
		Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings.	(4)		
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to vegetated swale/biofilter.	(4)		
		Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to MS4s.	(4)		
		Design driveways with shared access, flared (single lane at street) or wheel strips (paving only under tires); or, drain into landscaping prior to discharging to the MS4.		(5)	
		Uncovered temporary or guest parking on private residential lots may be paved with a permeable surface, or designed to drain into landscaping prior to discharging to the MS4.		(4)	
		Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.	(4)		
		Overflow parking (parking stalls provided in excess of the Co-Permittee's minimum parking requirements) may be constructed with permeable paving.		(6)	
		Other comparable and equally effective design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).		(6)	

(1) The project proposes to allow for the roof runoff thru Roof downspouts to be directed /treated on site to drain thru the perimeter landscape areas as the initial treatment but the waters will be directed to the onsite filtration systems.
(2) Interior walkways are designed to flow across landscape areas, where possible, prior to flowing to the onsite filtration systems.
(3) Underground piping will be used only where there is insufficient slope for swales.
(4) All flows are directed to the onsite filtration systems.
(5) Driveways are per City of Wildomar zoning requirements.
(6) None proposed.

V.2 Source Control BMPs

Table 2. Source Control BMPs

BMP Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	✷✷		
Activity Restrictions	✷✷		
Irrigation System and Landscape Maintenance	✷✷		
Common Area Litter Control	✷✷		
Street Sweeping Private Streets and Parking Lots	✷✷		
Drainage Facility Inspection and Maintenance	✷✷		
Structural Source Control BMPs			
MS4 Stenciling and Signage	✷✷		
Landscape and Irrigation System Design	✷✷		
Protect Slopes and Channels	✷✷		
Provide Community Car Wash Racks		✷✷	NOT A PART OF
Properly Design:			
Fueling Areas		✷✷	NOT A PART OF
Air/Water Supply Area Drainage		✷✷	NOT A PART OF
Trash Storage Areas	✷✷		
Loading Docks	✷✷		
Maintenance Bays		✷✷	NOT A PART OF
Vehicle and Equipment Wash Areas		✷✷	NOT A PART OF
Outdoor Material Storage Areas		✷✷	NOT A PART OF
Outdoor Work Areas or Processing Areas		✷✷	NOT A PART OF
Provide Wash Water Controls for Food Preparation Areas		✷✷	NOT A PART OF

Description of Source Control BMPs

Non-Structural Source Control BMPs:

Education/Training for Property Owners, Operators, Tenants, Occupants, or Employees
This property owner through its appropriate management personnel will annually provide environmental awareness education materials to responsible employees. These materials shall include general housekeeping practices that contribute to the protection of Urban Runoff quality and BMPs that eliminate or reduce pollution during subsequent property improvements. These materials or a resource list for obtaining these materials will be available through the City of Wildomar. The City may elect to recover printing costs for such materials. The property manager shall request these materials (in writing) at least 30 days prior to the intended distribution date.
This project will have people who will be employed or contracted to perform activities that may impact Urban Runoff. BMP training and education programs will be provided by the property manager to all new employees within 6 months of hire date and annually thereafter. Employees training materials may be derived from educational materials available in Appendix D of this WQMP, or through the City of Wildomar or other resources such as "Stormwater Best Management Practices Handbook for Industrial and Commercial" (CASQA, 2003). The most recent editions of the CASQA handbooks can be downloaded at www.cabmphandbooks.com.

Activity Restrictions
The owner shall prepare tenant rules for the purpose of Receiving Water quality protection. Alternatively, use restrictions are included in this WQMP. Examples of activity restrictions are:

- Prohibiting the blowing, sweeping, or hosing of debris (leaf litter, grass clippings, litter, etc.) into streets, storm drain inlets, or other conveyances.
- Require dumpster lids to be closed at all times.
- Prohibit vehicle washing, maintenance, or repair on the premises or restrict those activities to designated areas.

Irrigation System and Landscape Maintenance
Maintenance of irrigation systems and landscaping shall be consistent with the City's water conservation ordinance, which can be accessed through the City's website or obtained through the City's planning/permitting counter. Fertilizer and pesticide usage shall be consistent with the instructions contained on product labels and with regulations administered by California's Department of Pesticide Regulation. Pesticide use shall be at a a minimum and should not be applied prior to rainfall events. Additionally, landscape maintenance shall include replacement of dead vegetation, repair of erosion rills, proper disposal of green waste, etc. Irrigation system maintenance will include periodic testing and observation of the irrigation system to detect overspray, broken sprinkler heads, and other system failures. The property manager will specify the frequency of irrigation system and landscape maintenance activities.

Common Area Litter Control
Trash receptacles will be provided in common areas. Emptying of trash receptacles, the frequency with which trash receptacles will be emptied, patrolling common areas and perimeter fences or walls to collect litter, noting trash disposal violations by tenants and reporting such observations to the property manager for investigation will be specified by the owner through its designated manager or agent.

Street Sweeping Private Street and Parking Lots
Parking lots shall be swept at least bi-weekly, including just prior to the start of the rainy season (October 1st) or as specified by the owner.

Drainage Facility Inspection and Maintenance

Routine maintenance of the onsite drainage facilities should take place quarterly and in the late summer or early fall prior to the start of the rainy season (October 1st). The drainage facilities must be cleaned of accumulated sediment/debris if any fills 25% or more of the sediment/debris storage capacity. The onsite drainage facilities shall be inspected annually and the cleaning frequency shall be assessed by the owner and modified as needed.

Structural Source Control BMPs

MS4 Stenciling and Signage

Stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language (such as: "NO DUMPING ONLY RAIN IN THE DRAIN") and/or graphical icons to discourage illegal dumping will be provided.
The owner shall be responsible for maintaining the legibility of stencils and signs.

Landscape and Irrigation System Design

Rain shutoff devices shall be employed to prevent irrigation during and after precipitation events. Irrigation systems shall be designed to each landscape area's specific water requirements. Flow reducers or shutoff valves triggered by a pressure drop to control water loss due to broken sprinkler heads or lines shall be provided in the system design. Timing and application methods of irrigation water shall be designed to minimize the runoff of excess irrigation water into the MS4. Other comparable, equally effective methods to reduce irrigation water runoff shall be employed. The project landscape plan shall be consistent with the City's water conservation ordinance. The site landscaping shall:

- Utilize plants with low irrigation requirements (for example, native or drought tolerant species)
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface infiltration.
- Use mulches (such as wood chips or shredded wood products) in planter areas without ground cover to minimize sediment in runoff.
- Install appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant material where possible and /or as recommended by the landscape architect.
- Utilize plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth.
- Do not apply pesticides immediately prior to rainfall events.

.

Trash Storage Areas

All trash container areas shall meet the following requirements:

1. Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements around the area, screened or walled to prevent off-site transport of trash.
2. Trash dumpsters (containers) shall be leak proof and have attached covers or lids, which are to remain closed.
3. Trash enclosures shall be on a concrete pad. The pad shall be a minimum of one foot larger all around than the trash bins and sloped to drain to the adjacent driveway.

V.3 Treatment Control BMPs

Description

Infiltration and Re-Use BMPs were considered and found to be infeasible. *(See Appendix F)* Therefore, the BMPs Treatment will consist of sand filtration and treatment control with underdrains. All storm flows will be directed to the treatment control. First flush flows will be treated in the treatment control and larger storm events will be intercepted by raised inlets and conveyed in a separate by-pass storm drain. The treatment control BMPs will connect to the by-pass storm drain prior to leaving the site and connect to the existing inlet structures and piping under I-15.

The onsite storm drain system will be located in drive aisles. They will terminate into the existing concrete inlet structures along the west side of the project within Caltrans right of way. Roof drains will be directed to landscape areas where practical and all catch basins will be fitted with filter inserts.

Proprietary Treatment/storage devices will be installed as far downstream as possible within each drainage area to allow for filtration of runoff. The device chosen for use of this project are manufactured by Kristar Enterprises and are sold under the trade name of CUDO. Detailed information for this product is contained in Appendix F. The existing soil conditions are not conducive to infiltration, but a layer of permeable material will be placed underneath the CUDO structures to allow possible filtration. Piping will be placed within the permeable section to collect water and transmit it to the adjacent storm drain system.

The systems are designed and constructed to substantially treat the stormwaters and meet the criteria of medium to high efficiency for the removal of the expected pollutants. Sand filtration has a low to medium efficiency for removal of nutrients; however, the additional storage of the storm mitigation vault will retain and infiltrate to help meet the medium to high requirement.

Inspection and Maintenance

Routine maintenance of the onsite drainage facilities should take place quarterly and in the late summer or early fall prior to the start of the rainy season (October 1st), and as directed in section VI. Operation and Maintenance Responsibility for Treatment Control BMPs of this WQMP. The drainage facilities must be cleaned of accumulated sediment/debris if any fills 25% or more of the sediment/debris storage capacity. Catch basin inserts shall be cleaned quarterly, monthly during the rain season, and inspected after each rain.

Table 3: Treatment Control BMP Selection Matrix

Pollutant of Concern		Treatment Control BMP Categories[9]							
		Veg. Swale /Veg. Filter Strips [2]	**Detention Basins[2]**	**Infiltration Basins/ Trenches/Porous Pavement[3][10] [4}**	**Wet Ponds or Wetlands**	**Sand Filter or Filtration**	**Water Quality Inlets**	**Hydrodynamic Separator Systems [4]**	**Manufactured/ Proprietary Devices**
Sediment/Turbidity		H/M	M	H/M	H/M	H/M	L	H/M (L for turbidity)	U
Yes/No?	No								
Nutrients		L	M	H/M	H/M	L/M	L	L	U
Yes/No?	Yes			X[1]		X			
Organic Compounds		U	U	U	U	H/M	L	L	U
Yes/No?	No								
Trash & Debris		L	M	U	U	H/M	M	H/M	U
Yes/No?	No								
Oxygen Demanding Substances		L	M	H/M	H/M	H/M	L	L	U
Yes/No?	Yes					X			
Bacteria & Viruses		U	U	H/M	U	H/M	L	L	U
Yes/No?	Yes					X			
Oils & Grease		H/M	M	U	U	H/M	M	L/M	U
Yes/No?	No								
Pesticides (non-soil bound)		U	U	U	U	U	L	L	U
Yes/No?	Yes					X			
Metals		H/M	M	H	H	H	L	L	U
Yes/No?	Yes					X			

[1] This represents the additional storage of the Design Volume below the proposed bioretention facilities, where the volume will infiltrate over time.

Abbreviations:
L: Low removal efficiency
H/M: High or medium removal efficiency U: Unknown removal efficiency
Notes:

(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.
(2) Includes grass swales, grass strips, wetland vegetation swales, and bioretention.
(3) Includes extended/dry detention basins with grass lining and extended/dry detention basins with impervious lining. Effectiveness based upon minimum 36-48-hour drawdown time.
(4) (4) Includes infiltration basins, filtration trenches, and porous pavements. {{ Underground Detention system }}
(5) Includes permanent pool wet ponds and constructed wetlands.
(6) Includes sand filters and media filters.
(7) Also known as hydrodynamic devices, baffle boxes, swirl concentrators, or cyclone separators.
(8) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this WQMP, or newly developed/emerging stormwater treatment technologies.
(9) Project proponents should base BMP designs on the Riverside County Stormwater Quality Best Management Practice Design Handbook. However, project proponents may also wish to reference the California Stormwater BMP Handbook – New Development and Redevelopment (www.cabmphandbooks.com). The Handbook contains additional information on BMP operation and maintenance.
(10) Note: Projects that will utilize infiltration-based Treatment Control BMPs (e.g., Infiltration Basins, Filtration trenches, Porous Pavement) must include a copy of the property/project soils report as Appendix E to the FINAL project- specific WQMP. The selection of a Treatment Control BMP (or BMPs) for the project must specifically consider the effectiveness of the Treatment Control BMP for pollutants identified as causing an impairment of Receiving Waters to which the project will discharge Urban Runoff.

V.4 Equivalent Treatment Control Alternatives

NOT APPLICABLE

V.5 Regionally-Based Treatment Control BMPs

NOT APPLICABLE.

VI. Operation and Maintenance Responsibility for Treatment Control BMPs

The project proposes the use of an underground storm chamber system, which will be incorporated with the onsite storm water collection system as the primary treatment control BMPs. The systems will be maintained by the owner through its duly authorized manager, contractor or agent. A preliminary maintenance schedule is offered below. Records of BMP inspectors, maintenance and water quality monitoring will be kept on file with the property manager.

Treatment Control BMPs	Inspection Frequency	Maintenance
Fertilizers and Pesticides	Fertilizer and Pesticide usage shall be consistent with the instructions contained on product labels and with regulations administered by California's Department of Pesticide Regulation. Pesticide use shall be at a minimum and should not be applied prior to rainfall events	
Catch Basins with Inserts	Quarterly, monthly during the rain season and after all rain events	Clean trash and debris from insert, excavate, pump or vacuum sediments
Landscape grass/ vegetated swales	Weekly inspection and maintenance during construction. Quarterly inspection and weekly maintenance project completion	Requires inspection of sediment buildup. Mow, weed, trim and remove accumulation of trash and debris. Blow waste onto landscape areas and sweep up, do not blow into street or near drainage inlets.
Storm Drains	Annually	Excavate, pump or vacuum sediments
Underground Detention System	Quarterly and early fall prior to October 1	Jetvac sediments in chambers

The above schedule is preliminary in nature. Frequency of inspection and maintenance of the facilities can be altered to respond to rainstorm events, type and quantity of debris found in the system and to adjust to site specific needs or demands.

The owner will conduct visual inspections of the source control and treatment control BMPs in accordance with schedule set forth on above. Operations of the BMPs listed in this WQMP will commence at the start of, during and after construction. Once the project is completed and the BMPs implemented the measures set forth on this WQMP will continue perpetuity. Water quality monitoring is not proposed as part of this project.

The owner will conduct visual inspections of the source control and treatment control BMPs in accordance with the schedule set forth on the Table above. Water quality monitoring is not proposed as part of this project.

Typical Inspection and Maintenance Procedures

All inspection and maintenance procedures shall be conducted in a safe manner in conformance with all local, State and Federal laws and guidelines.

Catch Basins

1. Inspect catch basins and manholes upstream of infiltration chambers for sediment.
2. Remove grate or cover.
3. Remove trash and debris from catch basin insert.
4. Skim off oils and floatables.
5. Using a tape measure, measure the depth of sediment.
6. If sediment is at a depth greater than 6" proceed to step 7. If not proceed to step 8.
7. Vacuum or manually remove sediment.
8. Replace grate
9. Record depth and date and schedule next inspection.

Underground Detention System

Step 1 - Inspect for sediment

A) Inspection manholes
   - Remove lid from frame.
   - Using a flashlight and stadia rod, measure depth of sediment.
   - If sediment is at, or above 3 inch depth proceed to Step 2. If not proceed to Step 3.

B) Pipes
C) Remove cover from manhole at upstream end.
D) Using a flashlight, inspect pipelines.
E) Mirrors on poles or cameras may be used to avoid a confined space entry.
F) Follow OSHA regulations for confined space entry if entering manhole.
G) If sediment depth is greater than 25% of the pipe diameter, proceed to Step 2. If not, proceed to Step 3.

Step 2 - Clean out pipelines using the JetVac or similar process.

A) A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable.
B) Apply multiple passes of JetVac until backflush water is clean.

Step 3 - Replace manhole lids.

Step 4 - Dispose of vacuumed waste at the appropriate City/County disposal site.

Maintenance Records

Records of inspection and maintenance of the onsite Treatment Control BMPs will be maintained by the owner/property manager. Records will be kept onsite at the property manager's office. Until the property manager is established, records will be maintained by the owner / property manager and shall maintain a minimum of a three year history.

The following is a sample of the appropriate guidelines for maintenance and serves as a record –keeping document and is the full responsibility and accountability of the Owner . See herein as attached / Inspection Checklist

Inspection and Maintenance Checklist

DATE OF INSPECTION: TIME DATE: AM/PM CIRCLE
INSPECTED BY:

PRINT NAME _____

SIGNATURE _____

The designated Site Inspector shall use the following guidelines, Section VI of the WQMP and sheets in Appendix D for maintenance, inspection, and repair of BMPs identified in the WQMP. Include any comments in the box to the right, including reparations made or needed. If reparations are needed, please provide a follow up date. The completed checklist shall be filed in order to keep a record of what was done.

BEST MANAGEMENT PRACTICE	INSPECTION FREQUENCY	MAINTENANCE FREQUENCY	OBSERVATIONS /COMMENTS
Educate Operators, Tenants, Contractors or Employees	Annually in September (before rainy season)	N/A	
Activity restrictions	Annually in September (before rainy season)	N/A	
Irrigation systems and landscape maintenance	monthly	As needed based on maintenance indicators	
Pesticides	Annually	N/A	Review application procedures with Landscape Maintenance Company
Common area litter control	n/a	Routine litter pick up	
Street sweeping of parking lots	N/A	Bi –monthly coordinate with the city street sweeping	
Protect slopes and channels	Annually in September before rainy season	As needed planting and removal of debris and silt accumulation and repair vegetation as needed in eroded areas	
Trash storage areas	- Weekly - As needed	Coordinate weekly trash pick-up; - Inspect dumpsters to be leak proof - keep lids closed	

BEST MANAGEMENT PRACTICE	INSPECTION FREQUENCY	MAINTENANCE FREQUENCY	OBSERVATIONS /COMMENTS
Catch Basins with Inserts	Quarterly and after all storm events	After each rain / major storm event; see that the outfall inlet is kept clear of debris. All CB inserts need to be maintained and either cleaned or replaced as necessary	
Underground Detention System	Quarterly and early fall prior to October 1	Ensure that water entering the system is not polluted with onsite debris that has been lying near the inlets. (see notes below)	

- Do not blow any grass clippings or any other waste into the areas of the inlet of the Underground Storm Chamber System
- A major storm event is any storm that results in 1.90 inches of rain or more in a 24 hour period; maintenance of the Underground Storm Chamber System needs to be addressed after these major events
- It is the full responsibility of the owner to see that all M/O for all BMPS are implemented to the satisfaction and full requirements of this WQMP
- The Developer / owner shall comply and follow the manufacturer's guidelines/ recommendations / procedures for the efficient and designed required maintenance of the underground storm chamber system. An Inspection and Maintenance Guideline from the manufacturer is included in Appendix D.

BMP TRAINING ACKNOWLEDGEMENT FORM

By signing this form, the undersigned certifies that he/she has received the listed materials and training to meet the requirements for the operation and maintenance of BMPS that he/she is responsible for. The undersigned also acknowledges that punitive actions may be imposed if he/she fails to comply. The punitive actions can be in terms of a monetary fine or termination of the contract or the rights that are contractually transferred to the undersigned. If necessary, the owner or public agencies may complete the corrective actions and bill the undersigned; if necessary the owner or public agencies may complete corrective actions and bill the undersigned

ITEM	TRAINING DESCRIPTION	RELATED BMPS	HANDOUT MATERIALS	COMMENTS

BUSINESS NAME _____ Title/position _____

Signature _____ Date _____

EDUCATIONAL LOG

NAME	DATE	WQMP MATERIALS PROVIDED

VII. Funding

The owner will privately fund the operation and maintenance for treatment control BMPs. The owner will advise a potential new property owner or tenant of the responsibility to maintain and operate Treatment Control BMPs listed in the Water Quality Management Plan.

Project Owner / Developer

JIM KIECKHAFER
GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC
6201 OAK CANYON, SUITE 250
IRVINE, CA 92618
949-270-7800

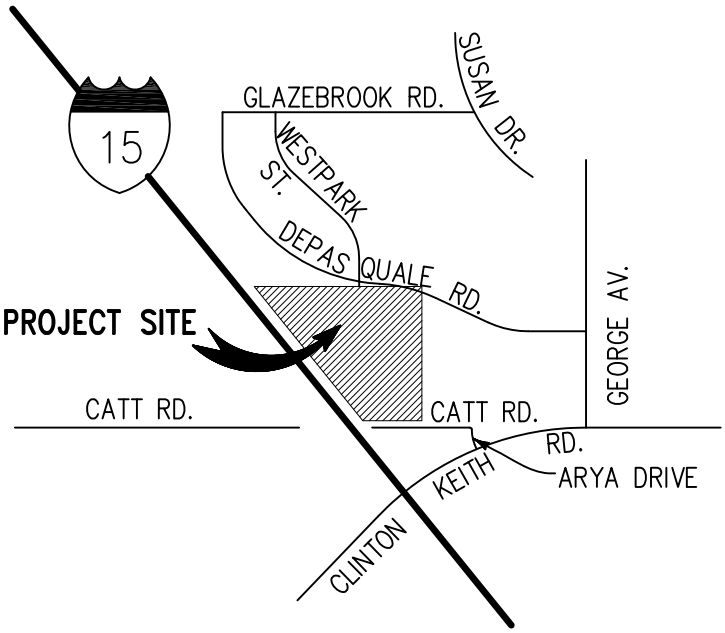
APPENDIX A

Conditions of Approval
(Preliminary – Not Available)

APPENDIX B

Vicinity Map

Site/ WQMP Plan



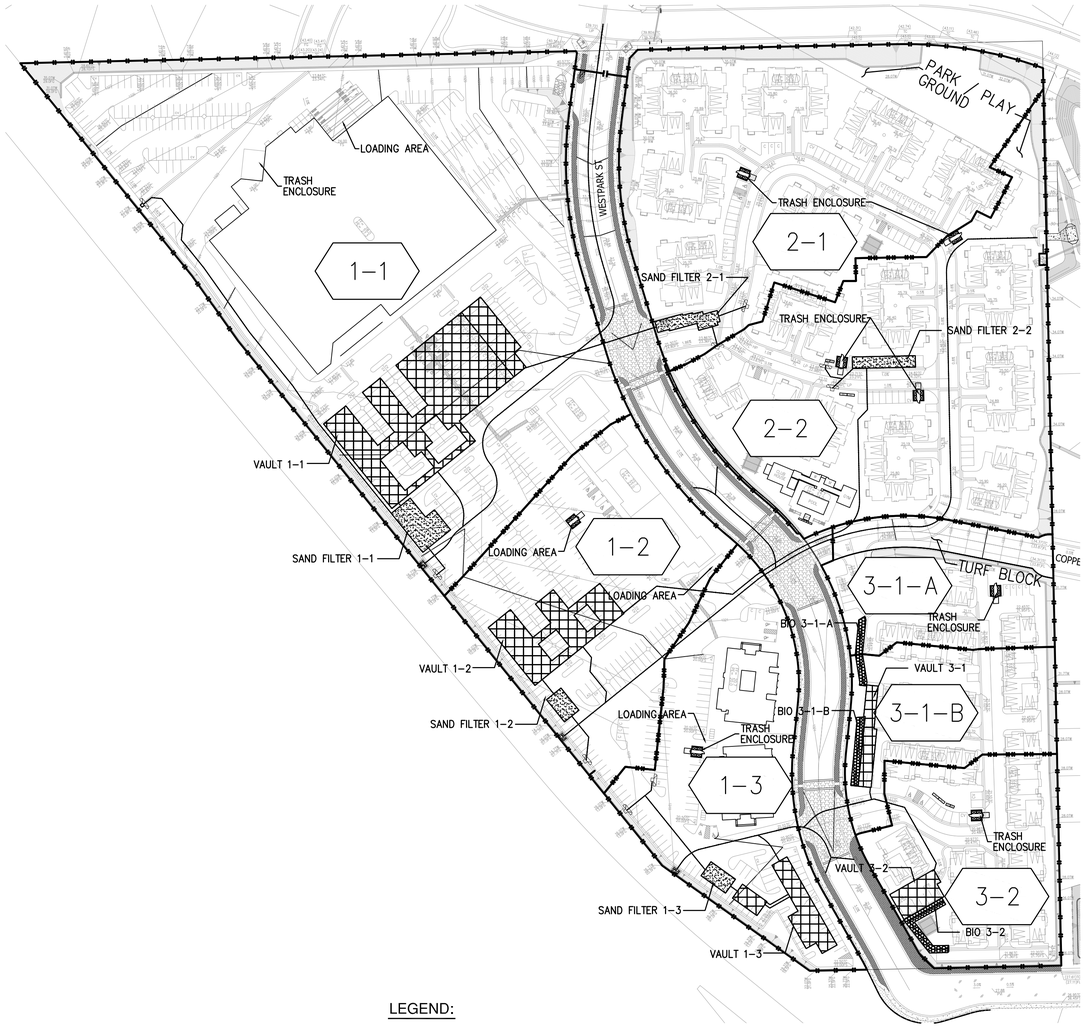
VICINITY MAP

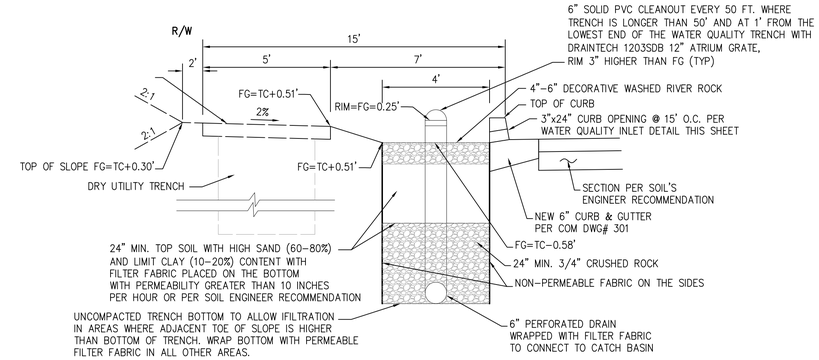
NOT TO SCALE
SEC. 36, T.6S, R.4W

WESTPARK PROMENADE
WILDOMAR, CA
PA 13-0082

PACIFIC COAST LAND CONSULTANTS, Inc.
CIVIL ENGINEERING * LAND PLANNING * LAND SURVEYING
25096 JEFFERSON AVENUE SUITE "D"
MURRIETA, CALIFORNIA 92562
TEL. (951) 698-1350

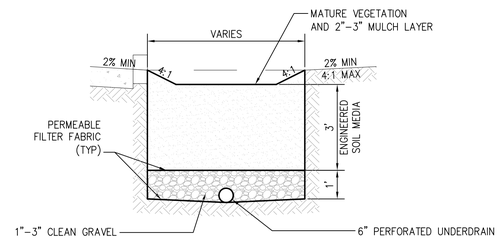
S:\Land Projects 2004\27210 CLINTON KEITH 26\DWG\15-EXHIBITS\VICMAP-8X11.dwg 8-11-14 04:21:46 PM





CITY WATER QUALITY TRENCH TYPICAL SECTION

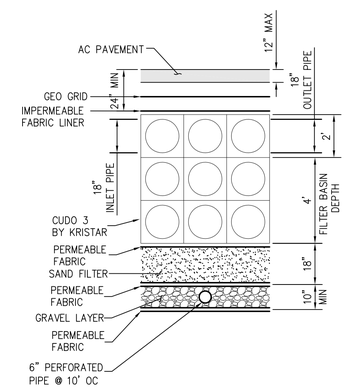
NOT TO SCALE



BIORETENTION FACILITY WITH UNDERDRAIN BMP

DMA'S 3–1–A, 3–1–B & 3–2

NOT TO SCALE



TYPICAL SECTION SAND FILTER WITH UNDERDRAIN BMP

DMA'S 1–1, 1–2, 1–3, 2–1 & 2–2

NOT TO SCALE

LEGEND:

- 1–1 — DRAINAGE MANAGEMENT AREA
- DMA BOUNDARY
- UNDERGROUND DETENTION VAULT
- SAND FILTER
- BIORETENTION AREA
- CITY WATER QUALITY TRENCH

DRAINAGE MGMT. AREA	IMPERVIOUS AREA–A_I (AC)	PERVIOUS AREA–A_P (AC)	TOTAL AREA–A_T (AC)	A_I %	A_P %	BMP VOLUME CF	SAND FILTER AREA REQ'D. SF	SAND FILTER AREA PROV'D SF	BIORETENTION AREA REQ'D SF	BIORETENTION AREA PROV'D SF	STORM VAULT AREA REQ'D SF	VAULT DEPTH FT	STORM VAULT AREA PROV'D SF
1–1	6.60	1.51	8.11	81.3	18.7	12,659	3,165	3,200	–	–	28,561	6	28,934
1–2	2.05	0.47	2.52	81.3	18.7	3,933	983	1,040	–	–	10,000	6	10,048
1–3	1.86	0.43	2.29	81.3	18.7	3,574	894	1,000	–	–	5,184	6	5,230
2–1	2.93	1.25	4.18	70.1	29.9	5,462	1,366	1,400	–	–	SEE DMA	1–1	–
2–2	2.86	1.32	4.08	70.1	29.9	5,332	1,333	1,400	–	–	SEE DMA	1–2	–
3–1–A	0.88	0.33	1.21	72.7	27.3	1,625	–	–	940	940	2,401	8	2,404
3–1–B	0.84	0.31	1.15	72.7	27.3	1,545	–	–	894	940	SEE DMA	3–1–A	–
H	1.16	0.43	1.59	72.7	27.3	2,136	–	–	1,235	1,300	2,704	8	2,704

GRAPHIC SCALE

100 0 50 100 200 300

1 inch = 100 ft.

DIGALERT

DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG

TOLL FREE 1-800-227-2600

A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:

WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

The private engineer signing these plans is responsible for assuring the accuracy and acceptability of the design hereon. In the event of discrepancies arising after city acceptance or during construction, the private engineer shall be responsible for determining an acceptable solution and revising the plans for acceptance by the city.

MARK	BY	DATE	REVISIONS	APPR.	DATE

ENGINEER — CITY

CITY OF WILDOMAR

ACCEPTED BY:

Date:

DANIEL YORK, Director of Public Works

ACCEPTANCE AS TO CONFORMANCE WITH APPLICABLE CITY STANDARDS AND PRACTICES

SEAL–ENGINEER:

REGISTERED PROFESSIONAL ENGINEER — TRAVIS P. VINCENT JR. — No. 37356 Exp. 6/30/16 — CIVIL — STATE OF CALIFORNIA

PACIFIC COAST LAND CONSULTANTS, Inc.
CIVIL ENGINEERING • LAND PLANNING • LAND SURVEYING
25096 JEFFERSON AVENUE SUITE "D"
MURRIETA, CALIFORNIA 92562
TEL. (951) 698–1350

PREPARED BY: TRAVIS P. VINCENT JR.

R.C.E. No. 37356 EXP. 6–30–16

BENCHMARK:
Elevation = _____
Datum = _____
BENCHMARK # _____

THIS SURVEY WAS PERFORMED ON (date) BY (surveyor) L.S. (number), EXP. (date)

SCALE: H: As Noted V: As Noted

CITY OF WILDOMAR

WESTPARK PROMENADE

PRELIMINARY WQMP SITE PLAN

SHEET No. 1 OF 1 SHTS

S:\Land Projects 2004\27210 CLINTON KEITH 28\DWG\13-WQMP\SITE_WQMP.dwg 4-14-16 10:26:51 AM

APPENDIX C

Supporting Detail Related to Hydraulic Conditions of Concern

PRELIMINARY HYDROLOGY

The proposed facilities are designed to satisfy condition C of the hydrologic conditions of concern.

The volume to be detained is determined by a comparison of flow duration curves between the existing condition and the mitigated and developed condition. As required by the MS4 permit, we have utilized the Santa Margarita Region Hydrology Model to resize the facilities. The following pages contain the SMRHM reports for the various drainage maintenance areas.

FINDINGS

DMA	VAULT AREA REQUIRED (SF)	DMA AREA PROVIDED (SF)	VAULT DEPTH	ORIFICE SIZE AND DEPTH
DMA 1-1 AND 2-1	28,561	28,934	6’	1.58” @ 0’ 0.2” @ 4.15’
DMA 1-2 AND 2-2	10,000	10,048	6’	1.22” @ 0’ 0.2” @3.75’
DMA 1-3	5,184	5,230	6’	0.69’ @ 0’ 0.2’ @ 3.75’
DMA 3-1	2,401	2,404	8’	0.67” @ 0’ 0.2” @ 5.65’
DMA 3-2	2,704	2,704	8’	0.50” @ 0’ 0.2” @ 6.45’

SMRHM

PROJECT REPORT

General Model Information

Project Name:	Westpark1-1
Site Name:	Westpark Promenade
Site Address:	PA 13-0082
City:	Wildomar
Report Date:	4/13/2016
Gage:	Wildomar / North Murrieta
Data Start:	1949/10/01
Data End:	2011/09/30
Timestep:	15 Minute
Precip Scale:	1.00
Version Date:	2016/04/05

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data

Predeveloped Land Use

DMA 1-1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Shrub,Mod(5-10%)	11.43
Pervious Total	11.43
Impervious Land Use	acre
Impervious Total	0
Basin Total	11.43

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

DMA 1-1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Urban,Flat(0-5%)	1.36
Pervious Total	1.36
Impervious Land Use	acre
Roof Area	2.07
Parking,Flat(0-5%)	4.53
Impervious Total	6.6
Basin Total	7.96

Element Flows To:

Surface	Interflow	Groundwater
Sand Filter 1-1	Sand Filter 1-1	

DMA 2-1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Urban,Flat(0-5%)	1.25
Pervious Total	1.25
Impervious Land Use	acre
Roof Area	1.15
Parking,Flat(0-5%)	1.78
Impervious Total	2.93
Basin Total	4.18

Element Flows To:

Surface	Interflow	Groundwater
Sand Filter 2-1	Sand Filter 2-1	

Routing Elements

Predeveloped Routing

Mitigated Routing

Sand Filter 1-1

Bottom Length:	100.00 ft.
Bottom Width:	32.00 ft.
Depth:	4 ft.
Side slope 1:	0 To 1
Side slope 2:	0 To 1
Side slope 3:	0 To 1
Side slope 4:	0 To 1
Filtration On	
Hydraulic conductivity:	3
Depth of filter medium:	2.5

Total Volume Infiltrated (ac-ft.):	279.999
Total Volume Through Riser (ac-ft.):	56.073
Total Volume Through Facility (ac-ft.):	336.072
Percent Infiltrated:	83.32
Total Precip Applied to Facility:	0
Total Evap From Facility:	0

Discharge Structure	
Riser Height:	3 ft.
Riser Diameter:	18 in.
Element Flows To:	
Outlet 1	Outlet 2
Vault 1-1	Vault 1-1

Sand Filter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.073	0.000	0.000	0.000
0.0444	0.073	0.003	0.000	0.226
0.0889	0.073	0.006	0.000	0.230
0.1333	0.073	0.009	0.000	0.234
0.1778	0.073	0.013	0.000	0.238
0.2222	0.073	0.016	0.000	0.242
0.2667	0.073	0.019	0.000	0.245
0.3111	0.073	0.022	0.000	0.249
0.3556	0.073	0.026	0.000	0.253
0.4000	0.073	0.029	0.000	0.257
0.4444	0.073	0.032	0.000	0.261
0.4889	0.073	0.035	0.000	0.265
0.5333	0.073	0.039	0.000	0.269
0.5778	0.073	0.042	0.000	0.273
0.6222	0.073	0.045	0.000	0.277
0.6667	0.073	0.049	0.000	0.281
0.7111	0.073	0.052	0.000	0.285
0.7556	0.073	0.055	0.000	0.289
0.8000	0.073	0.058	0.000	0.293
0.8444	0.073	0.062	0.000	0.297
0.8889	0.073	0.065	0.000	0.301
0.9333	0.073	0.068	0.000	0.305
0.9778	0.073	0.071	0.000	0.309
1.0222	0.073	0.075	0.000	0.313
1.0667	0.073	0.078	0.000	0.317
1.1111	0.073	0.081	0.000	0.321
1.1556	0.073	0.084	0.000	0.324
1.2000	0.073	0.088	0.000	0.328

1.2444	0.073	0.091	0.000	0.332
1.2889	0.073	0.094	0.000	0.336
1.3333	0.073	0.097	0.000	0.340
1.3778	0.073	0.101	0.000	0.344
1.4222	0.073	0.104	0.000	0.348
1.4667	0.073	0.107	0.000	0.352
1.5111	0.073	0.111	0.000	0.356
1.5556	0.073	0.114	0.000	0.360
1.6000	0.073	0.117	0.000	0.364
1.6444	0.073	0.120	0.000	0.368
1.6889	0.073	0.124	0.000	0.372
1.7333	0.073	0.127	0.000	0.376
1.7778	0.073	0.130	0.000	0.380
1.8222	0.073	0.133	0.000	0.384
1.8667	0.073	0.137	0.000	0.388
1.9111	0.073	0.140	0.000	0.392
1.9556	0.073	0.143	0.000	0.396
2.0000	0.073	0.146	0.000	0.400
2.0444	0.073	0.150	0.000	0.404
2.0889	0.073	0.153	0.000	0.407
2.1333	0.073	0.156	0.000	0.411
2.1778	0.073	0.160	0.000	0.415
2.2222	0.073	0.163	0.000	0.419
2.2667	0.073	0.166	0.000	0.423
2.3111	0.073	0.169	0.000	0.427
2.3556	0.073	0.173	0.000	0.431
2.4000	0.073	0.176	0.000	0.435
2.4444	0.073	0.179	0.000	0.439
2.4889	0.073	0.182	0.000	0.443
2.5333	0.073	0.186	0.000	0.447
2.5778	0.073	0.189	0.000	0.451
2.6222	0.073	0.192	0.000	0.455
2.6667	0.073	0.195	0.000	0.459
2.7111	0.073	0.199	0.000	0.463
2.7556	0.073	0.202	0.000	0.467
2.8000	0.073	0.205	0.000	0.471
2.8444	0.073	0.209	0.000	0.475
2.8889	0.073	0.212	0.000	0.479
2.9333	0.073	0.215	0.000	0.483
2.9778	0.073	0.218	0.000	0.486
3.0222	0.073	0.222	0.052	0.490
3.0667	0.073	0.225	0.273	0.494
3.1111	0.073	0.228	0.587	0.498
3.1556	0.073	0.231	0.970	0.502
3.2000	0.073	0.235	1.404	0.506
3.2444	0.073	0.238	1.877	0.510
3.2889	0.073	0.241	2.374	0.514
3.3333	0.073	0.244	2.882	0.518
3.3778	0.073	0.248	3.386	0.522
3.4222	0.073	0.251	3.871	0.526
3.4667	0.073	0.254	4.326	0.530
3.5111	0.073	0.257	4.737	0.534
3.5556	0.073	0.261	5.097	0.538
3.6000	0.073	0.264	5.401	0.542
3.6444	0.073	0.267	5.649	0.546
3.6889	0.073	0.271	5.848	0.550
3.7333	0.073	0.274	6.014	0.554
3.7778	0.073	0.277	6.249	0.558

3.8222	0.073	0.280	6.425	0.562
3.8667	0.073	0.284	6.597	0.565
3.9111	0.073	0.287	6.764	0.569
3.9556	0.073	0.290	6.927	0.573
4.0000	0.073	0.293	7.086	0.577
4.0444	0.073	0.297	7.242	0.581

Vault 1-1

Width:	170.1 ft.	
Length:	170.1 ft.	
Depth:	6 ft.	
Infiltration On		
Infiltration rate:	0.1	
Infiltration safety factor:	0.5	
Total Volume Infiltrated (ac-ft.):		180.022
Total Volume Through Riser (ac-ft.):		312.236
Total Volume Through Facility (ac-ft.):		492.258
Percent Infiltrated:		36.57
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Discharge Structure		
Riser Height:	5 ft.	
Riser Diameter:	18 in.	
Orifice 1 Diameter:	1.58 in.	Elevation:0 ft.
Orifice 3 Diameter:	0.2 in.	Elevation:4.15 ft.
Element Flows To:		
Outlet 1	Outlet 2	

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.664	0.000	0.000	0.000
0.0667	0.664	0.044	0.017	0.033
0.1333	0.664	0.088	0.024	0.033
0.2000	0.664	0.132	0.030	0.033
0.2667	0.664	0.177	0.035	0.033
0.3333	0.664	0.221	0.039	0.033
0.4000	0.664	0.265	0.042	0.033
0.4667	0.664	0.310	0.046	0.033
0.5333	0.664	0.354	0.049	0.033
0.6000	0.664	0.398	0.052	0.033
0.6667	0.664	0.442	0.055	0.033
0.7333	0.664	0.487	0.058	0.033
0.8000	0.664	0.531	0.060	0.033
0.8667	0.664	0.575	0.063	0.033
0.9333	0.664	0.620	0.065	0.033
1.0000	0.664	0.664	0.067	0.033
1.0667	0.664	0.708	0.070	0.033
1.1333	0.664	0.752	0.072	0.033
1.2000	0.664	0.797	0.074	0.033
1.2667	0.664	0.841	0.076	0.033
1.3333	0.664	0.885	0.078	0.033
1.4000	0.664	0.929	0.080	0.033
1.4667	0.664	0.974	0.082	0.033
1.5333	0.664	1.018	0.083	0.033
1.6000	0.664	1.062	0.085	0.033
1.6667	0.664	1.107	0.087	0.033
1.7333	0.664	1.151	0.089	0.033
1.8000	0.664	1.195	0.090	0.033
1.8667	0.664	1.239	0.092	0.033
1.9333	0.664	1.284	0.094	0.033
2.0000	0.664	1.328	0.095	0.033
2.0667	0.664	1.372	0.097	0.033

2.1333	0.664	1.417	0.098	0.033
2.2000	0.664	1.461	0.100	0.033
2.2667	0.664	1.505	0.102	0.033
2.3333	0.664	1.549	0.103	0.033
2.4000	0.664	1.594	0.104	0.033
2.4667	0.664	1.638	0.106	0.033
2.5333	0.664	1.682	0.107	0.033
2.6000	0.664	1.727	0.109	0.033
2.6667	0.664	1.771	0.110	0.033
2.7333	0.664	1.815	0.112	0.033
2.8000	0.664	1.859	0.113	0.033
2.8667	0.664	1.904	0.114	0.033
2.9333	0.664	1.948	0.116	0.033
3.0000	0.664	1.992	0.117	0.033
3.0667	0.664	2.037	0.118	0.033
3.1333	0.664	2.081	0.119	0.033
3.2000	0.664	2.125	0.121	0.033
3.2667	0.664	2.169	0.122	0.033
3.3333	0.664	2.214	0.123	0.033
3.4000	0.664	2.258	0.124	0.033
3.4667	0.664	2.302	0.126	0.033
3.5333	0.664	2.347	0.127	0.033
3.6000	0.664	2.391	0.128	0.033
3.6667	0.664	2.435	0.129	0.033
3.7333	0.664	2.479	0.130	0.033
3.8000	0.664	2.524	0.132	0.033
3.8667	0.664	2.568	0.133	0.033
3.9333	0.664	2.612	0.134	0.033
4.0000	0.664	2.656	0.135	0.033
4.0667	0.664	2.701	0.136	0.033
4.1333	0.664	2.745	0.137	0.033
4.2000	0.664	2.789	0.139	0.033
4.2667	0.664	2.834	0.140	0.033
4.3333	0.664	2.878	0.141	0.033
4.4000	0.664	2.922	0.142	0.033
4.4667	0.664	2.966	0.143	0.033
4.5333	0.664	3.011	0.144	0.033
4.6000	0.664	3.055	0.146	0.033
4.6667	0.664	3.099	0.147	0.033
4.7333	0.664	3.144	0.148	0.033
4.8000	0.664	3.188	0.149	0.033
4.8667	0.664	3.232	0.150	0.033
4.9333	0.664	3.276	0.151	0.033
5.0000	0.664	3.321	0.152	0.033
5.0667	0.664	3.365	0.427	0.033
5.1333	0.664	3.409	0.926	0.033
5.2000	0.664	3.454	1.560	0.033
5.2667	0.664	3.498	2.280	0.033
5.3333	0.664	3.542	3.040	0.033
5.4000	0.664	3.586	3.790	0.033
5.4667	0.664	3.631	4.485	0.033
5.5333	0.664	3.675	5.084	0.033
5.6000	0.664	3.719	5.562	0.033
5.6667	0.664	3.764	5.917	0.033
5.7333	0.664	3.808	6.177	0.033
5.8000	0.664	3.852	6.503	0.033
5.8667	0.664	3.896	6.762	0.033
5.9333	0.664	3.941	7.012	0.033

6.0000	0.664	3.985	7.254	0.033
6.0667	0.664	4.029	7.487	0.033
6.1333	0.000	0.000	7.713	0.000

Sand Filter 2-1

Bottom Length:	24.00 ft.	
Bottom Width:	58.00 ft.	
Depth:	4 ft.	
Side slope 1:	0 To 1	
Side slope 2:	0 To 1	
Side slope 3:	0 To 1	
Side slope 4:	0 To 1	
Filtration On		
Hydraulic conductivity:	3	
Depth of filter medium:	2.5	
Total Volume Infiltrated (ac-ft.):		126.52
Total Volume Through Riser (ac-ft.):		29.712
Total Volume Through Facility (ac-ft.):		156.232
Percent Infiltrated:		80.98
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Discharge Structure		
Riser Height:	3 ft.	
Riser Diameter:	18 in.	
Element Flows To:		
Outlet 1	Outlet 2	
Vault 1-1	Vault 1-1	

Sand Filter Hydraulic Table

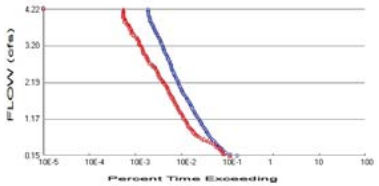
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.032	0.000	0.000	0.000
0.0444	0.032	0.001	0.000	0.098
0.0889	0.032	0.002	0.000	0.100
0.1333	0.032	0.004	0.000	0.101
0.1778	0.032	0.005	0.000	0.103
0.2222	0.032	0.007	0.000	0.105
0.2667	0.032	0.008	0.000	0.107
0.3111	0.032	0.009	0.000	0.108
0.3556	0.032	0.011	0.000	0.110
0.4000	0.032	0.012	0.000	0.112
0.4444	0.032	0.014	0.000	0.113
0.4889	0.032	0.015	0.000	0.115
0.5333	0.032	0.017	0.000	0.117
0.5778	0.032	0.018	0.000	0.119
0.6222	0.032	0.019	0.000	0.120
0.6667	0.032	0.021	0.000	0.122
0.7111	0.032	0.022	0.000	0.124
0.7556	0.032	0.024	0.000	0.125
0.8000	0.032	0.025	0.000	0.127
0.8444	0.032	0.027	0.000	0.129
0.8889	0.032	0.028	0.000	0.131
0.9333	0.032	0.029	0.000	0.132
0.9778	0.032	0.031	0.000	0.134
1.0222	0.032	0.032	0.000	0.136
1.0667	0.032	0.034	0.000	0.137
1.1111	0.032	0.035	0.000	0.139
1.1556	0.032	0.036	0.000	0.141
1.2000	0.032	0.038	0.000	0.143
1.2444	0.032	0.039	0.000	0.144
1.2889	0.032	0.041	0.000	0.146

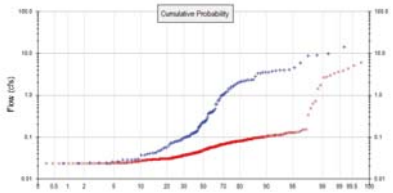
1.3333	0.032	0.042	0.000	0.148
1.3778	0.032	0.044	0.000	0.149
1.4222	0.032	0.045	0.000	0.151
1.4667	0.032	0.046	0.000	0.153
1.5111	0.032	0.048	0.000	0.155
1.5556	0.032	0.049	0.000	0.156
1.6000	0.032	0.051	0.000	0.158
1.6444	0.032	0.052	0.000	0.160
1.6889	0.032	0.054	0.000	0.162
1.7333	0.032	0.055	0.000	0.163
1.7778	0.032	0.056	0.000	0.165
1.8222	0.032	0.058	0.000	0.167
1.8667	0.032	0.059	0.000	0.168
1.9111	0.032	0.061	0.000	0.170
1.9556	0.032	0.062	0.000	0.172
2.0000	0.032	0.063	0.000	0.174
2.0444	0.032	0.065	0.000	0.175
2.0889	0.032	0.066	0.000	0.177
2.1333	0.032	0.068	0.000	0.179
2.1778	0.032	0.069	0.000	0.180
2.2222	0.032	0.071	0.000	0.182
2.2667	0.032	0.072	0.000	0.184
2.3111	0.032	0.073	0.000	0.186
2.3556	0.032	0.075	0.000	0.187
2.4000	0.032	0.076	0.000	0.189
2.4444	0.032	0.078	0.000	0.191
2.4889	0.032	0.079	0.000	0.192
2.5333	0.032	0.081	0.000	0.194
2.5778	0.032	0.082	0.000	0.196
2.6222	0.032	0.083	0.000	0.198
2.6667	0.032	0.085	0.000	0.199
2.7111	0.032	0.086	0.000	0.201
2.7556	0.032	0.088	0.000	0.203
2.8000	0.032	0.089	0.000	0.204
2.8444	0.032	0.090	0.000	0.206
2.8889	0.032	0.092	0.000	0.208
2.9333	0.032	0.093	0.000	0.210
2.9778	0.032	0.095	0.000	0.211
3.0222	0.032	0.096	0.052	0.213
3.0667	0.032	0.098	0.273	0.215
3.1111	0.032	0.099	0.587	0.217
3.1556	0.032	0.100	0.970	0.218
3.2000	0.032	0.102	1.404	0.220
3.2444	0.032	0.103	1.877	0.222
3.2889	0.032	0.105	2.374	0.223
3.3333	0.032	0.106	2.882	0.225
3.3778	0.032	0.107	3.386	0.227
3.4222	0.032	0.109	3.871	0.229
3.4667	0.032	0.110	4.326	0.230
3.5111	0.032	0.112	4.737	0.232
3.5556	0.032	0.113	5.097	0.234
3.6000	0.032	0.115	5.401	0.235
3.6444	0.032	0.116	5.649	0.237
3.6889	0.032	0.117	5.848	0.239
3.7333	0.032	0.119	6.014	0.241
3.7778	0.032	0.120	6.249	0.242
3.8222	0.032	0.122	6.425	0.244
3.8667	0.032	0.123	6.597	0.246

3.9111	0.032	0.125	6.764	0.247
3.9556	0.032	0.126	6.927	0.249
4.0000	0.032	0.127	7.086	0.251
4.0444	0.032	0.129	7.242	0.253

Analysis Results

POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 11.43
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 2.61
Total Impervious Area: 9.53

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	1.515343
5 year	3.564265
10 year	4.218751
25 year	9.093237

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.114895
5 year	0.632807
10 year	3.100564
25 year	4.384222

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1515	3530	2474	70	Pass
0.1926	2524	1829	72	Pass
0.2337	2062	1766	85	Pass
0.2748	1859	1692	91	Pass
0.3159	1702	1600	94	Pass
0.3569	1571	1519	96	Pass
0.3980	1443	1350	93	Pass
0.4391	1345	1208	89	Pass
0.4802	1263	1091	86	Pass
0.5213	1178	956	81	Pass
0.5624	1087	829	76	Pass
0.6034	1024	685	66	Pass
0.6445	961	587	61	Pass
0.6856	896	518	57	Pass
0.7267	857	471	54	Pass
0.7678	817	437	53	Pass
0.8089	784	406	51	Pass
0.8499	749	382	51	Pass
0.8910	707	355	50	Pass
0.9321	671	337	50	Pass
0.9732	641	320	49	Pass
1.0143	611	309	50	Pass
1.0554	588	296	50	Pass
1.0964	557	284	50	Pass
1.1375	538	273	50	Pass
1.1786	521	254	48	Pass
1.2197	491	245	49	Pass
1.2608	467	238	50	Pass
1.3019	437	229	52	Pass
1.3429	423	212	50	Pass
1.3840	412	204	49	Pass
1.4251	392	197	50	Pass
1.4662	373	189	50	Pass
1.5073	362	182	50	Pass
1.5484	350	175	50	Pass
1.5894	338	165	48	Pass
1.6305	327	160	48	Pass
1.6716	306	155	50	Pass
1.7127	295	149	50	Pass
1.7538	284	145	51	Pass
1.7949	270	135	50	Pass
1.8359	253	131	51	Pass
1.8770	242	125	51	Pass
1.9181	233	120	51	Pass
1.9592	222	116	52	Pass
2.0003	214	112	52	Pass
2.0414	206	109	52	Pass
2.0824	200	107	53	Pass
2.1235	194	100	51	Pass
2.1646	190	94	49	Pass
2.2057	184	90	48	Pass
2.2468	176	85	48	Pass
2.2879	169	80	47	Pass

2.3289	167	76	45	Pass
2.3700	159	73	45	Pass
2.4111	153	70	45	Pass
2.4522	148	69	46	Pass
2.4933	143	67	46	Pass
2.5343	138	64	46	Pass
2.5754	133	61	45	Pass
2.6165	131	57	43	Pass
2.6576	131	53	40	Pass
2.6987	127	50	39	Pass
2.7398	122	45	36	Pass
2.7808	120	43	35	Pass
2.8219	113	41	36	Pass
2.8630	111	40	36	Pass
2.9041	106	39	36	Pass
2.9452	104	37	35	Pass
2.9863	99	34	34	Pass
3.0273	95	33	34	Pass
3.0684	93	32	34	Pass
3.1095	91	32	35	Pass
3.1506	89	31	34	Pass
3.1917	87	30	34	Pass
3.2328	83	28	33	Pass
3.2738	80	26	32	Pass
3.3149	79	26	32	Pass
3.3560	75	26	34	Pass
3.3971	73	24	32	Pass
3.4382	70	24	34	Pass
3.4793	67	22	32	Pass
3.5203	66	20	30	Pass
3.5614	61	18	29	Pass
3.6025	59	18	30	Pass
3.6436	57	18	31	Pass
3.6847	56	17	30	Pass
3.7258	54	17	31	Pass
3.7668	52	16	30	Pass
3.8079	50	15	30	Pass
3.8490	48	14	29	Pass
3.8901	46	13	28	Pass
3.9312	46	13	28	Pass
3.9723	45	13	28	Pass
4.0133	44	12	27	Pass
4.0544	42	12	28	Pass
4.0955	42	12	28	Pass
4.1366	41	12	29	Pass
4.1777	41	12	29	Pass
4.2188	41	12	29	Pass

Water Quality

Drawdown Time Results

Pond: Vault 1-1

Days	Stage(feet)	Percent of Total Run Time
1	0.233	8.0422
2	0.354	6.8208
3	0.496	5.7553
4	0.658	4.8377
5	0.840	4.0437

Maximum Stage: 5.694 Drawdown Time: Exceeds 5 days.

POC 2

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 3

POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 4

POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Rational Method

Company Name	Pacific Coast Land Consultants
Designed by	Chris Hopper
Company Project Number/Name	Westpark Promenade
Drainage Area Number/Name	Riverside County Flood Control Worksheets utilized for this work.
Date	4/13/16
County/City Case No.	PA 13-0082

Township
Range
Section
85th Percentile

acre	Cover Type
	Roofs
	Concrete or Asphalt
	Grouted or Gapless Paving Blocks
	Compacted Soil (e.g. unpaved parking)
	Decomposed Granite
	Permeable Paving Blocks w/ Sand Filled Gap
	Class 2 Base
	Gravel or Class 2 Permeable Base
	Pervious Concrete / Porous Asphalt
	Open and Porous Pavers
	Turf block
	Ornamental Landscaping
	Natural (A Soil)
	Natural (B Soil)
	Natural (C Soil)
	Natural (D Soil)
	Mixed Surface Types Fraction = 0.00

Calculated Values
C = 0.00
Vu = 0.00 (in * ac)/ac
Vbmp = 0 ft3
Qbmp = 0.0 ft3/s

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

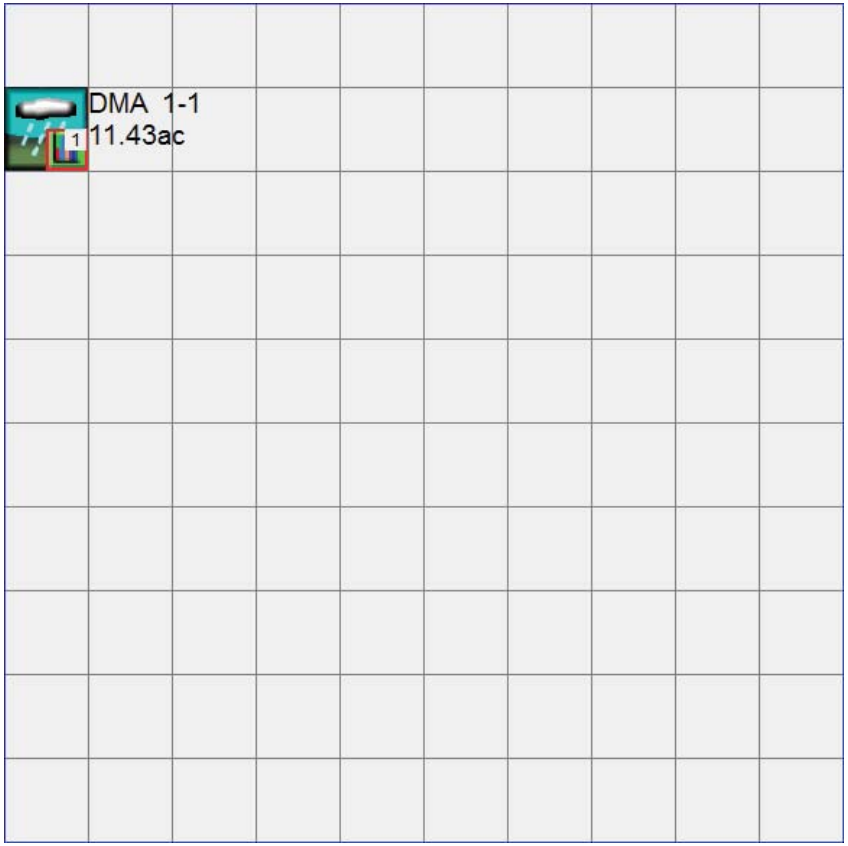
No PERLND changes have been made.

IMPLND Changes

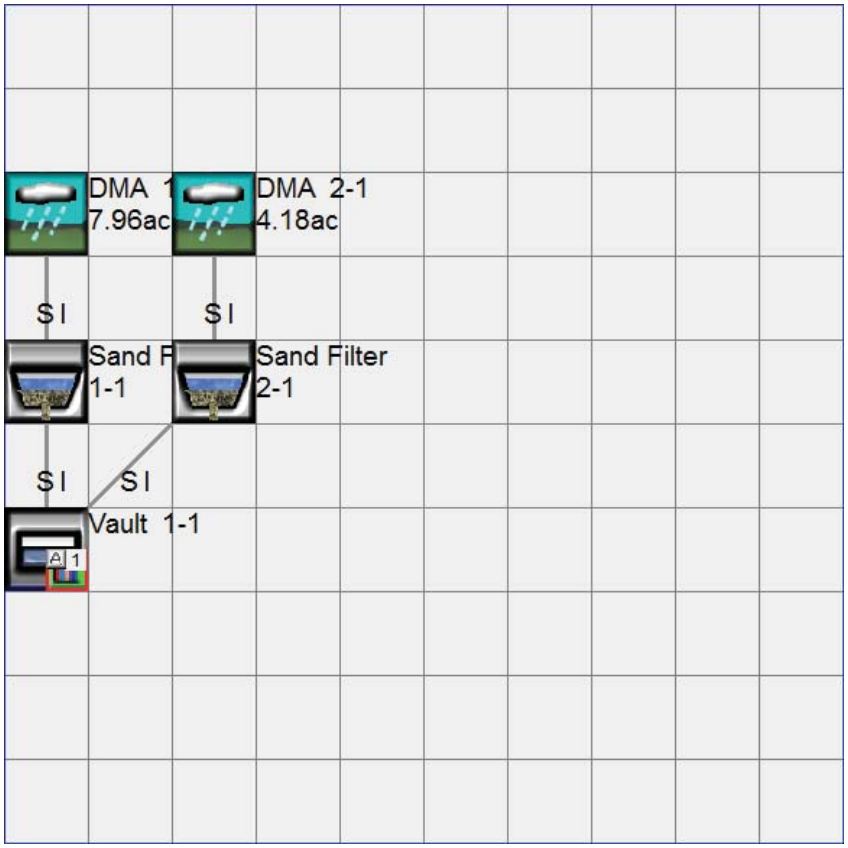
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   Westpark1-1.wdm
MESSU      25   PreWestpark1-1.MES
           27   PreWestpark1-1.L61
           28   PreWestpark1-1.L62
           30   POCWestpark1-11.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      38
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        DMA  1-1                    MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   38     C/D,Shrub,Mod(5-10%)    1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   38         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   38         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```



```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   38         0    0    0    1    0    0    0    0    1    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   38         0       4.5      0.04       350       0.1         2      0.95
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   38        40        35         3         2      0.15      0.15         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   38         0       0.7       0.3       1.2      0.45         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   38       0.5  0.5  0.5  0.6 0.65 0.65 0.65 0.65 0.65 0.65 0.55  0.5
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   38      0.13 0.13 0.13 0.14 0.15 0.15 0.15 0.15 0.15 0.15 0.14 0.13
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   38         0         0      0.01         0       0.5       0.3      0.01
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                      User  t-series Engl Metr ***
                                          in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2
```

```
  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
DMA  1-1***
PERLND  38                       11.43     COPY   501     12
PERLND  38                       11.43     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES
```



```
SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   Westpark1-1.wdm
MESSU      25   MitWestpark1-1.MES
           27   MitWestpark1-1.L61
           28   MitWestpark1-1.L62
           30   POCWestpark1-11.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      45
      IMPLND       5
      IMPLND      14
      RCHRES       1
      RCHRES       2
      RCHRES       3
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Vault  1-1                 MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                        User  t-series Engl Metr ***
                                        in  out           ***
   45     C/D,Urban,Flat(0-5%)    1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ***************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   45         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
```



```
  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   45         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   45         0    0    0    1    0    0    0    0    1    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   45                0       4.6      0.04       400      0.05         3     0.995
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   45               40        35         3         2      0.45      0.15         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   45                0       0.7      0.25         1       0.4         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   45       0.5  0.5  0.5  0.6 0.65 0.65 0.65 0.65 0.65 0.65 0.55  0.5
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   45      0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   45                0       0      0.01         0       3.5       1.7       0.1
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                      User  t-series Engl Metr ***
                                        in  out           ***
    5     Roof Area                1    1    1   27    0
   14     Parking,Flat(0-5%)       1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ***************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    5         0    0    1    0    0    0
   14         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    5         0    0    4    0    0    0    1    9
   14         0    0    4    0    0    0    1    9
```

```
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    5         0    0    0    0    0
   14         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    5            100      0.05       0.1       0.1
   14            100      0.05       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    5              0         0
   14              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    5              0         0
   14              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
DMA  1-1***
PERLND  45                        1.36     RCHRES   1      2
PERLND  45                        1.36     RCHRES   1      3
IMPLND   5                        2.07     RCHRES   1      5
IMPLND  14                        4.53     RCHRES   1      5
DMA  2-1***
PERLND  45                        1.25     RCHRES   2      2
PERLND  45                        1.25     RCHRES   2      3
IMPLND   5                        1.15     RCHRES   2      5
IMPLND  14                        1.78     RCHRES   2      5

******Routing******
RCHRES   1                           1     RCHRES   3      7
RCHRES   1                                 COPY     1     17
RCHRES   1                           1     RCHRES   3      8
RCHRES   1                                 COPY     1     18
RCHRES   2                           1     RCHRES   3      7
RCHRES   2                                 COPY     1     17
RCHRES   2                           1     RCHRES   3      8
RCHRES   2                                 COPY     1     18
RCHRES   3                           1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
```



```
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                            in  out                          ***
    1     Sand Filter  1-1-005    2    1    1    1   28    0    1
    2     Sand Filter  2-1-016    2    1    1    1   28    0    1
    3     Vault  1-1              2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ***************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
    2        0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
    3        0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.02       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.03       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.073462  0.000000  0.000000  0.000000
  0.044444  0.073462  0.003265  0.000000  0.226173
  0.088889  0.073462  0.006530  0.000000  0.230123
  0.133333  0.073462  0.009795  0.000000  0.234074
  0.177778  0.073462  0.013060  0.000000  0.238025
  0.222222  0.073462  0.016325  0.000000  0.241975
  0.266667  0.073462  0.019590  0.000000  0.245926
  0.311111  0.073462  0.022855  0.000000  0.249877
  0.355556  0.073462  0.026120  0.000000  0.253827
```

0.400000	0.073462	0.029385	0.000000	0.257778
0.444444	0.073462	0.032650	0.000000	0.261728
0.488889	0.073462	0.035915	0.000000	0.265679
0.533333	0.073462	0.039180	0.000000	0.269630
0.577778	0.073462	0.042445	0.000000	0.273580
0.622222	0.073462	0.045710	0.000000	0.277531
0.666667	0.073462	0.048975	0.000000	0.281481
0.711111	0.073462	0.052240	0.000000	0.285432
0.755556	0.073462	0.055505	0.000000	0.289383
0.800000	0.073462	0.058770	0.000000	0.293333
0.844444	0.073462	0.062034	0.000000	0.297284
0.888889	0.073462	0.065299	0.000000	0.301235
0.933333	0.073462	0.068564	0.000000	0.305185
0.977778	0.073462	0.071829	0.000000	0.309136
1.022222	0.073462	0.075094	0.000000	0.313086
1.066667	0.073462	0.078359	0.000000	0.317037
1.111111	0.073462	0.081624	0.000000	0.320988
1.155556	0.073462	0.084889	0.000000	0.324938
1.200000	0.073462	0.088154	0.000000	0.328889
1.244444	0.073462	0.091419	0.000000	0.332840
1.288889	0.073462	0.094684	0.000000	0.336790
1.333333	0.073462	0.097949	0.000000	0.340741
1.377778	0.073462	0.101214	0.000000	0.344691
1.422222	0.073462	0.104479	0.000000	0.348642
1.466667	0.073462	0.107744	0.000000	0.352593
1.511111	0.073462	0.111009	0.000000	0.356543
1.555556	0.073462	0.114274	0.000000	0.360494
1.600000	0.073462	0.117539	0.000000	0.364444
1.644444	0.073462	0.120804	0.000000	0.368395
1.688889	0.073462	0.124069	0.000000	0.372346
1.733333	0.073462	0.127334	0.000000	0.376296
1.777778	0.073462	0.130599	0.000000	0.380247
1.822222	0.073462	0.133864	0.000000	0.384198
1.866667	0.073462	0.137129	0.000000	0.388148
1.911111	0.073462	0.140394	0.000000	0.392099
1.955556	0.073462	0.143659	0.000000	0.396049
2.000000	0.073462	0.146924	0.000000	0.400000
2.044444	0.073462	0.150189	0.000000	0.403951
2.088889	0.073462	0.153454	0.000000	0.407901
2.133333	0.073462	0.156719	0.000000	0.411852
2.177778	0.073462	0.159984	0.000000	0.415802
2.222222	0.073462	0.163249	0.000000	0.419753
2.266667	0.073462	0.166514	0.000000	0.423704
2.311111	0.073462	0.169779	0.000000	0.427654
2.355556	0.073462	0.173044	0.000000	0.431605
2.400000	0.073462	0.176309	0.000000	0.435556
2.444444	0.073462	0.179574	0.000000	0.439506
2.488889	0.073462	0.182838	0.000000	0.443457
2.533333	0.073462	0.186103	0.000000	0.447407
2.577778	0.073462	0.189368	0.000000	0.451358
2.622222	0.073462	0.192633	0.000000	0.455309
2.666667	0.073462	0.195898	0.000000	0.459259
2.711111	0.073462	0.199163	0.000000	0.463210
2.755556	0.073462	0.202428	0.000000	0.467160
2.800000	0.073462	0.205693	0.000000	0.471111
2.844444	0.073462	0.208958	0.000000	0.475062
2.888889	0.073462	0.212223	0.000000	0.479012
2.933333	0.073462	0.215488	0.000000	0.482963
2.977778	0.073462	0.218753	0.000000	0.486914
3.022222	0.073462	0.222018	0.052737	0.490864
3.066667	0.073462	0.225283	0.273695	0.494815
3.111111	0.073462	0.228548	0.587805	0.498765
3.155556	0.073462	0.231813	0.970000	0.502716
3.200000	0.073462	0.235078	1.404464	0.506667
3.244444	0.073462	0.238343	1.877310	0.510617
3.288889	0.073462	0.241608	2.374724	0.514568
3.333333	0.073462	0.244873	2.882519	0.518519
3.377778	0.073462	0.248138	3.386283	0.522469
3.422222	0.073462	0.251403	3.871856	0.526420
3.466667	0.073462	0.254668	4.326027	0.530370

3.511111	0.073462	0.257933	4.737392	0.534321
3.555556	0.073462	0.261198	5.097354	0.538272
3.600000	0.073462	0.264463	5.401220	0.542222
3.644444	0.073462	0.267728	5.649420	0.546173
3.688889	0.073462	0.270993	5.848795	0.550123
3.733333	0.073462	0.274258	6.013989	0.554074
3.777778	0.073462	0.277523	6.249853	0.558025
3.822222	0.073462	0.280788	6.425940	0.561975
3.866667	0.073462	0.284053	6.597328	0.565926
3.911111	0.073462	0.287318	6.764376	0.569877
3.955556	0.073462	0.290583	6.927396	0.573827
4.000000	0.073462	0.293848	7.086668	0.577778

END FTABLE 1

FTABLE 3

92 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.664233	0.000000	0.000000	0.000000		
0.066667	0.664233	0.044282	0.017492	0.033488		
0.133333	0.664233	0.088564	0.024737	0.033488		
0.200000	0.664233	0.132847	0.030296	0.033488		
0.266667	0.664233	0.177129	0.034983	0.033488		
0.333333	0.664233	0.221411	0.039112	0.033488		
0.400000	0.664233	0.265693	0.042845	0.033488		
0.466667	0.664233	0.309976	0.046278	0.033488		
0.533333	0.664233	0.354258	0.049473	0.033488		
0.600000	0.664233	0.398540	0.052475	0.033488		
0.666667	0.664233	0.442822	0.055313	0.033488		
0.733333	0.664233	0.487105	0.058013	0.033488		
0.800000	0.664233	0.531387	0.060592	0.033488		
0.866667	0.664233	0.575669	0.063067	0.033488		
0.933333	0.664233	0.619951	0.065447	0.033488		
1.000000	0.664233	0.664233	0.067744	0.033488		
1.066667	0.664233	0.708516	0.069966	0.033488		
1.133333	0.664233	0.752798	0.072119	0.033488		
1.200000	0.664233	0.797080	0.074210	0.033488		
1.266667	0.664233	0.841362	0.076244	0.033488		
1.333333	0.664233	0.885645	0.078224	0.033488		
1.400000	0.664233	0.929927	0.080156	0.033488		
1.466667	0.664233	0.974209	0.082042	0.033488		
1.533333	0.664233	1.018491	0.083886	0.033488		
1.600000	0.664233	1.062774	0.085691	0.033488		
1.666667	0.664233	1.107056	0.087458	0.033488		
1.733333	0.664233	1.151338	0.089190	0.033488		
1.800000	0.664233	1.195620	0.090889	0.033488		
1.866667	0.664233	1.239902	0.092556	0.033488		
1.933333	0.664233	1.284185	0.094195	0.033488		
2.000000	0.664233	1.328467	0.095805	0.033488		
2.066667	0.664233	1.372749	0.097389	0.033488		
2.133333	0.664233	1.417031	0.098947	0.033488		
2.200000	0.664233	1.461314	0.100481	0.033488		
2.266667	0.664233	1.505596	0.101992	0.033488		
2.333333	0.664233	1.549878	0.103481	0.033488		
2.400000	0.664233	1.594160	0.104949	0.033488		
2.466667	0.664233	1.638443	0.106397	0.033488		
2.533333	0.664233	1.682725	0.107825	0.033488		
2.600000	0.664233	1.727007	0.109234	0.033488		
2.666667	0.664233	1.771289	0.110626	0.033488		
2.733333	0.664233	1.815571	0.112000	0.033488		
2.800000	0.664233	1.859854	0.113358	0.033488		
2.866667	0.664233	1.904136	0.114699	0.033488		
2.933333	0.664233	1.948418	0.116026	0.033488		
3.000000	0.664233	1.992700	0.117337	0.033488		
3.066667	0.664233	2.036983	0.118633	0.033488		
3.133333	0.664233	2.081265	0.119916	0.033488		
3.200000	0.664233	2.125547	0.121185	0.033488		
3.266667	0.664233	2.169829	0.122441	0.033488		
3.333333	0.664233	2.214112	0.123684	0.033488		
3.400000	0.664233	2.258394	0.124914	0.033488		
3.466667	0.664233	2.302676	0.126133	0.033488		

```
3.533333  0.664233  2.346958  0.127340  0.033488
3.600000  0.664233  2.391240  0.128536  0.033488
3.666667  0.664233  2.435523  0.129720  0.033488
3.733333  0.664233  2.479805  0.130894  0.033488
3.800000  0.664233  2.524087  0.132058  0.033488
3.866667  0.664233  2.568369  0.133211  0.033488
3.933333  0.664233  2.612652  0.134355  0.033488
4.000000  0.664233  2.656934  0.135489  0.033488
4.066667  0.664233  2.701216  0.136613  0.033488
4.133333  0.664233  2.745498  0.137728  0.033488
4.200000  0.664233  2.789781  0.139077  0.033488
4.266667  0.664233  2.834063  0.140303  0.033488
4.333333  0.664233  2.878345  0.141486  0.033488
4.400000  0.664233  2.922627  0.142644  0.033488
4.466667  0.664233  2.966910  0.143785  0.033488
4.533333  0.664233  3.011192  0.144911  0.033488
4.600000  0.664233  3.055474  0.146024  0.033488
4.666667  0.664233  3.099756  0.147125  0.033488
4.733333  0.664233  3.144038  0.148215  0.033488
4.800000  0.664233  3.188321  0.149296  0.033488
4.866667  0.664233  3.232603  0.150366  0.033488
4.933333  0.664233  3.276885  0.151428  0.033488
5.000000  0.664233  3.321167  0.152482  0.033488
5.066667  0.664233  3.365450  0.427222  0.033488
5.133333  0.664233  3.409732  0.926029  0.033488
5.200000  0.664233  3.454014  1.560057  0.033488
5.266667  0.664233  3.498296  2.280438  0.033488
5.333333  0.664233  3.542579  3.040149  0.033488
5.400000  0.664233  3.586861  3.790838  0.033488
5.466667  0.664233  3.631143  4.485664  0.033488
5.533333  0.664233  3.675425  5.084829  0.033488
5.600000  0.664233  3.719707  5.562840  0.033488
5.666667  0.664233  3.763990  5.917095  0.033488
5.733333  0.664233  3.808272  6.177565  0.033488
5.800000  0.664233  3.852554  6.503052  0.033488
5.866667  0.664233  3.896836  6.762836  0.033488
5.933333  0.664233  3.941119  7.012835  0.033488
6.000000  0.664233  3.985401  7.254083  0.033488
6.066667  0.664233  4.029683  7.487440  0.033488
END FTABLE  3
FTABLE      2
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.031956  0.000000  0.000000  0.000000
0.044444  0.031956  0.001420  0.000000  0.098385
0.088889  0.031956  0.002841  0.000000  0.100104
0.133333  0.031956  0.004261  0.000000  0.101822
0.177778  0.031956  0.005681  0.000000  0.103541
0.222222  0.031956  0.007101  0.000000  0.105259
0.266667  0.031956  0.008522  0.000000  0.106978
0.311111  0.031956  0.009942  0.000000  0.108696
0.355556  0.031956  0.011362  0.000000  0.110415
0.400000  0.031956  0.012782  0.000000  0.112133
0.444444  0.031956  0.014203  0.000000  0.113852
0.488889  0.031956  0.015623  0.000000  0.115570
0.533333  0.031956  0.017043  0.000000  0.117289
0.577778  0.031956  0.018463  0.000000  0.119007
0.622222  0.031956  0.019884  0.000000  0.120726
0.666667  0.031956  0.021304  0.000000  0.122444
0.711111  0.031956  0.022724  0.000000  0.124163
0.755556  0.031956  0.024144  0.000000  0.125881
0.800000  0.031956  0.025565  0.000000  0.127600
0.844444  0.031956  0.026985  0.000000  0.129319
0.888889  0.031956  0.028405  0.000000  0.131037
0.933333  0.031956  0.029826  0.000000  0.132756
0.977778  0.031956  0.031246  0.000000  0.134474
1.022222  0.031956  0.032666  0.000000  0.136193
1.066667  0.031956  0.034086  0.000000  0.137911
1.111111  0.031956  0.035507  0.000000  0.139630
```



```
1.155556  0.031956  0.036927  0.000000  0.141348
1.200000  0.031956  0.038347  0.000000  0.143067
1.244444  0.031956  0.039767  0.000000  0.144785
1.288889  0.031956  0.041188  0.000000  0.146504
1.333333  0.031956  0.042608  0.000000  0.148222
1.377778  0.031956  0.044028  0.000000  0.149941
1.422222  0.031956  0.045448  0.000000  0.151659
1.466667  0.031956  0.046869  0.000000  0.153378
1.511111  0.031956  0.048289  0.000000  0.155096
1.555556  0.031956  0.049709  0.000000  0.156815
1.600000  0.031956  0.051129  0.000000  0.158533
1.644444  0.031956  0.052550  0.000000  0.160252
1.688889  0.031956  0.053970  0.000000  0.161970
1.733333  0.031956  0.055390  0.000000  0.163689
1.777778  0.031956  0.056811  0.000000  0.165407
1.822222  0.031956  0.058231  0.000000  0.167126
1.866667  0.031956  0.059651  0.000000  0.168844
1.911111  0.031956  0.061071  0.000000  0.170563
1.955556  0.031956  0.062492  0.000000  0.172281
2.000000  0.031956  0.063912  0.000000  0.174000
2.044444  0.031956  0.065332  0.000000  0.175719
2.088889  0.031956  0.066752  0.000000  0.177437
2.133333  0.031956  0.068173  0.000000  0.179156
2.177778  0.031956  0.069593  0.000000  0.180874
2.222222  0.031956  0.071013  0.000000  0.182593
2.266667  0.031956  0.072433  0.000000  0.184311
2.311111  0.031956  0.073854  0.000000  0.186030
2.355556  0.031956  0.075274  0.000000  0.187748
2.400000  0.031956  0.076694  0.000000  0.189467
2.444444  0.031956  0.078114  0.000000  0.191185
2.488889  0.031956  0.079535  0.000000  0.192904
2.533333  0.031956  0.080955  0.000000  0.194622
2.577778  0.031956  0.082375  0.000000  0.196341
2.622222  0.031956  0.083796  0.000000  0.198059
2.666667  0.031956  0.085216  0.000000  0.199778
2.711111  0.031956  0.086636  0.000000  0.201496
2.755556  0.031956  0.088056  0.000000  0.203215
2.800000  0.031956  0.089477  0.000000  0.204933
2.844444  0.031956  0.090897  0.000000  0.206652
2.888889  0.031956  0.092317  0.000000  0.208370
2.933333  0.031956  0.093737  0.000000  0.210089
2.977778  0.031956  0.095158  0.000000  0.211807
3.022222  0.031956  0.096578  0.052737  0.213526
3.066667  0.031956  0.097998  0.273695  0.215244
3.111111  0.031956  0.099418  0.587805  0.216963
3.155556  0.031956  0.100839  0.970000  0.218681
3.200000  0.031956  0.102259  1.404464  0.220400
3.244444  0.031956  0.103679  1.877310  0.222119
3.288889  0.031956  0.105099  2.374724  0.223837
3.333333  0.031956  0.106520  2.882519  0.225556
3.377778  0.031956  0.107940  3.386283  0.227274
3.422222  0.031956  0.109360  3.871856  0.228993
3.466667  0.031956  0.110781  4.326027  0.230711
3.511111  0.031956  0.112201  4.737392  0.232430
3.555556  0.031956  0.113621  5.097354  0.234148
3.600000  0.031956  0.115041  5.401220  0.235867
3.644444  0.031956  0.116462  5.649420  0.237585
3.688889  0.031956  0.117882  5.848795  0.239304
3.733333  0.031956  0.119302  6.013989  0.241022
3.777778  0.031956  0.120722  6.249853  0.242741
3.822222  0.031956  0.122143  6.425940  0.244459
3.866667  0.031956  0.123563  6.597328  0.246178
3.911111  0.031956  0.124983  6.764376  0.247896
3.955556  0.031956  0.126403  6.927396  0.249615
4.000000  0.031956  0.127824  7.086668  0.251333
END FTABLE  2
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
```

```
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP
WDM     22 IRRG     ENGL    0.7       SAME PERLND  45     EXTNL  SURLI

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   3 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        7
RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17

  MASS-LINK       18
RCHRES     OFLOW  OVOL   2                 COPY           INPUT  MEAN
  END MASS-LINK   18


END MASS-LINK

END RUN
```

Mitigated HSPF Message File

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1978/ 2/10  3:45

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 1.2658E+04 1.2800E+04 1.4008E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1978/ 2/10  3:45

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 6400.0     -6.076E+04    9.4937  9.4937E+00      2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1978/ 2/10  4: 0

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 1.2658E+04 1.2800E+04 1.2855E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1978/ 2/10  4: 0

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 6400.0     -8.852E+03    1.3831  1.3831E+00      2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1978/ 3/ 1  5:45

RCHRES:     1
```



```
The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 1.2658E+04 1.2800E+04 1.4579E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1978/ 3/ 1  5:45

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 6400.0     -8.645E+04   13.508     13.508        2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1978/ 3/ 1  6:45

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 1.2658E+04 1.2800E+04 1.4016E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1978/ 3/ 1  6:45

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 6400.0     -6.111E+04    9.5492     9.5492       2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1978/ 3/ 2 13:45

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 1.2658E+04 1.2800E+04 1.3748E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1978/ 3/ 2 13:45

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 6400.0     -4.907E+04    7.6672  7.6672E+00      2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1980/ 2/13 23: 0

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 1.2658E+04 1.2800E+04 1.3517E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1980/ 2/13 23: 0

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 6400.0     -3.867E+04    6.0418  6.0418E+00      2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1980/ 2/14  7:45

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 1.2658E+04 1.2800E+04 1.8629E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1980/ 2/14  7:45

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
```



```
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 6400.0     -2.687E+05   41.984   4.1984E+01      2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1980/ 2/14  8:45

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 1.2658E+04 1.2800E+04 1.4112E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1980/ 2/14  8:45

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 6400.0     -6.543E+04   10.224   1.0224E+01      2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1980/ 2/14  7:45

RCHRES:     2

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 5.5061E+03 5568.0     6899.0
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1980/ 2/14  7:45

RCHRES:     2

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 2784.0     -6.265E+04   22.503     22.503        2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1982/11/30  9:15
```

```
RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1          V2         VOL
91 1.2658E+04 1.2800E+04 1.3212E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1982/11/30  9:15

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 6400.0     -2.496E+04    3.8995  3.8995E+00      2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1983/ 8/15 16: 0

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1          V2         VOL
91 1.2658E+04 1.2800E+04 1.3134E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1983/ 8/15 16: 0

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 6400.0     -2.141E+04    3.3459  3.3459E+00      2
```

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SMRHM

PROJECT REPORT

General Model Information

Project Name:	Westpark1-2
Site Name:	Westpark Promenade
Site Address:	PA 13-0082
City:	Wildomar
Report Date:	4/13/2016
Gage:	Wildomar / North Murrieta
Data Start:	1949/10/01
Data End:	2011/09/30
Timestep:	15 Minute
Precip Scale:	1.00
Version Date:	2016/04/05

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data

Predeveloped Land Use

DMA 1-2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Shrub,Mod(5-10%)	7.06
Pervious Total	7.06
Impervious Land Use	acre
Impervious Total	0
Basin Total	7.06

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

DMA 1-2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Urban,Flat(0-5%)	0.47
Pervious Total	0.47
Impervious Land Use	acre
Roof Area	0.81
Parking,Flat(0-5%)	1.24
Impervious Total	2.05
Basin Total	2.52

Element Flows To:

Surface	Interflow	Groundwater
Sand Filter 1-2	Sand Filter 1-2	

DMA 2-2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Urban,Flat(0-5%)	1.22
Pervious Total	1.22
Impervious Land Use	acre
Roof Area	1.27
Parking,Flat(0-5%)	1.59
Impervious Total	2.86
Basin Total	4.08

Element Flows To:

Surface	Interflow	Groundwater
Sand Filter 2-2	Sand Filter 2-2	

Routing Elements

Predeveloped Routing

Mitigated Routing

Sand Filter 1-2

Bottom Length:	26.00 ft.
Bottom Width:	40.00 ft.
Depth:	4 ft.
Side slope 1:	0 To 1
Side slope 2:	0 To 1
Side slope 3:	0 To 1
Side slope 4:	0 To 1
Filtration On	
Hydraulic conductivity:	3
Depth of filter medium:	2.5
Total Volume Infiltrated (ac-ft.):	88.037
Total Volume Through Riser (ac-ft.):	16.817
Total Volume Through Facility (ac-ft.):	104.855
Percent Infiltrated:	83.96
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	3 ft.
Riser Diameter:	18 in.
Element Flows To:	
Outlet 1	Outlet 2
Vault 1-2	Vault 1-2

Sand Filter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.023	0.000	0.000	0.000
0.0444	0.023	0.001	0.000	0.073
0.0889	0.023	0.002	0.000	0.074
0.1333	0.023	0.003	0.000	0.076
0.1778	0.023	0.004	0.000	0.077
0.2222	0.023	0.005	0.000	0.078
0.2667	0.023	0.006	0.000	0.079
0.3111	0.023	0.007	0.000	0.081
0.3556	0.023	0.008	0.000	0.082
0.4000	0.023	0.009	0.000	0.083
0.4444	0.023	0.010	0.000	0.085
0.4889	0.023	0.011	0.000	0.086
0.5333	0.023	0.012	0.000	0.087
0.5778	0.023	0.013	0.000	0.088
0.6222	0.023	0.014	0.000	0.090
0.6667	0.023	0.015	0.000	0.091
0.7111	0.023	0.017	0.000	0.092
0.7556	0.023	0.018	0.000	0.094
0.8000	0.023	0.019	0.000	0.095
0.8444	0.023	0.020	0.000	0.096
0.8889	0.023	0.021	0.000	0.097
0.9333	0.023	0.022	0.000	0.099
0.9778	0.023	0.023	0.000	0.100
1.0222	0.023	0.024	0.000	0.101
1.0667	0.023	0.025	0.000	0.103
1.1111	0.023	0.026	0.000	0.104
1.1556	0.023	0.027	0.000	0.105
1.2000	0.023	0.028	0.000	0.106

1.2444	0.023	0.029	0.000	0.108
1.2889	0.023	0.030	0.000	0.109
1.3333	0.023	0.031	0.000	0.110
1.3778	0.023	0.032	0.000	0.112
1.4222	0.023	0.034	0.000	0.113
1.4667	0.023	0.035	0.000	0.114
1.5111	0.023	0.036	0.000	0.115
1.5556	0.023	0.037	0.000	0.117
1.6000	0.023	0.038	0.000	0.118
1.6444	0.023	0.039	0.000	0.119
1.6889	0.023	0.040	0.000	0.121
1.7333	0.023	0.041	0.000	0.122
1.7778	0.023	0.042	0.000	0.123
1.8222	0.023	0.043	0.000	0.124
1.8667	0.023	0.044	0.000	0.126
1.9111	0.023	0.045	0.000	0.127
1.9556	0.023	0.046	0.000	0.128
2.0000	0.023	0.047	0.000	0.130
2.0444	0.023	0.048	0.000	0.131
2.0889	0.023	0.049	0.000	0.132
2.1333	0.023	0.050	0.000	0.133
2.1778	0.023	0.052	0.000	0.135
2.2222	0.023	0.053	0.000	0.136
2.2667	0.023	0.054	0.000	0.137
2.3111	0.023	0.055	0.000	0.139
2.3556	0.023	0.056	0.000	0.140
2.4000	0.023	0.057	0.000	0.141
2.4444	0.023	0.058	0.000	0.142
2.4889	0.023	0.059	0.000	0.144
2.5333	0.023	0.060	0.000	0.145
2.5778	0.023	0.061	0.000	0.146
2.6222	0.023	0.062	0.000	0.148
2.6667	0.023	0.063	0.000	0.149
2.7111	0.023	0.064	0.000	0.150
2.7556	0.023	0.065	0.000	0.151
2.8000	0.023	0.066	0.000	0.153
2.8444	0.023	0.067	0.000	0.154
2.8889	0.023	0.069	0.000	0.155
2.9333	0.023	0.070	0.000	0.157
2.9778	0.023	0.071	0.000	0.158
3.0222	0.023	0.072	0.052	0.159
3.0667	0.023	0.073	0.273	0.160
3.1111	0.023	0.074	0.587	0.162
3.1556	0.023	0.075	0.970	0.163
3.2000	0.023	0.076	1.404	0.164
3.2444	0.023	0.077	1.877	0.166
3.2889	0.023	0.078	2.374	0.167
3.3333	0.023	0.079	2.882	0.168
3.3778	0.023	0.080	3.386	0.169
3.4222	0.023	0.081	3.871	0.171
3.4667	0.023	0.082	4.326	0.172
3.5111	0.023	0.083	4.737	0.173
3.5556	0.023	0.084	5.097	0.174
3.6000	0.023	0.086	5.401	0.176
3.6444	0.023	0.087	5.649	0.177
3.6889	0.023	0.088	5.848	0.178
3.7333	0.023	0.089	6.014	0.180
3.7778	0.023	0.090	6.249	0.181

3.8222	0.023	0.091	6.425	0.182
3.8667	0.023	0.092	6.597	0.183
3.9111	0.023	0.093	6.764	0.185
3.9556	0.023	0.094	6.927	0.186
4.0000	0.023	0.095	7.086	0.187
4.0444	0.023	0.096	7.242	0.189

Vault 1-2

Width:	100 ft.	
Length:	100 ft.	
Depth:	6 ft.	
Infiltration On		
Infiltration rate:	0.1	
Infiltration safety factor:	2	
Total Volume Infiltrated (ac-ft.):		137.964
Total Volume Through Riser (ac-ft.):		120.339
Total Volume Through Facility (ac-ft.):		258.303
Percent Infiltrated:		53.41
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Discharge Structure		
Riser Height:	5 ft.	
Riser Diameter:	18 in.	
Orifice 1 Diameter:	1.22 in.	Elevation:0 ft.
Orifice 3 Diameter:	0.2 in.	Elevation:3.75 ft.
Element Flows To:		
Outlet 1	Outlet 2	

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.229	0.000	0.000	0.000
0.0667	0.229	0.015	0.010	0.046
0.1333	0.229	0.030	0.014	0.046
0.2000	0.229	0.045	0.018	0.046
0.2667	0.229	0.061	0.020	0.046
0.3333	0.229	0.076	0.023	0.046
0.4000	0.229	0.091	0.025	0.046
0.4667	0.229	0.107	0.027	0.046
0.5333	0.229	0.122	0.029	0.046
0.6000	0.229	0.137	0.031	0.046
0.6667	0.229	0.153	0.033	0.046
0.7333	0.229	0.168	0.034	0.046
0.8000	0.229	0.183	0.036	0.046
0.8667	0.229	0.199	0.037	0.046
0.9333	0.229	0.214	0.039	0.046
1.0000	0.229	0.229	0.040	0.046
1.0667	0.229	0.244	0.041	0.046
1.1333	0.229	0.260	0.043	0.046
1.2000	0.229	0.275	0.044	0.046
1.2667	0.229	0.290	0.045	0.046
1.3333	0.229	0.306	0.046	0.046
1.4000	0.229	0.321	0.047	0.046
1.4667	0.229	0.336	0.048	0.046
1.5333	0.229	0.352	0.050	0.046
1.6000	0.229	0.367	0.051	0.046
1.6667	0.229	0.382	0.052	0.046
1.7333	0.229	0.397	0.053	0.046
1.8000	0.229	0.413	0.054	0.046
1.8667	0.229	0.428	0.055	0.046
1.9333	0.229	0.443	0.056	0.046
2.0000	0.229	0.459	0.057	0.046
2.0667	0.229	0.474	0.058	0.046

2.1333	0.229	0.489	0.059	0.046
2.2000	0.229	0.505	0.059	0.046
2.2667	0.229	0.520	0.060	0.046
2.3333	0.229	0.535	0.061	0.046
2.4000	0.229	0.551	0.062	0.046
2.4667	0.229	0.566	0.063	0.046
2.5333	0.229	0.581	0.064	0.046
2.6000	0.229	0.596	0.065	0.046
2.6667	0.229	0.612	0.066	0.046
2.7333	0.229	0.627	0.066	0.046
2.8000	0.229	0.642	0.067	0.046
2.8667	0.229	0.658	0.068	0.046
2.9333	0.229	0.673	0.069	0.046
3.0000	0.229	0.688	0.070	0.046
3.0667	0.229	0.704	0.070	0.046
3.1333	0.229	0.719	0.071	0.046
3.2000	0.229	0.734	0.072	0.046
3.2667	0.229	0.749	0.073	0.046
3.3333	0.229	0.765	0.073	0.046
3.4000	0.229	0.780	0.074	0.046
3.4667	0.229	0.795	0.075	0.046
3.5333	0.229	0.811	0.075	0.046
3.6000	0.229	0.826	0.076	0.046
3.6667	0.229	0.841	0.077	0.046
3.7333	0.229	0.857	0.078	0.046
3.8000	0.229	0.872	0.079	0.046
3.8667	0.229	0.887	0.079	0.046
3.9333	0.229	0.903	0.080	0.046
4.0000	0.229	0.918	0.081	0.046
4.0667	0.229	0.933	0.082	0.046
4.1333	0.229	0.948	0.082	0.046
4.2000	0.229	0.964	0.083	0.046
4.2667	0.229	0.979	0.084	0.046
4.3333	0.229	0.994	0.084	0.046
4.4000	0.229	1.010	0.085	0.046
4.4667	0.229	1.025	0.086	0.046
4.5333	0.229	1.040	0.087	0.046
4.6000	0.229	1.056	0.087	0.046
4.6667	0.229	1.071	0.088	0.046
4.7333	0.229	1.086	0.089	0.046
4.8000	0.229	1.101	0.089	0.046
4.8667	0.229	1.117	0.090	0.046
4.9333	0.229	1.132	0.090	0.046
5.0000	0.229	1.147	0.091	0.046
5.0667	0.229	1.163	0.365	0.046
5.1333	0.229	1.178	0.864	0.046
5.2000	0.229	1.193	1.497	0.046
5.2667	0.229	1.209	2.217	0.046
5.3333	0.229	1.224	2.977	0.046
5.4000	0.229	1.239	3.727	0.046
5.4667	0.229	1.255	4.421	0.046
5.5333	0.229	1.270	5.020	0.046
5.6000	0.229	1.285	5.498	0.046
5.6667	0.229	1.300	5.852	0.046
5.7333	0.229	1.316	6.112	0.046
5.8000	0.229	1.331	6.437	0.046
5.8667	0.229	1.346	6.696	0.046
5.9333	0.229	1.362	6.946	0.046

6.0000	0.229	1.377	7.187	0.046
6.0667	0.229	1.392	7.420	0.046
6.1333	0.000	0.000	7.646	0.000

Sand Filter 2-2

Bottom Length:	26.00 ft.	
Bottom Width:	54.00 ft.	
Depth:	4 ft.	
Side slope 1:	0 To 1	
Side slope 2:	0 To 1	
Side slope 3:	0 To 1	
Side slope 4:	0 To 1	
Filtration On		
Hydraulic conductivity:	3	
Depth of filter medium:	2.5	
Total Volume Infiltrated (ac-ft.):		125.094
Total Volume Through Riser (ac-ft.):		28.333
Total Volume Through Facility (ac-ft.):		153.427
Percent Infiltrated:		81.53
Total Precip Applied to Facility:		1.721
Total Evap From Facility:		0.866
Discharge Structure		
Riser Height:	3 ft.	
Riser Diameter:	18 in.	
Element Flows To:		
Outlet 1	Outlet 2	
Vault 1-2	Vault 1-2	

Sand Filter Hydraulic Table

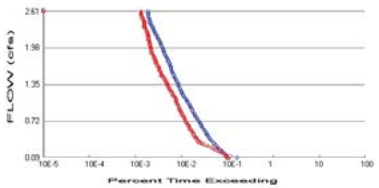
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.032	0.000	0.000	0.000
0.0444	0.032	0.001	0.000	0.099
0.0889	0.032	0.002	0.000	0.101
0.1333	0.032	0.004	0.000	0.102
0.1778	0.032	0.005	0.000	0.104
0.2222	0.032	0.007	0.000	0.106
0.2667	0.032	0.008	0.000	0.107
0.3111	0.032	0.010	0.000	0.109
0.3556	0.032	0.011	0.000	0.111
0.4000	0.032	0.012	0.000	0.113
0.4444	0.032	0.014	0.000	0.114
0.4889	0.032	0.015	0.000	0.116
0.5333	0.032	0.017	0.000	0.118
0.5778	0.032	0.018	0.000	0.120
0.6222	0.032	0.020	0.000	0.121
0.6667	0.032	0.021	0.000	0.123
0.7111	0.032	0.022	0.000	0.125
0.7556	0.032	0.024	0.000	0.127
0.8000	0.032	0.025	0.000	0.128
0.8444	0.032	0.027	0.000	0.130
0.8889	0.032	0.028	0.000	0.132
0.9333	0.032	0.030	0.000	0.133
0.9778	0.032	0.031	0.000	0.135
1.0222	0.032	0.032	0.000	0.137
1.0667	0.032	0.034	0.000	0.139
1.1111	0.032	0.035	0.000	0.140
1.1556	0.032	0.037	0.000	0.142
1.2000	0.032	0.038	0.000	0.144
1.2444	0.032	0.040	0.000	0.146
1.2889	0.032	0.041	0.000	0.147

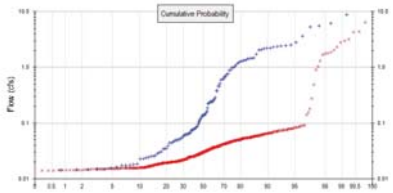
1.3333	0.032	0.043	0.000	0.149
1.3778	0.032	0.044	0.000	0.151
1.4222	0.032	0.045	0.000	0.153
1.4667	0.032	0.047	0.000	0.154
1.5111	0.032	0.048	0.000	0.156
1.5556	0.032	0.050	0.000	0.158
1.6000	0.032	0.051	0.000	0.159
1.6444	0.032	0.053	0.000	0.161
1.6889	0.032	0.054	0.000	0.163
1.7333	0.032	0.055	0.000	0.165
1.7778	0.032	0.057	0.000	0.166
1.8222	0.032	0.058	0.000	0.168
1.8667	0.032	0.060	0.000	0.170
1.9111	0.032	0.061	0.000	0.172
1.9556	0.032	0.063	0.000	0.173
2.0000	0.032	0.064	0.000	0.175
2.0444	0.032	0.065	0.000	0.177
2.0889	0.032	0.067	0.000	0.179
2.1333	0.032	0.068	0.000	0.180
2.1778	0.032	0.070	0.000	0.182
2.2222	0.032	0.071	0.000	0.184
2.2667	0.032	0.073	0.000	0.185
2.3111	0.032	0.074	0.000	0.187
2.3556	0.032	0.075	0.000	0.189
2.4000	0.032	0.077	0.000	0.191
2.4444	0.032	0.078	0.000	0.192
2.4889	0.032	0.080	0.000	0.194
2.5333	0.032	0.081	0.000	0.196
2.5778	0.032	0.083	0.000	0.198
2.6222	0.032	0.084	0.000	0.199
2.6667	0.032	0.086	0.000	0.201
2.7111	0.032	0.087	0.000	0.203
2.7556	0.032	0.088	0.000	0.205
2.8000	0.032	0.090	0.000	0.206
2.8444	0.032	0.091	0.000	0.208
2.8889	0.032	0.093	0.000	0.210
2.9333	0.032	0.094	0.000	0.211
2.9778	0.032	0.096	0.000	0.213
3.0222	0.032	0.097	0.052	0.215
3.0667	0.032	0.098	0.273	0.217
3.1111	0.032	0.100	0.587	0.218
3.1556	0.032	0.101	0.970	0.220
3.2000	0.032	0.103	1.404	0.222
3.2444	0.032	0.104	1.877	0.224
3.2889	0.032	0.106	2.374	0.225
3.3333	0.032	0.107	2.882	0.227
3.3778	0.032	0.108	3.386	0.229
3.4222	0.032	0.110	3.871	0.231
3.4667	0.032	0.111	4.326	0.232
3.5111	0.032	0.113	4.737	0.234
3.5556	0.032	0.114	5.097	0.236
3.6000	0.032	0.116	5.401	0.237
3.6444	0.032	0.117	5.649	0.239
3.6889	0.032	0.118	5.848	0.241
3.7333	0.032	0.120	6.014	0.243
3.7778	0.032	0.121	6.249	0.244
3.8222	0.032	0.123	6.425	0.246
3.8667	0.032	0.124	6.597	0.248

3.9111	0.032	0.126	6.764	0.250
3.9556	0.032	0.127	6.927	0.251
4.0000	0.032	0.128	7.086	0.253
4.0444	0.032	0.130	7.242	0.255

Analysis Results

POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 7.06
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.69
Total Impervious Area: 4.91

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.935986
5 year	2.201549
10 year	2.605807
25 year	5.616645

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.079026
5 year	1.366212
10 year	2.500661
25 year	4.257679

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0936	3550	2237	63	Pass
0.1190	2539	2155	84	Pass
0.1444	2060	2040	99	Pass
0.1697	1859	1827	98	Pass
0.1951	1702	1601	94	Pass
0.2205	1570	1408	89	Pass
0.2459	1445	1225	84	Pass
0.2712	1349	1024	75	Pass
0.2966	1264	832	65	Pass
0.3220	1181	687	58	Pass
0.3474	1087	591	54	Pass
0.3727	1025	538	52	Pass
0.3981	961	502	52	Pass
0.4235	896	482	53	Pass
0.4489	857	456	53	Pass
0.4742	815	434	53	Pass
0.4996	784	409	52	Pass
0.5250	749	397	53	Pass
0.5504	707	378	53	Pass
0.5757	672	356	52	Pass
0.6011	641	343	53	Pass
0.6265	611	329	53	Pass
0.6519	588	314	53	Pass
0.6772	557	305	54	Pass
0.7026	538	286	53	Pass
0.7280	521	277	53	Pass
0.7534	491	267	54	Pass
0.7787	467	259	55	Pass
0.8041	437	247	56	Pass
0.8295	423	236	55	Pass
0.8549	412	228	55	Pass
0.8802	393	221	56	Pass
0.9056	373	211	56	Pass
0.9310	362	205	56	Pass
0.9564	350	197	56	Pass
0.9818	338	193	57	Pass
1.0071	326	187	57	Pass
1.0325	306	178	58	Pass
1.0579	297	174	58	Pass
1.0833	284	168	59	Pass
1.1086	270	166	61	Pass
1.1340	253	163	64	Pass
1.1594	242	153	63	Pass
1.1848	233	145	62	Pass
1.2101	222	139	62	Pass
1.2355	214	131	61	Pass
1.2609	206	126	61	Pass
1.2863	200	122	61	Pass
1.3116	194	118	60	Pass
1.3370	190	112	58	Pass
1.3624	184	109	59	Pass
1.3878	176	106	60	Pass
1.4131	169	102	60	Pass

1.4385	167	99	59	Pass
1.4639	159	95	59	Pass
1.4893	153	88	57	Pass
1.5146	148	81	54	Pass
1.5400	143	80	55	Pass
1.5654	138	79	57	Pass
1.5908	134	76	56	Pass
1.6161	131	73	55	Pass
1.6415	131	72	54	Pass
1.6669	127	70	55	Pass
1.6923	122	66	54	Pass
1.7177	120	64	53	Pass
1.7430	113	61	53	Pass
1.7684	111	61	54	Pass
1.7938	106	59	55	Pass
1.8192	104	56	53	Pass
1.8445	99	56	56	Pass
1.8699	95	54	56	Pass
1.8953	93	51	54	Pass
1.9207	92	50	54	Pass
1.9460	89	49	55	Pass
1.9714	87	47	54	Pass
1.9968	83	47	56	Pass
2.0222	80	47	58	Pass
2.0475	79	45	56	Pass
2.0729	75	45	60	Pass
2.0983	73	44	60	Pass
2.1237	70	43	61	Pass
2.1490	67	42	62	Pass
2.1744	66	42	63	Pass
2.1998	62	42	67	Pass
2.2252	59	40	67	Pass
2.2505	57	40	70	Pass
2.2759	56	39	69	Pass
2.3013	54	38	70	Pass
2.3267	52	37	71	Pass
2.3520	50	34	68	Pass
2.3774	48	34	70	Pass
2.4028	46	34	73	Pass
2.4282	46	34	73	Pass
2.4536	45	34	75	Pass
2.4789	44	33	75	Pass
2.5043	42	32	76	Pass
2.5297	42	30	71	Pass
2.5551	41	29	70	Pass
2.5804	41	29	70	Pass
2.6058	41	29	70	Pass

Water Quality

Drawdown Time Results

Pond: Vault 1-2

Days	Stage(feet)	Percent of Total Run Time
1	0.319	4.2906
2	0.566	3.3570
3	0.874	2.6063
4	1.243	1.9811
5	1.673	1.4359

Maximum Stage: 5.936 Drawdown Time: Exceeds 5 days.

POC 2

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 3

POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 4

POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Rational Method

Company Name	Pacific Coast Land Consultants
Designed by	Chris Hopper
Company Project Number/Name	Westpark Promenade
Drainage Area Number/Name	See Riverside County Worksheets for LID sizing
Date	4/16/16
County/City Case No.	PA 13-0082

Township
Range
Section
85th Percentile

acre	Cover Type
	Roofs
	Concrete or Asphalt
	Grouted or Gapless Paving Blocks
	Compacted Soil (e.g. unpaved parking)
	Decomposed Granite
	Permeable Paving Blocks w/ Sand Filled Gap
	Class 2 Base
	Gravel or Class 2 Permeable Base
	Pervious Concrete / Porous Asphalt
	Open and Porous Pavers
	Turf block
	Ornamental Landscaping
	Natural (A Soil)
	Natural (B Soil)
	Natural (C Soil)
	Natural (D Soil)
	Mixed Surface Types Fraction = 0.00

Calculated Values
C = 0.00
Vu = 0.00 (in * ac)/ac
Vbmp = 0 ft3
Qbmp = 0.0 ft3/s

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

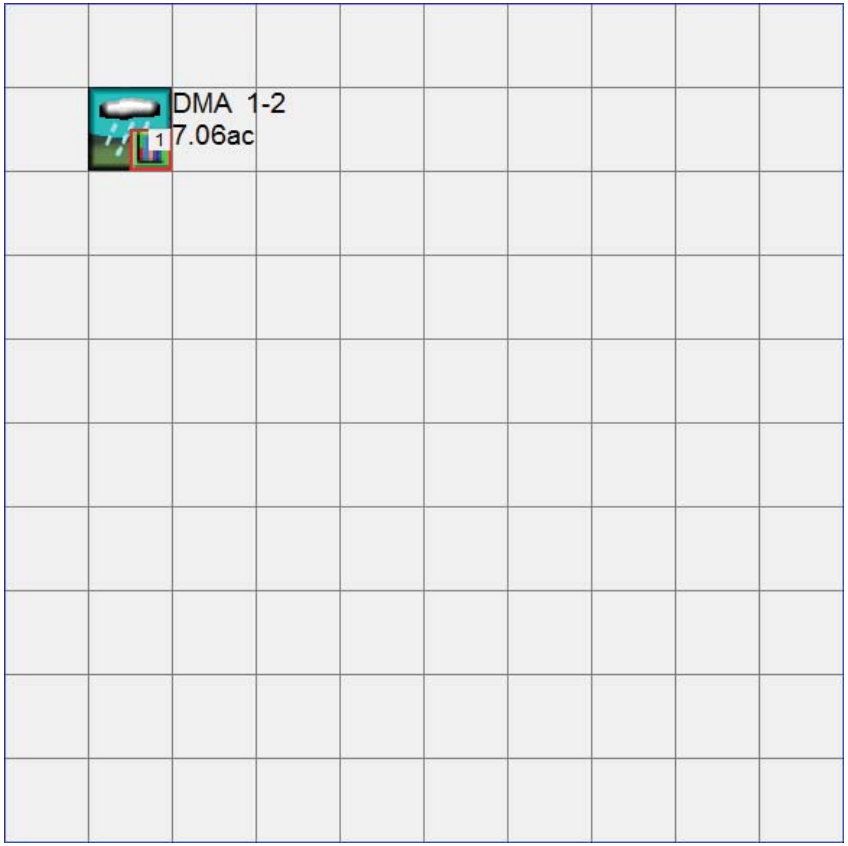
No PERLND changes have been made.

IMPLND Changes

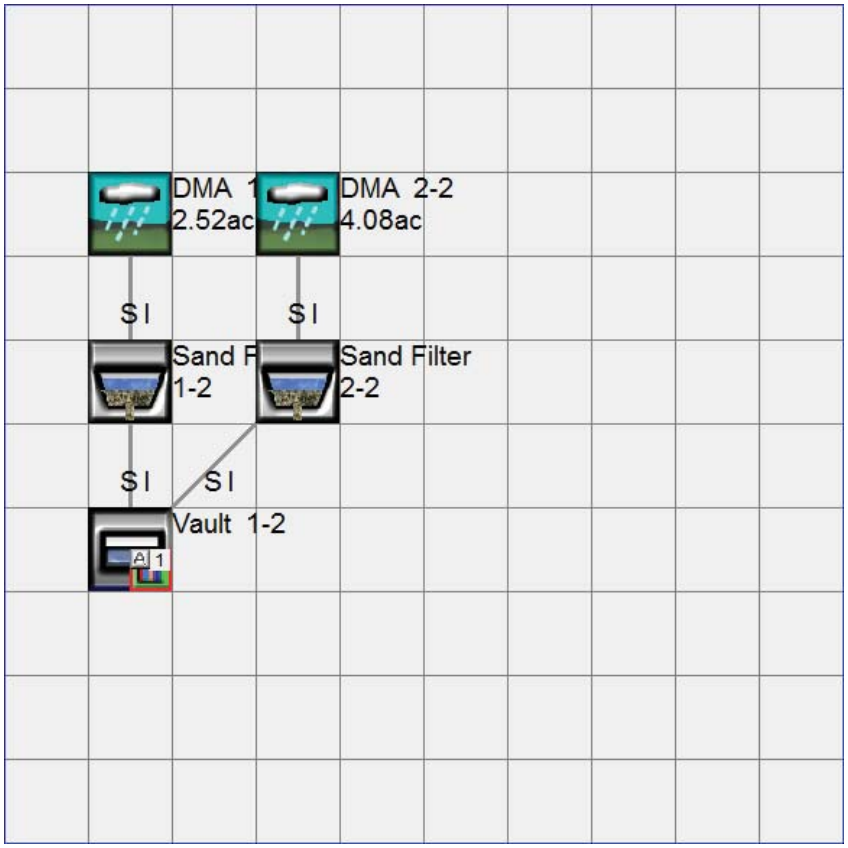
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   Westpark1-2.wdm
MESSU      25   PreWestpark1-2.MES
           27   PreWestpark1-2.L61
           28   PreWestpark1-2.L62
           30   POCWestpark1-21.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      38
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        DMA  1-2                    MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   38     C/D,Shrub,Mod(5-10%)    1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   38         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   38         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```



```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   38         0    0    0    1    0    0    0    0    1    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   38             0       4.5      0.04       350       0.1         2      0.95
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   38            40        35         3         2      0.15      0.15         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   38             0       0.7       0.3       1.2      0.45         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   38       0.5  0.5  0.5  0.6 0.65 0.65 0.65 0.65 0.65 0.65 0.55  0.5
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   38      0.13 0.13 0.13 0.14 0.15 0.15 0.15 0.15 0.15 0.15 0.14 0.13
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   38             0         0      0.01         0       0.5       0.3      0.01
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                      User  t-series Engl Metr ***
                                          in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2
```

```
  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
DMA  1-2***
PERLND  38                        7.06     COPY   501     12
PERLND  38                        7.06     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES
```



```
SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   Westpark1-2.wdm
MESSU      25   MitWestpark1-2.MES
           27   MitWestpark1-2.L61
           28   MitWestpark1-2.L62
           30   POCWestpark1-21.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      45
      IMPLND       5
      IMPLND      14
      RCHRES       1
      RCHRES       2
      RCHRES       3
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Vault  1-2                 MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                        User  t-series Engl Metr ***
                                        in  out           ***
   45     C/D,Urban,Flat(0-5%)    1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ***************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   45         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
```



```
  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   45         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   45         0    0    0    1    0    0    0    0    1    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   45                0       4.6      0.04       400      0.05         3     0.995
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   45               40        35         3         2      0.45      0.15         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   45                0       0.7      0.25         1       0.4         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   45       0.5  0.5  0.5  0.6 0.65 0.65 0.65 0.65 0.65 0.65 0.55  0.5
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   45      0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   45                0       0      0.01         0       3.5       1.7       0.1
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                      User  t-series Engl Metr ***
                                        in  out           ***
    5     Roof Area                1    1    1   27    0
   14     Parking,Flat(0-5%)       1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ***************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    5         0    0    1    0    0    0
   14         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    5         0    0    4    0    0    0    1    9
   14         0    0    4    0    0    0    1    9
```

```
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    5         0    0    0    0    0
   14         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    5            100      0.05       0.1       0.1
   14            100      0.05       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    5              0         0
   14              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    5              0         0
   14              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
DMA  1-2***
PERLND  45                        0.47     RCHRES   1      2
PERLND  45                        0.47     RCHRES   1      3
IMPLND   5                        0.81     RCHRES   1      5
IMPLND  14                        1.24     RCHRES   1      5
DMA  2-2***
PERLND  45                        1.22     RCHRES   2      2
PERLND  45                        1.22     RCHRES   2      3
IMPLND   5                        1.27     RCHRES   2      5
IMPLND  14                        1.59     RCHRES   2      5

******Routing******
RCHRES   1                           1     RCHRES   3      7
RCHRES   1                                 COPY     1     17
RCHRES   1                           1     RCHRES   3      8
RCHRES   1                                 COPY     1     18
RCHRES   2                           1     RCHRES   3      7
RCHRES   2                                 COPY     1     17
RCHRES   2                           1     RCHRES   3      8
RCHRES   2                                 COPY     1     18
RCHRES   3                           1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
```



```
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                            in  out                          ***
    1     Sand Filter  1-2-009    2    1    1    1   28    0    1
    2     Sand Filter  2-2-018    2    1    1    1   28    0    1
    3     Vault  1-2              2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
    2        0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
    3        0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.01       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.02       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.023875  0.000000  0.000000  0.000000
  0.044444  0.023875  0.001061  0.000000  0.073506
  0.088889  0.023875  0.002122  0.000000  0.074790
  0.133333  0.023875  0.003183  0.000000  0.076074
  0.177778  0.023875  0.004244  0.000000  0.077358
  0.222222  0.023875  0.005306  0.000000  0.078642
  0.266667  0.023875  0.006367  0.000000  0.079926
  0.311111  0.023875  0.007428  0.000000  0.081210
  0.355556  0.023875  0.008489  0.000000  0.082494
```

0.400000	0.023875	0.009550	0.000000	0.083778
0.444444	0.023875	0.010611	0.000000	0.085062
0.488889	0.023875	0.011672	0.000000	0.086346
0.533333	0.023875	0.012733	0.000000	0.087630
0.577778	0.023875	0.013795	0.000000	0.088914
0.622222	0.023875	0.014856	0.000000	0.090198
0.666667	0.023875	0.015917	0.000000	0.091481
0.711111	0.023875	0.016978	0.000000	0.092765
0.755556	0.023875	0.018039	0.000000	0.094049
0.800000	0.023875	0.019100	0.000000	0.095333
0.844444	0.023875	0.020161	0.000000	0.096617
0.888889	0.023875	0.021222	0.000000	0.097901
0.933333	0.023875	0.022283	0.000000	0.099185
0.977778	0.023875	0.023345	0.000000	0.100469
1.022222	0.023875	0.024406	0.000000	0.101753
1.066667	0.023875	0.025467	0.000000	0.103037
1.111111	0.023875	0.026528	0.000000	0.104321
1.155556	0.023875	0.027589	0.000000	0.105605
1.200000	0.023875	0.028650	0.000000	0.106889
1.244444	0.023875	0.029711	0.000000	0.108173
1.288889	0.023875	0.030772	0.000000	0.109457
1.333333	0.023875	0.031833	0.000000	0.110741
1.377778	0.023875	0.032895	0.000000	0.112025
1.422222	0.023875	0.033956	0.000000	0.113309
1.466667	0.023875	0.035017	0.000000	0.114593
1.511111	0.023875	0.036078	0.000000	0.115877
1.555556	0.023875	0.037139	0.000000	0.117160
1.600000	0.023875	0.038200	0.000000	0.118444
1.644444	0.023875	0.039261	0.000000	0.119728
1.688889	0.023875	0.040322	0.000000	0.121012
1.733333	0.023875	0.041384	0.000000	0.122296
1.777778	0.023875	0.042445	0.000000	0.123580
1.822222	0.023875	0.043506	0.000000	0.124864
1.866667	0.023875	0.044567	0.000000	0.126148
1.911111	0.023875	0.045628	0.000000	0.127432
1.955556	0.023875	0.046689	0.000000	0.128716
2.000000	0.023875	0.047750	0.000000	0.130000
2.044444	0.023875	0.048811	0.000000	0.131284
2.088889	0.023875	0.049872	0.000000	0.132568
2.133333	0.023875	0.050934	0.000000	0.133852
2.177778	0.023875	0.051995	0.000000	0.135136
2.222222	0.023875	0.053056	0.000000	0.136420
2.266667	0.023875	0.054117	0.000000	0.137704
2.311111	0.023875	0.055178	0.000000	0.138988
2.355556	0.023875	0.056239	0.000000	0.140272
2.400000	0.023875	0.057300	0.000000	0.141556
2.444444	0.023875	0.058361	0.000000	0.142840
2.488889	0.023875	0.059423	0.000000	0.144123
2.533333	0.023875	0.060484	0.000000	0.145407
2.577778	0.023875	0.061545	0.000000	0.146691
2.622222	0.023875	0.062606	0.000000	0.147975
2.666667	0.023875	0.063667	0.000000	0.149259
2.711111	0.023875	0.064728	0.000000	0.150543
2.755556	0.023875	0.065789	0.000000	0.151827
2.800000	0.023875	0.066850	0.000000	0.153111
2.844444	0.023875	0.067911	0.000000	0.154395
2.888889	0.023875	0.068973	0.000000	0.155679
2.933333	0.023875	0.070034	0.000000	0.156963
2.977778	0.023875	0.071095	0.000000	0.158247
3.022222	0.023875	0.072156	0.052737	0.159531
3.066667	0.023875	0.073217	0.273695	0.160815
3.111111	0.023875	0.074278	0.587805	0.162099
3.155556	0.023875	0.075339	0.970000	0.163383
3.200000	0.023875	0.076400	1.404464	0.164667
3.244444	0.023875	0.077461	1.877310	0.165951
3.288889	0.023875	0.078523	2.374724	0.167235
3.333333	0.023875	0.079584	2.882519	0.168519
3.377778	0.023875	0.080645	3.386283	0.169802
3.422222	0.023875	0.081706	3.871856	0.171086
3.466667	0.023875	0.082767	4.326027	0.172370

3.511111	0.023875	0.083828	4.737392	0.173654
3.555556	0.023875	0.084889	5.097354	0.174938
3.600000	0.023875	0.085950	5.401220	0.176222
3.644444	0.023875	0.087012	5.649420	0.177506
3.688889	0.023875	0.088073	5.848795	0.178790
3.733333	0.023875	0.089134	6.013989	0.180074
3.777778	0.023875	0.090195	6.249853	0.181358
3.822222	0.023875	0.091256	6.425940	0.182642
3.866667	0.023875	0.092317	6.597328	0.183926
3.911111	0.023875	0.093378	6.764376	0.185210
3.955556	0.023875	0.094439	6.927396	0.186494
4.000000	0.023875	0.095500	7.086668	0.187778

END FTABLE 1

FTABLE 3

92 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.229568	0.000000	0.000000	0.000000		
0.066667	0.229568	0.015305	0.010429	0.046296		
0.133333	0.229568	0.030609	0.014748	0.046296		
0.200000	0.229568	0.045914	0.018063	0.046296		
0.266667	0.229568	0.061218	0.020858	0.046296		
0.333333	0.229568	0.076523	0.023319	0.046296		
0.400000	0.229568	0.091827	0.025545	0.046296		
0.466667	0.229568	0.107132	0.027592	0.046296		
0.533333	0.229568	0.122436	0.029497	0.046296		
0.600000	0.229568	0.137741	0.031286	0.046296		
0.666667	0.229568	0.153046	0.032979	0.046296		
0.733333	0.229568	0.168350	0.034588	0.046296		
0.800000	0.229568	0.183655	0.036126	0.046296		
0.866667	0.229568	0.198959	0.037601	0.046296		
0.933333	0.229568	0.214264	0.039021	0.046296		
1.000000	0.229568	0.229568	0.040390	0.046296		
1.066667	0.229568	0.244873	0.041715	0.046296		
1.133333	0.229568	0.260178	0.042999	0.046296		
1.200000	0.229568	0.275482	0.044245	0.046296		
1.266667	0.229568	0.290787	0.045458	0.046296		
1.333333	0.229568	0.306091	0.046639	0.046296		
1.400000	0.229568	0.321396	0.047791	0.046296		
1.466667	0.229568	0.336700	0.048915	0.046296		
1.533333	0.229568	0.352005	0.050015	0.046296		
1.600000	0.229568	0.367309	0.051090	0.046296		
1.666667	0.229568	0.382614	0.052144	0.046296		
1.733333	0.229568	0.397919	0.053176	0.046296		
1.800000	0.229568	0.413223	0.054189	0.046296		
1.866667	0.229568	0.428528	0.055184	0.046296		
1.933333	0.229568	0.443832	0.056161	0.046296		
2.000000	0.229568	0.459137	0.057121	0.046296		
2.066667	0.229568	0.474441	0.058065	0.046296		
2.133333	0.229568	0.489746	0.058994	0.046296		
2.200000	0.229568	0.505051	0.059909	0.046296		
2.266667	0.229568	0.520355	0.060810	0.046296		
2.333333	0.229568	0.535660	0.061697	0.046296		
2.400000	0.229568	0.550964	0.062573	0.046296		
2.466667	0.229568	0.566269	0.063436	0.046296		
2.533333	0.229568	0.581573	0.064287	0.046296		
2.600000	0.229568	0.596878	0.065128	0.046296		
2.666667	0.229568	0.612182	0.065957	0.046296		
2.733333	0.229568	0.627487	0.066777	0.046296		
2.800000	0.229568	0.642792	0.067586	0.046296		
2.866667	0.229568	0.658096	0.068386	0.046296		
2.933333	0.229568	0.673401	0.069177	0.046296		
3.000000	0.229568	0.688705	0.069958	0.046296		
3.066667	0.229568	0.704010	0.070731	0.046296		
3.133333	0.229568	0.719314	0.071496	0.046296		
3.200000	0.229568	0.734619	0.072253	0.046296		
3.266667	0.229568	0.749923	0.073001	0.046296		
3.333333	0.229568	0.765228	0.073742	0.046296		
3.400000	0.229568	0.780533	0.074476	0.046296		
3.466667	0.229568	0.795837	0.075203	0.046296		

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3.533333  0.229568  0.811142  0.075923  0.046296
3.600000  0.229568  0.826446  0.076635  0.046296
3.666667  0.229568  0.841751  0.077342  0.046296
3.733333  0.229568  0.857055  0.078042  0.046296
3.800000  0.229568  0.872360  0.078978  0.046296
3.866667  0.229568  0.887665  0.079794  0.046296
3.933333  0.229568  0.902969  0.080570  0.046296
4.000000  0.229568  0.918274  0.081324  0.046296
4.066667  0.229568  0.933578  0.082062  0.046296
4.133333  0.229568  0.948883  0.082788  0.046296
4.200000  0.229568  0.964187  0.083504  0.046296
4.266667  0.229568  0.979492  0.084210  0.046296
4.333333  0.229568  0.994796  0.084908  0.046296
4.400000  0.229568  1.010101  0.085599  0.046296
4.466667  0.229568  1.025406  0.086282  0.046296
4.533333  0.229568  1.040710  0.086958  0.046296
4.600000  0.229568  1.056015  0.087629  0.046296
4.666667  0.229568  1.071319  0.088293  0.046296
4.733333  0.229568  1.086624  0.088951  0.046296
4.800000  0.229568  1.101928  0.089603  0.046296
4.866667  0.229568  1.117233  0.090250  0.046296
4.933333  0.229568  1.132537  0.090892  0.046296
5.000000  0.229568  1.147842  0.091529  0.046296
5.066667  0.229568  1.163147  0.365857  0.046296
5.133333  0.229568  1.178451  0.864254  0.046296
5.200000  0.229568  1.193756  1.497875  0.046296
5.266667  0.229568  1.209060  2.217853  0.046296
5.333333  0.229568  1.224365  2.977163  0.046296
5.400000  0.229568  1.239669  3.727454  0.046296
5.466667  0.229568  1.254974  4.421885  0.046296
5.533333  0.229568  1.270279  5.020657  0.046296
5.600000  0.229568  1.285583  5.498278  0.046296
5.666667  0.229568  1.300888  5.852146  0.046296
5.733333  0.229568  1.316192  6.112230  0.046296
5.800000  0.229568  1.331497  6.437335  0.046296
5.866667  0.229568  1.346801  6.696738  0.046296
5.933333  0.229568  1.362106  6.946360  0.046296
6.000000  0.229568  1.377410  7.187232  0.046296
6.066667  0.229568  1.392715  7.420215  0.046296
END FTABLE  3
FTABLE      2
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.032231  0.000000  0.000000  0.000000
0.044444  0.032231  0.001433  0.000000  0.099233
0.088889  0.032231  0.002865  0.000000  0.100967
0.133333  0.032231  0.004298  0.000000  0.102700
0.177778  0.032231  0.005730  0.000000  0.104433
0.222222  0.032231  0.007163  0.000000  0.106167
0.266667  0.032231  0.008595  0.000000  0.107900
0.311111  0.032231  0.010028  0.000000  0.109633
0.355556  0.032231  0.011460  0.000000  0.111367
0.400000  0.032231  0.012893  0.000000  0.113100
0.444444  0.032231  0.014325  0.000000  0.114833
0.488889  0.032231  0.015758  0.000000  0.116567
0.533333  0.032231  0.017190  0.000000  0.118300
0.577778  0.032231  0.018623  0.000000  0.120033
0.622222  0.032231  0.020055  0.000000  0.121767
0.666667  0.032231  0.021488  0.000000  0.123500
0.711111  0.032231  0.022920  0.000000  0.125233
0.755556  0.032231  0.024353  0.000000  0.126967
0.800000  0.032231  0.025785  0.000000  0.128700
0.844444  0.032231  0.027218  0.000000  0.130433
0.888889  0.032231  0.028650  0.000000  0.132167
0.933333  0.032231  0.030083  0.000000  0.133900
0.977778  0.032231  0.031515  0.000000  0.135633
1.022222  0.032231  0.032948  0.000000  0.137367
1.066667  0.032231  0.034380  0.000000  0.139100
1.111111  0.032231  0.035813  0.000000  0.140833
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1.155556  0.032231  0.037245  0.000000  0.142567
1.200000  0.032231  0.038678  0.000000  0.144300
1.244444  0.032231  0.040110  0.000000  0.146033
1.288889  0.032231  0.041543  0.000000  0.147767
1.333333  0.032231  0.042975  0.000000  0.149500
1.377778  0.032231  0.044408  0.000000  0.151233
1.422222  0.032231  0.045840  0.000000  0.152967
1.466667  0.032231  0.047273  0.000000  0.154700
1.511111  0.032231  0.048705  0.000000  0.156433
1.555556  0.032231  0.050138  0.000000  0.158167
1.600000  0.032231  0.051570  0.000000  0.159900
1.644444  0.032231  0.053003  0.000000  0.161633
1.688889  0.032231  0.054435  0.000000  0.163367
1.733333  0.032231  0.055868  0.000000  0.165100
1.777778  0.032231  0.057300  0.000000  0.166833
1.822222  0.032231  0.058733  0.000000  0.168567
1.866667  0.032231  0.060165  0.000000  0.170300
1.911111  0.032231  0.061598  0.000000  0.172033
1.955556  0.032231  0.063030  0.000000  0.173767
2.000000  0.032231  0.064463  0.000000  0.175500
2.044444  0.032231  0.065895  0.000000  0.177233
2.088889  0.032231  0.067328  0.000000  0.178967
2.133333  0.032231  0.068760  0.000000  0.180700
2.177778  0.032231  0.070193  0.000000  0.182433
2.222222  0.032231  0.071625  0.000000  0.184167
2.266667  0.032231  0.073058  0.000000  0.185900
2.311111  0.032231  0.074490  0.000000  0.187633
2.355556  0.032231  0.075923  0.000000  0.189367
2.400000  0.032231  0.077355  0.000000  0.191100
2.444444  0.032231  0.078788  0.000000  0.192833
2.488889  0.032231  0.080220  0.000000  0.194567
2.533333  0.032231  0.081653  0.000000  0.196300
2.577778  0.032231  0.083085  0.000000  0.198033
2.622222  0.032231  0.084518  0.000000  0.199767
2.666667  0.032231  0.085950  0.000000  0.201500
2.711111  0.032231  0.087383  0.000000  0.203233
2.755556  0.032231  0.088815  0.000000  0.204967
2.800000  0.032231  0.090248  0.000000  0.206700
2.844444  0.032231  0.091680  0.000000  0.208433
2.888889  0.032231  0.093113  0.000000  0.210167
2.933333  0.032231  0.094545  0.000000  0.211900
2.977778  0.032231  0.095978  0.000000  0.213633
3.022222  0.032231  0.097410  0.052737  0.215367
3.066667  0.032231  0.098843  0.273695  0.217100
3.111111  0.032231  0.100275  0.587805  0.218833
3.155556  0.032231  0.101708  0.970000  0.220567
3.200000  0.032231  0.103140  1.404464  0.222300
3.244444  0.032231  0.104573  1.877310  0.224033
3.288889  0.032231  0.106006  2.374724  0.225767
3.333333  0.032231  0.107438  2.882519  0.227500
3.377778  0.032231  0.108871  3.386283  0.229233
3.422222  0.032231  0.110303  3.871856  0.230967
3.466667  0.032231  0.111736  4.326027  0.232700
3.511111  0.032231  0.113168  4.737392  0.234433
3.555556  0.032231  0.114601  5.097354  0.236167
3.600000  0.032231  0.116033  5.401220  0.237900
3.644444  0.032231  0.117466  5.649420  0.239633
3.688889  0.032231  0.118898  5.848795  0.241367
3.733333  0.032231  0.120331  6.013989  0.243100
3.777778  0.032231  0.121763  6.249853  0.244833
3.822222  0.032231  0.123196  6.425940  0.246567
3.866667  0.032231  0.124628  6.597328  0.248300
3.911111  0.032231  0.126061  6.764376  0.250033
3.955556  0.032231  0.127493  6.927396  0.251767
4.000000  0.032231  0.128926  7.086668  0.253500
END FTABLE  2
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
```

```
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP
WDM     22 IRRG     ENGL    0.7       SAME PERLND  45     EXTNL  SURLI
WDM      2 PREC     ENGL    1              RCHRES   2     EXTNL  PREC
WDM      1 EVAP     ENGL    1              RCHRES   2     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   3 HYDR   RO      1 1        1      WDM   1004 FLOW     ENGL      REPL
RCHRES   3 HYDR   O       1 1        1      WDM   1006 FLOW     ENGL      REPL
RCHRES   3 HYDR   O       2 1        1      WDM   1007 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE   1 1        1      WDM   1005 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN    1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN    1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        7
RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17

  MASS-LINK       18
RCHRES     OFLOW  OVOL   2                 COPY           INPUT  MEAN
  END MASS-LINK   18


END MASS-LINK

END RUN
```

Mitigated HSPF Message File

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1980/ 2/14  7:45

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 4113.8     4160.0     4357.5
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1980/ 2/14  7:45

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 2080.0     -1.097E+04    5.2733     5.2733       2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1980/ 2/14  7:45

RCHRES:     2

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 5553.6     5616.0     6901.8
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1980/ 2/14  7:45

RCHRES:     2

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 2808.0     -6.065E+04   21.598   2.1598E+01      2
```

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Local (360)943-0304

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SMRHM

PROJECT REPORT

General Model Information

Project Name:	Westpark1-3
Site Name:	Westpark Promenade
Site Address:	PA 13-0082
City:	Wildomar
Report Date:	4/13/2016
Gage:	Wildomar / North Murrieta
Data Start:	1949/10/01
Data End:	2011/09/30
Timestep:	15 Minute
Precip Scale:	1.00
Version Date:	2016/04/05

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data

Predeveloped Land Use

DMA 3

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Shrub,Mod(5-10%)	2.33
Pervious Total	2.33
Impervious Land Use	acre
Impervious Total	0
Basin Total	2.33

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

DMA 1-3

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Urban,Flat(0-5%)	0.43
Pervious Total	0.43
Impervious Land Use	acre
Roof Area	0.36
Parking,Flat(0-5%)	1.48
Impervious Total	1.84
Basin Total	2.27

Element Flows To:

Surface	Interflow	Groundwater
Sand Filter 1-3	Sand Filter 1-3	

Routing Elements
Predeveloped Routing

Mitigated Routing

Sand Filter 1-3

Bottom Length:	40.00 ft.
Bottom Width:	25.00 ft.
Depth:	4 ft.
Side slope 1:	0 To 1
Side slope 2:	0 To 1
Side slope 3:	0 To 1
Side slope 4:	0 To 1
Filtration On	
Hydraulic conductivity:	3
Depth of filter medium:	2.5
Total Volume Infiltrated (ac-ft.):	80.805
Total Volume Through Riser (ac-ft.):	13.398
Total Volume Through Facility (ac-ft.):	94.202
Percent Infiltrated:	85.78
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	3 ft.
Riser Diameter:	18 in.
Element Flows To:	
Outlet 1	Outlet 2
Vault 1-3	Vault 1-3

Sand Filter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.023	0.000	0.000	0.000
0.0444	0.023	0.001	0.000	0.070
0.0889	0.023	0.002	0.000	0.071
0.1333	0.023	0.003	0.000	0.073
0.1778	0.023	0.004	0.000	0.074
0.2222	0.023	0.005	0.000	0.075
0.2667	0.023	0.006	0.000	0.076
0.3111	0.023	0.007	0.000	0.078
0.3556	0.023	0.008	0.000	0.079
0.4000	0.023	0.009	0.000	0.080
0.4444	0.023	0.010	0.000	0.081
0.4889	0.023	0.011	0.000	0.083
0.5333	0.023	0.012	0.000	0.084
0.5778	0.023	0.013	0.000	0.085
0.6222	0.023	0.014	0.000	0.086
0.6667	0.023	0.015	0.000	0.088
0.7111	0.023	0.016	0.000	0.089
0.7556	0.023	0.017	0.000	0.090
0.8000	0.023	0.018	0.000	0.091
0.8444	0.023	0.019	0.000	0.092
0.8889	0.023	0.020	0.000	0.094
0.9333	0.023	0.021	0.000	0.095
0.9778	0.023	0.022	0.000	0.096
1.0222	0.023	0.023	0.000	0.097
1.0667	0.023	0.024	0.000	0.099
1.1111	0.023	0.025	0.000	0.100
1.1556	0.023	0.026	0.000	0.101
1.2000	0.023	0.027	0.000	0.102

1.2444	0.023	0.028	0.000	0.104
1.2889	0.023	0.029	0.000	0.105
1.3333	0.023	0.030	0.000	0.106
1.3778	0.023	0.031	0.000	0.107
1.4222	0.023	0.032	0.000	0.109
1.4667	0.023	0.033	0.000	0.110
1.5111	0.023	0.034	0.000	0.111
1.5556	0.023	0.035	0.000	0.112
1.6000	0.023	0.036	0.000	0.113
1.6444	0.023	0.037	0.000	0.115
1.6889	0.023	0.038	0.000	0.116
1.7333	0.023	0.039	0.000	0.117
1.7778	0.023	0.040	0.000	0.118
1.8222	0.023	0.041	0.000	0.120
1.8667	0.023	0.042	0.000	0.121
1.9111	0.023	0.043	0.000	0.122
1.9556	0.023	0.044	0.000	0.123
2.0000	0.023	0.045	0.000	0.125
2.0444	0.023	0.046	0.000	0.126
2.0889	0.023	0.048	0.000	0.127
2.1333	0.023	0.049	0.000	0.128
2.1778	0.023	0.050	0.000	0.129
2.2222	0.023	0.051	0.000	0.131
2.2667	0.023	0.052	0.000	0.132
2.3111	0.023	0.053	0.000	0.133
2.3556	0.023	0.054	0.000	0.134
2.4000	0.023	0.055	0.000	0.136
2.4444	0.023	0.056	0.000	0.137
2.4889	0.023	0.057	0.000	0.138
2.5333	0.023	0.058	0.000	0.139
2.5778	0.023	0.059	0.000	0.141
2.6222	0.023	0.060	0.000	0.142
2.6667	0.023	0.061	0.000	0.143
2.7111	0.023	0.062	0.000	0.144
2.7556	0.023	0.063	0.000	0.146
2.8000	0.023	0.064	0.000	0.147
2.8444	0.023	0.065	0.000	0.148
2.8889	0.023	0.066	0.000	0.149
2.9333	0.023	0.067	0.000	0.150
2.9778	0.023	0.068	0.000	0.152
3.0222	0.023	0.069	0.052	0.153
3.0667	0.023	0.070	0.273	0.154
3.1111	0.023	0.071	0.587	0.155
3.1556	0.023	0.072	0.970	0.157
3.2000	0.023	0.073	1.404	0.158
3.2444	0.023	0.074	1.877	0.159
3.2889	0.023	0.075	2.374	0.160
3.3333	0.023	0.076	2.882	0.162
3.3778	0.023	0.077	3.386	0.163
3.4222	0.023	0.078	3.871	0.164
3.4667	0.023	0.079	4.326	0.165
3.5111	0.023	0.080	4.737	0.167
3.5556	0.023	0.081	5.097	0.168
3.6000	0.023	0.082	5.401	0.169
3.6444	0.023	0.083	5.649	0.170
3.6889	0.023	0.084	5.848	0.171
3.7333	0.023	0.085	6.014	0.173
3.7778	0.023	0.086	6.249	0.174

3.8222	0.023	0.087	6.425	0.175
3.8667	0.023	0.088	6.597	0.176
3.9111	0.023	0.089	6.764	0.178
3.9556	0.023	0.090	6.927	0.179
4.0000	0.023	0.091	7.086	0.180
4.0444	0.023	0.092	7.242	0.181

Vault 1-3

Width:	72 ft.		
Length:	72 ft.		
Depth:	6 ft.		
Infiltration On			
Infiltration rate:	0.1		
Infiltration safety factor:	0.5		
Total Volume Infiltrated (ac-ft.):			32.553
Total Volume Through Riser (ac-ft.):			61.628
Total Volume Through Facility (ac-ft.):			94.181
Percent Infiltrated:			34.56
Total Precip Applied to Facility:			0
Total Evap From Facility:			0
Discharge Structure			
Riser Height:	5 ft.		
Riser Diameter:	18 in.		
Orifice 1 Diameter:	0.69 in.	Elevation:0 ft.	
Orifice 3 Diameter:	0.2 in.	Elevation:3.75 ft.	
Element Flows To:			
Outlet 1	Outlet 2		

Vault Hydraulic Table

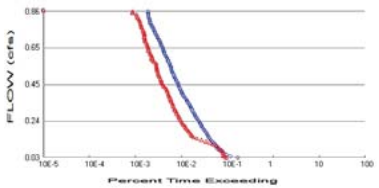
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.119	0.000	0.000	0.000
0.0667	0.119	0.007	0.003	0.006
0.1333	0.119	0.015	0.004	0.006
0.2000	0.119	0.023	0.005	0.006
0.2667	0.119	0.031	0.006	0.006
0.3333	0.119	0.039	0.007	0.006
0.4000	0.119	0.047	0.008	0.006
0.4667	0.119	0.055	0.008	0.006
0.5333	0.119	0.063	0.009	0.006
0.6000	0.119	0.071	0.010	0.006
0.6667	0.119	0.079	0.010	0.006
0.7333	0.119	0.087	0.011	0.006
0.8000	0.119	0.095	0.011	0.006
0.8667	0.119	0.103	0.012	0.006
0.9333	0.119	0.111	0.012	0.006
1.0000	0.119	0.119	0.012	0.006
1.0667	0.119	0.126	0.013	0.006
1.1333	0.119	0.134	0.013	0.006
1.2000	0.119	0.142	0.014	0.006
1.2667	0.119	0.150	0.014	0.006
1.3333	0.119	0.158	0.014	0.006
1.4000	0.119	0.166	0.015	0.006
1.4667	0.119	0.174	0.015	0.006
1.5333	0.119	0.182	0.016	0.006
1.6000	0.119	0.190	0.016	0.006
1.6667	0.119	0.198	0.016	0.006
1.7333	0.119	0.206	0.017	0.006
1.8000	0.119	0.214	0.017	0.006
1.8667	0.119	0.222	0.017	0.006
1.9333	0.119	0.230	0.018	0.006
2.0000	0.119	0.238	0.018	0.006
2.0667	0.119	0.246	0.018	0.006

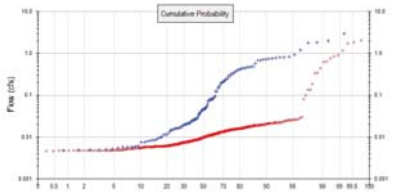
2.1333	0.119	0.253	0.018	0.006
2.2000	0.119	0.261	0.019	0.006
2.2667	0.119	0.269	0.019	0.006
2.3333	0.119	0.277	0.019	0.006
2.4000	0.119	0.285	0.020	0.006
2.4667	0.119	0.293	0.020	0.006
2.5333	0.119	0.301	0.020	0.006
2.6000	0.119	0.309	0.020	0.006
2.6667	0.119	0.317	0.021	0.006
2.7333	0.119	0.325	0.021	0.006
2.8000	0.119	0.333	0.021	0.006
2.8667	0.119	0.341	0.021	0.006
2.9333	0.119	0.349	0.022	0.006
3.0000	0.119	0.357	0.022	0.006
3.0667	0.119	0.365	0.022	0.006
3.1333	0.119	0.372	0.022	0.006
3.2000	0.119	0.380	0.023	0.006
3.2667	0.119	0.388	0.023	0.006
3.3333	0.119	0.396	0.023	0.006
3.4000	0.119	0.404	0.023	0.006
3.4667	0.119	0.412	0.024	0.006
3.5333	0.119	0.420	0.024	0.006
3.6000	0.119	0.428	0.024	0.006
3.6667	0.119	0.436	0.024	0.006
3.7333	0.119	0.444	0.025	0.006
3.8000	0.119	0.452	0.025	0.006
3.8667	0.119	0.460	0.025	0.006
3.9333	0.119	0.468	0.026	0.006
4.0000	0.119	0.476	0.026	0.006
4.0667	0.119	0.484	0.026	0.006
4.1333	0.119	0.491	0.026	0.006
4.2000	0.119	0.499	0.027	0.006
4.2667	0.119	0.507	0.027	0.006
4.3333	0.119	0.515	0.027	0.006
4.4000	0.119	0.523	0.028	0.006
4.4667	0.119	0.531	0.028	0.006
4.5333	0.119	0.539	0.028	0.006
4.6000	0.119	0.547	0.028	0.006
4.6667	0.119	0.555	0.028	0.006
4.7333	0.119	0.563	0.029	0.006
4.8000	0.119	0.571	0.029	0.006
4.8667	0.119	0.579	0.029	0.006
4.9333	0.119	0.587	0.029	0.006
5.0000	0.119	0.595	0.030	0.006
5.0667	0.119	0.603	0.304	0.006
5.1333	0.119	0.610	0.802	0.006
5.2000	0.119	0.618	1.435	0.006
5.2667	0.119	0.626	2.154	0.006
5.3333	0.119	0.634	2.913	0.006
5.4000	0.119	0.642	3.663	0.006
5.4667	0.119	0.650	4.357	0.006
5.5333	0.119	0.658	4.956	0.006
5.6000	0.119	0.666	5.433	0.006
5.6667	0.119	0.674	5.786	0.006
5.7333	0.119	0.682	6.046	0.006
5.8000	0.119	0.690	6.371	0.006
5.8667	0.119	0.698	6.630	0.006
5.9333	0.119	0.706	6.879	0.006

6.0000	0.119	0.714	7.119	0.006
6.0667	0.119	0.722	7.352	0.006
6.1333	0.000	0.000	7.578	0.000

Analysis Results

POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 2.33
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.43
Total Impervious Area: 1.84

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.308902
5 year	0.726574
10 year	0.85999
25 year	1.853652

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.02268
5 year	0.209039
10 year	0.787517
25 year	1.735179

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0309	3674	2045	55	Pass
0.0393	2537	1814	71	Pass
0.0476	2073	1782	85	Pass
0.0560	1854	1759	94	Pass
0.0644	1709	1724	100	Pass
0.0728	1579	1617	102	Pass
0.0811	1444	1468	101	Pass
0.0895	1353	1332	98	Pass
0.0979	1268	1214	95	Pass
0.1063	1180	1051	89	Pass
0.1146	1095	917	83	Pass
0.1230	1024	750	73	Pass
0.1314	962	599	62	Pass
0.1398	899	474	52	Pass
0.1481	857	401	46	Pass
0.1565	817	368	45	Pass
0.1649	788	350	44	Pass
0.1733	749	325	43	Pass
0.1816	707	309	43	Pass
0.1900	671	292	43	Pass
0.1984	642	281	43	Pass
0.2068	614	265	43	Pass
0.2151	588	248	42	Pass
0.2235	557	234	42	Pass
0.2319	539	224	41	Pass
0.2403	521	215	41	Pass
0.2486	491	206	41	Pass
0.2570	467	199	42	Pass
0.2654	437	191	43	Pass
0.2738	425	183	43	Pass
0.2821	412	171	41	Pass
0.2905	393	170	43	Pass
0.2989	374	161	43	Pass
0.3073	362	156	43	Pass
0.3156	352	152	43	Pass
0.3240	338	146	43	Pass
0.3324	327	143	43	Pass
0.3408	307	138	44	Pass
0.3491	295	132	44	Pass
0.3575	284	129	45	Pass
0.3659	270	126	46	Pass
0.3743	253	122	48	Pass
0.3826	242	116	47	Pass
0.3910	233	115	49	Pass
0.3994	222	112	50	Pass
0.4078	214	107	50	Pass
0.4161	206	105	50	Pass
0.4245	200	101	50	Pass
0.4329	194	93	47	Pass
0.4413	190	88	46	Pass
0.4496	185	85	45	Pass
0.4580	176	81	46	Pass
0.4664	171	80	46	Pass

0.4748	167	78	46	Pass
0.4831	159	76	47	Pass
0.4915	153	73	47	Pass
0.4999	149	70	46	Pass
0.5083	143	69	48	Pass
0.5166	138	67	48	Pass
0.5250	133	64	48	Pass
0.5334	131	64	48	Pass
0.5417	131	64	48	Pass
0.5501	127	62	48	Pass
0.5585	122	62	50	Pass
0.5669	120	61	50	Pass
0.5752	113	55	48	Pass
0.5836	111	52	46	Pass
0.5920	106	50	47	Pass
0.6004	104	50	48	Pass
0.6087	99	49	49	Pass
0.6171	95	46	48	Pass
0.6255	93	46	49	Pass
0.6339	92	44	47	Pass
0.6422	89	42	47	Pass
0.6506	87	42	48	Pass
0.6590	84	41	48	Pass
0.6674	80	40	50	Pass
0.6757	79	39	49	Pass
0.6841	75	37	49	Pass
0.6925	73	35	47	Pass
0.7009	70	35	50	Pass
0.7092	67	35	52	Pass
0.7176	66	34	51	Pass
0.7260	62	34	54	Pass
0.7344	59	34	57	Pass
0.7427	58	33	56	Pass
0.7511	56	33	58	Pass
0.7595	55	32	58	Pass
0.7679	52	30	57	Pass
0.7762	50	29	58	Pass
0.7846	48	29	60	Pass
0.7930	46	28	60	Pass
0.8014	46	27	58	Pass
0.8097	45	27	60	Pass
0.8181	44	26	59	Pass
0.8265	42	25	59	Pass
0.8349	42	24	57	Pass
0.8432	41	23	56	Pass
0.8516	41	19	46	Pass
0.8600	41	19	46	Pass

Water Quality

Drawdown Time Results

Pond: Vault 1-3

Days	Stage(feet)	Percent of Total Run Time
1	0.241	8.1682
2	0.371	6.8870
3	0.526	5.7652
4	0.703	4.8023
5	0.904	3.9753

Maximum Stage: 5.390 Drawdown Time: Exceeds 5 days.

POC 2

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 3

POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 4

POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Rational Method

Company Name	Pacific Coast Land Consultants
Designed by	Chris Hopper
Company Project Number/Name	Westpark Promenade
Drainage Area Number/Name	See Riverside County Worksheets for LID Sizing
Date	4/13/16
County/City Case No.	PA 13-0082

Township
Range
Section
85th Percentile

acre	Cover Type
	Roofs
	Concrete or Asphalt
	Grouted or Gapless Paving Blocks
	Compacted Soil (e.g. unpaved parking)
	Decomposed Granite
	Permeable Paving Blocks w/ Sand Filled Gap
	Class 2 Base
	Gravel or Class 2 Permeable Base
	Pervious Concrete / Porous Asphalt
	Open and Porous Pavers
	Turf block
	Ornamental Landscaping
	Natural (A Soil)
	Natural (B Soil)
	Natural (C Soil)
	Natural (D Soil)
	Mixed Surface Types Fraction = 0.00

Calculated Values
C = 0.00
Vu = 0.00 (in * ac)/ac
Vbmp = 0 ft3
Qbmp = 0.0 ft3/s

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

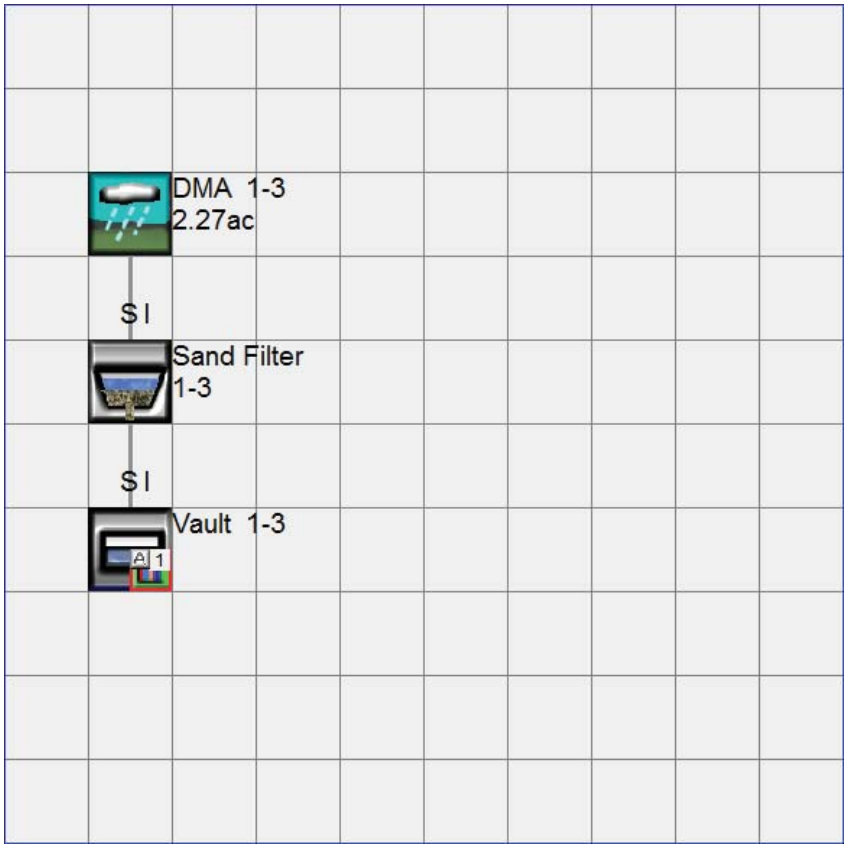
IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic

Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   Westpark1-3.wdm
MESSU      25   PreWestpark1-3.MES
           27   PreWestpark1-3.L61
           28   PreWestpark1-3.L62
           30   POCWestpark1-31.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      38
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        DMA  3                     MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                      in  out           ***
   38     C/D,Shrub,Mod(5-10%)    1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   38         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   38         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```



```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   38         0    0    0    1    0    0    0    0    1    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   38             0       4.5      0.04       350       0.1         2      0.95
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   38            40        35         3         2      0.15      0.15         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   38             0       0.7       0.3       1.2      0.45         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   38       0.5  0.5  0.5  0.6 0.65 0.65 0.65 0.65 0.65 0.65 0.55  0.5
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   38      0.13 0.13 0.13 0.14 0.15 0.15 0.15 0.15 0.15 0.15 0.14 0.13
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   38             0         0      0.01         0       0.5       0.3      0.01
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                      User  t-series Engl Metr ***
                                        in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2
```

```
  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
DMA  3***
PERLND  38                        2.33     COPY   501     12
PERLND  38                        2.33     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES
```



```
SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   Westpark1-3.wdm
MESSU      25   MitWestpark1-3.MES
           27   MitWestpark1-3.L61
           28   MitWestpark1-3.L62
           30   POCWestpark1-31.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      45
      IMPLND       5
      IMPLND      14
      RCHRES       1
      RCHRES       2
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Vault  1-3                  MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                           User  t-series Engl Metr ***
                                           in  out           ***
   45     C/D,Urban,Flat(0-5%)    1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   45        0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
```



```
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   45        0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   45        0    0    0    1    0    0    0    0    1    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   45            0       4.6      0.04       400      0.05         3     0.995
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   45            40        35         3         2      0.45      0.15         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   45             0       0.7      0.25         1       0.4         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   45       0.5  0.5  0.5  0.6 0.65 0.65 0.65 0.65 0.65 0.65 0.55  0.5
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   45      0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   45             0         0      0.01         0       3.5       1.7       0.1
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                         in  out           ***
    5     Roof Area                 1    1    1   27    0
   14     Parking,Flat(0-5%)        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    5        0    0    1    0    0    0
   14        0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    5        0    0    4    0    0    0    1    9
   14        0    0    4    0    0    0    1    9
  END PRINT-INFO
```

```
  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    5         0    0    0    0    0
   14         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    5            100      0.05       0.1       0.1
   14            100      0.05       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    5              0         0
   14              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    5              0         0
   14              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
DMA  1-3***
PERLND  45                        0.43     RCHRES   1      2
PERLND  45                        0.43     RCHRES   1      3
IMPLND   5                        0.36     RCHRES   1      5
IMPLND  14                        1.48     RCHRES   1      5

******Routing******
RCHRES   1                           1     RCHRES   2      7
RCHRES   1                                 COPY     1     17
RCHRES   1                           1     RCHRES   2      8
RCHRES   1                                 COPY     1     18
RCHRES   2                           1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                         in  out                             ***
    1     Sand Filter  1-3-013    2    1    1    1   28    0    1
    2     Vault  1-3              2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
```



```
    <PLS > ************* Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  5  0  0  0       0  0  0  0  0         2  2  2  2  2
    2        0  1  0  0    4  5  0  0  0       0  0  0  0  0         2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.01       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)    (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.022957  0.000000  0.000000  0.000000
  0.044444  0.022957  0.001020  0.000000  0.070679
  0.088889  0.022957  0.002041  0.000000  0.071914
  0.133333  0.022957  0.003061  0.000000  0.073148
  0.177778  0.022957  0.004081  0.000000  0.074383
  0.222222  0.022957  0.005102  0.000000  0.075617
  0.266667  0.022957  0.006122  0.000000  0.076852
  0.311111  0.022957  0.007142  0.000000  0.078086
  0.355556  0.022957  0.008162  0.000000  0.079321
  0.400000  0.022957  0.009183  0.000000  0.080556
  0.444444  0.022957  0.010203  0.000000  0.081790
  0.488889  0.022957  0.011223  0.000000  0.083025
  0.533333  0.022957  0.012244  0.000000  0.084259
  0.577778  0.022957  0.013264  0.000000  0.085494
  0.622222  0.022957  0.014284  0.000000  0.086728
  0.666667  0.022957  0.015305  0.000000  0.087963
  0.711111  0.022957  0.016325  0.000000  0.089198
  0.755556  0.022957  0.017345  0.000000  0.090432
  0.800000  0.022957  0.018365  0.000000  0.091667
  0.844444  0.022957  0.019386  0.000000  0.092901
  0.888889  0.022957  0.020406  0.000000  0.094136
  0.933333  0.022957  0.021426  0.000000  0.095370
  0.977778  0.022957  0.022447  0.000000  0.096605
  1.022222  0.022957  0.023467  0.000000  0.097840
  1.066667  0.022957  0.024487  0.000000  0.099074
```

1.111111	0.022957	0.025508	0.000000	0.100309
1.155556	0.022957	0.026528	0.000000	0.101543
1.200000	0.022957	0.027548	0.000000	0.102778
1.244444	0.022957	0.028569	0.000000	0.104012
1.288889	0.022957	0.029589	0.000000	0.105247
1.333333	0.022957	0.030609	0.000000	0.106481
1.377778	0.022957	0.031629	0.000000	0.107716
1.422222	0.022957	0.032650	0.000000	0.108951
1.466667	0.022957	0.033670	0.000000	0.110185
1.511111	0.022957	0.034690	0.000000	0.111420
1.555556	0.022957	0.035711	0.000000	0.112654
1.600000	0.022957	0.036731	0.000000	0.113889
1.644444	0.022957	0.037751	0.000000	0.115123
1.688889	0.022957	0.038772	0.000000	0.116358
1.733333	0.022957	0.039792	0.000000	0.117593
1.777778	0.022957	0.040812	0.000000	0.118827
1.822222	0.022957	0.041832	0.000000	0.120062
1.866667	0.022957	0.042853	0.000000	0.121296
1.911111	0.022957	0.043873	0.000000	0.122531
1.955556	0.022957	0.044893	0.000000	0.123765
2.000000	0.022957	0.045914	0.000000	0.125000
2.044444	0.022957	0.046934	0.000000	0.126235
2.088889	0.022957	0.047954	0.000000	0.127469
2.133333	0.022957	0.048975	0.000000	0.128704
2.177778	0.022957	0.049995	0.000000	0.129938
2.222222	0.022957	0.051015	0.000000	0.131173
2.266667	0.022957	0.052036	0.000000	0.132407
2.311111	0.022957	0.053056	0.000000	0.133642
2.355556	0.022957	0.054076	0.000000	0.134877
2.400000	0.022957	0.055096	0.000000	0.136111
2.444444	0.022957	0.056117	0.000000	0.137346
2.488889	0.022957	0.057137	0.000000	0.138580
2.533333	0.022957	0.058157	0.000000	0.139815
2.577778	0.022957	0.059178	0.000000	0.141049
2.622222	0.022957	0.060198	0.000000	0.142284
2.666667	0.022957	0.061218	0.000000	0.143519
2.711111	0.022957	0.062239	0.000000	0.144753
2.755556	0.022957	0.063259	0.000000	0.145988
2.800000	0.022957	0.064279	0.000000	0.147222
2.844444	0.022957	0.065299	0.000000	0.148457
2.888889	0.022957	0.066320	0.000000	0.149691
2.933333	0.022957	0.067340	0.000000	0.150926
2.977778	0.022957	0.068360	0.000000	0.152160
3.022222	0.022957	0.069381	0.052737	0.153395
3.066667	0.022957	0.070401	0.273695	0.154630
3.111111	0.022957	0.071421	0.587805	0.155864
3.155556	0.022957	0.072442	0.970000	0.157099
3.200000	0.022957	0.073462	1.404464	0.158333
3.244444	0.022957	0.074482	1.877310	0.159568
3.288889	0.022957	0.075502	2.374724	0.160802
3.333333	0.022957	0.076523	2.882519	0.162037
3.377778	0.022957	0.077543	3.386283	0.163272
3.422222	0.022957	0.078563	3.871856	0.164506
3.466667	0.022957	0.079584	4.326027	0.165741
3.511111	0.022957	0.080604	4.737392	0.166975
3.555556	0.022957	0.081624	5.097354	0.168210
3.600000	0.022957	0.082645	5.401220	0.169444
3.644444	0.022957	0.083665	5.649420	0.170679
3.688889	0.022957	0.084685	5.848795	0.171914
3.733333	0.022957	0.085706	6.013989	0.173148
3.777778	0.022957	0.086726	6.249853	0.174383
3.822222	0.022957	0.087746	6.425940	0.175617
3.866667	0.022957	0.088766	6.597328	0.176852
3.911111	0.022957	0.089787	6.764376	0.178086
3.955556	0.022957	0.090807	6.927396	0.179321
4.000000	0.022957	0.091827	7.086668	0.180556

END FTABLE 1
FTABLE 2
92 5

Depth	Area	Volume	Outflow1	Outflow2	Velocity	Travel Time***
(ft)	(acres)	(acre-ft)	(cfs)	(cfs)	(ft/sec)	(Minutes)***
0.000000	0.119008	0.000000	0.000000	0.000000		
0.066667	0.119008	0.007934	0.003336	0.006000		
0.133333	0.119008	0.015868	0.004718	0.006000		
0.200000	0.119008	0.023802	0.005778	0.006000		
0.266667	0.119008	0.031736	0.006672	0.006000		
0.333333	0.119008	0.039669	0.007459	0.006000		
0.400000	0.119008	0.047603	0.008171	0.006000		
0.466667	0.119008	0.055537	0.008826	0.006000		
0.533333	0.119008	0.063471	0.009435	0.006000		
0.600000	0.119008	0.071405	0.010008	0.006000		
0.666667	0.119008	0.079339	0.010549	0.006000		
0.733333	0.119008	0.087273	0.011064	0.006000		
0.800000	0.119008	0.095207	0.011556	0.006000		
0.866667	0.119008	0.103140	0.012028	0.006000		
0.933333	0.119008	0.111074	0.012482	0.006000		
1.000000	0.119008	0.119008	0.012920	0.006000		
1.066667	0.119008	0.126942	0.013344	0.006000		
1.133333	0.119008	0.134876	0.013754	0.006000		
1.200000	0.119008	0.142810	0.014153	0.006000		
1.266667	0.119008	0.150744	0.014541	0.006000		
1.333333	0.119008	0.158678	0.014919	0.006000		
1.400000	0.119008	0.166612	0.015287	0.006000		
1.466667	0.119008	0.174545	0.015647	0.006000		
1.533333	0.119008	0.182479	0.015998	0.006000		
1.600000	0.119008	0.190413	0.016342	0.006000		
1.666667	0.119008	0.198347	0.016679	0.006000		
1.733333	0.119008	0.206281	0.017010	0.006000		
1.800000	0.119008	0.214215	0.017334	0.006000		
1.866667	0.119008	0.222149	0.017652	0.006000		
1.933333	0.119008	0.230083	0.017964	0.006000		
2.000000	0.119008	0.238017	0.018271	0.006000		
2.066667	0.119008	0.245950	0.018573	0.006000		
2.133333	0.119008	0.253884	0.018871	0.006000		
2.200000	0.119008	0.261818	0.019163	0.006000		
2.266667	0.119008	0.269752	0.019451	0.006000		
2.333333	0.119008	0.277686	0.019735	0.006000		
2.400000	0.119008	0.285620	0.020015	0.006000		
2.466667	0.119008	0.293554	0.020291	0.006000		
2.533333	0.119008	0.301488	0.020564	0.006000		
2.600000	0.119008	0.309421	0.020833	0.006000		
2.666667	0.119008	0.317355	0.021098	0.006000		
2.733333	0.119008	0.325289	0.021360	0.006000		
2.800000	0.119008	0.333223	0.021619	0.006000		
2.866667	0.119008	0.341157	0.021875	0.006000		
2.933333	0.119008	0.349091	0.022128	0.006000		
3.000000	0.119008	0.357025	0.022378	0.006000		
3.066667	0.119008	0.364959	0.022625	0.006000		
3.133333	0.119008	0.372893	0.022870	0.006000		
3.200000	0.119008	0.380826	0.023112	0.006000		
3.266667	0.119008	0.388760	0.023351	0.006000		
3.333333	0.119008	0.396694	0.023588	0.006000		
3.400000	0.119008	0.404628	0.023823	0.006000		
3.466667	0.119008	0.412562	0.024055	0.006000		
3.533333	0.119008	0.420496	0.024286	0.006000		
3.600000	0.119008	0.428430	0.024514	0.006000		
3.666667	0.119008	0.436364	0.024740	0.006000		
3.733333	0.119008	0.444298	0.024963	0.006000		
3.800000	0.119008	0.452231	0.025428	0.006000		
3.866667	0.119008	0.460165	0.025776	0.006000		
3.933333	0.119008	0.468099	0.026088	0.006000		
4.000000	0.119008	0.476033	0.026382	0.006000		
4.066667	0.119008	0.483967	0.026665	0.006000		
4.133333	0.119008	0.491901	0.026939	0.006000		
4.200000	0.119008	0.499835	0.027206	0.006000		
4.266667	0.119008	0.507769	0.027467	0.006000		
4.333333	0.119008	0.515702	0.027724	0.006000		
4.400000	0.119008	0.523636	0.027976	0.006000		
4.466667	0.119008	0.531570	0.028224	0.006000		
4.533333	0.119008	0.539504	0.028469	0.006000		

```
  4.600000  0.119008  0.547438  0.028711  0.006000
  4.666667  0.119008  0.555372  0.028949  0.006000
  4.733333  0.119008  0.563306  0.029185  0.006000
  4.800000  0.119008  0.571240  0.029418  0.006000
  4.866667  0.119008  0.579174  0.029649  0.006000
  4.933333  0.119008  0.587107  0.029877  0.006000
  5.000000  0.119008  0.595041  0.030103  0.006000
  5.066667  0.119008  0.602975  0.304023  0.006000
  5.133333  0.119008  0.610909  0.802014  0.006000
  5.200000  0.119008  0.618843  1.435233  0.006000
  5.266667  0.119008  0.626777  2.154810  0.006000
  5.333333  0.119008  0.634711  2.913722  0.006000
  5.400000  0.119008  0.642645  3.663618  0.006000
  5.466667  0.119008  0.650579  4.357656  0.006000
  5.533333  0.119008  0.658512  4.956038  0.006000
  5.600000  0.119008  0.666446  5.433271  0.006000
  5.666667  0.119008  0.674380  5.786753  0.006000
  5.733333  0.119008  0.682314  6.046454  0.006000
  5.800000  0.119008  0.690248  6.371177  0.006000
  5.866667  0.119008  0.698182  6.630201  0.006000
  5.933333  0.119008  0.706116  6.879446  0.006000
  6.000000  0.119008  0.714050  7.119943  0.006000
  6.066667  0.119008  0.721983  7.352553  0.006000
  END FTABLE  2
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP
WDM     22 IRRG     ENGL    0.7       SAME PERLND  45     EXTNL  SURLI

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   2 HYDR   RO     1 1        1      WDM   1008 FLOW     ENGL      REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1009 FLOW     ENGL      REPL
RCHRES   2 HYDR   O      2 1        1      WDM   1010 FLOW     ENGL      REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1011 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        7
RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8
```



```
  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17

  MASS-LINK       18
RCHRES     OFLOW  OVOL   2                 COPY           INPUT  MEAN
  END MASS-LINK   18


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1980/ 2/14  7:45

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1         V2        VOL
91 3955.6     4000.0     4016.1
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1980/ 2/14  7:45

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
0.0000E+00 2000.0     -2.727E+03    1.3634  1.3634E+00      2
```

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SMRHM

PROJECT REPORT

General Model Information

Project Name:	Westpark3-1
Site Name:	Westpark Promenade
Site Address:	PA 13-0082
City:	Wildomar
Report Date:	4/13/2016
Gage:	Wildomar / North Murrieta
Data Start:	1949/10/01
Data End:	2011/09/30
Timestep:	15 Minute
Precip Scale:	1.00
Version Date:	2016/04/05

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data

Predeveloped Land Use

DMA 3-1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Shrub,Mod(5-10%)	2.68
Pervious Total	2.68
Impervious Land Use	acre
Impervious Total	0
Basin Total	2.68

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

DMA 3-1-A

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Urban,Flat(0-5%)	0.31
Pervious Total	0.31
Impervious Land Use	acre
Roof Area	0.28
Parking,Flat(0-5%)	0.3
Permeable Pavement	0.3
Impervious Total	0.88
Basin Total	1.19

Element Flows To:

Surface	Interflow	Groundwater
Surface Swale 3-1-A	Surface Swale 3-1-A	

DMA 3-1-B

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Urban,Flat(0-5%)	0.29
Pervious Total	0.29
Impervious Land Use	acre
Roof Area	0.42
Parking,Flat(0-5%)	0.21
Permeable Pavement	0.21
Impervious Total	0.84
Basin Total	1.13

Element Flows To:

Surface	Interflow	Groundwater
Surface Swale 3-1-B	Surface Swale 3-1-B	

Routing Elements

Predeveloped Routing

Mitigated Routing

Bio Swale 3-1-A

Bottom Length:	94.00 ft.
Bottom Width:	10.00 ft.
Material thickness of first layer:	3
Material type for first layer:	Loamy fine sand
Material thickness of second layer:	1
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.1
Infiltration safety factor:	0.5
Total Volume Infiltrated (ac-ft.):	0.319
Total Volume Through Riser (ac-ft.):	16.583
Total Volume Through Facility (ac-ft.):	46.5
Percent Infiltrated:	0.69
Total Precip Applied to Facility:	1.54
Total Evap From Facility:	1.273
Underdrain used	
Underdrain Diameter (feet):	0.5
Orifice Diameter (in.):	6
Offset (in.):	0
Flow Through Underdrain (ac-ft.):	29.598
Total Outflow (ac-ft.):	46.5
Percent Through Underdrain:	63.65
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	12 in.
Element Flows To:	
Outlet 1	Outlet 2
Vault 3-1	

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0289	0.0000	0.0000	0.0000
0.0659	0.0288	0.0003	0.0000	0.0000
0.1319	0.0287	0.0005	0.0000	0.0000
0.1978	0.0286	0.0008	0.0000	0.0000
0.2637	0.0285	0.0011	0.0000	0.0000
0.3297	0.0284	0.0014	0.0001	0.0000
0.3956	0.0282	0.0016	0.0001	0.0000
0.4615	0.0281	0.0019	0.0001	0.0000
0.5275	0.0280	0.0025	0.0002	0.0000
0.5934	0.0279	0.0031	0.0003	0.0000
0.6593	0.0278	0.0036	0.0003	0.0000
0.7253	0.0276	0.0042	0.0004	0.0000
0.7912	0.0275	0.0048	0.0006	0.0000
0.8571	0.0274	0.0053	0.0007	0.0000
0.9231	0.0273	0.0059	0.0008	0.0000
0.9890	0.0271	0.0065	0.0010	0.0000
1.0549	0.0270	0.0071	0.0012	0.0000
1.1209	0.0269	0.0077	0.0014	0.0000
1.1868	0.0268	0.0083	0.0016	0.0000
1.2527	0.0267	0.0089	0.0018	0.0000

1.3187	0.0265	0.0095	0.0021	0.0000
1.3846	0.0264	0.0101	0.0024	0.0000
1.4505	0.0263	0.0107	0.0027	0.0000
1.5165	0.0262	0.0113	0.0030	0.0000
1.5824	0.0261	0.0119	0.0034	0.0000
1.6484	0.0259	0.0125	0.0038	0.0000
1.7143	0.0258	0.0131	0.0042	0.0000
1.7802	0.0257	0.0137	0.0046	0.0000
1.8462	0.0256	0.0144	0.0050	0.0001
1.9121	0.0255	0.0150	0.0055	0.0001
1.9780	0.0253	0.0156	0.0060	0.0001
2.0440	0.0252	0.0162	0.0065	0.0001
2.1099	0.0251	0.0169	0.0071	0.0001
2.1758	0.0250	0.0175	0.0077	0.0001
2.2418	0.0248	0.0182	0.0083	0.0001
2.3077	0.0247	0.0188	0.0089	0.0001
2.3736	0.0246	0.0194	0.0096	0.0001
2.4396	0.0245	0.0201	0.0103	0.0001
2.5055	0.0244	0.0208	0.0110	0.0001
2.5714	0.0242	0.0214	0.0118	0.0001
2.6374	0.0241	0.0221	0.0126	0.0001
2.7033	0.0240	0.0227	0.0134	0.0001
2.7692	0.0239	0.0234	0.0143	0.0002
2.8352	0.0238	0.0241	0.0151	0.0002
2.9011	0.0236	0.0247	0.0161	0.0002
2.9670	0.0235	0.0254	0.0170	0.0002
3.0330	0.0234	0.0261	0.0180	0.0002
3.0989	0.0233	0.0269	0.0185	0.0002
3.1648	0.0232	0.0276	0.0185	0.0002
3.2308	0.0230	0.0284	0.0185	0.0002
3.2967	0.0229	0.0291	0.0185	0.0002
3.3626	0.0228	0.0299	0.0185	0.0002
3.4286	0.0227	0.0307	0.0185	0.0002
3.4945	0.0225	0.0314	0.0185	0.0002
3.5604	0.0224	0.0322	0.0185	0.0002
3.6264	0.0223	0.0330	0.0185	0.0002
3.6923	0.0222	0.0337	0.0185	0.0002
3.7582	0.0221	0.0345	0.0185	0.0002
3.8242	0.0219	0.0353	0.0185	0.0002
3.8901	0.0218	0.0361	0.0185	0.0002
3.9560	0.0217	0.0369	0.0185	0.0002
4.0000	0.0216	0.0374	0.0185	0.0002

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
4.0000	0.0289	0.0374	0.0000	0.0191	0.0000
4.0659	0.0290	0.0393	0.0000	0.0191	0.0000
4.1319	0.0292	0.0412	0.0000	0.0195	0.0000
4.1978	0.0293	0.0432	0.0000	0.0199	0.0000
4.2637	0.0294	0.0451	0.0000	0.0203	0.0000
4.3297	0.0295	0.0470	0.0000	0.0207	0.0000
4.3956	0.0297	0.0490	0.0000	0.0211	0.0000
4.4615	0.0298	0.0509	0.0000	0.0215	0.0000
4.5275	0.0299	0.0529	0.0000	0.0220	0.0000
4.5934	0.0300	0.0549	0.0000	0.0224	0.0000
4.6593	0.0301	0.0569	0.0000	0.0228	0.0000
4.7253	0.0303	0.0589	0.0000	0.0232	0.0000
4.7912	0.0304	0.0609	0.0000	0.0236	0.0000

4.8571	0.0305	0.0629	0.0000	0.0240	0.0000
4.9231	0.0306	0.0649	0.0000	0.0244	0.0000
4.9890	0.0307	0.0669	0.0000	0.0248	0.0000
5.0549	0.0309	0.0689	0.1365	0.0252	0.0000
5.1209	0.0310	0.0710	0.4414	0.0257	0.0000
5.1868	0.0311	0.0730	0.8261	0.0261	0.0000
5.2527	0.0312	0.0751	1.2343	0.0265	0.0000
5.3187	0.0313	0.0771	1.6096	0.0269	0.0000
5.3846	0.0315	0.0792	1.9054	0.0273	0.0000
5.4505	0.0316	0.0813	2.1028	0.0277	0.0000
5.5165	0.0317	0.0834	2.2635	0.0281	0.0000
5.5824	0.0318	0.0855	2.4037	0.0285	0.0000
5.6484	0.0320	0.0876	2.5361	0.0289	0.0000
5.7143	0.0321	0.0897	2.6619	0.0293	0.0000
5.7802	0.0322	0.0918	2.7821	0.0298	0.0000
5.8462	0.0323	0.0939	2.8972	0.0302	0.0000
5.9121	0.0324	0.0961	3.0080	0.0306	0.0000
5.9780	0.0326	0.0982	3.1148	0.0310	0.0000
6.0000	0.0326	0.0989	3.2181	0.0311	0.0000

Surface Swale 3-1-A

Element Flows To:

Outlet 1	Outlet 2
Vault 3-1	Bio Swale 3-1-A

Bio Swale 3-1-B

Bottom Length:	90.00 ft.
Bottom Width:	10.00 ft.
Material thickness of first layer:	3
Material type for first layer:	Loamy fine sand
Material thickness of second layer:	1
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	0.5
Total Volume Infiltrated (ac-ft.):	1.401
Total Volume Through Riser (ac-ft.):	15.673
Total Volume Through Facility (ac-ft.):	44.317
Percent Infiltrated:	3.16
Total Precip Applied to Facility:	1.486
Total Evap From Facility:	1.241
Underdrain used	
Underdrain Diameter (feet):	0.5
Orifice Diameter (in.):	6
Offset (in.):	0
Flow Through Underdrain (ac-ft.):	27.243
Total Outflow (ac-ft.):	44.317
Percent Through Underdrain:	61.47
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	12 in.
Element Flows To:	
Outlet 1	Outlet 2
Vault 3-1	

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0280	0.0000	0.0000	0.0000
0.0659	0.0279	0.0003	0.0000	0.0000
0.1319	0.0278	0.0005	0.0000	0.0000
0.1978	0.0277	0.0008	0.0000	0.0000
0.2637	0.0276	0.0010	0.0000	0.0000
0.3297	0.0274	0.0013	0.0001	0.0000
0.3956	0.0273	0.0016	0.0001	0.0000
0.4615	0.0272	0.0021	0.0001	0.0000
0.5275	0.0271	0.0027	0.0002	0.0000
0.5934	0.0270	0.0032	0.0002	0.0000
0.6593	0.0268	0.0037	0.0003	0.0000
0.7253	0.0267	0.0043	0.0004	0.0000
0.7912	0.0266	0.0048	0.0005	0.0000
0.8571	0.0265	0.0054	0.0006	0.0000
0.9231	0.0264	0.0059	0.0008	0.0000
0.9890	0.0262	0.0065	0.0009	0.0000
1.0549	0.0261	0.0071	0.0011	0.0001
1.1209	0.0260	0.0076	0.0013	0.0001
1.1868	0.0259	0.0082	0.0015	0.0001
1.2527	0.0257	0.0088	0.0017	0.0001
1.3187	0.0256	0.0094	0.0019	0.0001
1.3846	0.0255	0.0099	0.0022	0.0001

1.4505	0.0254	0.0105	0.0025	0.0001
1.5165	0.0253	0.0111	0.0028	0.0001
1.5824	0.0251	0.0117	0.0031	0.0002
1.6484	0.0250	0.0123	0.0035	0.0002
1.7143	0.0249	0.0129	0.0038	0.0002
1.7802	0.0248	0.0135	0.0042	0.0002
1.8462	0.0247	0.0141	0.0046	0.0002
1.9121	0.0245	0.0147	0.0051	0.0003
1.9780	0.0244	0.0153	0.0055	0.0003
2.0440	0.0243	0.0159	0.0060	0.0003
2.1099	0.0242	0.0165	0.0065	0.0003
2.1758	0.0241	0.0171	0.0071	0.0004
2.2418	0.0239	0.0177	0.0076	0.0004
2.3077	0.0238	0.0183	0.0082	0.0004
2.3736	0.0237	0.0190	0.0088	0.0005
2.4396	0.0236	0.0196	0.0095	0.0005
2.5055	0.0234	0.0202	0.0102	0.0005
2.5714	0.0233	0.0209	0.0109	0.0006
2.6374	0.0232	0.0215	0.0116	0.0006
2.7033	0.0231	0.0221	0.0123	0.0006
2.7692	0.0230	0.0228	0.0131	0.0007
2.8352	0.0228	0.0234	0.0139	0.0007
2.9011	0.0227	0.0241	0.0148	0.0008
2.9670	0.0226	0.0247	0.0156	0.0008
3.0330	0.0225	0.0254	0.0165	0.0009
3.0989	0.0224	0.0262	0.0170	0.0009
3.1648	0.0222	0.0269	0.0170	0.0009
3.2308	0.0221	0.0276	0.0170	0.0009
3.2967	0.0220	0.0283	0.0170	0.0009
3.3626	0.0219	0.0291	0.0170	0.0009
3.4286	0.0218	0.0298	0.0170	0.0009
3.4945	0.0216	0.0305	0.0170	0.0009
3.5604	0.0215	0.0313	0.0170	0.0009
3.6264	0.0214	0.0320	0.0170	0.0009
3.6923	0.0213	0.0328	0.0170	0.0009
3.7582	0.0211	0.0335	0.0170	0.0009
3.8242	0.0210	0.0343	0.0170	0.0009
3.8901	0.0209	0.0350	0.0170	0.0009
3.9560	0.0208	0.0358	0.0170	0.0009
4.0000	0.0207	0.0363	0.0170	0.0009

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
4.0000	0.0280	0.0363	0.0000	0.0183	0.0000
4.0659	0.0281	0.0382	0.0000	0.0183	0.0000
4.1319	0.0282	0.0400	0.0000	0.0187	0.0000
4.1978	0.0284	0.0419	0.0000	0.0191	0.0000
4.2637	0.0285	0.0438	0.0000	0.0195	0.0000
4.3297	0.0286	0.0457	0.0000	0.0198	0.0000
4.3956	0.0287	0.0475	0.0000	0.0202	0.0000
4.4615	0.0289	0.0494	0.0000	0.0206	0.0000
4.5275	0.0290	0.0513	0.0000	0.0210	0.0000
4.5934	0.0291	0.0533	0.0000	0.0214	0.0000
4.6593	0.0292	0.0552	0.0000	0.0218	0.0000
4.7253	0.0293	0.0571	0.0000	0.0222	0.0000
4.7912	0.0295	0.0591	0.0000	0.0226	0.0000
4.8571	0.0296	0.0610	0.0000	0.0230	0.0000
4.9231	0.0297	0.0630	0.0000	0.0234	0.0000

4.9890	0.0298	0.0649	0.0000	0.0238	0.0000
5.0549	0.0299	0.0669	0.1365	0.0242	0.0000
5.1209	0.0301	0.0689	0.4414	0.0246	0.0000
5.1868	0.0302	0.0709	0.8261	0.0250	0.0000
5.2527	0.0303	0.0728	1.2343	0.0253	0.0000
5.3187	0.0304	0.0749	1.6096	0.0257	0.0000
5.3846	0.0306	0.0769	1.9054	0.0261	0.0000
5.4505	0.0307	0.0789	2.1028	0.0265	0.0000
5.5165	0.0308	0.0809	2.2635	0.0269	0.0000
5.5824	0.0309	0.0829	2.4037	0.0273	0.0000
5.6484	0.0310	0.0850	2.5361	0.0277	0.0000
5.7143	0.0312	0.0870	2.6619	0.0281	0.0000
5.7802	0.0313	0.0891	2.7821	0.0285	0.0000
5.8462	0.0314	0.0912	2.8972	0.0289	0.0000
5.9121	0.0315	0.0932	3.0080	0.0293	0.0000
5.9780	0.0316	0.0953	3.1148	0.0297	0.0000
6.0000	0.0317	0.0960	3.2181	0.0298	0.0000

Surface Swale 3-1-B

Element Flows To:

Outlet 1	Outlet 2
Vault 3-1	Bio Swale 3-1-B

Vault 3-1

Width:	49 ft.	
Length:	49 ft.	
Depth:	8 ft.	
Infiltration On		
Infiltration rate:	0.1	
Infiltration safety factor:	0.5	
Total Volume Infiltrated (ac-ft.):		16.208
Total Volume Through Riser (ac-ft.):		72.882
Total Volume Through Facility (ac-ft.):		89.089
Percent Infiltrated:		18.19
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Discharge Structure		
Riser Height:	7 ft.	
Riser Diameter:	18 in.	
Orifice 1 Diameter:	0.67 in.	Elevation:0 ft.
Orifice 3 Diameter:	0.2 in.	Elevation:5.65 ft.
Element Flows To:		
Outlet 1	Outlet 2	

Vault Hydraulic Table

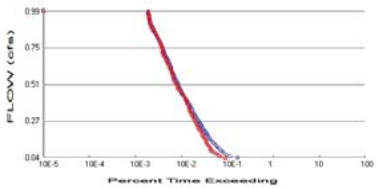
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.055	0.000	0.000	0.000
0.0889	0.055	0.004	0.003	0.002
0.1778	0.055	0.009	0.005	0.002
0.2667	0.055	0.014	0.006	0.002
0.3556	0.055	0.019	0.007	0.002
0.4444	0.055	0.024	0.008	0.002
0.5333	0.055	0.029	0.008	0.002
0.6222	0.055	0.034	0.009	0.002
0.7111	0.055	0.039	0.010	0.002
0.8000	0.055	0.044	0.010	0.002
0.8889	0.055	0.049	0.011	0.002
0.9778	0.055	0.053	0.012	0.002
1.0667	0.055	0.058	0.012	0.002
1.1556	0.055	0.063	0.013	0.002
1.2444	0.055	0.068	0.013	0.002
1.3333	0.055	0.073	0.014	0.002
1.4222	0.055	0.078	0.014	0.002
1.5111	0.055	0.083	0.015	0.002
1.6000	0.055	0.088	0.015	0.002
1.6889	0.055	0.093	0.015	0.002
1.7778	0.055	0.098	0.016	0.002
1.8667	0.055	0.102	0.016	0.002
1.9556	0.055	0.107	0.017	0.002
2.0444	0.055	0.112	0.017	0.002
2.1333	0.055	0.117	0.017	0.002
2.2222	0.055	0.122	0.018	0.002
2.3111	0.055	0.127	0.018	0.002
2.4000	0.055	0.132	0.018	0.002
2.4889	0.055	0.137	0.019	0.002
2.5778	0.055	0.142	0.019	0.002
2.6667	0.055	0.147	0.019	0.002
2.7556	0.055	0.151	0.020	0.002

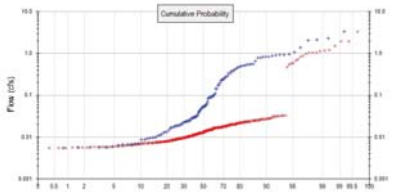
2.8444	0.055	0.156	0.020	0.002
2.9333	0.055	0.161	0.020	0.002
3.0222	0.055	0.166	0.021	0.002
3.1111	0.055	0.171	0.021	0.002
3.2000	0.055	0.176	0.021	0.002
3.2889	0.055	0.181	0.022	0.002
3.3778	0.055	0.186	0.022	0.002
3.4667	0.055	0.191	0.022	0.002
3.5556	0.055	0.196	0.023	0.002
3.6444	0.055	0.200	0.023	0.002
3.7333	0.055	0.205	0.023	0.002
3.8222	0.055	0.210	0.023	0.002
3.9111	0.055	0.215	0.024	0.002
4.0000	0.055	0.220	0.024	0.002
4.0889	0.055	0.225	0.024	0.002
4.1778	0.055	0.230	0.024	0.002
4.2667	0.055	0.235	0.025	0.002
4.3556	0.055	0.240	0.025	0.002
4.4444	0.055	0.245	0.025	0.002
4.5333	0.055	0.249	0.025	0.002
4.6222	0.055	0.254	0.026	0.002
4.7111	0.055	0.259	0.026	0.002
4.8000	0.055	0.264	0.026	0.002
4.8889	0.055	0.269	0.026	0.002
4.9778	0.055	0.274	0.027	0.002
5.0667	0.055	0.279	0.027	0.002
5.1556	0.055	0.284	0.027	0.002
5.2444	0.055	0.289	0.027	0.002
5.3333	0.055	0.294	0.028	0.002
5.4222	0.055	0.298	0.028	0.002
5.5111	0.055	0.303	0.028	0.002
5.6000	0.055	0.308	0.028	0.002
5.6889	0.055	0.313	0.029	0.002
5.7778	0.055	0.318	0.029	0.002
5.8667	0.055	0.323	0.030	0.002
5.9556	0.055	0.328	0.030	0.002
6.0444	0.055	0.333	0.030	0.002
6.1333	0.055	0.338	0.030	0.002
6.2222	0.055	0.343	0.031	0.002
6.3111	0.055	0.347	0.031	0.002
6.4000	0.055	0.352	0.031	0.002
6.4889	0.055	0.357	0.032	0.002
6.5778	0.055	0.362	0.032	0.002
6.6667	0.055	0.367	0.032	0.002
6.7556	0.055	0.372	0.032	0.002
6.8444	0.055	0.377	0.033	0.002
6.9333	0.055	0.382	0.033	0.002
7.0222	0.055	0.387	0.086	0.002
7.1111	0.055	0.392	0.621	0.002
7.2000	0.055	0.396	1.438	0.002
7.2889	0.055	0.401	2.409	0.002
7.3778	0.055	0.406	3.420	0.002
7.4667	0.055	0.411	4.360	0.002
7.5556	0.055	0.416	5.132	0.002
7.6444	0.055	0.421	5.684	0.002
7.7333	0.055	0.426	6.049	0.002
7.8222	0.055	0.431	6.461	0.002
7.9111	0.055	0.436	6.800	0.002

8.0000	0.055	0.441	7.122	0.002
8.0889	0.055	0.445	7.431	0.002
8.1778	0.000	0.000	7.727	0.000

Analysis Results

POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 2.68
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.6
Total Impervious Area: 1.72

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.355303
5 year	0.835716
10 year	0.989173
25 year	2.132098

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.027567
5 year	0.831401
10 year	1.136607
25 year	1.933122

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0355	3598	1977	54	Pass
0.0452	2524	1593	63	Pass
0.0548	2075	1402	67	Pass
0.0644	1860	1250	67	Pass
0.0741	1702	1118	65	Pass
0.0837	1576	1001	63	Pass
0.0933	1445	955	66	Pass
0.1030	1356	920	67	Pass
0.1126	1267	888	70	Pass
0.1222	1180	834	70	Pass
0.1319	1096	811	73	Pass
0.1415	1026	780	76	Pass
0.1511	961	742	77	Pass
0.1608	899	720	80	Pass
0.1704	857	698	81	Pass
0.1800	815	666	81	Pass
0.1897	784	637	81	Pass
0.1993	749	616	82	Pass
0.2089	708	595	84	Pass
0.2186	672	558	83	Pass
0.2282	642	535	83	Pass
0.2378	614	512	83	Pass
0.2475	589	491	83	Pass
0.2571	557	474	85	Pass
0.2667	539	462	85	Pass
0.2763	521	444	85	Pass
0.2860	491	430	87	Pass
0.2956	467	415	88	Pass
0.3052	437	396	90	Pass
0.3149	425	382	89	Pass
0.3245	413	368	89	Pass
0.3341	393	353	89	Pass
0.3438	373	344	92	Pass
0.3534	362	334	92	Pass
0.3630	350	325	92	Pass
0.3727	339	318	93	Pass
0.3823	327	306	93	Pass
0.3919	307	297	96	Pass
0.4016	297	293	98	Pass
0.4112	284	285	100	Pass
0.4208	270	276	102	Pass
0.4305	254	265	104	Pass
0.4401	242	255	105	Pass
0.4497	233	242	103	Pass
0.4594	222	222	100	Pass
0.4690	214	210	98	Pass
0.4786	207	198	95	Pass
0.4883	200	188	94	Pass
0.4979	194	184	94	Pass
0.5075	190	181	95	Pass
0.5172	184	175	95	Pass
0.5268	177	167	94	Pass
0.5364	171	159	92	Pass

0.5461	167	154	92	Pass
0.5557	159	149	93	Pass
0.5653	153	147	96	Pass
0.5750	149	146	97	Pass
0.5846	143	142	99	Pass
0.5942	138	139	100	Pass
0.6039	134	134	100	Pass
0.6135	131	132	100	Pass
0.6231	131	127	96	Pass
0.6328	127	121	95	Pass
0.6424	122	115	94	Pass
0.6520	120	112	93	Pass
0.6617	113	110	97	Pass
0.6713	111	106	95	Pass
0.6809	106	101	95	Pass
0.6906	104	97	93	Pass
0.7002	99	92	92	Pass
0.7098	95	90	94	Pass
0.7195	93	88	94	Pass
0.7291	91	87	95	Pass
0.7387	89	86	96	Pass
0.7484	87	86	98	Pass
0.7580	84	83	98	Pass
0.7676	80	82	102	Pass
0.7773	79	79	100	Pass
0.7869	75	77	102	Pass
0.7965	73	75	102	Pass
0.8062	70	72	102	Pass
0.8158	67	71	105	Pass
0.8254	66	68	103	Pass
0.8350	61	65	106	Pass
0.8447	59	62	105	Pass
0.8543	57	60	105	Pass
0.8639	56	57	101	Pass
0.8736	55	53	96	Pass
0.8832	52	51	98	Pass
0.8928	51	50	98	Pass
0.9025	48	48	100	Pass
0.9121	46	46	100	Pass
0.9217	46	46	100	Pass
0.9314	45	45	100	Pass
0.9410	44	44	100	Pass
0.9506	42	44	104	Pass
0.9603	42	44	104	Pass
0.9699	41	44	107	Pass
0.9795	41	43	104	Pass
0.9892	41	41	100	Pass

Water Quality

Drawdown Time Results

Pond: Vault 3-1

Days	Stage(feet)	Percent of Total Run Time
1	0.451	7.0883
2	0.822	5.3667
3	1.288	4.0691
4	1.850	2.9916
5	2.509	2.1938

Maximum Stage: 7.387 Drawdown Time: Exceeds 5 days.

POC 2

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 3

POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 4

POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Rational Method

Company Name	Pacific Coast Land Consultants
Designed by	Chris Hopper
Company Project Number/Name	Westpark Promenade
Drainage Area Number/Name	See Riverside County Worksheet for LID Sizing
Date	4/13/16
County/City Case No.	PA 13-0082

Township
Range
Section
85th Percentile

acre	Cover Type
	Roofs
	Concrete or Asphalt
	Grouted or Gapless Paving Blocks
	Compacted Soil (e.g. unpaved parking)
	Decomposed Granite
	Permeable Paving Blocks w/ Sand Filled Gap
	Class 2 Base
	Gravel or Class 2 Permeable Base
	Pervious Concrete / Porous Asphalt
	Open and Porous Pavers
	Turf block
	Ornamental Landscaping
	Natural (A Soil)
	Natural (B Soil)
	Natural (C Soil)
	Natural (D Soil)
	Mixed Surface Types Fraction = 0.00

Calculated Values
C = 0.00
Vu = 0.00 (in * ac)/ac
Vbmp = 0 ft3
Qbmp = 0.0 ft3/s

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

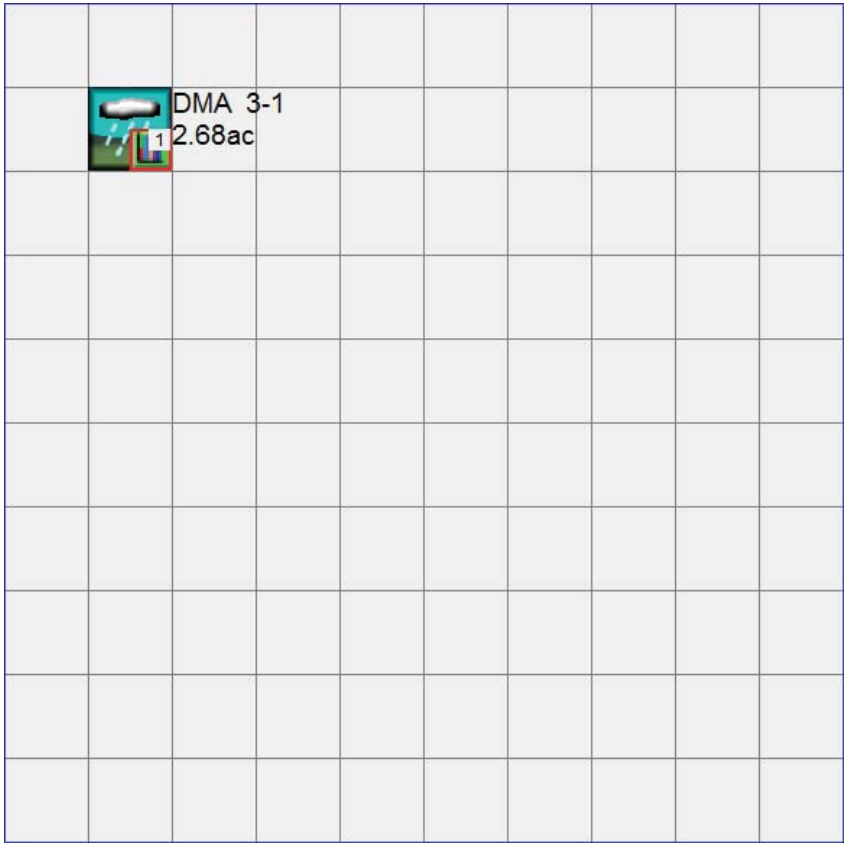
No PERLND changes have been made.

IMPLND Changes

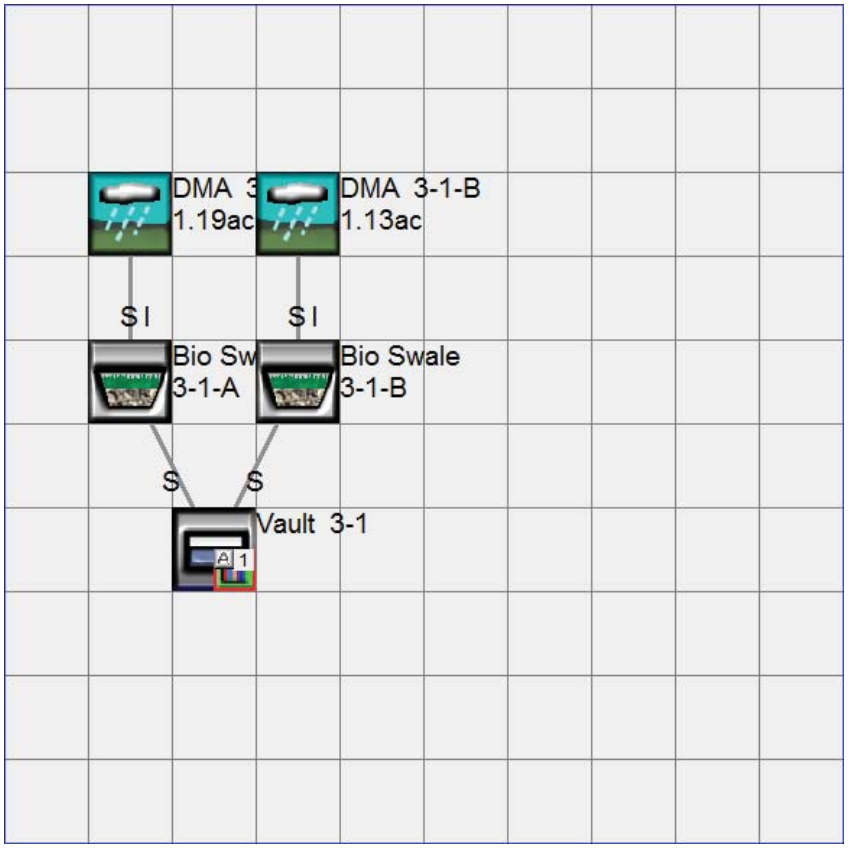
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   Westpark3-1.wdm
MESSU      25   PreWestpark3-1.MES
           27   PreWestpark3-1.L61
           28   PreWestpark3-1.L62
           30   POCWestpark3-11.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      38
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        DMA  3-1                    MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                      in  out           ***
   38     C/D,Shrub,Mod(5-10%)    1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   38         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   38         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```



```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   38         0    0    0    1    0    0    0    0    1    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   38         0       4.5      0.04       350       0.1         2      0.95
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   38        40        35         3         2      0.15      0.15         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   38         0       0.7       0.3       1.2      0.45         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   38       0.5  0.5  0.5  0.6 0.65 0.65 0.65 0.65 0.65 0.65 0.55  0.5
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   38      0.13 0.13 0.13 0.14 0.15 0.15 0.15 0.15 0.15 0.15 0.14 0.13
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   38         0         0      0.01         0       0.5       0.3      0.01
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                      User  t-series Engl Metr ***
                                        in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2
```

```
  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
DMA  3-1***
PERLND  38                        2.68     COPY   501     12
PERLND  38                        2.68     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES
```



```
SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   Westpark3-1.wdm
MESSU      25   MitWestpark3-1.MES
           27   MitWestpark3-1.L61
           28   MitWestpark3-1.L62
           30   POCWestpark3-11.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      45
      IMPLND       5
      IMPLND      14
      IMPLND      19
      GENER        2
      RCHRES       1
      RCHRES       2
      GENER        4
      RCHRES       3
      RCHRES       4
      RCHRES       5
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Vault  3-1                 MAX                   1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    2        24
    4        24
  END OPCODE
  PARM
    #    #         K ***
    2             0.
    4             0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                          in  out           ***
   45     C/D,Urban,Flat(0-5%)    1    1    1    1   27    0
```



```
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   45         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   45         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   45         0    0    0    1    0    0    0    0    1    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >       PWATER input info: Part 2          ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   45              0       4.6      0.04       400      0.05         3     0.995
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >       PWATER input info: Part 3          ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   45             40        35         3         2      0.45      0.15         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >      PWATER input info: Part 4                                  ***
    # -  #      CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   45              0       0.7      0.25         1       0.4         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >       PWATER input info: Part 3          ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   45       0.5  0.5  0.5  0.6 0.65 0.65 0.65 0.65 0.65 0.65 0.55  0.5
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >       PWATER input info: Part 3          ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   45      0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   45              0         0      0.01         0       3.5       1.7       0.1
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                          in  out           ***
    5     Roof Area                 1    1    1   27    0
   14     Parking,Flat(0-5%)        1    1    1   27    0
   19     Permeable Pavement        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
```

```
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    5         0    0    1    0    0    0
   14         0    0    1    0    0    0
   19         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    5         0    0    4    0    0    0    1    9
   14         0    0    4    0    0    0    1    9
   19         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    5         0    0    0    0    0
   14         0    0    0    0    0
   19         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    5            100      0.05       0.1       0.1
   14            100      0.05       0.1       0.1
   19            100      0.01      0.05       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    5              0         0
   14              0         0
   19              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    5              0         0
   14              0         0
   19              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                <--Area-->     <-Target->   MBLK   ***
<Name>   #                <-factor->     <Name>   #   Tbl#   ***
DMA  3-1-A***
PERLND  45                      0.31     RCHRES   1      2
PERLND  45                      0.31     RCHRES   1      3
IMPLND   5                      0.28     RCHRES   1      5
IMPLND  14                       0.3     RCHRES   1      5
IMPLND  19                       0.3     RCHRES   1      5
DMA  3-1-B***
PERLND  45                      0.29     RCHRES   3      2
PERLND  45                      0.29     RCHRES   3      3
IMPLND   5                      0.42     RCHRES   3      5
IMPLND  14                      0.21     RCHRES   3      5
IMPLND  19                      0.21     RCHRES   3      5

******Routing******
RCHRES   2                         1     RCHRES   5      7
RCHRES   2                               COPY     1     17
RCHRES   1                         1     RCHRES   5      7
RCHRES   1                               COPY     1     17
RCHRES   1                         1     RCHRES   2      8
```



```
RCHRES   4                         1     RCHRES   5      7
RCHRES   4                               COPY     1     17
RCHRES   3                         1     RCHRES   5      7
RCHRES   3                               COPY     1     17
RCHRES   3                         1     RCHRES   4      8
RCHRES   5                         1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
GENER    2 OUTPUT TIMSER      .0011111     RCHRES   1     EXTNL  OUTDGT 1
GENER    4 OUTPUT TIMSER      .0011111     RCHRES   3     EXTNL  OUTDGT 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                          in  out                            ***
    1     Surface Swale  3-022    3    1    1    1   28    0    1
    2     Bio Swale  3-1-A-021    2    1    1    1   28    0    1
    3     Surface Swale  3-026    3    1    1    1   28    0    1
    4     Bio Swale  3-1-B-025    2    1    1    1   28    0    1
    5     Vault  3-1              2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
    4         1    0    0    0    0    0    0    0    0    0
    5         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
    4         4    0    0    0    0    0    0    0    0    0    1    9
    5         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *         ***
    1        0  1  0  0    4  5  6  0  0      0  1  0  0  0       2  1  2  2  2
    2        0  1  0  0    4  5  0  0  0      0  0  0  0  0       2  2  2  2  2
    3        0  1  0  0    4  5  6  0  0      0  1  0  0  0       2  1  2  2  2
    4        0  1  0  0    4  5  0  0  0      0  0  0  0  0       2  2  2  2  2
    5        0  1  0  0    4  5  0  0  0      0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.01       0.0       0.0       0.5       0.0
```

```
    2              2      0.02       0.0       0.0       0.5       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
    4              4      0.02       0.0       0.0       0.5       0.0
    5              5      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <--->><--->><--->><--->><---> *** <--->><--->><--->><--->><--->
    1            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    4            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    5            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                        <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <---><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol2   RCHRES   2 VOL             4
  UVQUAN v2m2   GLOBAL     WORKSP  1       3
  UVQUAN vpo2   GLOBAL     WORKSP  2       3
  UVQUAN v2d2   GENER    2 K       1       3
*** User-Defined Variable Quantity Lines
***                          addr
***                        <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <---><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol4   RCHRES   4 VOL             4
  UVQUAN v2m4   GLOBAL     WORKSP  3       3
  UVQUAN vpo4   GLOBAL     WORKSP  4       3
  UVQUAN v2d4   GENER    4 K       1       3
*** User-Defined Target Variable Names
***                addr or                      addr or
***               <------>                     <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <---><-> <---><-><-><-> <---> <-->    <---><-><-><-> <---> <-->
  UVNAME  v2m2    1 WORKSP  1         1.0 QUAN
  UVNAME  vpo2    1 WORKSP  2         1.0 QUAN
  UVNAME  v2d2    1 K       1         1.0 QUAN
*** User-Defined Target Variable Names
***                addr or                      addr or
***               <------>                     <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <---><-> <---><-><-><-> <---> <-->    <---><-><-><-> <---> <-->
  UVNAME  v2m4    1 WORKSP  3         1.0 QUAN
  UVNAME  vpo4    1 WORKSP  4         1.0 QUAN
  UVNAME  v2d4    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <---><-><-><-><-><--------> <> <-><->
  GENER   2                              v2m2            =  1526.
*** Compute remaining available pore space
  GENER   2                              vpo2            =  v2m2
  GENER   2                              vpo2           -=  vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
  GENER   2                              vpo2            =  0.0
END IF
*** Infiltration volume
  GENER   2                              v2d2            =  vpo2
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <---><-><-><-><-><--------> <> <-><->
  GENER   4                              v2m4            =  1481.
*** Compute remaining available pore space
  GENER   4                              vpo4            =  v2m4
```



```
  GENER   4                              vpo4           -=  vol4
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo4 < 0.0) THEN
  GENER   4                              vpo4            =  0.0
END IF
*** Infiltration volume
  GENER   4                              v2d4            =  vpo4
END SPEC-ACTIONS
FTABLES
  FTABLE      2
   62    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.028926  0.000000  0.000000  0.000000
  0.065934  0.028845  0.000270  0.000000  0.000000
  0.131868  0.028724  0.000542  0.000000  0.000000
  0.197802  0.028603  0.000816  0.000000  0.000000
  0.263736  0.028482  0.001091  0.000038  0.000000
  0.329670  0.028361  0.001367  0.000061  0.000001
  0.395604  0.028239  0.001645  0.000093  0.000001
  0.461538  0.028118  0.001924  0.000136  0.000001
  0.527473  0.027997  0.002486  0.000191  0.000002
  0.593407  0.027876  0.003051  0.000260  0.000003
  0.659341  0.027755  0.003619  0.000342  0.000004
  0.725275  0.027634  0.004190  0.000439  0.000005
  0.791209  0.027513  0.004764  0.000552  0.000006
  0.857143  0.027392  0.005341  0.000681  0.000007
  0.923077  0.027271  0.005922  0.000827  0.000009
  0.989011  0.027150  0.006505  0.000992  0.000011
  1.054945  0.027029  0.007091  0.001174  0.000013
  1.120879  0.026907  0.007680  0.001376  0.000015
  1.186813  0.026786  0.008272  0.001598  0.000017
  1.252747  0.026665  0.008867  0.001840  0.000020
  1.318681  0.026544  0.009466  0.002103  0.000023
  1.384615  0.026423  0.010067  0.002388  0.000026
  1.450549  0.026302  0.010671  0.002695  0.000029
  1.516484  0.026181  0.011279  0.003025  0.000033
  1.582418  0.026060  0.011889  0.003378  0.000036
  1.648352  0.025939  0.012502  0.003754  0.000040
  1.714286  0.025818  0.013119  0.004155  0.000045
  1.780220  0.025697  0.013738  0.004581  0.000049
  1.846154  0.025575  0.014361  0.005032  0.000054
  1.912088  0.025454  0.014986  0.005509  0.000059
  1.978022  0.025333  0.015615  0.006012  0.000065
  2.043956  0.025212  0.016246  0.006541  0.000070
  2.109890  0.025091  0.016881  0.007098  0.000076
  2.175824  0.024970  0.017518  0.007682  0.000083
  2.241758  0.024849  0.018159  0.008295  0.000089
  2.307692  0.024728  0.018803  0.008935  0.000096
  2.373626  0.024607  0.019449  0.009605  0.000103
  2.439560  0.024486  0.020099  0.010304  0.000111
  2.505495  0.024365  0.020752  0.011033  0.000119
  2.571429  0.024243  0.021407  0.011791  0.000127
  2.637363  0.024122  0.022066  0.012581  0.000135
  2.703297  0.024001  0.022728  0.013401  0.000144
  2.769231  0.023880  0.023393  0.014252  0.000153
  2.835165  0.023759  0.024061  0.015135  0.000163
  2.901099  0.023638  0.024732  0.016050  0.000173
  2.967033  0.023517  0.025406  0.016997  0.000183
  3.032967  0.023396  0.026147  0.017976  0.000193
  3.098901  0.023275  0.026891  0.018477  0.000199
  3.164835  0.023154  0.027639  0.018477  0.000199
  3.230769  0.023033  0.028390  0.018477  0.000199
  3.296703  0.022911  0.029145  0.018477  0.000199
  3.362637  0.022790  0.029903  0.018477  0.000199
  3.428571  0.022669  0.030664  0.018477  0.000199
  3.494505  0.022548  0.031428  0.018477  0.000199
  3.560440  0.022427  0.032196  0.018477  0.000199
  3.626374  0.022306  0.032967  0.018477  0.000199
  3.692308  0.022185  0.033741  0.018477  0.000199
```

```
  3.758242  0.022064  0.034519  0.018477  0.000199
  3.824176  0.021943  0.035300  0.018477  0.000199
  3.890110  0.021822  0.036084  0.018477  0.000199
  3.956044  0.021701  0.036872  0.018477  0.000199
  4.000000  0.021579  0.078537  0.018477  0.000199
  END FTABLE  2
  FTABLE      1
   32    6
    Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
     (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.021579  0.000000  0.000000  0.000000  0.000000
  0.065934  0.029047  0.001911  0.000000  0.019086  0.000000
  0.131868  0.029168  0.003830  0.000000  0.019496  0.000000
  0.197802  0.029289  0.005757  0.000000  0.019907  0.000000
  0.263736  0.029410  0.007693  0.000000  0.020317  0.000000
  0.329670  0.029531  0.009636  0.000000  0.020728  0.000000
  0.395604  0.029652  0.011587  0.000000  0.021138  0.000000
  0.461538  0.029773  0.013546  0.000000  0.021548  0.000000
  0.527473  0.029894  0.015513  0.000000  0.021959  0.000000
  0.593407  0.030015  0.017488  0.000000  0.022369  0.000000
  0.659341  0.030137  0.019471  0.000000  0.022780  0.000000
  0.725275  0.030258  0.021462  0.000000  0.023190  0.000000
  0.791209  0.030379  0.023461  0.000000  0.023601  0.000000
  0.857143  0.030500  0.025468  0.000000  0.024011  0.000000
  0.923077  0.030621  0.027483  0.000000  0.024422  0.000000
  0.989011  0.030742  0.029506  0.000000  0.024832  0.000000
  1.054945  0.030863  0.031537  0.136453  0.025242  0.000000
  1.120879  0.030984  0.033576  0.441409  0.025653  0.000000
  1.186813  0.031105  0.035623  0.826090  0.026063  0.000000
  1.252747  0.031226  0.037678  1.234286  0.026474  0.000000
  1.318681  0.031347  0.039740  1.609623  0.026884  0.000000
  1.384615  0.031469  0.041811  1.905359  0.027295  0.000000
  1.450549  0.031590  0.043890  2.102770  0.027705  0.000000
  1.516484  0.031711  0.045977  2.263538  0.028116  0.000000
  1.582418  0.031832  0.048072  2.403681  0.028526  0.000000
  1.648352  0.031953  0.050175  2.536091  0.028936  0.000000
  1.714286  0.032074  0.052285  2.661923  0.029347  0.000000
  1.780220  0.032195  0.054404  2.782070  0.029757  0.000000
  1.846154  0.032316  0.056531  2.897238  0.030168  0.000000
  1.912088  0.032437  0.058666  3.008000  0.030578  0.000000
  1.978022  0.032558  0.060808  3.114826  0.030989  0.000000
  2.000000  0.032599  0.061524  3.218108  0.031125  0.000000
  END FTABLE  1
  FTABLE      4
   62    5
    Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
     (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.028007  0.000000  0.000000  0.000000
  0.065934  0.027927  0.000259  0.000000  0.000000
  0.131868  0.027806  0.000519  0.000000  0.000000
  0.197802  0.027684  0.000781  0.000000  0.000000
  0.263736  0.027563  0.001045  0.000035  0.000002
  0.329670  0.027442  0.001310  0.000056  0.000003
  0.395604  0.027321  0.001576  0.000086  0.000004
  0.461538  0.027200  0.002112  0.000125  0.000006
  0.527473  0.027079  0.002651  0.000176  0.000009
  0.593407  0.026958  0.003193  0.000239  0.000012
  0.659341  0.026837  0.003738  0.000315  0.000016
  0.725275  0.026716  0.004286  0.000404  0.000021
  0.791209  0.026595  0.004837  0.000508  0.000026
  0.857143  0.026474  0.005391  0.000627  0.000032
  0.923077  0.026352  0.005949  0.000762  0.000039
  0.989011  0.026231  0.006509  0.000913  0.000047
  1.054945  0.026110  0.007072  0.001081  0.000056
  1.120879  0.025989  0.007638  0.001267  0.000065
  1.186813  0.025868  0.008207  0.001471  0.000076
  1.252747  0.025747  0.008780  0.001694  0.000087
  1.318681  0.025626  0.009355  0.001936  0.000100
```



```
  1.384615  0.025505  0.009933  0.002198  0.000113
  1.450549  0.025384  0.010515  0.002481  0.000128
  1.516484  0.025263  0.011099  0.002784  0.000143
  1.582418  0.025142  0.011687  0.003109  0.000160
  1.648352  0.025020  0.012277  0.003455  0.000178
  1.714286  0.024899  0.012870  0.003824  0.000197
  1.780220  0.024778  0.013467  0.004216  0.000217
  1.846154  0.024657  0.014066  0.004631  0.000238
  1.912088  0.024536  0.014669  0.005070  0.000261
  1.978022  0.024415  0.015275  0.005533  0.000285
  2.043956  0.024294  0.015883  0.006020  0.000310
  2.109890  0.024173  0.016495  0.006533  0.000336
  2.175824  0.024052  0.017109  0.007071  0.000364
  2.241758  0.023931  0.017727  0.007634  0.000393
  2.307692  0.023810  0.018348  0.008224  0.000423
  2.373626  0.023688  0.018972  0.008840  0.000455
  2.439560  0.023567  0.019598  0.009484  0.000488
  2.505495  0.023446  0.020228  0.010154  0.000523
  2.571429  0.023325  0.020861  0.010853  0.000558
  2.637363  0.023204  0.021497  0.011579  0.000596
  2.703297  0.023083  0.022136  0.012334  0.000635
  2.769231  0.022962  0.022777  0.013117  0.000675
  2.835165  0.022841  0.023422  0.013930  0.000717
  2.901099  0.022720  0.024070  0.014772  0.000760
  2.967033  0.022599  0.024721  0.015644  0.000805
  3.032967  0.022478  0.025437  0.016545  0.000851
  3.098901  0.022356  0.026157  0.017006  0.000875
  3.164835  0.022235  0.026879  0.017006  0.000875
  3.230769  0.022114  0.027606  0.017006  0.000875
  3.296703  0.021993  0.028335  0.017006  0.000875
  3.362637  0.021872  0.029068  0.017006  0.000875
  3.428571  0.021751  0.029804  0.017006  0.000875
  3.494505  0.021630  0.030543  0.017006  0.000875
  3.560440  0.021509  0.031285  0.017006  0.000875
  3.626374  0.021388  0.032031  0.017006  0.000875
  3.692308  0.021267  0.032781  0.017006  0.000875
  3.758242  0.021146  0.033533  0.017006  0.000875
  3.824176  0.021024  0.034289  0.017006  0.000875
  3.890110  0.020903  0.035048  0.017006  0.000875
  3.956044  0.020782  0.035811  0.017006  0.000875
  4.000000  0.020661  0.076274  0.017006  0.000875
  END FTABLE  4
  FTABLE      3
   32    6
    Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
     (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.020661  0.000000  0.000000  0.000000  0.000000
  0.065934  0.028128  0.001851  0.000000  0.018274  0.000000
  0.131868  0.028250  0.003709  0.000000  0.018667  0.000000
  0.197802  0.028371  0.005576  0.000000  0.019060  0.000000
  0.263736  0.028492  0.007450  0.000000  0.019453  0.000000
  0.329670  0.028613  0.009333  0.000000  0.019845  0.000000
  0.395604  0.028734  0.011224  0.000000  0.020238  0.000000
  0.461538  0.028855  0.013122  0.000000  0.020631  0.000000
  0.527473  0.028976  0.015029  0.000000  0.021024  0.000000
  0.593407  0.029097  0.016943  0.000000  0.021417  0.000000
  0.659341  0.029218  0.018866  0.000000  0.021810  0.000000
  0.725275  0.029339  0.020796  0.000000  0.022203  0.000000
  0.791209  0.029460  0.022735  0.000000  0.022596  0.000000
  0.857143  0.029582  0.024681  0.000000  0.022989  0.000000
  0.923077  0.029703  0.026635  0.000000  0.023382  0.000000
  0.989011  0.029824  0.028598  0.000000  0.023775  0.000000
  1.054945  0.029945  0.030568  0.136453  0.024168  0.000000
  1.120879  0.030066  0.032547  0.441409  0.024561  0.000000
  1.186813  0.030187  0.034533  0.826090  0.024954  0.000000
  1.252747  0.030308  0.036527  1.234286  0.025347  0.000000
  1.318681  0.030429  0.038530  1.609623  0.025740  0.000000
  1.384615  0.030550  0.040540  1.905359  0.026133  0.000000
```

```
1.450549  0.030671  0.042558  2.102770  0.026526  0.000000
1.516484  0.030792  0.044584  2.263538  0.026919  0.000000
1.582418  0.030914  0.046619  2.403681  0.027312  0.000000
1.648352  0.031035  0.048661  2.536091  0.027705  0.000000
1.714286  0.031156  0.050711  2.661923  0.028098  0.000000
1.780220  0.031277  0.052769  2.782070  0.028491  0.000000
1.846154  0.031398  0.054836  2.897238  0.028884  0.000000
1.912088  0.031519  0.056910  3.008000  0.029277  0.000000
1.978022  0.031640  0.058992  3.114826  0.029670  0.000000
2.000000  0.031680  0.059688  3.218108  0.029801  0.000000
END FTABLE  3
FTABLE      5
 92    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.055119  0.000000  0.000000  0.000000
0.088889  0.055119  0.004900  0.003632  0.002779
0.177778  0.055119  0.009799  0.005136  0.002779
0.266667  0.055119  0.014699  0.006291  0.002779
0.355556  0.055119  0.019598  0.007264  0.002779
0.444444  0.055119  0.024498  0.008121  0.002779
0.533333  0.055119  0.029397  0.008896  0.002779
0.622222  0.055119  0.034297  0.009609  0.002779
0.711111  0.055119  0.039196  0.010273  0.002779
0.800000  0.055119  0.044096  0.010896  0.002779
0.888889  0.055119  0.048995  0.011485  0.002779
0.977778  0.055119  0.053895  0.012046  0.002779
1.066667  0.055119  0.058794  0.012581  0.002779
1.155556  0.055119  0.063694  0.013095  0.002779
1.244444  0.055119  0.068593  0.013589  0.002779
1.333333  0.055119  0.073493  0.014066  0.002779
1.422222  0.055119  0.078392  0.014528  0.002779
1.511111  0.055119  0.083292  0.014975  0.002779
1.600000  0.055119  0.088191  0.015409  0.002779
1.688889  0.055119  0.093091  0.015831  0.002779
1.777778  0.055119  0.097990  0.016242  0.002779
1.866667  0.055119  0.102890  0.016643  0.002779
1.955556  0.055119  0.107789  0.017035  0.002779
2.044444  0.055119  0.112689  0.017418  0.002779
2.133333  0.055119  0.117588  0.017793  0.002779
2.222222  0.055119  0.122488  0.018159  0.002779
2.311111  0.055119  0.127387  0.018519  0.002779
2.400000  0.055119  0.132287  0.018872  0.002779
2.488889  0.055119  0.137186  0.019218  0.002779
2.577778  0.055119  0.142086  0.019558  0.002779
2.666667  0.055119  0.146985  0.019893  0.002779
2.755556  0.055119  0.151885  0.020221  0.002779
2.844444  0.055119  0.156784  0.020545  0.002779
2.933333  0.055119  0.161684  0.020864  0.002779
3.022222  0.055119  0.166583  0.021177  0.002779
3.111111  0.055119  0.171483  0.021487  0.002779
3.200000  0.055119  0.176382  0.021791  0.002779
3.288889  0.055119  0.181282  0.022092  0.002779
3.377778  0.055119  0.186181  0.022388  0.002779
3.466667  0.055119  0.191081  0.022681  0.002779
3.555556  0.055119  0.195980  0.022970  0.002779
3.644444  0.055119  0.200880  0.023255  0.002779
3.733333  0.055119  0.205779  0.023537  0.002779
3.822222  0.055119  0.210679  0.023816  0.002779
3.911111  0.055119  0.215578  0.024091  0.002779
4.000000  0.055119  0.220478  0.024363  0.002779
4.088889  0.055119  0.225377  0.024633  0.002779
4.177778  0.055119  0.230277  0.024899  0.002779
4.266667  0.055119  0.235176  0.025162  0.002779
4.355556  0.055119  0.240076  0.025423  0.002779
4.444444  0.055119  0.244975  0.025681  0.002779
4.533333  0.055119  0.249875  0.025937  0.002779
4.622222  0.055119  0.254774  0.026190  0.002779
4.711111  0.055119  0.259674  0.026441  0.002779
4.800000  0.055119  0.264573  0.026689  0.002779
```



```
4.888889  0.055119  0.269473  0.026935  0.002779
4.977778  0.055119  0.274372  0.027179  0.002779
5.066667  0.055119  0.279272  0.027420  0.002779
5.155556  0.055119  0.284171  0.027660  0.002779
5.244444  0.055119  0.289071  0.027897  0.002779
5.333333  0.055119  0.293970  0.028132  0.002779
5.422222  0.055119  0.298870  0.028366  0.002779
5.511111  0.055119  0.303769  0.028597  0.002779
5.600000  0.055119  0.308669  0.028827  0.002779
5.688889  0.055119  0.313568  0.029269  0.002779
5.777778  0.055119  0.318468  0.029669  0.002779
5.866667  0.055119  0.323367  0.030011  0.002779
5.955556  0.055119  0.328267  0.030328  0.002779
6.044444  0.055119  0.333166  0.030631  0.002779
6.133333  0.055119  0.338066  0.030923  0.002779
6.222222  0.055119  0.342965  0.031208  0.002779
6.311111  0.055119  0.347865  0.031485  0.002779
6.400000  0.055119  0.352764  0.031758  0.002779
6.488889  0.055119  0.357664  0.032025  0.002779
6.577778  0.055119  0.362563  0.032288  0.002779
6.666667  0.055119  0.367463  0.032548  0.002779
6.755556  0.055119  0.372362  0.032803  0.002779
6.844444  0.055119  0.377262  0.033056  0.002779
6.933333  0.055119  0.382161  0.033306  0.002779
7.022222  0.055119  0.387061  0.086289  0.002779
7.111111  0.055119  0.391960  0.621602  0.002779
7.200000  0.055119  0.396860  1.438502  0.002779
7.288889  0.055119  0.401759  2.409002  0.002779
7.377778  0.055119  0.406659  3.420798  0.002779
7.466667  0.055119  0.411558  4.360776  0.002779
7.555556  0.055119  0.416458  5.132336  0.002779
7.644444  0.055119  0.421357  5.684633  0.002779
7.733333  0.055119  0.426257  6.049432  0.002779
7.822222  0.055119  0.431156  6.461610  0.002779
7.911111  0.055119  0.436056  6.800271  0.002779
8.000000  0.055119  0.440955  7.122787  0.002779
8.088889  0.055119  0.445855  7.431267  0.002779
  END FTABLE  5
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP
WDM     22 IRRG     ENGL    0.7       SAME PERLND  45     EXTNL  SURLI
WDM      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
WDM      2 PREC     ENGL    1              RCHRES   3     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.5            RCHRES   3     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   4     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   5 HYDR   RO     1 1        1      WDM   1012 FLOW     ENGL      REPL
RCHRES   5 HYDR   O      1 1        1      WDM   1014 FLOW     ENGL      REPL
RCHRES   5 HYDR   O      2 1        1      WDM   1015 FLOW     ENGL      REPL
RCHRES   5 HYDR   STAGE  1 1        1      WDM   1013 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
```

```
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        7
RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```


Predeveloped HSPF Message File

Mitigated HSPF Message File

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Local (360)943-0304

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SMRHM

PROJECT REPORT

General Model Information

Project Name:	Westpark3-2
Site Name:	Westpark Promenade
Site Address:	PA 13-0082
City:	Wildomar
Report Date:	4/14/2016
Gage:	Wildomar / North Murrieta
Data Start:	1949/10/01
Data End:	2011/09/30
Timestep:	15 Minute
Precip Scale:	1.00
Version Date:	2016/04/05

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data

Predeveloped Land Use

DMA 3-2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Shrub,Mod(5-10%)	1.59
Pervious Total	1.59
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.59

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

DMA 3-2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C D,Urban,Flat(0-5%)	0.43
Pervious Total	0.43
Impervious Land Use	acre
Roof Area	0.56
Parking,Flat(0-5%)	0.6
Impervious Total	1.16
Basin Total	1.59

Element Flows To:

Surface	Interflow	Groundwater
Surface o Swale 3-2	Surface o Swale 3-2	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bio Swale 3-2

Bottom Length:	130.00 ft.
Bottom Width:	10.00 ft.
Material thickness of first layer:	3
Material type for first layer:	Loamy fine sand
Material thickness of second layer:	1
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.1
Infiltration safety factor:	0.5
Total Volume Infiltrated (ac-ft.):	0.582
Total Volume Through Riser (ac-ft.):	21.767
Total Volume Through Facility (ac-ft.):	61.504
Percent Infiltrated:	0.95
Total Precip Applied to Facility:	1.982
Total Evap From Facility:	1.657
Underdrain used	
Underdrain Diameter (feet):	0.5
Orifice Diameter (in.):	6
Offset (in.):	0
Flow Through Underdrain (ac-ft.):	39.155
Total Outflow (ac-ft.):	61.504
Percent Through Underdrain:	63.66
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	12 in.
Element Flows To:	
Outlet 1	Outlet 2
Vault 3-2	

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0372	0.0000	0.0000	0.0000
0.0659	0.0371	0.0004	0.0000	0.0000
0.1319	0.0370	0.0007	0.0000	0.0000
0.1978	0.0369	0.0011	0.0000	0.0000
0.2637	0.0367	0.0015	0.0000	0.0000
0.3297	0.0366	0.0019	0.0000	0.0000
0.3956	0.0365	0.0023	0.0000	0.0000
0.4615	0.0364	0.0026	0.0000	0.0000
0.5275	0.0363	0.0030	0.0000	0.0000
0.5934	0.0361	0.0034	0.0000	0.0000
0.6593	0.0360	0.0042	0.0000	0.0000
0.7253	0.0359	0.0050	0.0000	0.0000
0.7912	0.0358	0.0057	0.0000	0.0000
0.8571	0.0357	0.0065	0.0000	0.0000
0.9231	0.0355	0.0073	0.0000	0.0000
0.9890	0.0354	0.0081	0.0000	0.0000
1.0549	0.0353	0.0089	0.0000	0.0000
1.1209	0.0352	0.0097	0.0000	0.0000
1.1868	0.0351	0.0105	0.0000	0.0000
1.2527	0.0349	0.0113	0.0000	0.0000

1.3187	0.0348	0.0121	0.0000	0.0000
1.3846	0.0347	0.0129	0.0000	0.0000
1.4505	0.0346	0.0137	0.0001	0.0001
1.5165	0.0344	0.0145	0.0001	0.0001
1.5824	0.0343	0.0154	0.0001	0.0001
1.6484	0.0342	0.0162	0.0001	0.0001
1.7143	0.0341	0.0170	0.0001	0.0001
1.7802	0.0340	0.0178	0.0001	0.0001
1.8462	0.0338	0.0187	0.0001	0.0001
1.9121	0.0337	0.0195	0.0001	0.0001
1.9780	0.0336	0.0203	0.0001	0.0001
2.0440	0.0335	0.0212	0.0001	0.0001
2.1099	0.0334	0.0220	0.0001	0.0001
2.1758	0.0332	0.0228	0.0002	0.0002
2.2418	0.0331	0.0237	0.0002	0.0002
2.3077	0.0330	0.0245	0.0002	0.0002
2.3736	0.0329	0.0254	0.0002	0.0002
2.4396	0.0328	0.0262	0.0002	0.0002
2.5055	0.0326	0.0271	0.0002	0.0002
2.5714	0.0325	0.0280	0.0002	0.0002
2.6374	0.0324	0.0288	0.0003	0.0003
2.7033	0.0323	0.0297	0.0003	0.0003
2.7692	0.0321	0.0306	0.0003	0.0003
2.8352	0.0320	0.0314	0.0003	0.0003
2.9011	0.0319	0.0323	0.0003	0.0003
2.9670	0.0318	0.0332	0.0003	0.0003
3.0330	0.0317	0.0342	0.0004	0.0004
3.0989	0.0315	0.0351	0.0004	0.0004
3.1648	0.0314	0.0361	0.0004	0.0004
3.2308	0.0313	0.0371	0.0004	0.0004
3.2967	0.0312	0.0381	0.0004	0.0004
3.3626	0.0311	0.0391	0.0004	0.0004
3.4286	0.0309	0.0400	0.0004	0.0004
3.4945	0.0308	0.0410	0.0004	0.0004
3.5604	0.0307	0.0420	0.0004	0.0004
3.6264	0.0306	0.0430	0.0004	0.0004
3.6923	0.0304	0.0440	0.0004	0.0004
3.7582	0.0303	0.0450	0.0004	0.0004
3.8242	0.0302	0.0460	0.0004	0.0004
3.8901	0.0301	0.0471	0.0004	0.0004
3.9560	0.0300	0.0481	0.0004	0.0004
4.0000	0.0298	0.0487	0.0004	0.0004

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
4.0000	0.0372	0.0487	0.0000	0.0264	0.0000
4.0659	0.0373	0.0512	0.0000	0.0264	0.0000
4.1319	0.0374	0.0537	0.0000	0.0270	0.0000
4.1978	0.0376	0.0561	0.0000	0.0275	0.0000
4.2637	0.0377	0.0586	0.0001	0.0281	0.0000
4.3297	0.0378	0.0611	0.0001	0.0287	0.0000
4.3956	0.0379	0.0636	0.0001	0.0292	0.0000
4.4615	0.0380	0.0661	0.0002	0.0298	0.0000
4.5275	0.0382	0.0686	0.0003	0.0304	0.0000
4.5934	0.0383	0.0711	0.0004	0.0309	0.0000
4.6593	0.0384	0.0737	0.0005	0.0315	0.0000
4.7253	0.0385	0.0762	0.0006	0.0321	0.0000
4.7912	0.0386	0.0787	0.0008	0.0326	0.0000

4.8571	0.0388	0.0813	0.0009	0.0332	0.0000
4.9231	0.0389	0.0839	0.0011	0.0338	0.0000
4.9890	0.0390	0.0864	0.0014	0.0343	0.0000
5.0549	0.0391	0.0890	0.0016	0.0349	0.0000
5.1209	0.0392	0.0916	0.0019	0.0355	0.0000
5.1868	0.0394	0.0942	0.0022	0.0360	0.0000
5.2527	0.0395	0.0968	0.0025	0.0366	0.0000
5.3187	0.0396	0.0994	0.0029	0.0372	0.0000
5.3846	0.0397	0.1020	0.0033	0.0377	0.0000
5.4505	0.0399	0.1046	0.0037	0.0383	0.0000
5.5165	0.0400	0.1073	0.0042	0.0389	0.0000
5.5824	0.0401	0.1099	0.0047	0.0395	0.0000
5.6484	0.0402	0.1125	0.0052	0.0400	0.0000
5.7143	0.0403	0.1152	0.0057	0.0406	0.0000
5.7802	0.0405	0.1179	0.0063	0.0412	0.0000
5.8462	0.0406	0.1205	0.0069	0.0417	0.0000
5.9121	0.0407	0.1232	0.0076	0.0423	0.0000
5.9780	0.0408	0.1259	0.0083	0.0429	0.0000
6.0000	0.0409	0.1268	0.0090	0.0430	0.0000

Surface o Swale 3-2

Element Flows To:

Outlet 1	Outlet 2
Vault 3-2	Bio Swale 3-2

Vault 3-2

Width:	52 ft.	
Length:	52 ft.	
Depth:	8 ft.	
Infiltration On		
Infiltration rate:	0.1	
Infiltration safety factor:	0.5	
Total Volume Infiltrated (ac-ft.):		19.711
Total Volume Through Riser (ac-ft.):		41.21
Total Volume Through Facility (ac-ft.):		60.921
Percent Infiltrated:		32.36
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Discharge Structure		
Riser Height:	7 ft.	
Riser Diameter:	18 in.	
Orifice 1 Diameter:	0.5 in.	Elevation:0 ft.
Orifice 3 Diameter:	0.2 in.	Elevation:6.45 ft.

Element Flows To:

Outlet 1	Outlet 2

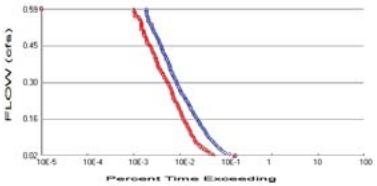
Vault Hydraulic Table

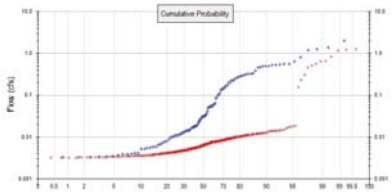
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.062	0.000	0.000	0.000
0.0889	0.062	0.005	0.002	0.003
0.1778	0.062	0.011	0.002	0.003
0.2667	0.062	0.016	0.003	0.003
0.3556	0.062	0.022	0.004	0.003
0.4444	0.062	0.027	0.004	0.003
0.5333	0.062	0.033	0.005	0.003
0.6222	0.062	0.038	0.005	0.003
0.7111	0.062	0.044	0.005	0.003
0.8000	0.062	0.049	0.006	0.003
0.8889	0.062	0.055	0.006	0.003
0.9778	0.062	0.060	0.006	0.003
1.0667	0.062	0.066	0.007	0.003
1.1556	0.062	0.071	0.007	0.003
1.2444	0.062	0.077	0.007	0.003
1.3333	0.062	0.082	0.007	0.003
1.4222	0.062	0.088	0.008	0.003
1.5111	0.062	0.093	0.008	0.003
1.6000	0.062	0.099	0.008	0.003
1.6889	0.062	0.104	0.008	0.003
1.7778	0.062	0.110	0.009	0.003
1.8667	0.062	0.115	0.009	0.003
1.9556	0.062	0.121	0.009	0.003
2.0444	0.062	0.126	0.009	0.003
2.1333	0.062	0.132	0.009	0.003
2.2222	0.062	0.137	0.010	0.003
2.3111	0.062	0.143	0.010	0.003
2.4000	0.062	0.149	0.010	0.003
2.4889	0.062	0.154	0.010	0.003
2.5778	0.062	0.160	0.010	0.003
2.6667	0.062	0.165	0.011	0.003
2.7556	0.062	0.171	0.011	0.003

2.8444	0.062	0.176	0.011	0.003
2.9333	0.062	0.182	0.011	0.003
3.0222	0.062	0.187	0.011	0.003
3.1111	0.062	0.193	0.012	0.003
3.2000	0.062	0.198	0.012	0.003
3.2889	0.062	0.204	0.012	0.003
3.3778	0.062	0.209	0.012	0.003
3.4667	0.062	0.215	0.012	0.003
3.5556	0.062	0.220	0.012	0.003
3.6444	0.062	0.226	0.013	0.003
3.7333	0.062	0.231	0.013	0.003
3.8222	0.062	0.237	0.013	0.003
3.9111	0.062	0.242	0.013	0.003
4.0000	0.062	0.248	0.013	0.003
4.0889	0.062	0.253	0.013	0.003
4.1778	0.062	0.259	0.013	0.003
4.2667	0.062	0.264	0.014	0.003
4.3556	0.062	0.270	0.014	0.003
4.4444	0.062	0.275	0.014	0.003
4.5333	0.062	0.281	0.014	0.003
4.6222	0.062	0.286	0.014	0.003
4.7111	0.062	0.292	0.014	0.003
4.8000	0.062	0.298	0.014	0.003
4.8889	0.062	0.303	0.015	0.003
4.9778	0.062	0.309	0.015	0.003
5.0667	0.062	0.314	0.015	0.003
5.1556	0.062	0.320	0.015	0.003
5.2444	0.062	0.325	0.015	0.003
5.3333	0.062	0.331	0.015	0.003
5.4222	0.062	0.336	0.015	0.003
5.5111	0.062	0.342	0.015	0.003
5.6000	0.062	0.347	0.016	0.003
5.6889	0.062	0.353	0.016	0.003
5.7778	0.062	0.358	0.016	0.003
5.8667	0.062	0.364	0.016	0.003
5.9556	0.062	0.369	0.016	0.003
6.0444	0.062	0.375	0.016	0.003
6.1333	0.062	0.380	0.016	0.003
6.2222	0.062	0.386	0.016	0.003
6.3111	0.062	0.391	0.017	0.003
6.4000	0.062	0.397	0.017	0.003
6.4889	0.062	0.402	0.017	0.003
6.5778	0.062	0.408	0.017	0.003
6.6667	0.062	0.413	0.018	0.003
6.7556	0.062	0.419	0.018	0.003
6.8444	0.062	0.424	0.018	0.003
6.9333	0.062	0.430	0.018	0.003
7.0222	0.062	0.435	0.071	0.003
7.1111	0.062	0.441	0.606	0.003
7.2000	0.062	0.446	1.423	0.003
7.2889	0.062	0.452	2.394	0.003
7.3778	0.062	0.458	3.405	0.003
7.4667	0.062	0.463	4.345	0.003
7.5556	0.062	0.469	5.117	0.003
7.6444	0.062	0.474	5.669	0.003
7.7333	0.062	0.480	6.034	0.003
7.8222	0.062	0.485	6.446	0.003
7.9111	0.062	0.491	6.784	0.003

8.0000	0.062	0.496	7.107	0.003
8.0889	0.062	0.502	7.415	0.003
8.1778	0.000	0.000	7.711	0.000

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.59
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.43
Total Impervious Area: 1.16

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.210796
5 year	0.495816
10 year	0.58686
25 year	1.264939

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.012306
5 year	0.039164
10 year	0.587367
25 year	1.173739

Duration Flows
The Facility PASSED

Flow(cfs)	**Predev**	**Mit**	**Percentage**	**Pass/Fail**
0.0211	3530	3346	94	Pass
0.0268	2615	1168	44	Pass
0.0325	2077	1001	48	Pass
0.0382	1860	883	47	Pass
0.0439	1735	818	47	Pass
0.0497	1582	739	46	Pass
0.0554	1450	667	46	Pass
0.0611	1349	602	44	Pass
0.0668	1270	550	43	Pass
0.0725	1184	503	42	Pass
0.0782	1088	484	44	Pass
0.0839	1034	472	45	Pass
0.0897	964	457	47	Pass
0.0954	899	431	47	Pass
0.1011	857	410	47	Pass
0.1068	820	392	47	Pass
0.1125	785	379	48	Pass
0.1182	749	365	48	Pass
0.1239	711	358	50	Pass
0.1297	674	344	51	Pass
0.1354	643	328	51	Pass
0.1411	611	318	52	Pass
0.1468	589	303	51	Pass
0.1525	562	290	51	Pass
0.1582	538	276	51	Pass
0.1640	523	270	51	Pass
0.1697	492	257	52	Pass
0.1754	467	249	53	Pass
0.1811	437	240	54	Pass
0.1868	426	239	56	Pass
0.1925	413	232	56	Pass
0.1982	393	224	56	Pass
0.2040	374	217	58	Pass
0.2097	362	207	57	Pass
0.2154	351	202	57	Pass
0.2211	338	195	57	Pass
0.2268	327	188	57	Pass
0.2325	307	178	57	Pass
0.2382	297	173	58	Pass
0.2440	284	165	58	Pass
0.2497	272	160	58	Pass
0.2554	255	157	61	Pass
0.2611	242	153	63	Pass
0.2668	234	150	64	Pass
0.2725	222	148	66	Pass
0.2783	214	143	66	Pass
0.2840	207	138	66	Pass
0.2897	201	135	67	Pass
0.2954	194	132	68	Pass
0.3011	190	126	66	Pass
0.3068	185	119	64	Pass
0.3125	177	113	63	Pass
0.3183	171	111	64	Pass

0.3240	167	106	63	Pass
0.3297	159	102	64	Pass
0.3354	153	98	64	Pass
0.3411	148	93	62	Pass
0.3468	143	88	61	Pass
0.3525	138	86	62	Pass
0.3583	134	80	59	Pass
0.3640	132	78	59	Pass
0.3697	131	75	57	Pass
0.3754	127	72	56	Pass
0.3811	122	72	59	Pass
0.3868	120	70	58	Pass
0.3926	113	68	60	Pass
0.3983	111	67	60	Pass
0.4040	106	66	62	Pass
0.4097	104	64	61	Pass
0.4154	99	62	62	Pass
0.4211	95	59	62	Pass
0.4268	93	57	61	Pass
0.4326	92	56	60	Pass
0.4383	89	54	60	Pass
0.4440	87	52	59	Pass
0.4497	84	49	58	Pass
0.4554	80	46	57	Pass
0.4611	79	43	54	Pass
0.4668	75	42	56	Pass
0.4726	73	42	57	Pass
0.4783	70	41	58	Pass
0.4840	68	40	58	Pass
0.4897	66	37	56	Pass
0.4954	62	36	58	Pass
0.5011	59	36	61	Pass
0.5069	58	36	62	Pass
0.5126	56	32	57	Pass
0.5183	55	32	58	Pass
0.5240	52	32	61	Pass
0.5297	52	32	61	Pass
0.5354	48	32	66	Pass
0.5411	46	32	69	Pass
0.5469	46	30	65	Pass
0.5526	45	30	66	Pass
0.5583	44	28	63	Pass
0.5640	42	24	57	Pass
0.5697	42	24	57	Pass
0.5754	41	23	56	Pass
0.5811	41	23	56	Pass
0.5869	41	22	53	Pass

Water Quality

Drawdown Time Results

Pond: Vault 3-2

Days	**Stage(feet)**	**Percent of Total Run Time**
1	0.301	8.8857
2	0.448	7.6913
3	0.618	6.6243
4	0.812	5.6820
5	1.030	4.8314

Maximum Stage: 7.203 Drawdown Time: Exceeds 5 days.

Rational Method

Company Name	Pacific Coast Land Consultants
Designed by	Chris Hopper
Company Project Number/Name	Westpark Promenade
Drainage Area Number/Name	See Riverside County Worksheets for LID Sizing
Date	4/13/16
County/City Case No.	PA 13-0082

Township
Range
Section
85th Percentile

acre	Cover Type
	Roofs
	Concrete or Asphalt
	Grouted or Gapless Paving Blocks
	Compacted Soil (e.g. unpaved parking)
	Decomposed Granite
	Permeable Paving Blocks w/ Sand Filled Gap
	Class 2 Base
	Gravel or Class 2 Permeable Base
	Pervious Concrete / Porous Asphalt
	Open and Porous Pavers
	Turf block
	Ornamental Landscaping
	Natural (A Soil)
	Natural (B Soil)
	Natural (C Soil)
	Natural (D Soil)
	Mixed Surface Types Fraction = 0.00

Calculated Values
C = 0.00
Vu = 0.00 (in * ac)/ac
Vbmp = 0 ft3
Qbmp = 0.0 ft3/s

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

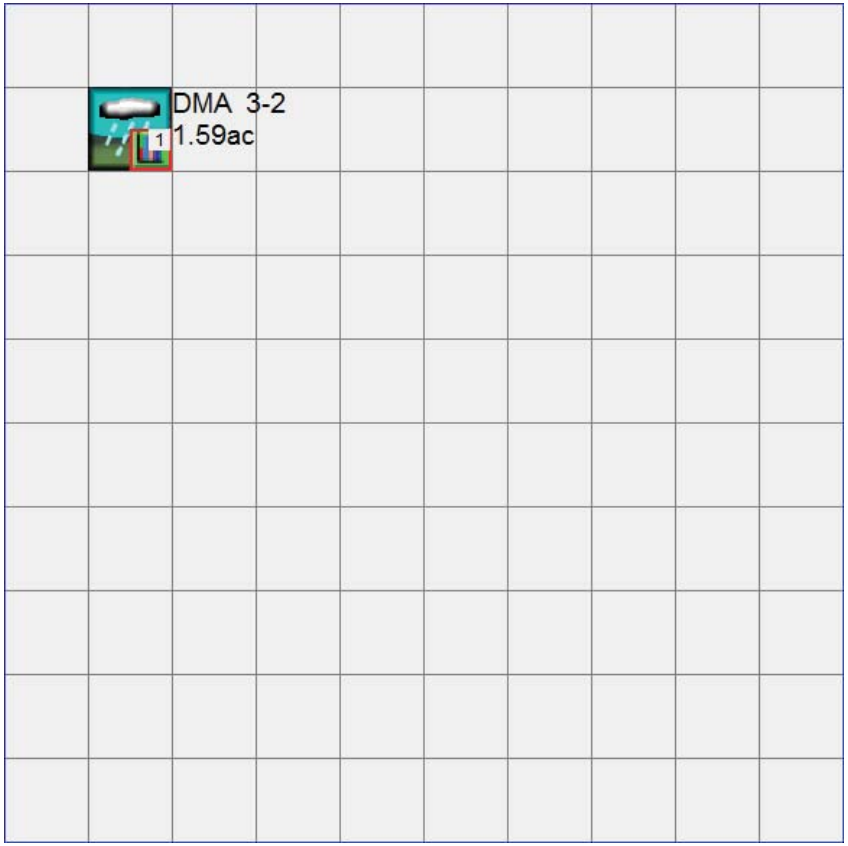
No PERLND changes have been made.

IMPLND Changes

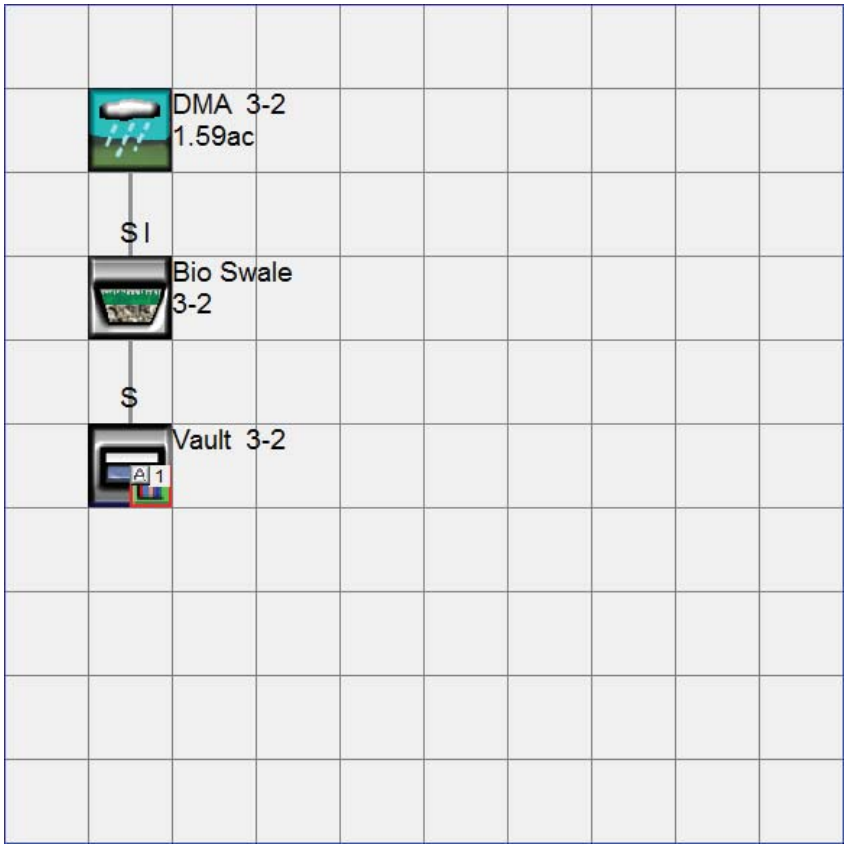
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   Westpark3-2.wdm
MESSU      25   PreWestpark3-2.MES
           27   PreWestpark3-2.L61
           28   PreWestpark3-2.L62
           30   POCWestpark3-21.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      38
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        DMA  3-2                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                      in  out           ***
   38     C/D,Shrub,Mod(5-10%)    1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   38         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   38         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```



```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   38         0    0    0    1    0    0    0    0    1    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   38            0       4.5      0.04       350       0.1         2      0.95
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   38           40        35         3         2      0.15      0.15         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   38            0       0.7       0.3       1.2      0.45         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   38       0.5  0.5  0.5  0.6 0.65 0.65 0.65 0.65 0.65 0.65 0.55  0.5
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   38      0.13 0.13 0.13 0.14 0.15 0.15 0.15 0.15 0.15 0.15 0.14 0.13
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   38            0         0      0.01         0       0.5       0.3      0.01
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                      User  t-series Engl Metr ***
                                        in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2
```

```
  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
DMA  3-2***
PERLND  38                        1.59     COPY   501     12
PERLND  38                        1.59     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES
```



```
SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2011 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                               ***
WDM        26   Westpark3-2.wdm
MESSU      25   MitWestpark3-2.MES
           27   MitWestpark3-2.L61
           28   MitWestpark3-2.L62
           30   POCWestpark3-21.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      45
      IMPLND       5
      IMPLND      14
      GENER        2
      RCHRES       1
      RCHRES       2
      RCHRES       3
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Vault  3-2                 MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    2        24
  END OPCODE
  PARM
    #    #         K ***
    2             0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                           in  out           ***
   45     C/D,Urban,Flat(0-5%)    1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ***************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
```



```
   45         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   45         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   45         0    0    0    1    0    0    0    0    1    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2          ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   45              0       4.6      0.04       400      0.05         3     0.995
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3          ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   45             40        35         3         2      0.45      0.15         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   45              0       0.7      0.25         1       0.4         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3          ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   45       0.5  0.5  0.5  0.6 0.65 0.65 0.65 0.65 0.65 0.65 0.55  0.5
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3          ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   45      0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11 0.11
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   45              0         0      0.01         0       3.5       1.7       0.1
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                       User  t-series Engl Metr ***
                                         in  out           ***
    5     Roof Area                 1    1    1   27    0
   14     Parking,Flat(0-5%)        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ***************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    5         0    0    1    0    0    0
   14         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
```

```
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    5        0    0    4    0    0    0    1    9
   14        0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    5        0    0    0    0    0
   14        0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    5           100      0.05       0.1       0.1
   14           100      0.05       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    5              0         0
   14              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    5              0         0
   14              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
DMA  3-2***
PERLND  45                        0.43     RCHRES   1      2
PERLND  45                        0.43     RCHRES   1      3
IMPLND   5                        0.56     RCHRES   1      5
IMPLND  14                         0.6     RCHRES   1      5

******Routing******
RCHRES   2                           1     RCHRES   3      7
RCHRES   2                                 COPY     1     17
RCHRES   1                           1     RCHRES   3      7
RCHRES   1                                 COPY     1     17
RCHRES   1                           1     RCHRES   2      8
RCHRES   3                           1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
GENER    2 OUTPUT TIMSER      .0011111     RCHRES   1     EXTNL  OUTDGT 1


<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                        in  out                              ***
```



```
    1     Surface o Swale -006    3    1    1    1   28    0    1
    2     Bio Swale  3-2          2    1    1    1   28    0    1
    3     Vault  3-2              2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *       ***
    1       0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    2       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    3       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.01       0.0       0.0       0.5       0.0
    2              2      0.02       0.0       0.0       0.5       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft    for each possible exit        for each possible exit
  <------><-------->    <---><---><---><---><---> *** <---><---><---><---><--->
    1            0        4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0        4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0        4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                        <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol2   RCHRES   2 VOL              4
  UVQUAN v2m2   GLOBAL     WORKSP  1        3
  UVQUAN vpo2   GLOBAL     WORKSP  2        3
  UVQUAN v2d2   GENER    2 K       1        3
*** User-Defined Target Variable Names
***                 addr or                      addr or
***                <------>                     <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m2    1 WORKSP  1          1.0 QUAN
  UVNAME  vpo2    1 WORKSP  2          1.0 QUAN
  UVNAME  v2d2    1 K       1          1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
```

```
  GENER   2                                v2m2            =  1988.
*** Compute remaining available pore space
  GENER   2                                vpo2            =  v2m2
  GENER   2                                vpo2           -=  vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
  GENER   2                                vpo2            =  0.0
END IF
*** Infiltration volume
  GENER   2                                v2d2            =  vpo2
END SPEC-ACTIONS
FTABLES
  FTABLE      2
   62    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)    (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.037190  0.000000  0.000000  0.000000
  0.065934  0.037109  0.000374  0.000000  0.000000
  0.131868  0.036988  0.000749  0.000000  0.000000
  0.197802  0.036867  0.001125  0.000000  0.000000
  0.263736  0.036746  0.001504  0.000053  0.000001
  0.329670  0.036625  0.001883  0.000084  0.000001
  0.395604  0.036504  0.002265  0.000128  0.000002
  0.461538  0.036383  0.002647  0.000188  0.000003
  0.527473  0.036262  0.003031  0.000264  0.000004
  0.593407  0.036141  0.003417  0.000358  0.000005
  0.659341  0.036020  0.004192  0.000471  0.000007
  0.725275  0.035898  0.004969  0.000605  0.000009
  0.791209  0.035777  0.005750  0.000760  0.000011
  0.857143  0.035656  0.006533  0.000938  0.000014
  0.923077  0.035535  0.007320  0.001140  0.000017
  0.989011  0.035414  0.008110  0.001366  0.000020
  1.054945  0.035293  0.008902  0.001618  0.000024
  1.120879  0.035172  0.009698  0.001896  0.000028
  1.186813  0.035051  0.010497  0.002201  0.000033
  1.252747  0.034930  0.011299  0.002535  0.000038
  1.318681  0.034809  0.012103  0.002897  0.000043
  1.384615  0.034688  0.012911  0.003289  0.000049
  1.450549  0.034566  0.013722  0.003712  0.000055
  1.516484  0.034445  0.014536  0.004166  0.000062
  1.582418  0.034324  0.015353  0.004652  0.000069
  1.648352  0.034203  0.016173  0.005171  0.000077
  1.714286  0.034082  0.016996  0.005723  0.000085
  1.780220  0.033961  0.017821  0.006310  0.000094
  1.846154  0.033840  0.018650  0.006931  0.000103
  1.912088  0.033719  0.019482  0.007587  0.000113
  1.978022  0.033598  0.020318  0.008280  0.000123
  2.043956  0.033477  0.021156  0.009010  0.000134
  2.109890  0.033356  0.021997  0.009776  0.000145
  2.175824  0.033234  0.022841  0.010581  0.000157
  2.241758  0.033113  0.023688  0.011425  0.000170
  2.307692  0.032992  0.024538  0.012307  0.000183
  2.373626  0.032871  0.025391  0.013230  0.000197
  2.439560  0.032750  0.026247  0.014192  0.000211
  2.505495  0.032629  0.027107  0.015196  0.000226
  2.571429  0.032508  0.027969  0.016241  0.000241
  2.637363  0.032387  0.028834  0.017328  0.000258
  2.703297  0.032266  0.029703  0.018458  0.000274
  2.769231  0.032145  0.030574  0.019631  0.000292
  2.835165  0.032024  0.031448  0.020847  0.000310
  2.901099  0.031902  0.032326  0.022107  0.000329
  2.967033  0.031781  0.033206  0.023411  0.000348
  3.032967  0.031660  0.034174  0.024760  0.000368
  3.098901  0.031539  0.035144  0.025449  0.000378
  3.164835  0.031418  0.036118  0.025449  0.000378
  3.230769  0.031297  0.037095  0.025449  0.000378
  3.296703  0.031176  0.038076  0.025449  0.000378
  3.362637  0.031055  0.039060  0.025449  0.000378
  3.428571  0.030934  0.040047  0.025449  0.000378
  3.494505  0.030813  0.041038  0.025449  0.000378
```



```
  3.560440  0.030692  0.042032  0.025449  0.000378
  3.626374  0.030570  0.043029  0.025449  0.000378
  3.692308  0.030449  0.044029  0.025449  0.000378
  3.758242  0.030328  0.045033  0.025449  0.000378
  3.824176  0.030207  0.046040  0.025449  0.000378
  3.890110  0.030086  0.047051  0.025449  0.000378
  3.956044  0.029965  0.048065  0.025449  0.000378
  4.000000  0.029844  0.102359  0.025449  0.000378
  END FTABLE  2
  FTABLE      1
   32    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)    (cfs)      (cfs)      (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.029844  0.000000  0.000000  0.000000  0.000000
  0.065934  0.037311  0.002456  0.000000  0.026395  0.000000
  0.131868  0.037432  0.004920  0.000000  0.026963  0.000000
  0.197802  0.037553  0.007392  0.000000  0.027530  0.000000
  0.263736  0.037674  0.009872  0.000000  0.028098  0.000000
  0.329670  0.037796  0.012360  0.000000  0.028666  0.000000
  0.395604  0.037917  0.014856  0.000000  0.029233  0.000000
  0.461538  0.038038  0.017360  0.000000  0.029801  0.000000
  0.527473  0.038159  0.019872  0.000000  0.030369  0.000000
  0.593407  0.038280  0.022392  0.000000  0.030936  0.000000
  0.659341  0.038401  0.024920  0.000000  0.031504  0.000000
  0.725275  0.038522  0.027456  0.000000  0.032072  0.000000
  0.791209  0.038643  0.030000  0.000000  0.032639  0.000000
  0.857143  0.038764  0.032552  0.000000  0.033207  0.000000
  0.923077  0.038885  0.035112  0.000000  0.033774  0.000000
  0.989011  0.039006  0.037680  0.000000  0.034342  0.000000
  1.054945  0.039128  0.040255  0.136453  0.034910  0.000000
  1.120879  0.039249  0.042839  0.441409  0.035477  0.000000
  1.186813  0.039370  0.045431  0.826090  0.036045  0.000000
  1.252747  0.039491  0.048031  1.234286  0.036613  0.000000
  1.318681  0.039612  0.050639  1.609623  0.037180  0.000000
  1.384615  0.039733  0.053254  1.905359  0.037748  0.000000
  1.450549  0.039854  0.055878  2.102770  0.038316  0.000000
  1.516484  0.039975  0.058510  2.263538  0.038883  0.000000
  1.582418  0.040096  0.061150  2.403681  0.039451  0.000000
  1.648352  0.040217  0.063797  2.536091  0.040018  0.000000
  1.714286  0.040338  0.066453  2.661923  0.040586  0.000000
  1.780220  0.040460  0.069117  2.782070  0.041154  0.000000
  1.846154  0.040581  0.071788  2.897238  0.041721  0.000000
  1.912088  0.040702  0.074468  3.008000  0.042289  0.000000
  1.978022  0.040823  0.077156  3.114826  0.042857  0.000000
  2.000000  0.040863  0.078053  3.218108  0.043046  0.000000
  END FTABLE  1
  FTABLE      3
   92    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)    (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.062075  0.000000  0.000000  0.000000
  0.088889  0.062075  0.005518  0.002023  0.003130
  0.177778  0.062075  0.011036  0.002860  0.003130
  0.266667  0.062075  0.016553  0.003503  0.003130
  0.355556  0.062075  0.022071  0.004045  0.003130
  0.444444  0.062075  0.027589  0.004523  0.003130
  0.533333  0.062075  0.033107  0.004954  0.003130
  0.622222  0.062075  0.038625  0.005351  0.003130
  0.711111  0.062075  0.044142  0.005721  0.003130
  0.800000  0.062075  0.049660  0.006068  0.003130
  0.888889  0.062075  0.055178  0.006396  0.003130
  0.977778  0.062075  0.060696  0.006708  0.003130
  1.066667  0.062075  0.066214  0.007007  0.003130
  1.155556  0.062075  0.071731  0.007293  0.003130
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WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
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WDM     22 IRRG     ENGL    0.7       SAME PERLND  45     EXTNL  SURLI
WDM      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
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RCHRES   3 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
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COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
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  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
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RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    7

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  END MASS-LINK    8

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
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Predeveloped HSPF Message File

Mitigated HSPF Message File

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APPENDIX D

Educational Materials

To be a part of the Final WQMP
(Pools and Fountains to be included)

APPENDIX E

Soils Report / Percolation test results report

Preliminary Geotechnical Interpretive Report
Westpark Promenade Project No. 13351-10
August 6, 2013

Interpretive Report for Infiltration System Design
Westpark Promenade Project No. 13351-11A
August 6, 2013

PRELIMINARY GEOTECHNICAL INTERPRETIVE REPORT

PROPOSED WESTPARK PROMENADE RESIDENTIAL AND OFFICE COMPLEX, ASSESSOR'S PARCEL NUMBER 376-410-025, 376-410-013, AND 376-410-023, LOCATED NORTH OF CATT ROAD AND EAST OF INTERSTATE 15 (I-15), CITY OF WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA

PROJECT NO. 13351-10A

ISSUED: AUGUST 6, 2013

Earth - Strata, Inc.
Geotechnical, Environmental and Materials Testing Consultants
BETTER PEOPLE • BETTER SERVICE • BETTER RESULTS

August 6, 2013 Project No. 13351-10A

Mr. James Kieckhafer
GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC.
6201 Oak Canyon, Suite 200
Irvine, CA 92618

Subject: **Preliminary Geotechnical Interpretive Report, Proposed Westpark Promenade Residential and Office Complex, Assessor's Parcel Number 376-410-025, 376-410-013, and 376-410-023, Located North of Catt Road and East of Interstate 15 (I-15), City of Wildomar, Riverside County, California**

Earth-Strata is pleased to present our preliminary geotechnical interpretive report for the proposed Westpark Promenade residential and office complex, Assessor's Parcel Number 376-410-025, 376-410-013, and 376-410-023, located north of Catt Road and East of Interstate 15 (I-15) in the City of Wildomar of Riverside County, California. This work was performed in accordance with the scope of work described in our proposal, dated June 5, 2013. The purpose of this study is to evaluate the nature, distribution, engineering properties, and geologic strata underlying the site with respect to the proposed development.

Earth-Strata appreciates the opportunity to offer our consultation and advice on this project. In the event that you have any questions, please do not hesitate to contact the undersigned at your earliest convenience.

Respectfully submitted,

EARTH-STRATA, Inc.

Stephen M. Poole, PE, GE
Principal Engineer

SMP/am

Distribution: (4) Addressee

TABLE OF CONTENTS

Section	Page
INTRODUCTION	1
SITE DESCRIPTION	1
PROPOSED DEVELOPMENT AND GRADING	1
FIELD EXPLORATION AND LABORATORY TESTING	3
Field Exploration	3
Laboratory Testing	3
FINDINGS	3
Regional Geology	3
Local Geology	4
Faulting	6
Landslides	6
CONCLUSIONS AND RECOMMENDATIONS	6
General	6
Earthwork	6
Earthwork and Grading	6
Clearing and Grubbing	7
Excavation Characteristics	7
Groundwater	7
Ground Preparation For Fill Areas	7
Oversize Rock	8
Compacted Fill Placement	8
Import Earth Materials	8
Cut/Fill Transitions	9
Cut Areas	10
Shrinkage, Bulking and Subsidence	10
Geotechnical Observations	10
Post Grading Considerations	10
Slope Landscaping and Maintenance	10
Site Drainage	11
Utility Trenches	11
SEISMIC DESIGN CONSIDERATIONS	11
Ground Motions	11
Secondary Seismic Hazards	12
Liquefaction and Lateral Spreading	13
Ground Lurching	13
Ground Subsidence	13
General	13
Allowable Bearing Values	14
Settlement	14
Lateral Resistance	14
Structural Setbacks and Building Clearance	14
Foundation Observations	15
Expansive Soil Considerations	16
Very Low Expansion Potential (Expansion Index of 20 or Less)	16
Footings	16
Building Floor Slabs	16
Low Expansion Potential (Expansion Index of 21 to 50)	17
Footings	17
Building Floor Slabs	18
Post Tensioned Slab/Foundation Design Recommendations	18
Corrosivity	20
RETAINING WALLS	21
Active and At-Rest Earth Pressures	21
Subdrain System	22
Temporary Excavations	22
Retaining Wall Backfill	22
CONCRETE FLATWORK	23
Thickness and Joint Spacing	23
Subgrade Preparation	23
PRELIMINARY ASPHALTIC CONCRETE PAVEMENT DESIGN	23
GRADING PLAN REVIEW AND CONSTRUCTION SERVICES	24
REPORT LIMITATIONS	24

Attachments:

Figure 1 – Vicinity Map (Page 2)
Figure 2 – Regional Geologic Map (Page 5)
APPENDIX A – References (Rear of Text)
APPENDIX B – Exploratory Logs (Rear of Text)
APPENDIX C – Laboratory Procedures and Test Results (Rear of Text)
APPENDIX D – Seismicity (Rear of Text)
APPENDIX E – Asphaltic Concrete Pavement Calculations (Rear of Text)
APPENDIX F – General Earthwork and Grading Specifications (Rear of Text)
Plate 1 – Geotechnical Map (In Pocket)

INTRODUCTION

Earth-Strata is pleased to present our preliminary geotechnical interpretive report for the proposed development. The purpose of this study was to evaluate the nature, distribution, engineering properties, and geologic strata underlying the site with respect to the proposed development, and then provide preliminary grading and foundation design recommendations based on the plans you provided. The general location of the subject property is indicated on the Vicinity Map, Figure 1. The plans you provided were used as the base map to show geologic conditions within the subject site, see Geotechnical Map, Plate 1.

SITE DESCRIPTION

The subject property is located on the north side of Catt Road and East of Interstate 15 in the City of Murrieta, Riverside County, California. The approximate location of the site is shown on the Vicinity Map, Figure 1.

The subject property is comprised of approximately 26 acres of undeveloped land. The site has not been graded. Topographic relief at the subject property is relatively moderate with the terrain being generally gently hilly. Elevations at the site range from approximately 1300 to 1350 feet above mean sea level (msl), for a difference of about 50± feet across the entire site. Drainage within the subject property generally flows to the west.

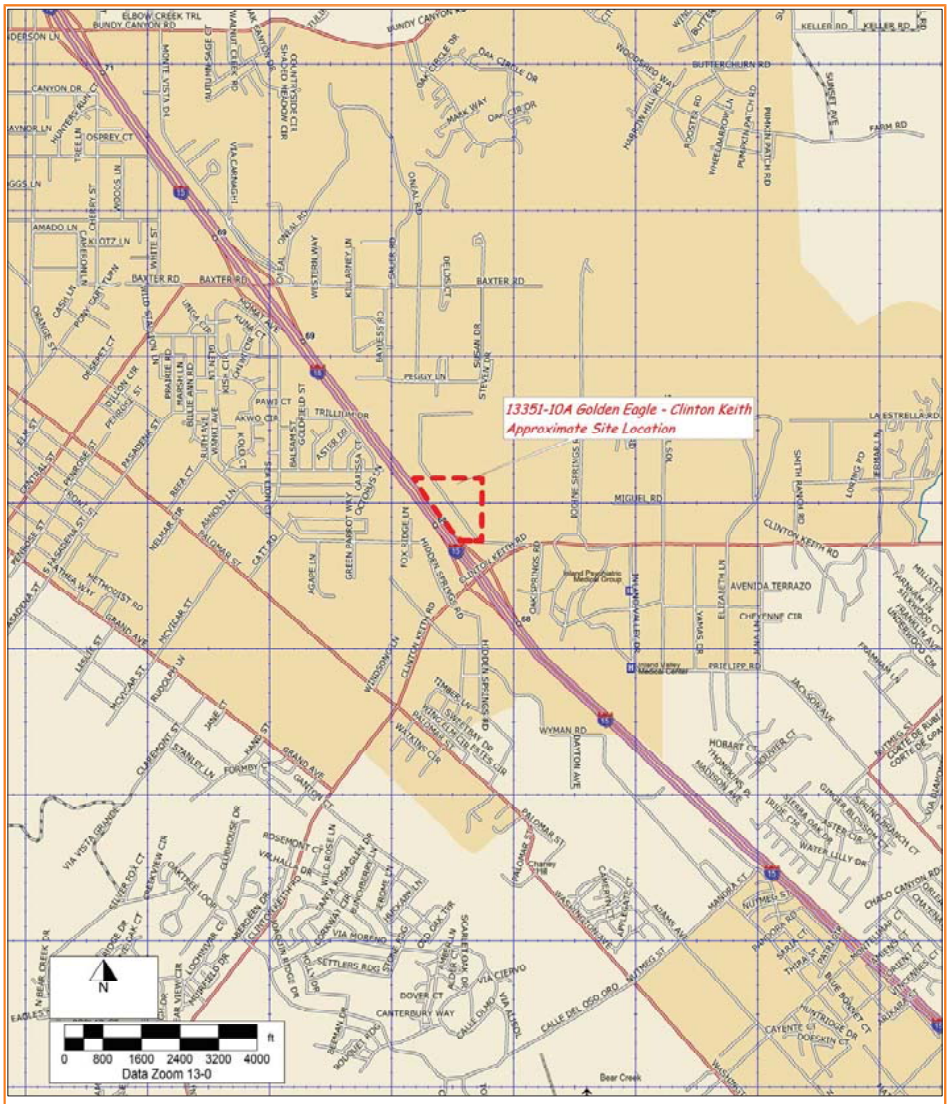
The site is currently bordered by single family residence to the north and east, and commercial building to the south and I-15 to the west. Most of the vegetation on the site consists of sparse to amounts of annual weeds/grasses.

PROPOSED DEVELOPMENT AND GRADING

The proposed residential and commercial development is expected to consist of concrete, wood or steel framed one- and/or two-story structures utilizing slab on grade construction with associated streets, landscape areas, and utilities. The current development plans include numerous building pads positioned throughout the site.

The plans provided by you were utilized in our exploration and form the base for our Geotechnical Map, Plate 1.

Formal plans have not been prepared and await the conclusions and recommendations of this report.



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	VICINITY MAP	SEE BAR SCALE
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FIELD EXPLORATION AND LABORATORY TESTING

Field Exploration

Subsurface exploration within the subject site was performed on July 28 and 29, 2013 for the exploratory excavations. A truck mounted hollow-stem-auger drill rig was utilized to drill borings throughout the site to a maximum depth of 20 feet.

Earth materials encountered during exploration were classified and logged in general accordance with the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) of ASTM D 2488. Upon completion of laboratory testing, exploratory logs and sample descriptions may have been reconciled to reflect laboratory test results with regard to ASTM D 2487.

Associated with the subsurface exploration was the collection of bulk (disturbed) samples and relatively undisturbed samples of earth materials for laboratory testing and analysis. The relatively undisturbed samples were obtained with a 3 inch outside diameter modified California split-spoon sampler lined with 1 inch high brass rings. Additional samples were retrieved using a Standard Penetration Test (N) split-spoon sampler. Samples obtained using a hollow stem auger drill rig, were mechanically driven with successive 30 inch drops of a 140-pound automatic safety hammer. The blow count per one foot increment was recorded in the boring logs. The central portions of the driven samples were placed in sealed containers and transported to our laboratory for testing and analysis. The approximate exploratory locations are shown on Plate 1 and descriptive logs are presented in Appendix B.

Laboratory Testing

Maximum dry density/optimum moisture content, sieve analysis, 200-wash, expansion potential, pH, resistivity, sulfate content, chloride content, and in-situ density/moisture content were determined for selected undisturbed and bulk samples of earth materials, considered representative of those encountered. An evaluation of the test data is reflected throughout the Conclusions and Recommendations section of this report. A brief description of laboratory test criteria and summaries of test data are presented in Appendix C.

FINDINGS

Regional Geology

Regionally, the site is located in the Peninsular Ranges Geomorphic Province of California. The Peninsular Ranges are characterized by northwest trending steep mountain ranges separated by sediment filled elongated valleys. The dominant structural geologic features reflect the northwest trend of the province. Associated with and subparallel to the San Andreas Fault are the San Jacinto Fault, Newport-Inglewood, and the Whittier-Elsinore Fault. The Santa Ana Mountains above the west side of the Elsinore Fault while the Perris Block forms the other side of the fault zone to the east. The Perris Block is bounded to the east by the San Jacinto Fault. The northern perimeter of the Los Angeles basin forms part of a northerly dipping blind thrust fault at the boundary between the Peninsular Ranges Province and the Transverse Range Province.

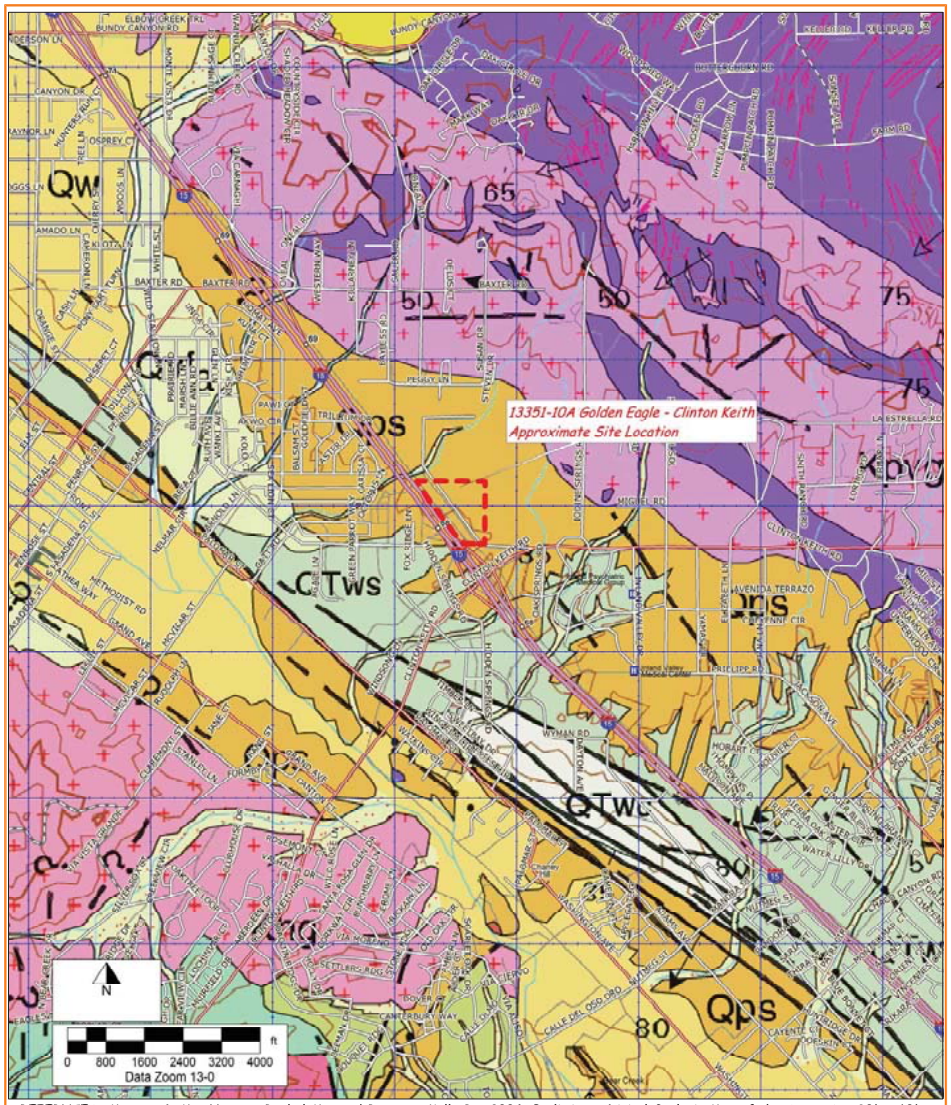
The mountainous regions within the Peninsular Ranges Province are comprised of Pre-Cretaceous, metasedimentary, and metavolcanic rocks along with Cretaceous plutonic rocks of the Southern California Batholith. The low lying areas are primarily comprised of Tertiary and Quaternary non-marine alluvial sediments consisting of alluvial deposits, sandstones, claystones, siltstones, conglomerates, and occasional volcanic units. A map illustrating the regional geology is presented on the Regional Geologic Map, Figure 2.

Local Geology

The earth materials on the site are primarily comprised of topsoil and Quaternary alluvial materials. A general description of the dominant earth materials observed on the site is provided below:

- Quaternary Alluvium (map symbol Qal): Quaternary alluvium was encountered to a maximum depth of 5 feet. These alluvial deposits consist predominately of interlayered light brown to brown, fine to coarse grained clayey sand, and occasional sandy silt. These deposits were generally noted to be in a slightly moist to moist, loose to medium dense state.

- Quaternary Pauba Formation (map symbol Qpfs): Pauba Formation bedrock was generally encountered below the alluvial materials to the full depth of our exploration. These materials primarily consisted of brown, fine to coarse grained sandstone with varying amounts of silt and clay, and interbedded claystone/siltstone. These materials were generally noted to be slightly moist to moist, moderately soft to hard and poorly bedded. Typically, the upper 1 to 3 feet of this unit is slightly more weathered and not as hard with occasional lenses of less indurated rock.



REFERNCES: Morton, D.M., Hauser, Rachel M., and Ruppert, Kelly R., 2004, Preliminary Digital Geologic Map of the Santa Ana 30' x 60' Quadrangle, Southern California, Version 2.0: U.S. Geological Survey Open-File Report 99-0172.
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	REGIONAL GEOLOGIC MAP	SEE BAR SCALE
BETTER PEOPLE • BETTER SERVICE • BETTER RESULTS		JULY 2013 / FIGURE 2

Geologic Structure

The alluvium described is common to this area and the geologic structure is consistent with regional trends. The alluvium is generally massive to horizontally layered and lacks significant structural planes.

Faulting

The project is located in a seismically active region and as a result, significant ground shaking will likely impact the site within the design life of the proposed project. The geologic structure of the entire southern California area is dominated by northwest-trending faults associated with the San Andreas Fault system, which accommodates for most of the right lateral movement associated with the relative motion between the Pacific and North American tectonic plates. Known active faults within this system include the Newport-Inglewood, Whittier-Elsinore, San Jacinto and San Andreas Faults.

An active fault is known to project through the site and the site is located within a County Alquist Earthquake Fault Zone. The active fault setback is in the northeast corner of the site with the actual fault located off site to the north and east. An active fault is defined by the State of California as having surface displacement within the past 11,000 years or during the Holocene geologic time period.

Based on our review of regional geologic maps and the computer program (USGS 2002 Interactive Deaggregation), the Glen Ivy Fault with an approximate source to site distance of 0.5 kilometers is the closest known active fault. The Elsinore Fault is approximately 3.1 kilometers and could produce the highest ground accelerations, with an anticipated maximum modal magnitude of 6.75. Based on the data compiled during the preparation of this report, it is our interpretation that the potential for surface rupture to adversely impact the proposed structures is very low to remote.

Landslides

Landslide debris was not observed during our subsurface exploration and no ancient landslides are known to exist on the site.

CONCLUSIONS AND RECOMMENDATIONS

General

From geotechnical and engineering geologic points of view, the subject property is considered suitable for the proposed development, provided the following conclusions and recommendations are incorporated into the plans and are implemented during construction.

Earthwork

Earthwork and Grading

The provisions of the 2010 California Building Code (CBC), including Appendix J Grading, should be applied to all earthwork and grading operations, as well as in accordance with all applicable grading codes and requirements of the appropriate reviewing agency. Unless specifically revised or amended herein, grading operations should also be performed in accordance with applicable

provisions of our General Earthwork and Grading Specifications within the last appendix of this report.

Clearing and Grubbing

Vegetation including trees, grasses, weeds, brush, shrubs, or any other debris should be stripped from the areas to be graded and properly disposed of offsite. In addition, laborers should be utilized to remove any roots, branches, or other deleterious materials during grading operations.

Earth-Strata should be notified at the appropriate times to provide observation and testing services during Clearing and Grubbing operations. Any buried structures or unanticipated conditions should be brought to our immediate attention.

Excavation Characteristics

Based on the results of our exploration and experience with similar projects in similar settings, the near surface earth materials, will be readily excavated with conventional earth moving equipment.

Groundwater

Groundwater was not observed during our subsurface exploration. Groundwater was observed in Boring 2 at a depth of 12 feet below existing grade. It should be noted that localized groundwater could be encountered during grading due to the limited number of exploratory locations or other factors.

Subdrain systems should be installed in all canyon areas, buttresses, fill over cut slopes, and/or stabilization fills. The subdrain systems should be installed with a minimum of 10 feet of cover. All subdrain systems should be constructed per the specific guidelines provided within the General Earthwork and Grading Specifications found in the last appendix of this report.

Ground Preparation For Fill Areas

For each area to receive compacted fill, the removal of low density, compressible earth materials, such as topsoil, upper alluvial materials, and undocumented artificial fill, should continue until firm competent alluvium is encountered. Removal excavations are subject to verification by the project engineer, geologist or their representative. Prior to placing compacted fills, the exposed bottom in each removal area should be scarified to a depth of 6 inches or more, watered or air dried as necessary to achieve near optimum moisture conditions and then compacted to a minimum of 90 percent of the maximum dry density determined by ASTM D 1557.

The intent of remedial grading is to diminish the potential for hydro-consolidation, slope instability, and/or settlement. Remedial grading should extend beyond the perimeter of the proposed structures a horizontal distance equal to the depth of excavation or a minimum of 5 feet, whichever is greater. For cursory purposes the anticipated removal depths are shown on the enclosed Geotechnical Map, Plate 1. In general, the anticipated removal depths should vary from 2 to 9 feet below existing grade.

Wet Removals

Wet alluvial materials will probably not be encountered within the low lying areas of the site. If removals of wet alluvial materials are required, special grading equipment and procedures can greatly reduce overall costs. Careful planning by an experienced grading contractor can reduce the need for special equipment, such as swamp cats, draglines, excavators, pumps, and top loading earthmovers. Possible solutions may include the placement of imported angular rock and/or geotextile ground reinforcement. More specific recommendations can be provided based on the actual conditions encountered. Drying or mixing of wet materials with dry materials will be needed to bring the wet materials to near optimum moisture prior to placing wet materials into compacted fills.

Oversize Rock

Oversize rock is not expected to be encountered during grading. Oversize rock that is encountered (i.e., rock exceeding a maximum dimension of 12 inches) should be disposed of offsite or stockpiled onsite and crushed for future use. The disposal of oversize rock is discussed in greater detail in General Earthwork and Grading Specifications within the last appendix of this report.

Compacted Fill Placement

Compacted fill materials should be placed in 6 to 8 inch maximum (uncompacted) lifts, watered or air dried as necessary to achieve uniform near optimum moisture content and then compacted to a minimum of 90 percent of the maximum dry density determined by ASTM D 1557-00.

Import Earth Materials

Should import earth materials be needed to achieve final design grades, all potential import materials should be free of deleterious/oversize materials, non-expansive, and approved by the project geotechnical consultant prior to delivery onsite.

Fill Slopes

When properly constructed, fill slopes up to 10 feet high with inclinations of 2:1 (h:v) or flatter are considered to be grossly stable. Keyways are required at the toe of all fill slopes higher than 5 feet and steeper than 5:1 (h:v). Keyways should be a minimum of 10 feet wide and 2 feet into competent earth materials, as measured on the downhill side. In order to establish keyway removals, backcuts should be cut no steeper than 1:1 or as recommended by the geotechnical engineer or engineering geologist. Compacted fill should be benched into competent earth materials.

Cut Slopes

When properly constructed, cut slopes into alluvium up to 10 feet high with inclinations of 2:1 (h:v) or flatter are considered grossly stable. Cut slopes should be observed by the engineering geologist or his representative during grading, but are anticipated to be stable.

Stabilization Fills

Currently, stabilization fills will not be required for cut slopes in the alluvium. Our engineering geologist or his representative should be called to evaluate all slopes during grading. In the event that unfavorable geologic conditions are encountered, recommendations for stabilization fills or flatter slopes will be provided.

Fill Over Cut Slopes

The fill portion of fill over cut slopes should not be constructed until the cut portion of the slope has been cut to finish grade. The earth materials and geologic structure exposed along the cut slope should be evaluated with regard to suitability for compacted fills or foundations and for stability. If the cut materials are determined to be competent, then the construction of the keyway and subdrain system may commence or additional remedial recommendations will be provided.

Temporary Backcuts

It is the responsibility of the grading contractor to follow all Cal-OSHA requirements with regard to excavation safety. Where existing developments are upslope, adequate slope stability to protect those developments must be maintained. Temporary backcuts will be required to accomplish removals of unsuitable materials and possibly, to perform canyon removals, stabilization fills, and/or keyways. Backcuts should be excavated at a gradient of 1:1 (h:v) or flatter. Flatter backcuts may be required where geologic structure or earth materials are unfavorable. It is imperative that grading schedules minimize the exposure time of the unsupported excavations. All excavations should be stabilized within 30 days of initial excavation.

Cut/Fill Transitions

Cut/fill transitions should be eliminated from all building areas where the depth of fill placed within the "fill" portion exceeds proposed footing depths. This is to diminish distress to structures resulting from excessive differential settlement. The entire foundation of each structure should be founded on a uniform bearing material. This should be accomplished by overexcavating the "cut" portion and replacing the excavated materials as properly compacted fill. Refer to the following table for recommended depths of overexcavation.

DEPTH OF FILL ("fill" portion)	DEPTH OF OVEREXCAVATION ("cut" portion)
Up to 5 feet	Equal Depth
5 to 10 feet	5 feet
Greater than 10 feet	One-half the thickness of fill placed on the "fill" portion (10 feet maximum)

Overexcavation of the "cut" portion should extend beyond the building perimeter a horizontal distance equal to the depth of overexcavation or a minimum of 5 feet, whichever is greater.

Cut Areas

Where low density surficial earth materials such as any undocumented artificial fills, topsoil, colluvium and/or alluvium are not removed in their entirety in cut areas, the entire lot should overexcavated a minimum of 3 feet below the proposed foundations and replaced with compacted fill. Final determination of areas that require overexcavation due to transition conditions should be determined in the field by a representative of Earth-Strata.

Shrinkage, Bulking and Subsidence

Volumetric changes in earth material quantities will occur when poorly consolidated earth materials are replaced with properly compacted fill. Estimates of the percent shrinkage/bulking factors for the various geologic units observed on the subject property are based on in-place densities and on the estimated average percent of relative compaction achieved during grading.

GEOLOGIC UNIT	SHRINKAGE (%)
Alluvium	10 to 15
Bedrock	0 to 5

Subsidence from scarification and recompaction of exposed bottom surfaces is expected to be negligible to approximately 0.01 foot.

The estimates of shrinkage/bulking and subsidence are intended as an aid for project engineers in determining earthwork quantities. Since many variables can affect the accuracy of these estimates, they should be used with caution and contingency plans should be in place for balancing the project.

Geotechnical Observations

Clearing operations, removal of unsuitable materials, and general grading procedures should be observed by the project geotechnical consultant or his representative. No compacted fill should be placed without observations by the geotechnical consultant or his representative to verify the adequacy of the removals.

The project geotechnical consultant or his representative should be present to observe grading operations and to check that minimum compaction requirements and proper lift thicknesses are being met, as well as to verify compliance with the other recommendations presented herein.

Post Grading Considerations

Slope Landscaping and Maintenance

Adequate slope and building pad drainage is essential for the long term performance of the subject site. The gross stability of graded slopes should not be adversely affected, provided all drainage provisions are properly constructed and maintained. Engineered slopes should be landscaped with deep rooted, drought tolerant maintenance free plant species, as recommended by the project landscape architect.

Site Drainage

Control of site drainage is important for the performance of the proposed project. Roof gutters are recommended for the proposed structures. Pad and roof drainage should be collected and transferred to driveways, adjacent streets, storm-drain facilities, or other locations approved by the building official in non-erosive drainage devices. Drainage should not be allowed to pond on the pad or against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters located within retaining wall backfill should be sealed to prevent moisture intrusion into the backfill. Planters located next to structures should be sealed to the depth of the footings. Drainage control devices require periodic cleaning, testing and maintenance to remain effective.

At a minimum, pad drainage should be designed at the minimum gradients required by the CBC. To divert water away from foundations, the ground surface adjacent to foundations should also be graded at the minimum gradients required per the CBC.

Utility Trenches

All utility trench backfill should be compacted at near optimum moisture to a minimum of 90 percent of the maximum dry density determined by ASTM test method D 1557-00. For utility trench backfill within pavement areas the upper 6 inches of subgrade materials should be compacted to 95 percent of the maximum dry density determined by ASTM D 1557-00. This includes within the street right-of-ways, utility easements, under footings, sidewalks, driveways and building floor slabs, as well as within or adjacent to any slopes. Backfill should be placed in approximately 6 to 8 inch maximum loose lifts and then mechanically compacted with a hydro-hammer, rolling with a sheepsfoot, pneumatic tampers, or similar equipment. The utility trenches should be tested by the project geotechnical engineer or their representative to verify minimum compaction requirements are obtained.

In order to minimize the penetration of moisture below building slabs, all utility trenches should be backfilled with compacted fill, lean concrete or concrete slurry where they undercut the perimeter foundation. Utility trenches that are proposed parallel to any building footings (interior and/or exterior trenches), should not be located within a 1:1 (h:v) plane projected downward from the outside bottom edge of the footing.

SEISMIC DESIGN CONSIDERATIONS

Ground Motions

Structures are required to be designed and constructed to resist the effects of seismic ground motions as provided in the 2010 California Building Code Section 1613. The design is dependent on the site class, occupancy category I, II, III, or IV, mapped spectral accelerations for short periods (S_s), and mapped spectral acceleration for a 1-second period (S_1).

In order for structural design to comply with the 2010 CBC, a computer program, Earthquake Ground Motion Parameters, Version 5.1.0, dated February 10, 2011, was used to compile spectral accelerations for the subject property based on data and maps jointly compiled by the United States Geological Survey

(USGS) and the California Geological Survey (CGS). The data found in the following table is based on the Maximum Considered Earthquake (MCE) with 5% damped ground motions having a 2% probability of being exceeded in 50 years (2,475 year return period).

The seismic design coefficients were determined by a combination of the site class, mapped spectral accelerations, and occupancy category. The following seismic design coefficients should be implemented during design of the proposed structures. Summaries of the Seismic Hazard Deaggregation graphs and test data are presented in Appendix D.

2010 CBC	FACTOR
Site Location	Latitude: 33.599558° (North) Longitude: -117.246056°(West)
Site Class	D
Mapped Spectral Accelerations for short periods, S_s	1.73
Mapped Spectral Accelerations for 1-Second Period, S_1	0.62
Site Coefficient, F_a	1.00
Site Coefficient, F_v	1.50
Maximum Considered Earthquake Spectral Response Acceleration for Short Periods, S_{ms}	1.73
Maximum Considered Earthquake Spectral Response Acceleration for 1-Second Period, S_{m1}	0.93
Design Spectral Response Acceleration for Short Periods, S_{DS}	1.15
Design Spectral Response Acceleration for 1-Second Period, S_{D1}	0.62
Seismic Design Category	D
Importance Factor Based on Occupancy Category	II

We performed the probabilistic seismic hazard assessment for the site in accordance with the 2010 CBC, Section 1803.5.12. The probabilistic seismic hazard maps and data files were jointly prepared by the United States Geological Survey (USGS) and the California Geological Survey (CGS) and can be found at the CGS Probabilistic Seismic Hazards Mapping Ground Motion Page. Actual ground shaking intensities at the site may be substantially higher or lower based on complex variables such as the near source directivity effects, depth and consistency of earth materials, topography, geologic structure, direction of fault rupture, and seismic wave reflection, refraction, and attenuation rates.

Secondary Seismic Hazards

Secondary effects of seismic shaking considered as potential hazards include several types of ground failure as well as induced flooding. Different types of ground failure, which could occur as a consequence of severe ground shaking at the site, include landslides, ground lurching, shallow ground rupture, and liquefaction/lateral spreading. The probability of occurrence of each type of ground failure depends on the severity of the earthquake, distance from faults, topography, the state of subsurface earth materials, groundwater conditions, and other factors. Based on our experience, subsurface exploration, and laboratory testing, all of the above secondary effects of seismic activity are considered unlikely.

Seismically induced flooding is normally a consequence of a tsunami (seismic sea wave), a seiche (i.e., a wave-like oscillation of surface water in an enclosed basin that may be initiated by a strong earthquake) or failure of a major reservoir or retention system up gradient of the site. Since the site is at an elevation of more than 1300 feet above mean sea level and is located more than 20 miles inland from the nearest coastline of the Pacific Ocean, the potential for seismically induced flooding due to a tsunamis is considered nonexistent. Since no enclosed bodies of water lie adjacent to or up gradient of the site, the likelihood for induced flooding due to a seiche overcoming the dams freeboard is considered nonexistent. It is considered remote that any major reservoir or retention system up gradient of the site would be compromised to a point of failure.

Liquefaction and Lateral Spreading

Liquefaction occurs as a result of a substantial loss of shear strength or shearing resistance in loose, saturated, cohesionless earth materials subjected to earthquake induced ground shaking. Potential impacts from liquefaction include loss of bearing capacity, liquefaction related settlement, lateral movements, and surface manifestation such as sand boils. Seismically induced settlement occurs when loose sandy soils become denser when subjected to shaking during an earthquake. The three factors determining whether a site is likely to be subject to liquefaction include seismic shaking, type and consistency of earth materials, and groundwater level. The proposed structures will be supported by compacted fill and competent alluvium, with groundwater at a depth of over 50 feet. As such, the potential for earthquake induced liquefaction and lateral spreading beneath the proposed structures is considered very low to remote due to the recommended compacted fill, relatively low groundwater level, and the dense nature of the deeper onsite earth materials.

Ground Lurching

The physics of ground lurching are not well understood, but it is generally thought to effect lightly loaded structures such as pavement, pipelines, and sidewalks. Heavier structures typically resist damage from ground lurching. Loose cohesionless earth materials near the surface are prone to ground lurching. Due to the recommendations herein and the lack of loose cohesionless earth materials near the surface, the potential for ground lurching is not expected to occur.

Ground Subsidence

Groundwater or oil withdrawal from sedimentary earth materials can cause the permanent collapse of pore space previously occupied by the fluid. The consolidation of subsurface sediments resulting from fluid withdrawal could cause the ground surface to subside. If sufficient differential subsidence occurs it can significantly damage engineered structures. Since no excessive withdrawal of fluids is planned in the vicinity of the proposed project, the potential for subsidence is considered low to remote.

TENTATIVE FOUNDATION DESIGN RECOMMENDATIONS

General

Provided grading is performed in accordance with the recommendations of this report, shallow foundations are considered feasible for support of the proposed structures. Tentative foundation

recommendations are provided herein and graphic presentations of relevant recommendations may also be included on the enclosed map.

Allowable Bearing Values

An allowable bearing value of 2,000 pounds per square foot (psf) is recommended for design of 24 inch square pad footings and 12 inch wide continuous footings founded at a minimum depth of 12 inches below the lowest adjacent final grade. This value may be increased by 20 percent for each additional 1-foot of width and/or depth to a maximum value of 3,000 psf. Recommended allowable bearing values include both dead and frequently applied live loads and may be increased by one third when designing for short duration wind or seismic forces.

Settlement

Based on the settlement characteristics of the earth materials that underlie the building sites and the anticipated loading, we estimate that the maximum total settlement of the footings will be less than approximately ¾ inch. Differential settlement is expected to be about ½ inch over a horizontal distance of approximately 20 feet, for an angular distortion ratio of 1:480. It is anticipated that the majority of the settlement will occur during construction or shortly after the initial application of loading.

The above settlement estimates are based on the assumption that the grading and construction are performed in accordance with the recommendations presented in this report and that the project geotechnical consultant will observe or test the earth material conditions in the footing excavations.

Lateral Resistance

Passive earth pressure of 250 psf per foot of depth to a maximum value of 2,500 psf may be used to establish lateral bearing resistance for footings. For areas coved with hardscape, passive earth pressure maybe taken from the surface. For areas without hardscape, the first 3 feet of the soil profile must be neglected when calculating passive earth pressure. A coefficient of friction of 0.36 times the dead load forces may be used between concrete and the supporting earth materials to determine lateral sliding resistance. The above values may be increased by one-third when designing for short duration wind or seismic forces. When combining passive and friction for lateral resistance, the passive component should be reduced by one third. In no case shall the lateral sliding resistance exceed one-half the dead load for clay, sandy clay, sandy silty clay, silty clay, and clayey silt.

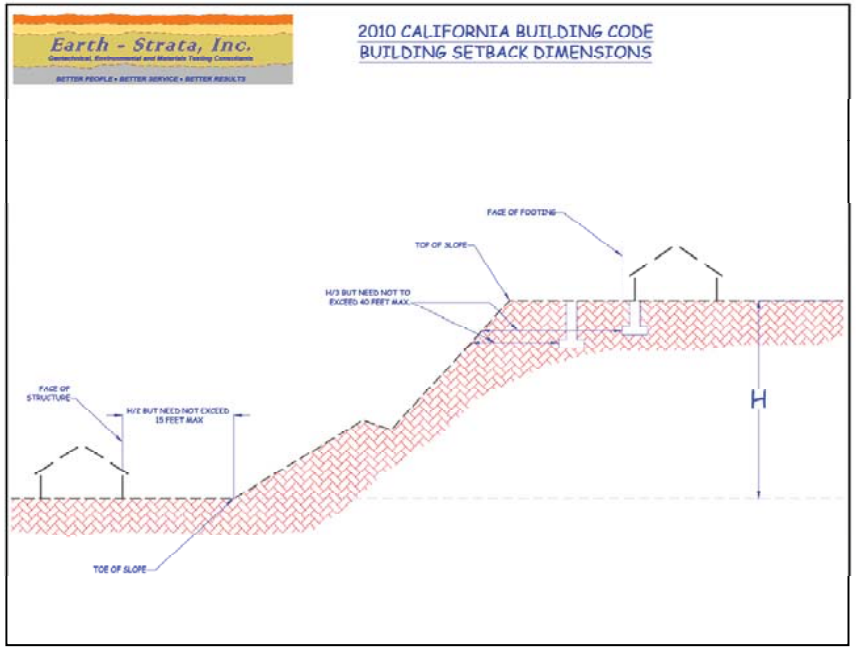
The above lateral resistance values are based on footings for an entire structure being placed directly against either compacted fill or competent bedrock.

Structural Setbacks and Building Clearance

Structural setbacks are required per the 2010 California Building Code (CBC). Additional structural setbacks are not required due to geologic or geotechnical conditions within the site. Improvements constructed in close proximity to natural or properly engineered and compacted slopes can, over time, be affected by natural processes including gravity forces, weathering, and long term secondary settlement. As a result, the CBC requires that buildings and structures be setback or footings deepened to resist the influence of these processes.

For structures that are planned near ascending and descending slopes, the footings should be embedded to satisfy the requirements presented in the CBC, Section 1808.7 as illustrated in the following Foundation Clearances From Slopes diagram.

FOUNDATION CLEARANCES FROM SLOPES



When determining the required clearance from ascending slopes with a retaining wall at the toe, the height of the slope shall be measured from the top of the wall to the top of the slope. The structural setback for pools may be reduced by one-half.

Foundation Observations

In accordance with the 2010 CBC and prior to the placement of forms, concrete, or steel, all foundation excavations should be observed by the geologist, engineer, or his representative to verify that they have been excavated into competent bearing materials. The excavations should be per the approved plans, moistened, cleaned of all loose materials, trimmed neat, level, and square. Any moisture softened earth materials should be removed prior to steel or concrete placement.

Earth materials from foundation excavations should not be placed in slab on grade areas unless the materials are tested for expansion potential and compacted to a minimum of 90 percent of the maximum dry density.

Expansive Soil Considerations

Preliminary laboratory test results indicate onsite earth materials exhibit an expansion potential of **VERY LOW to LOW** as classified in accordance with 2010 CBC Section 1803.5.3 and ASTM D4829-03. Additional, testing for expansive soil conditions should be conducted upon completion of rough grading. The following recommendations should be considered the very minimum requirements, for the earth materials tested. It is common practice for the project architect or structural engineer to require additional slab thickness, footing sizes, and/or reinforcement. *The preliminary design and construction recommendations herein are intended for the various levels of expansion potential anticipated at the completion of rough grading.

Very Low Expansion Potential (Expansion Index of 20 or Less)

Our laboratory test results indicate that the earth materials onsite exhibit a **VERY LOW** expansion potential as classified in accordance with 2010 CBC Section 1803.5.3 and ASTM D4829-03. Since the onsite earth materials exhibit expansion indices of 20 or less, the design of slab on ground foundations is exempt from the procedures outlined in Section 1808.6.1 or 1808.6.2.

Footings

- Exterior continuous footings may be founded at the minimum depths below the lowest adjacent final grade (i.e. 12 inch minimum depth for one-story, 18 inch minimum depth for two-story, and 24 inch minimum depth for three-story construction). Interior continuous footings for one-, two-, and three-story construction may be founded at a minimum depth of 12 inches below the lowest adjacent final grade. All continuous footings should have a minimum width of 12, 15, and 18 inches, for one-, two-, and three-story structures, respectively per Table 1809.7 of the 2010 CBC, and should be reinforced with a minimum of two (2) No. 4 bars, one (1) top and one (1) bottom.

- Exterior pad footings intended to support roof overhangs, such as second story decks, patio covers and similar construction should be a minimum of 24 inches square and founded at a minimum depth of 18 inches below the lowest adjacent final grade. No special reinforcement of the pad footings will be required.

Building Floor Slabs

- Building floor slabs should be a minimum of 4 inches thick and reinforced with a minimum of No. 3 bars spaced a maximum of 24 inches on center, each way. All floor slab reinforcement should be supported on concrete chairs or bricks to ensure the desired placement at mid-depth.

- Interior floor slabs, within living or moisture sensitive areas, should be underlain by a minimum 10-mil thick moisture/vapor barrier to help reduce the upward migration of moisture from the underlying earth materials. The moisture/vapor barrier used should meet

the performance standards of an ASTM E 1745 Class A material, and be properly installed in accordance with ACI publication 318-05. It is the responsibility of the contractor to ensure that the moisture/vapor barriers are free of openings, rips, or punctures prior to placing concrete. As an option for additional moisture reduction, higher strength concrete, such as a minimum 28-day compressive strength of 5,000 pounds per square inch (psi) may be used. Ultimately, the design of the moisture/vapor barrier system and recommendations for concrete placement and curing are the purview of the foundation engineer, taking into consideration the project requirements provided by the architect and owner.

- Garage floor slabs should be a minimum of 5 inches thick and should be reinforced in a similar manner as living area floor slabs. Garage floor slabs should be placed separately from adjacent wall footings with a positive separation maintained with ⅜ inch minimum felt expansion joint materials and quartered with weakened plane joints. A 12 inch wide turn down founded at the same depth as adjacent footings should be provided across garage entrances. The turn down should be reinforced with a minimum of two (2) No. 4 bars, one (1) top and one (1) bottom.

- The subgrade earth materials below all floor slabs should be pre-watered to promote uniform curing of the concrete and minimize the development of shrinkage cracks, prior to placing concrete. The pre-watering should be verified by Earth-Strata during construction.

Low Expansion Potential (Expansion Index of 21 to 50)

Our laboratory test results indicate that the earth materials onsite exhibit a **LOW** expansion potential as classified in accordance with 2010 CBC Section 1803.5.3 and ASTM D4829-03. Accordingly, the CBC specifies that slab on ground foundations (floor slabs) resting on earth materials with expansion indices greater than 20, require special design considerations in accordance with 2010 CBC Sections 1808.6.1 and 1808.6.2. The design procedures are based on the thickness and plasticity index of the various earth materials within the upper 15 feet of the proposed structure. For preliminary design purposes, we have assumed an effective plasticity index of 12.

Footings

- Exterior continuous footings may be founded at the minimum depths below the lowest adjacent final grade (i.e. 12 inch minimum depth for one-story, 18 inch minimum depth for two-story, and 24 inch minimum depth for three-story construction). Interior continuous footings for one-, two-, and three-story construction may be founded at a minimum depth of 12 inches below the lowest adjacent final grade. All continuous footings should have a minimum width of 12, 15, and 18 inches, for one-, two-, and three-story structures, respectively, and should be reinforced with a minimum of two (2) No. 4 bars, one (1) top and one (1) bottom.

- Exterior pad footings intended to support roof overhangs, such as second story decks, patio covers and similar construction should be a minimum of 24 inches square and founded at a minimum depth of 18 inches below the lowest adjacent final grade. The pad footings should be reinforced with a minimum of No. 4 bars spaced a maximum of 18 inches on center, each way, and should be placed near the bottom-third of the footings.

Building Floor Slabs

- The project architect or structural engineer should evaluate minimum floor slab thickness and reinforcement in accordance with 2010 CBC Section 1808.6.2 based on an assumed effective plasticity index of 12. Building floor slabs should be a minimum of 4 inches thick and reinforced with a minimum of No. 3 bars spaced a maximum of 18 inches on center, each way. All floor slab reinforcement should be supported on concrete chairs or bricks to ensure the desired placement at mid-depth.

- Interior floor slabs, within living or moisture sensitive areas, should be underlain by a minimum 10-mil thick moisture/vapor barrier to help reduce the upward migration of moisture from the underlying earth materials. The moisture/vapor barrier used should meet the performance standards of an ASTM E 1745 Class A material, and be properly installed in accordance with ACI publication 318-05. It is the responsibility of the contractor to ensure that the moisture/vapor barriers are free of openings, rips, or punctures prior to placing concrete. As an option for additional moisture reduction, higher strength concrete, such as a minimum 28-day compressive strength of 5,000 pounds per square inch (psi) may be used. Ultimately, the design of the moisture/vapor barrier system and recommendations for concrete placement and curing are the purview of the foundation engineer, taking into consideration the project requirements provided by the architect and owner.

- Garage floor slabs should be a minimum of 5 inches thick and should be reinforced in a similar manner as living area floor slabs. Garage floor slabs should be placed separately from adjacent wall footings with a positive separation maintained with ⅜ inch minimum felt expansion joint materials and quartered with weakened plane joints. A 12 inch wide turn down founded at the same depth as adjacent footings should be provided across garage entrances. The turn down should be reinforced with a minimum of two (2) No. 4 bars, one (1) top and one (1) bottom.

- The subgrade earth materials below all floor slabs should be pre-watered to achieve a moisture content that is at least equal or slightly greater than optimum moisture content, prior to placing concrete. This moisture content should penetrate a minimum depth of 12 inches into the subgrade earth materials. The pre-watering should be verified by Earth-Strata during construction.

Post Tensioned Slab/Foundation Design Recommendations

In lieu of the proceeding foundation recommendations, post tensioned slabs may be used to support the proposed structures. We recommend that the foundation engineer design the foundation system using the Preliminary Post Tensioned Foundation Slab Design table below. These parameters have been provided in general accordance with Post Tensioned Design. Alternate designs addressing the effects of expansive earth materials are allowed per 2010 CBC Section 1808.6.2. When utilizing these parameters, the foundation engineer should design the foundation system in accordance with the allowable deflection criteria of applicable codes and per the requirements of the structural engineer/architect.

It should be noted that the post tensioned design methodology is partially based on the assumption that soil moisture changes around and underneath post tensioned slabs, are influenced only by climate conditions. Soil moisture change below slabs is the major factor in foundation damages relating to expansive soil. However, the design methodology has no consideration for presaturation, owner

irrigation, or other non-climate related influences on the moisture content of subgrade earth materials. In recognition of these factors, we modified the geotechnical parameters determined from this methodology to account for reasonable irrigation practices and proper homeowner maintenance. Additionally, we recommend that prior to excavating footings, slab subgrades be presoaked to a depth of 12 inches and maintained at above optimum moisture until placing concrete. Furthermore, we recommend that the moisture content of the earth materials around the immediate perimeter and below the slab be presaturated to at least 1% above optimum moisture content just prior to placing concrete. The pre-watering should be verified and tested by Earth-Strata during construction.

The following geotechnical parameters assume that areas adjacent to the foundations, which are planted and irrigated, will be designed with proper drainage to prevent water from ponding. Water ponding near the foundation causes significant moisture change below the foundation. Our recommendations do not account for excessive irrigation and/or incorrect landscape design. Planters placed adjacent to the foundation, should be designed with an effective drainage system or liners, to prevent moisture infiltration below the foundation. Some lifting of the perimeter foundation beam should be expected even with properly constructed planters. Based on our experience monitoring sites with similar earth materials, elevated moisture contents below the foundation perimeter due to incorrect landscaping irrigation or maintenance, can result in uplift at the perimeter foundation relative to the central portion of the slab.

Future owners should be informed and educated of the importance in maintaining a consistent level of moisture within the earth materials around the structures. Future owners should also be informed of the potential negative consequences of either excessive watering, or allowing expansive earth materials to become too dry. Earth materials will shrink as they dry, followed by swelling during the rainy winter season, or when irrigation is resumed. This will cause distress to site improvements and structures.

Preliminary Post Tensioned Foundation Slab Design

PARAMETER	VALUE	
Expansion Index	Very Low[1]	Low[1]
Percent Finer than 0.002 mm in the Fraction Passing the No. 200 Sieve	< 20 percent (assumed)	< 20 percent (assumed)
Type of Clay Mineral	Montmorillonite (assumed)	Montmorillonite (assumed)
Thornthwaite Moisture Index	-20	-20
Depth to Constant Soil Suction	7 feet	7 feet
Constant Soil Suction	P.F. 3.6	P.F. 3.6
Moisture Velocity	0.7 inches/month	0.7 inches/month
Center Lift — Edge moisture variation distance, e_m Center lift, y_m	5.5 feet 1.5 inches	5.5 feet 2.0 inches
Edge Lift — Edge moisture variation distance, e_m Edge lift, y_m	2.5 feet 0.4 inches	3.0 feet 0.8 inches
Soluble Sulfate Content for Design of Concrete Mixtures in Contact with Earth Materials	Negligible	Negligible
Modulus of Subgrade Reaction, k (assuming presaturation as indicated below)	200 pci	200 pci
Minimum Perimeter Foundation Embedment	12	18
Under Slab Moisture/Vapor Barrier and Sand Layer	10-mil thick moisture/vapor barrier meeting the requirements of a ASTM E 1745 Class A material	

1. Obtained by laboratory testing.
2. Recommendations for foundation reinforcement are ultimately the purview of the foundation/structural engineer based upon the geotechnical criteria presented in this report, and structural engineering considerations.

Corrosivity

Corrosion is defined by the National Association of Corrosion Engineers (NACE) as "a deterioration of a substance or its properties because of a reaction with its environment." From a geotechnical viewpoint, the "substances" are the reinforced concrete foundations or buried metallic elements (not surrounded by concrete) and the "environment" is the prevailing earth materials in contact with them. Many factors can contribute to corrosivity, including the presence of chlorides, sulfates, salts, organic materials, different oxygen levels, poor drainage, different soil types, and moisture content. It is not considered practical or realistic to test for all of the factors which may contribute to corrosivity.

The potential for concrete exposure to chlorides is based upon the recognized Caltrans reference standard "Bridge Design Specifications", under Subsection 8.22.1 of that document, Caltrans has determined that "Corrosive water or soil contains more than 500 parts per million (ppm) of chlorides". Based on limited preliminary laboratory testing, the onsite earth materials have chloride contents *less* than 500 ppm. As such, specific requirements resulting from elevated chloride contents are not required.

Specific guidelines for concrete mix design are provided in 2010 CBC Section 1904.5 and ACI 318, Section 4.3 Table 4.3.1 when the soluble sulfate content of earth materials exceeds 0.1 percent by weight. Based on limited preliminary laboratory testing, the onsite earth materials are classified in accordance with

Table 4.3.1 as having a *negligible* sulfate exposure condition. Therefore, structural concrete in contact with onsite earth materials should utilize Type I or II.

Based on our laboratory testing of resistivity, the onsite earth materials in contact with buried steel should be considered *moderately corrosive*. Additionally, pH values below 9.7 are recognized as being corrosive to most common metallic components including, copper, steel, iron, and aluminum. The pH values for the earth materials tested were *lower* than 9.7. Therefore, any steel or metallic materials that are exposed to the earth materials should be encased in concrete or other measures should be taken to provide corrosion protection.

If building slabs are to be post tensioned, the post tensioning cables should be encased in concrete and/or encapsulated in accordance with the Post Tensioning Institute Guide Specifications. Post tensioning cable end plate anchors and nuts also need to be protected if exposed. If the anchor plates and nuts are in a recess in the edge of the concrete slab, the recess should be filled in with a non-shrink, non-porous, moisture-insensitive epoxy grout so that the anchorage assembly and the end of the cable are completely encased and isolated from the soil. A standard non-shrink, non-metallic cementitious grout may be used only when the post tension anchoring assembly is polyethylene encapsulated similar to that offered by Hayes Industries, LTD or O'Strand, Inc.

The preliminary test results for corrosivity are based on limited samples, and the initiation of grading may blend various earth materials together. This blending or imported material could alter and increase the detrimental properties of the onsite earth materials. Accordingly, additional testing for chlorides and sulfates along with testing for pH and resistivity should be performed upon completion of grading. Laboratory test results are presented in Appendix C.

RETAINING WALLS

Active and At-Rest Earth Pressures

Foundations may be designed in accordance with the recommendations provided in the Tentative Foundation Design Recommendation section of this report. The following table provides the minimum recommended equivalent fluid pressures for design of retaining walls a maximum of 8 feet high. The active earth pressure should be used for design of unrestrained retaining walls, which are free to tilt slightly. The at-rest earth pressure should be used for design of retaining walls that are restrained at the top, such as basement walls, curved walls with no joints, or walls restrained at corners. For curved walls, active pressure may be used if tilting is acceptable and construction joints are provided at each angle point and at a minimum of 15 foot intervals along the curved segments.

MINIMUM STATIC EQUIVALENT FLUID PRESSURES (pcf)		
PRESSURE TYPE	BACKSLOPE CONDITION	
	LEVEL	2:1 (h:v)
Active Earth Pressure	40	63
At-Rest Earth Pressure	60	95

The retaining wall parameters provided do not account for hydrostatic pressure behind the retaining walls. Therefore, the subdrain system is a very important part of the design. All retaining walls should be designed to resist surcharge loads imposed by other nearby walls, structures, or vehicles should be added

to the above earth pressures, if the additional loads are being applied within a 1.5:1 (h:v) plane projected up from the heel of the retaining wall footing. As a way of minimizing surcharge loads and the settlement potential of nearby buildings, the footings for the building can be deepened below the 1.5:1 (h:v)plane projected up from the heel of the retaining wall footing.

Upon request and under a separate scope of work, more detailed analyses can be performed to address equivalent fluid pressures with regard to stepped retaining walls, actual retaining wall heights, actual backfill inclinations, specific backfill materials, higher retaining walls requiring earthquake design motions, etc.

Subdrain System

We recommend a perforated pipe and gravel subdrain system be provided behind all proposed retaining walls to prevent the buildup of hydrostatic pressure behind the proposed retaining walls. The perforated pipe should consist of 4 inch minimum diameter Schedule 40 PVC or ABS SDR-35, placed with the perforations facing down. The pipe should be surrounded by 1 cubic foot per foot of ¾- or 1½ inch open graded gravel wrapped in filter fabric. The filter fabric should consist of Mirafi 140N or equivalent to prevent infiltration of fines and subsequent clogging of the subdrain system.

In lieu of a perforated pipe and gravel subdrain system, weep holes or open vertical masonry joints may be provided in the lowest row of block exposed to the air to prevent the buildup of hydrostatic pressure behind the proposed retaining walls. Weep holes should be a minimum of 3 inches in diameter and provided at intervals of at least every 6 feet along the wall. Open vertical masonry joints should be provided at a minimum of 32 inch intervals. A continuous gravel fill, a minimum of 1 cubic foot per foot, should be placed behind the weep holes or open masonry joints. The gravel should be wrapped in filter fabric consisting of Mirafi 140N or equivalent.

The retaining walls should be adequately coated on the backfilled side of the walls with a proven waterproofing compound by an experienced professional to inhibit infiltration of moisture through the walls.

Temporary Excavations

All excavations should be made in accordance with Cal-OSHA requirements. Earth-Strata is not responsible for job site safety.

Retaining Wall Backfill

Retaining wall backfill materials should be approved by the geotechnical engineer or his representative prior to placement as compacted fill. Retaining wall backfill should be placed in lifts no greater than 6 to 8 inches, watered or air dried as necessary to achieve near optimum moisture contents. All retaining wall backfill should be compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D 1557. Retaining wall backfill should be capped with a paved surface drain.

CONCRETE FLATWORK

Thickness and Joint Spacing

Concrete sidewalks and patio type slabs should be at least 3½ inches thick and provided with construction or expansion joints every 6 feet or less, to reduce the potential for excessive cracking. Concrete driveway slabs should be at least 4 inches thick and provided with construction or expansion joints every 10 feet or less.

Subgrade Preparation

In order to reduce the potential for unsightly cracking, subgrade earth materials underlying concrete flatwork should be compacted at near optimum moisture to a minimum of 90 percent of the maximum dry density determined by ASTM test method D 1557-00 and then moistened to at least optimum or slightly above optimum moisture content. This moisture should extend to a depth of at least 12 inches below subgrade and be maintained prior to placement of concrete. Pre-watering of the earth materials prior to placing concrete will promote uniform curing of the concrete and minimize the development of shrinkage cracks. The project geotechnical engineer or his representative should verify the density and moisture content of the earth materials and the depth of moisture penetration prior to placing concrete.

Cracking within concrete flatwork is often a result of factors such as the use of too high a water to cement ratio and/or inadequate steps taken to prevent moisture loss during the curing of the concrete. Concrete distress can be reduced by proper concrete mix design and proper placement and curing of the concrete. Minor cracking within concrete flatwork is normal and should be expected.

PRELIMINARY ASPHALTIC CONCRETE PAVEMENT DESIGN

The earth materials indicate an R-value of 30 may be used for preliminary pavement design. The following table includes our minimum recommended asphaltic concrete pavement sections calculated in accordance with the State of California design procedures using assumed Traffic Indices. Final pavement design should be based on sampling and testing of post grading conditions. Alternative pavement sections and calculation sheets have been provided within the appendices of this report.

PRELIMINARY ASPHALTIC CONCRETE PAVEMENT DESIGN			
PARAMETERS	CUL-DE-SAC/AUTO PARKING	RESIDENTIAL STREETS/AUTO DRIVES	RESIDENTIAL COLLECTOR STREETS/ENTRANCES/TRUCK DRIVES
Assumed Traffic Index	5.0	6.0	7.0
Design R-Value	30	30	30
AC Thickness (inches)	3	3	3½
AB Thickness (inches)	5.4	8.4	10.2

Notes: AC – Asphaltic Concrete
AB – Aggregate Base

The subgrade earth materials immediately below the aggregate base (base) should be compacted to a minimum of 95 percent of the maximum dry density determined by ASTM D 1557 to a minimum depth of 12 inches. Base materials should be compacted to a minimum of 95 percent of the maximum dry density determined by ASTM D 1557.

Base materials should consist of Class 2 aggregate base conforming to Section 26-1.02B of the State of California Standard Specifications or crushed aggregate base conforming to Section 200-2 of the Standard Specifications for Public Works Construction (Greenbook). Base materials should be compacted at or slightly below optimum moisture content. Asphaltic concrete materials and construction operations should conform to Section 203 of the Greenbook.

GRADING PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of **GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC** and their authorized representative. It likely does not contain sufficient information for other parties or other uses. Earth-Strata should be engaged to review the final design plans and specifications prior to construction. This is to verify that the recommendations contained in this report have been properly incorporated into the project plans and specifications. Should Earth-Strata not be accorded the opportunity to review the project plans and specifications, we are not responsibility for misinterpretation of our recommendations.

We recommend that Earth-Strata be retained to provide geologic and geotechnical engineering services during grading and foundation excavation phases of the work. In order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

Earth-Strata should review any changes in the project and modify and approve in writing the conclusions and recommendations of this report. This report and the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions encountered during grading or construction operations appear to be different than those indicated in this report, this office should be notified immediately, as revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Earth materials vary in type, strength, and other geotechnical properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the subject property. No practical study can completely eliminate uncertainty with regard to the anticipated geotechnical conditions in connection with a subject property. The conclusions and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by Earth-Strata based on the conditions revealed during grading and construction.

This report was prepared with the understanding that it is the responsibility of the owner or their representative, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should properly implement the conclusions and recommendations during grading

and construction, and notify the owner if they consider any of the recommendations presented herein to be unsafe or unsuitable.

APPENDIX A

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APPENDIX A

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APPENDIX B

EXPLORATORY LOGS

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SYMBOLS AND TERMS USED ON LOGS

The No. 200 Standard Sieve is about the smallest particle visible to the naked eye.					
Coarse-grained Soils >½ of materials larger than #200 sieve	**GRAVELS** Higher percentage of coarse fraction is larger than #4 sieve	Clean Gravels (less than 5% fines)		**GW**	Well-graded gravels, little or no fines
				GP	Poorly-graded gravels, little or no fines
		5 – 12% fines		**GW-GM**	Well-graded gravel with silt
				GW-GC	Well-graded gravel with clay
				GP-GM	Poorly-graded gravel with silt
				GP-GC	Poorly-graded gravel with clay
		Gravels with fines	PI < 4	**GM**	Silty Gravels
			PI > 7	**GC**	Clayey Gravels
	SANDS Higher percentage of coarse fraction is smaller than #4 sieve	Clean Sands (less than 5% fines)		**SW**	Well-graded sands, little or no fines
				SP	Poorly-graded sands, little or no fines
		5 – 12% fines		**SW-SM**	Well-graded sand with silt
				SW-SC	Well-graded sand with clay
				SP-SM	Poorly-graded sand with silt
				SP-SC	Poorly-graded sand with clay
		Sands with fines	PI < 4	**SM**	Silty Sands
			PI > 7	**SC**	Clayey Sands
			PI 4-7	**SC-SM**	Silty clayey sands
Fine-grained Soils ≥½ of materials smaller than #200 sieve	**SILTS & CLAYS** Liquid Limit Less Than 50		PI < 4	**ML**	Inorganic silts & sandy silts
			PI > 7	**CL**	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			PI 4-7	**ML-CL**	Silts & clays of low plasticity, sandy silty clay, silty clay
	SILTS & CLAYS Liquid Limit Greater Than 50			**MH**	Inorganic silts, micaceous or diatomaceous silt, sandy silt
				CH	Inorganic clays of high plasticity, fat clays, sandy clays, gravelly clays
				OH	Organic silts and clays of medium-to-high plasticity
Highly Organic Soils				**PT**	Peat, humus swamp soils with higher organic content

Symbols	
	Ring Sample
	SPT Sample
NR	No Recovery
▽	Groundwater

Grain Size				
Description		Sieve Size	Grain Size	Approximate Size
Boulders		>12"	>12"	Larger than basketball-sized
Cobbles		3-12"	3-12"	Fist-sized to basketball-sized
Gravel	Coarse	¾-3"	¾-3"	Thumb-sized to fist-sized
	Fine	#4-¾"	0.19-0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10-#4	0.079-0.19"	Rock salt-sized to pea-sized
	Medium	#40-#10	0.017-0.079"	Sugar-sized to rock salt-sized
	Fine	#200-#40	0.0029-0.017"	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029"	Flour-sized and smaller

Moisture Content
Slightly Moist
Moist
Very Moist
Wet

Consistency – Fine Grained Soils			
Apparent Density	SPT (# blows/foot)	Modified CA Sampler (# blows/foot)	Field Test
Very Soft	<1	<2	Easily penetrated by thumb; exudes between thumb and fingers when squeezed in hand
Soft	2-3	3-6	Easily penetrated one inch by thumb; molded by light finger pressure
Medium Stiff	4-6	7-12	Penetrated over ½ inch by thumb with moderate effort; molded by strong finger pressure
Stiff	7-10	13-15	Indented about ½ inch by thumb but penetrated only with great effort
Very Stiff	11-20	16-30	Readily indented thumbnail
Hard	>20	>30	Indented with difficulty by thumbnail

Relative Density – Coarse Grained Soils			
Apparent Density	SPT (# blows/foot)	Modified CA Sampler (# blows/foot)	Field Test
Very Loose	<2	<4	Easily penetrated with ½ inch reinforcing rod pushed by hand
Loose	3-5	4-10	Easily penetrated with ½ inch reinforcing rod pushed by hand
Medium Dense	6-15	11-30	Easily penetrated 1-foot with ½ inch reinforcing rod driven with a 5-lb hammer
Dense	16-25	31-50	Difficult to penetrate 1-foot with ½ inch reinforcing rod driven with a 5-lb hammer
Very Dense	>25	>50	Penetrated only a few inches with ½ inch reinforcing rod driven with a 5-lb hammer

JUNE 2007, Auto

Geotechnical Boring Log B-1

Date: July 29, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-10A	Logged By: MWG
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SC	Clayey SAND; light brown, moist, dense
	50/5"	1	107.7	5.6		
5	50/3"	2	-	-		***Quaternary Pauba Formation (Qpfs):***
					SC	Clayey SAND; brown, moist, very dense
	50/5"	3	118.6	8.2		
10	50/5"	4	114.8	5.6		
15	50/4"	5	117.2	8.4		
20	50/5"	6	129.1	6.4		
						E.O.B. @ 21.5 Feet
						No Groundwater
25						
30						

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Geotechnical Boring Log B-2

Date: July 29, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-10A	Logged By: MWG
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SC	Clayey SAND; reddish brown, slightly moist, dense
	38	1	118.0	5.9		
5	38	2	131.6	7.6		moist
	73	3	126.7	8.1		***Quaternary Pauba Formation (Qpfs):***
					SC	Clayey SAND; reddish, moist, dense with gravel to 10'
10	55	4	122.0	11.0		gray and brown, wet
					▽	groundwater at 12'
15	38	5	122.6	12.3		
						E.O.B. @ 16.5 Feet
						Groundwater @ 12 Feet
20						
25						
30						

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Geotechnical Boring Log B-3

Date: July 29, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-10A	Logged By: MWG
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SC	Clayey SAND; reddish brown, slightly moist, dense
	48	1	108.5	2.5		
5	77	2	113.4	5.7		***Quaternary Pauba Formation (Qpfs):***
					SC	Clayey SAND; brown, slightly moist, very dense
	80	3	126.7	5.4		
10	89/10"	4	129.0	6.2		moist
						practical refusal @ 11.5'
						E.O.B. @ 11.5 Feet
						No Groundwater
15						
20						
25						
30						

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Geotechnical Boring Log B-4

Date: July 30, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-10A	Logged By: MWG
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SC	Clayey SAND; reddish brown, moist
	64	1	133.7	5.8		***Quaternary Pauba Formation (Qpfs):***
5	50/5"	2	115.2	8.2	SC	Clayey SAND; olive brown, dense to very dense, moist
	70	3	128.6	8.6		
10	44	4	124.7	11.3		
15	58	5	124.6	10.6		
						E.O.B. @ 16.5 Feet
						No Groundwater
20						
25						
30						

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Geotechnical Boring Log B-5

Date: July 30, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-10A	Logged By: MWG
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SC	Clayey SAND; reddish brown, moist, loose
	56	1	130.1	6.2		***Quaternary Pauba Formation (Qpfs):***
					SC	Clayey SAND; brown, moist, very dense
5	88	2	127.0	8.0		
						practical refusal
	72/11"	3	122.1	11.1		
						E.O.B. @ 9 Feet
10						**No Groundwater**
15						
20						
25						
30						

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Geotechnical Boring Log B-6

Date: July 30, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-10A	Logged By: MWG
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SC	Clayey SAND; reddish brown, slightly moist, dense
	57	1	113.7	3.9		
						Quaternary Pauba Formation (Qpfs):
5	69	2	128.2	26.6	SC	Clayey SAND; brown, moist, very dense
						E.O.B. @ 6.5 Feet
						No Groundwater
10						
15						
20						
25						
30						

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Geotechnical Boring Log B-7

Date: July 30, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-10A	Logged By: MWG
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SC	Clayey SAND; reddish brown, slightly moist, dense
	56	1	117.2	4.0		
						Quaternary Pauba Formation (Qpfs):
5	72	2	-	-	SC	Clayey SAND; brown, moist, dense
						E.O.B. @ 6.5 Feet
						No Groundwater
10						
15						
20						
25						
30						

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Geotechnical Boring Log B-8

Date: July 30, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-10A	Logged By: MWG
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SC	Clayey SAND; light brown, slightly moist, dense
	64	1	124.7	5.1		
						Quaternary Pauba Formation (Qpfs):
5	50/4"	2	107.9	5.9	SC	Clayey SAND; brown, slightly moist, very dense
						E.O.B. @ 6 Feet
						No Groundwater
10						
15						
20						
25						
30						

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Geotechnical Boring Log B-9

Date: July 30, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-10A	Logged By: MWG
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SM	Silty SAND; light olive brown, loose, slightly moist
	9	1	108.5	1.5		
5	25	2	111.7	1.9		
					SC	Clayey SAND; reddish brown, dense, slightly moist
	51	3	129.8	5.9		***Quaternary Pauba Formation (Qpfs):***
					SC	Clayey SAND; brown, moist, very dense
10	51	4	126.3	7.6		
						E.O.B. @ 11.5 Feet
						No Groundwater
15						
20						
25						
30						

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Geotechnical Boring Log B-10

Date: July 30, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-10A	Logged By: MWG
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SM	Silty SAND; olive, slightly moist, medium dense
	27	1	119.3	3.2		
						slightly moist
5	22	2	119.5	2.3		
	34	3	104.9	1.7		
10	62	4	108.4	4.4		***Quaternary Pauba Formation (Qpfs):***
					SC	Clayey SAND; brown, moist, dense
						E.O.B. @ 11.5 Feet
						No Groundwater
15						
20						
25						
30						

26047 JEFFERSON AVENUE, SUITE C, MURRIETA, CA 92562

Earth - Strata, Inc.
Geotechnical, Environmental and Materials Testing Consultants
BETTER PEOPLE - BETTER SERVICE - BETTER RESULTS

APPENDIX C

LABORATORY PROCEDURES AND TEST RESULTS

APPENDIX C

Laboratory Procedures and Test Results

Laboratory testing provided quantitative and qualitative data involving the relevant engineering properties of the representative earth materials selected for testing. The representative samples were tested in general accordance with American Society for Testing and Materials (ASTM) procedures and/or California Test Methods (CTM).

Soil Classification: Earth materials encountered during exploration were classified and logged in general accordance with the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) of ASTM D 2488. Upon completion of laboratory testing, exploratory logs and sample descriptions were reconciled to reflect laboratory test results with regard to ASTM D 2487.

Moisture and Density Tests: For select samples moisture content was determined using the guidelines of ASTM D 2216 and dry density determinations were made using the guidelines of ASTM D 2937. These tests were performed on relatively undisturbed samples and the test results are presented on the exploratory logs.

Maximum Density Tests: The maximum dry density and optimum moisture content of representative samples were determined using the guidelines of ASTM D 1557. The test results are presented in the table below.

SAMPLE LOCATION	MATERIAL DESCRIPTION	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)
B-1 @ 0-2 feet	Silty Sand	127.0	6.5

Expansion Index: The expansion potential of representative samples was evaluated using the guidelines of ASTM D 4829. The test results are presented in the table below.

SAMPLE LOCATION	MATERIAL DESCRIPTION	EXPANSION INDEX	EXPANSION POTENTIAL
B-1 @ 0-2 feet	Silty Sand	15	Very Low

Minimum Resistivity and pH Tests: Minimum resistivity and pH Tests of select samples were performed using the guidelines of CTM 643. The test results are presented in the table below.

SAMPLE LOCATION	MATERIAL DESCRIPTION	pH	MINIMUM RESISTIVITY (ohm-cm)
B-1 @ 0-2 feet	Silty Sand	6.35	1,400

Soluble Sulfate: The soluble sulfate content of select samples was determined using the guidelines of CTM 417. The test results are presented in the table below.

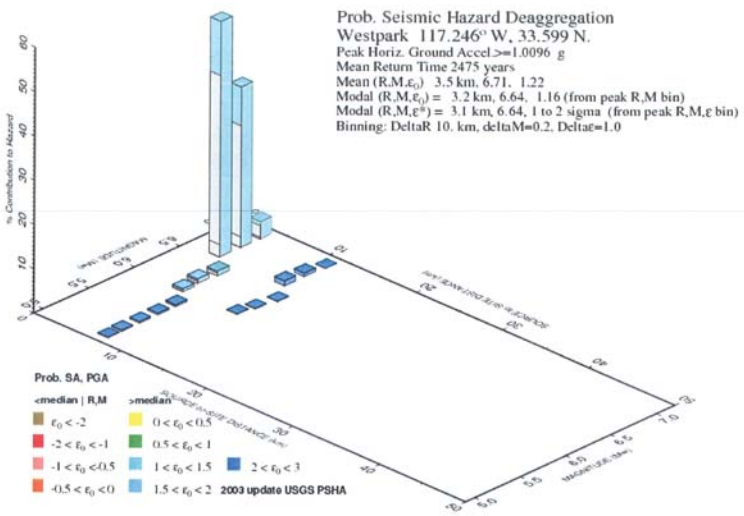
SAMPLE LOCATION	MATERIAL DESCRIPTION	SULFATE CONTENT (% by weight)	SULFATE EXPOSURE
B-1 @ 0-2 feet	Silty Sand	0.02	Negligible

Chloride Content: Chloride content of select samples was determined using the guidelines of CTM 422. The test results are presented in the table below.

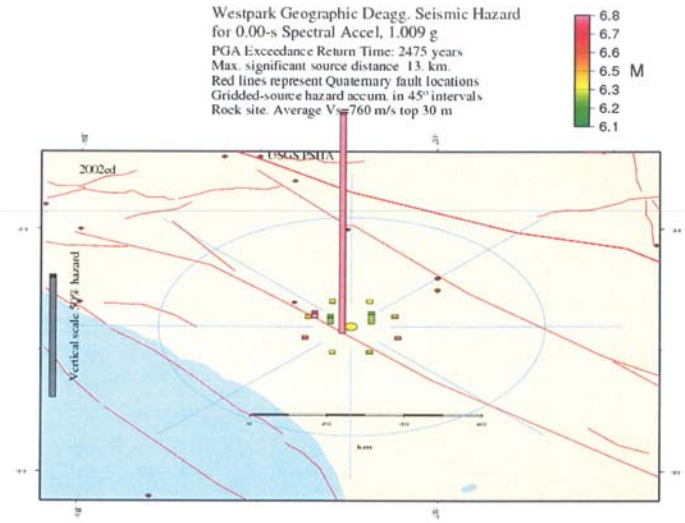
SAMPLE LOCATION	MATERIAL DESCRIPTION	CHLORIDE CONTENT (ppm)
B-1 @ 0-2 feet	Silty Sand	180

APPENDIX D

SEISMICITY



GMT 2013 Aug 4 23:20:08 Distance (R), magnitude (M), epsilon (ε0,ε) deaggregation for a site on ROCK avg Vs=760 m/s top 30 m USGS CGHT PSHA2002v3 UPDATE. Bins with h 0.05% contrib. omitted



GMT 2013 Aug 4 23:20:08 Site Coords:-117.246 33.5905 (yellow disk). Max annual Exc/Rate .3656E-03 (column height prop. to Exc/Rate). Red diamonds: historical earthquakes, M>6

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*** Deaggregation of Seismic Hazard for PGA & 2 Periods of Spectral Accel. ***
*** Data from U.S.G.S. National Seismic Hazards Mapping Project, 2002 version ***
PSHA Deaggregation. %contributions. site: Westpark  long: 117.246 W., lat: 33.599 N.
USGS 2002-03 update files and programs. dM=0.2. Site descr:ROCK
Return period: 2475 yrs. Exceedance PGA =1.0096    g.
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.00000
DIST(KM) MAG(MW) ALL_EPS EPSILON>2  1<EPS<2 0<EPS<1 -1<EPS<0 -2<EPS<-1 EPS<-2
    7.0     5.05    0.142    0.142    0.000    0.000    0.000    0.000    0.000
    7.0     5.20    0.314    0.314    0.000    0.000    0.000    0.000    0.000
    7.0     5.40    0.351    0.351    0.000    0.000    0.000    0.000    0.000
    7.0     5.60    0.390    0.385    0.005    0.000    0.000    0.000    0.000
    7.0     5.80    0.421    0.355    0.066    0.000    0.000    0.000    0.000
    5.5     6.02    0.695    0.367    0.328    0.000    0.000    0.000    0.000
   11.6     6.03    0.079    0.079    0.000    0.000    0.000    0.000    0.000
    5.3     6.20    1.016    0.439    0.578    0.000    0.000    0.000    0.000
   12.0     6.20    0.092    0.092    0.000    0.000    0.000    0.000    0.000
    5.5     6.40    1.086    0.419    0.667    0.000    0.000    0.000    0.000
   12.4     6.40    0.105    0.105    0.000    0.000    0.000    0.000    0.000
    3.2     6.64   53.172   12.194   38.214    2.764    0.000    0.000    0.000
   10.8     6.64    1.134    1.134    0.000    0.000    0.000    0.000    0.000
    3.2     6.87   36.259    8.806   25.031    2.423    0.000    0.000    0.000
   10.7     6.86    0.729    0.729    0.000    0.000    0.000    0.000    0.000
    3.3     7.08    3.901    0.948    2.584    0.369    0.000    0.000    0.000
   11.0     7.07    0.093    0.093    0.000    0.000    0.000    0.000    0.000

Summary statistics for above PSHA PGA  deaggregation, R=distance, e=epsilon:
 Mean src-site R=    3.5 km; M= 6.71; eps0=   1.22. Mean calculated for all sources.
Modal src-site R=    3.2 km; M= 6.64; eps0=   1.16 from peak (R,M) bin
Gridded source distance metrics: Rseis Rrup and Rjb
 MODE R*=   3.1km; M*= 6.64; EPS.INTERVAL: 1 to 2 sigma  % CONTRIB.= 38.214

Principal sources (faults, subduction, random seismicity having >10% contribution)
Source Category:                  % contr.   R(km)    M   epsilon0 (mean values)
California SS faults               92.97     3.3   6.75    1.19
Individual fault hazard details if contrib.>1%:
Elsinore-17                        91.24     3.1   6.75    1.16
Elsinore-16                         1.73    10.6   6.75    2.52
******************* Southern California ***************************************
PSHA Deaggregation. %contributions. ROCK site: Westpark  long: 117.246 d W., lat: 33.599 N.
USGS 2002-2003 update files and programs. Analysis on DaMoYr:04/08/2013
Return period: 2475 yrs. 1.00 s. PSA =0.9134   g.
#Pr[at least one eq with median motion>=PSA in 50 yrs]=0.00000
DIST(km) MAG(Mw) ALL_EPS EPSILON>2  1<EPS<2 0<EPS<1 -1<EPS<0 -2<EPS<-1 EPS<-2
    7.0     5.81    0.059    0.059    0.000    0.000    0.000    0.000    0.000
    4.6     6.03    0.204    0.194    0.010    0.000    0.000    0.000    0.000
    4.4     6.21    0.451    0.369    0.082    0.000    0.000    0.000    0.000
    3.9     6.43    1.064    0.810    0.254    0.000    0.000    0.000    0.000
   12.3     6.42    0.133    0.133    0.000    0.000    0.000    0.000    0.000
    3.2     6.66   44.929   13.348   31.582    0.000    0.000    0.000    0.000
   10.8     6.66    2.390    2.390    0.000    0.000    0.000    0.000    0.000
    3.3     6.86   33.893    8.035   25.858    0.000    0.000    0.000    0.000
   10.8     6.87    2.802    2.802    0.000    0.000    0.000    0.000    0.000
    3.1     7.00   13.277    1.910   10.513    0.854    0.000    0.000    0.000
   11.6     7.04    0.242    0.241    0.001    0.000    0.000    0.000    0.000
   10.6     7.10    0.269    0.233    0.036    0.000    0.000    0.000    0.000
   57.0     8.17    0.135    0.135    0.000    0.000    0.000    0.000    0.000

Summary statistics for above 1.0s PSA  deaggregation, R=distance, e=epsilon:
 Mean src-site R=    3.8 km; M= 6.77; eps0=   1.36. Mean calculated for all sources.
Modal src-site R=    3.2 km; M= 6.66; eps0=   1.37 from peak (R,M) bin
Gridded source distance metrics: Rseis Rrup and Rjb
 MODE R*=   3.2km; M*= 6.66; EPS.INTERVAL: 1 to 2 sigma  % CONTRIB.= 31.582

Principal sources (faults, subduction, random seismicity having >10% contribution)
Source Category:                  % contr.   R(km)    M   epsilon0 (mean values)
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California SS faults               95.86     3.7   6.78    1.34
Individual fault hazard details if contrib.>1%:
Elsinore-17                        90.41     3.2   6.78    1.28
Elsinore-16                         5.25    10.6   6.80    2.21
******************* Southern California ***************************************
PSHA Deaggregation. %contributions. ROCK site: Westpark  long: 117.246 d W., lat: 33.599 N.
USGS 2002-2003 update files and programs. Analysis on DaMoYr:04/08/2013
Return period: 2475 yrs. 0.20 s. PSA =2.4477   g.
#Pr[at least one eq with median motion>=PSA in 50 yrs]=0.00000
DIST(km) MAG(Mw) ALL_EPS EPSILON>2  1<EPS<2 0<EPS<1 -1<EPS<0 -2<EPS<-1 EPS<-2
    7.0     5.05    0.157    0.157    0.000    0.000    0.000    0.000    0.000
    7.0     5.20    0.354    0.354    0.000    0.000    0.000    0.000    0.000
    7.0     5.40    0.399    0.399    0.000    0.000    0.000    0.000    0.000
    7.0     5.60    0.437    0.427    0.010    0.000    0.000    0.000    0.000
    7.0     5.80    0.463    0.378    0.085    0.000    0.000    0.000    0.000
    5.6     6.02    0.703    0.372    0.331    0.000    0.000    0.000    0.000
   11.9     6.03    0.124    0.124    0.000    0.000    0.000    0.000    0.000
    5.4     6.20    1.016    0.456    0.560    0.000    0.000    0.000    0.000
   12.3     6.20    0.145    0.145    0.000    0.000    0.000    0.000    0.000
    5.6     6.40    1.090    0.434    0.656    0.000    0.000    0.000    0.000
   12.6     6.40    0.170    0.170    0.000    0.000    0.000    0.000    0.000
    3.1     6.64   51.981   11.833   35.138    5.010    0.000    0.000    0.000
   10.8     6.64    1.869    1.869    0.000    0.000    0.000    0.000    0.000
    3.1     6.87   34.665    7.409   22.880    4.377    0.000    0.000    0.000
   10.8     6.86    1.342    1.341    0.001    0.000    0.000    0.000    0.000
    3.2     7.05    4.856    1.859    2.408    0.590    0.000    0.000    0.000
   11.1     7.06    0.173    0.173    0.000    0.000    0.000    0.000    0.000

Summary statistics for above 0.2s PSA  deaggregation, R=distance, e=epsilon:
 Mean src-site R=    3.6 km; M= 6.71; eps0=   1.19. Mean calculated for all sources.
Modal src-site R=    3.1 km; M= 6.64; eps0=   1.12 from peak (R,M) bin
Gridded source distance metrics: Rseis Rrup and Rjb
 MODE R*=   3.1km; M*= 6.64; EPS.INTERVAL: 1 to 2 sigma  % CONTRIB.= 35.138

Principal sources (faults, subduction, random seismicity having >10% contribution)
Source Category:                  % contr.   R(km)    M   epsilon0 (mean values)
California SS faults               92.45     3.3   6.75    1.15
Individual fault hazard details if contrib.>1%:
Elsinore-17                        89.45     3.1   6.75    1.11
Elsinore-16                         3.00    10.6   6.76    2.36
******************* Southern California ***************************************
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APPENDIX E

ASPHALTIC CONCRETE PAVEMENT CALCULATIONS

PAVING DESIGN

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JN: 13351-10 CONSULT: SMP
PROJECT: Westpark
CALCULATION SHEET # Auto Parking

CALTRANS METHOD FOR DESIGN OF FLEXIBLE PAVEMENT

Input "R" value or "CBR" of native soil	30	
Type of Index Property - "R" value or "CBR" (C or R)	R	R Value
R Value used for Caltrans Method	30	
Input Traffic Index (TI)	5	
Calculated Total Gravel Equivalent (GE)	1.12	feet
Calculated Total Gravel Equivalent (GE)	13.44	inches
Calculated Gravel Factor (Gf) for A/C paving	2.53	
Gravel Factor for Base Course (Gf)	1.1	

Pavement sections provided below are considered equal; but, do not reflect reviewing agency minimums.

Gravel Equivalent			INCHES		FEET	
GE (feet)	GE (inches)	Delta (inches)	A/C Section Thickness (inches)	Minimum Base (inches)	A/C Section Thickness (feet)	Minimum Base (feet)
0.63	7.60	5.84	3.0	5.4	0.25	0.45
0.74	8.87	4.57	3.5	4.2	0.29	0.35
0.76	9.13	4.31	3.6	4.2	0.30	0.35
0.84	10.14	3.30	4.0	3.0	0.33	0.25
0.89	10.65	2.79	4.2	2.4	0.35	0.20
0.95	11.41	2.03	4.5	1.8	0.38	0.15
1.06	12.67	0.77	5.0	0.6	0.42	0.05
1.27	15.21	-1.77	6.0		0.50	
2.11	25.35	-11.91	10.0		0.83	
2.32	27.88	-14.44	11.0		0.92	
2.53	30.42	-16.98	12.0		1.00	

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JN: 13351-10 CONSULT: SMP
PROJECT: Westpark
CALCULATION SHEET # Auto Drives

CALTRANS METHOD FOR DESIGN OF FLEXIBLE PAVEMENT

Input "R" value or "CBR" of native soil	30	
Type of Index Property - "R" value or "CBR" (C or R)	R	R Value
R Value used for Caltrans Method	30	
Input Traffic Index (TI)	6	
Calculated Total Gravel Equivalent (GE)	1.344	feet
Calculated Total Gravel Equivalent (GE)	16.128	inches
Calculated Gravel Factor (Gf) for A/C paving	2.31	
Gravel Factor for Base Course (Gf)	1.1	

Pavement sections provided below are considered equal; but, do not reflect reviewing agency minimums.

Gravel Equivalent GE (feet)	GE (inches)	Delta (inches)	INCHES A/C Section Thickness (inches)	INCHES Minimum Base (inches)	FEET A/C Section Thickness (feet)	FEET Minimum Base (feet)
0.58	6.94	9.19	3.0	8.4	0.25	0.70
0.67	8.10	8.03	3.5	7.2	0.29	0.60
0.69	8.33	7.80	3.6	7.2	0.30	0.60
0.77	9.26	6.87	4.0	6.0	0.33	0.50
0.81	9.72	6.41	4.2	6.0	0.35	0.50
0.87	10.41	5.72	4.5	5.4	0.38	0.45
0.93	11.11	5.02	4.8	4.8	0.40	0.40
0.96	11.57	4.56	5.0	4.2	0.42	0.35
1.06	12.73	3.40	5.5	3.0	0.46	0.25
1.16	13.88	2.24	6.0	1.8	0.50	0.15
1.35	16.20	-0.07	7.0		0.58	

PAVING DESIGN

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JN: 13351-10 CONSULT: SMP
PROJECT: Westpark
CALCULATION SHEET # Entrance

CALTRANS METHOD FOR DESIGN OF FLEXIBLE PAVEMENT

Input "R" value or "CBR" of native soil	30	
Type of Index Property - "R" value or "CBR" (C or R)	R	R Value
R Value used for Caltrans Method	30	
Input Traffic Index (TI)	7	
Calculated Total Gravel Equivalent (GE)	1.568	feet
Calculated Total Gravel Equivalent (GE)	18.816	inches
Calculated Gravel Factor (Gf) for A/C paving	2.14	
Gravel Factor for Base Course (Gf)	1.1	

Pavement sections provided below are considered equal; but, do not reflect reviewing agency minimums.

Gravel Equivalent GE (feet)	GE (inches)	Delta (inches)	INCHES A/C Section Thickness (inches)	INCHES Minimum Base (inches)	FEET A/C Section Thickness (feet)	FEET Minimum Base (feet)
0.62	7.50	11.32	3.5	10.2	0.29	0.85
0.64	7.71	11.10	3.6	10.2	0.30	0.85
0.71	8.57	10.25	4.0	9.6	0.33	0.80
0.75	9.00	9.82	4.2	9.0	0.35	0.75
0.80	9.64	9.18	4.5	8.4	0.38	0.70
0.86	10.28	8.53	4.8	7.8	0.40	0.65
0.89	10.71	8.10	5.0	7.2	0.42	0.60
0.96	11.57	7.25	5.4	6.6	0.45	0.55
0.98	11.78	7.03	5.5	6.6	0.46	0.55
1.07	12.85	5.96	6.0	5.4	0.50	0.45
1.61	19.28	-0.46	9.0		0.75	

APPENDIX F

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

EARTH-STRATA

General Earthwork and Grading Specifications

General

Intent: These General Earthwork and Grading Specifications are intended to be the minimum requirements for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These General Earthwork and Grading Specifications should be considered a part of the recommendations contained in the geotechnical report(s) and if they are in conflict with the geotechnical report(s), the specific recommendations in the geotechnical report shall supersede these more general specifications. Observations made during earthwork operations by the project Geotechnical Consultant may result in new or revised recommendations that may supersede these specifications and/or the recommendations in the geotechnical report(s).

The Geotechnical Consultant of Record: The Owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant), prior to commencement of grading or construction. The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading or construction.

Prior to commencement of grading or construction, the Owner shall coordinate with the Geotechnical Consultant, and Earthwork Contractor (Contractor) to schedule sufficient personnel for the appropriate level of observation, mapping, and compaction testing.

During earthwork and grading operations, the Geotechnical Consultant shall observe, map, and document the subsurface conditions to confirm assumptions made during the geotechnical design phase of the project. Should the observed conditions differ significantly from the interpretive assumptions made during the design phase, the Geotechnical Consultant shall recommend appropriate changes to accommodate the observed conditions, and notify the reviewing agency where required.

The Geotechnical Consultant shall observe the moisture conditioning and processing of the excavations and fill materials. The Geotechnical Consultant should perform periodic relative density testing of fill materials to verify that the attained level of compaction is being accomplished as specified.

The Earthwork Contractor: The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of earth materials to receive compacted fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall be provided with the approved grading plans and geotechnical report(s) for his review and acceptance of responsibilities, prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the approved grading plans and geotechnical report(s). Prior to commencement of grading, the Contractor shall prepare and submit to the Owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "equipment" of work and the estimated quantities of daily earthwork contemplated for the site. The Contractor shall inform the Owner and the Geotechnical Consultant of work schedule changes and revisions to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. No assumptions shall be made by the Contractor with regard to whether the Geotechnical Consultant is aware of all grading operations.

It is the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the earthwork operations in accordance with the applicable grading codes and agency ordinances, these specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). At the sole discretion of the Geotechnical Consultant, any unsatisfactory conditions, such as unsuitable earth materials, improper moisture conditioning, inadequate compaction, insufficient buttress keyway size, adverse weather conditions, etc., resulting in a quality of work less than required in the approved grading plans and geotechnical report(s), the Geotechnical Consultant shall reject the work and may recommend to the Owner that grading be stopped until conditions are corrected.

Preparation of Areas for Compacted Fill

Clearing and Grubbing: Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed in a method acceptable to the Owner, Geotechnical Consultant, and governing agencies.

The Geotechnical Consultant shall evaluate the extent of these removals on a site by site basis. Earth materials to be placed as compacted fill shall not contain more than 1 percent organic materials (by volume). No compacted fill lift shall contain more than 10 percent organic matter.

Should potentially hazardous materials be encountered, the Contractor shall stop work in the affected area, and a hazardous materials specialist shall immediately be consulted to evaluate the potentially hazardous materials, prior to continuing to work in that area.

It is our understanding that the State of California defines most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) as hazardous waste. As such, indiscriminate dumping or spillage of these fluids may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall be prohibited. The contractor is responsible for all hazardous waste related to his operations. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Owner should contract the services of a qualified environmental assessor.

Processing: Exposed earth materials that have been observed to be satisfactory for support of compacted fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Exposed earth materials that are not observed to be satisfactory shall be removed or alternative recommendations may be provided by the Geotechnical Consultant. Scarification shall continue until the exposed earth materials are broken down and free of oversize material and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction. The earth materials should be moistened or air dried to near optimum moisture content, prior to compaction.

Overexcavation: The Cut Lot Typical Detail and Cut/Fill Transition Lot Typical Detail, included herein provides a graphic illustration that depicts typical overexcavation recommendations made in the approved geotechnical report(s) and/or grading plan(s).

Keyways and Benching: Where fills are to be placed on slopes steeper than 5:1 (horizontal to vertical units), the ground shall be thoroughly benched as compacted fill is placed. Please see the three Keyway and Benching Typical Details with subtitles Cut Over Fill Slope, Fill Over Cut Slope, and Fill Slope for a graphic illustration. The lowest bench or smallest keyway shall be a minimum of 15 feet wide (or ½ the proposed slope height) and at least 2 feet into competent earth materials as advised by the Geotechnical Consultant. Typical benches shall be excavated a minimum height of 4 feet into competent earth materials or as recommended by the Geotechnical Consultant. Fill placed on slopes steeper than 5:1 should be thoroughly benched or otherwise excavated to provide a flat subgrade for the compacted fill.

Evaluation/Acceptance of Bottom Excavations: All areas to receive compacted fill (bottom excavations), including removal excavations, processed areas, keyways, and benching, shall be observed, mapped, general elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive compacted fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to placing compacted fill. A licensed surveyor shall provide the survey control for determining elevations of bottom excavations, processed areas, keyways, and

benching. The Geotechnical Consultant is not responsible for erroneously located, fills, subdrain systems, or excavations.

Fill Materials

General: Earth material to be used as compacted fill should to a large extent be free of organic matter and other deleterious substances as evaluated and accepted by the Geotechnical Consultant.

Oversize: Oversize material is rock that does not break down into smaller pieces and has a maximum diameter greater than 8 inches. Oversize rock shall not be included within compacted fill unless specific methods and guidelines acceptable to the Geotechnical Consultant are followed. For examples of methods and guidelines of oversize rock placement see the enclosed Oversize Rock Disposal Detail. The inclusion of oversize materials in the compacted fill shall only be acceptable if the oversize material is completely surrounded by compacted fill or thoroughly jetted granular materials. No oversize material shall be placed within 10 vertical feet of finish grade or within 2 feet of proposed utilities or underground improvements.

Import: Should imported earth materials be required, the proposed import materials shall meet the requirements of the Geotechnical Consultant. Well graded, very low expansion potential earth materials free of organic matter and other deleterious substances are usually sought after as import materials. However, it is generally in the Owners best interest that potential import earth materials are provided to the Geotechnical Consultant to determine their suitability for the intended purpose. At least 48 hours should be allotted for the appropriate laboratory testing to be performed, prior to starting the import operations.

Fill Placement and Compaction Procedures

Fill Layers: Fill materials shall be placed in areas prepared to receive fill in nearly horizontal layers not exceeding 8 inches in loose thickness. Thicker layers may be accepted by the Geotechnical Consultant, provided field density testing indicates that the grading procedures can adequately compact the thicker layers. Each layer of fill shall be spread evenly and thoroughly mixed to obtain uniformity within the earth materials and consistent moisture throughout the fill.

Moisture Conditioning of Fill: Earth materials to be placed as compacted fill shall be watered, dried, blended, and/or mixed, as needed to obtain relatively uniform moisture contents that are at or slightly above optimum. The maximum density and optimum moisture content tests should be performed in accordance with the American Society of Testing and Materials (ASTM test method D1557-00).

Compaction of Fill: After each layer has been moisture-conditioned, mixed, and evenly spread, it should be uniformly compacted to a minimum of 90 percent of maximum dry density as determined by ASTM test method D1557-00. Compaction equipment shall be adequately sized and be either specifically designed for compaction of earth materials or be proven to consistently achieve the required level of compaction.

Compaction of Fill Slopes: In addition to normal compaction procedures specified above, additional effort to obtain compaction on slopes is needed. This may be accomplished by backrolling of slopes with sheepsfoot rollers as the fill is being placed, by overbuilding the fill slopes, or by other methods producing results that are satisfactory to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill and the slope face shall be a minimum of 90 percent of maximum density per ASTM test method D1557-00.

Compaction Testing of Fill: Field tests for moisture content and relative density of the compacted fill earth materials shall be periodically performed by the Geotechnical Consultant. The location and frequency of tests shall be at the Geotechnical Consultant's discretion based on field observations. Compaction test locations will not necessarily be random. The test locations may or may not be selected to verify minimum compaction requirements in areas that are typically prone to inadequate compaction, such as close to slope faces and near benching.

Frequency of Compaction Testing: Compaction tests shall be taken at minimum intervals of every 2 vertical feet and/or per 1,000 cubic yards of compacted materials placed. Additionally, as a guideline, at least one (1) test shall be taken on slope faces for each 5,000 square feet of slope face and/or for each 10 vertical feet of slope. The Contractor shall assure that fill placement is such that the testing schedule described herein can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork operations to a safe level so that these minimum standards can be obtained.

Compaction Test Locations: The approximate elevation and horizontal coordinates of each test location shall be documented by the Geotechnical Consultant. The Contractor shall coordinate with the Surveyor to assure that sufficient grade stakes are established. This will provide the Geotechnical Consultant with sufficient accuracy to determine the approximate test locations and elevations. The Geotechnical Consultant can not be responsible for staking erroneously located by the Surveyor or Contractor. A minimum of two grade stakes should be provided at a maximum horizontal distance of 100 feet and vertical difference of less than 5 feet.

Subdrain System Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the approved grading plan, and the typical details provided herein. The Geotechnical Consultant may recommend additional subdrain systems and/or changes to the subdrain systems described herein, with regard to the extent, location, grade, or material depending on conditions encountered during grading or other factors. All subdrain systems shall be surveyed by a licensed land surveyor (except for retaining wall subdrain systems) to verify line and grade after installation and prior to burial. Adequate time should be allowed by the Contractor to complete these surveys.

Excavation

All excavations and over-excavations for remedial purposes shall be evaluated by the Geotechnical Consultant during grading operations. Remedial removal depths indicated on the geotechnical plans are estimates only. The actual removal depths and extent shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading operations. Where fill over cut slopes are planned, the cut portion of the slope shall be excavated, evaluated, and accepted by the Geotechnical Consultant prior to placement of the fill portion of the proposed slope, unless specifically addressed by the Geotechnical Consultant. Typical details for cut over fill slopes and fill over cut slopes are provided herein.

Trench Backfill

1) The Contractor shall follow all OHSA and Cal/OSHA requirements for trench excavation safety.

2) Bedding and backfill of utility trenches shall be done in accordance with the applicable provisions in the Standard Specifications of Public Works Construction. Bedding materials shall have a Sand Equivalency more than 30 (SE>30). The bedding shall be placed to 1 foot over the conduit and thoroughly jetting to provide densification. Backfill should be compacted to a minimum of 90 percent of maximum dry density, from 1 foot above the top of the conduit to the surface.

3) Jetting of the bedding materials around the conduits shall be observed by the Geotechnical Consultant.

4) The Geotechnical Consultant shall test trench backfill for the minimum compaction requirements recommended herein. At least one test should be conducted for every 300 linear feet of trench and for each 2 vertical feet of backfill.

5) For trench backfill the lift thicknesses shall not exceed those allowed in the Standard Specifications of Public Works Construction, unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment or method.

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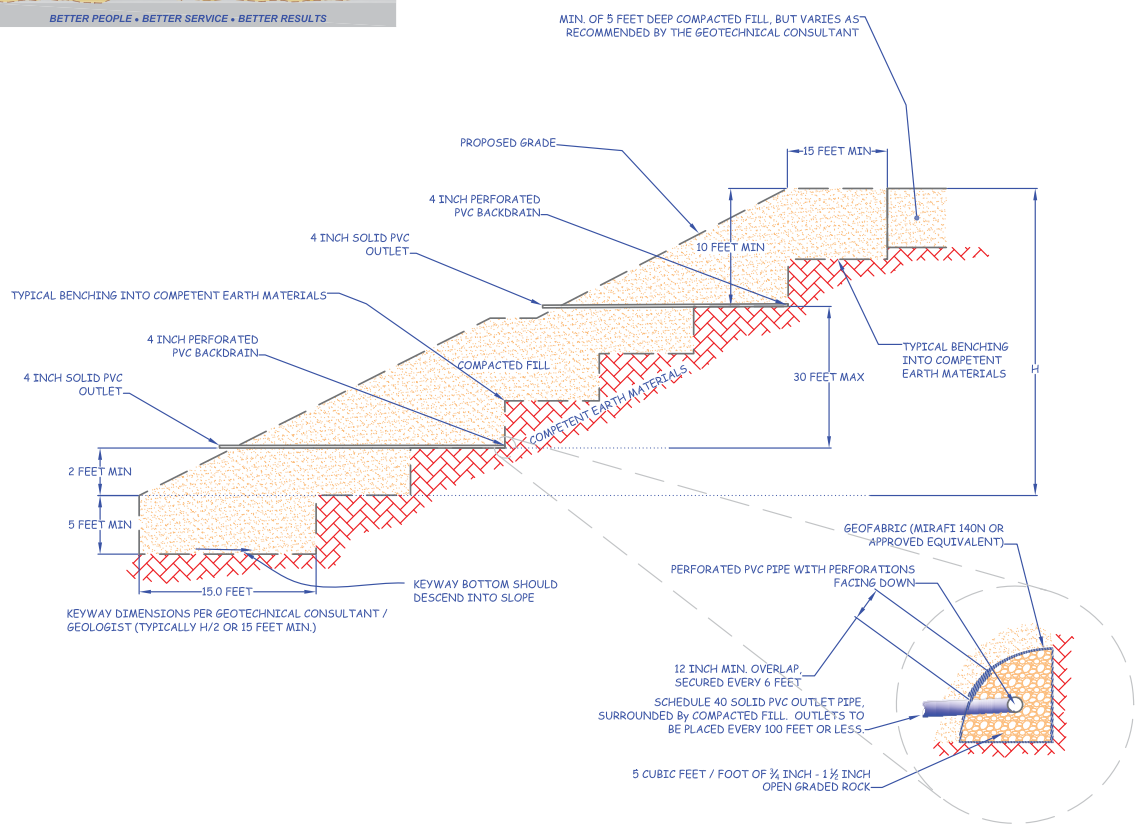
BUTTRESS TYPICAL DETAIL



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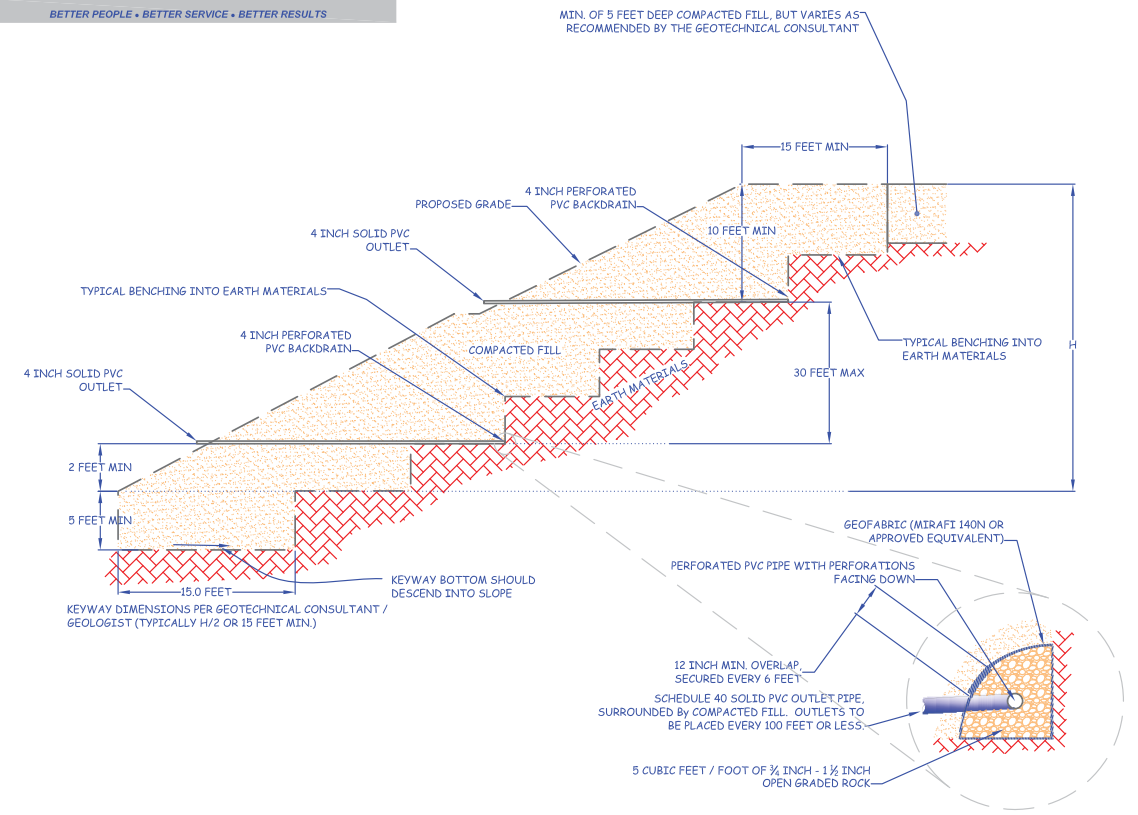
STABILIZATION FILL TYPICAL DETAIL



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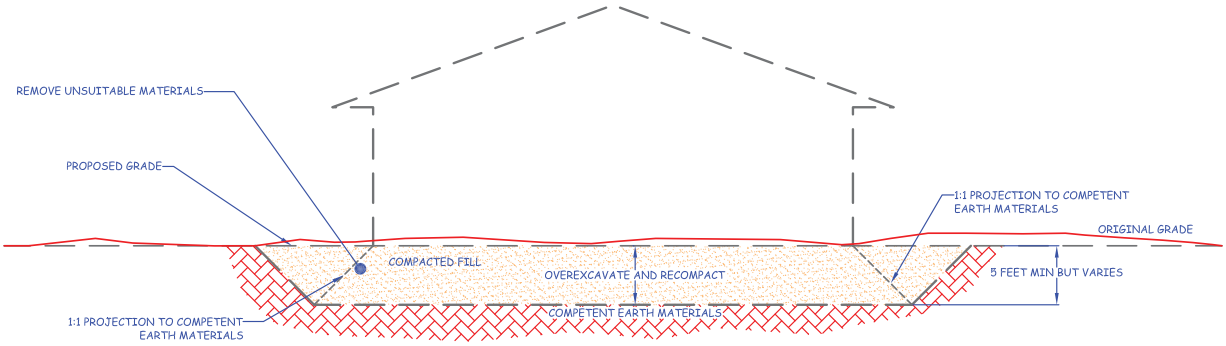
CUT LOT TYPICAL DETAIL



NOTE: REMOVAL BOTTOMS SHOULD BE GRADED WITH A MINIMUM 2% FALL TOWARDS STREET OR OTHER SUITABLE AREA (AS DETERMINED BY THE GEOTECHNICAL CONSULTANT) TO AVOID PONDING BELOW THE BUILDING

NOTE: WHERE DESIGN CUT LOTS ARE EXCAVATED ENTIRELY INTO COMPETENT EARTH MATERIALS, OVEREXCAVATION MAY STILL BY NEEDED FOR HARD-ROCK CONDITIONS OR MATERIALS WITH VARIABLE EXPANSION POTENTIALS

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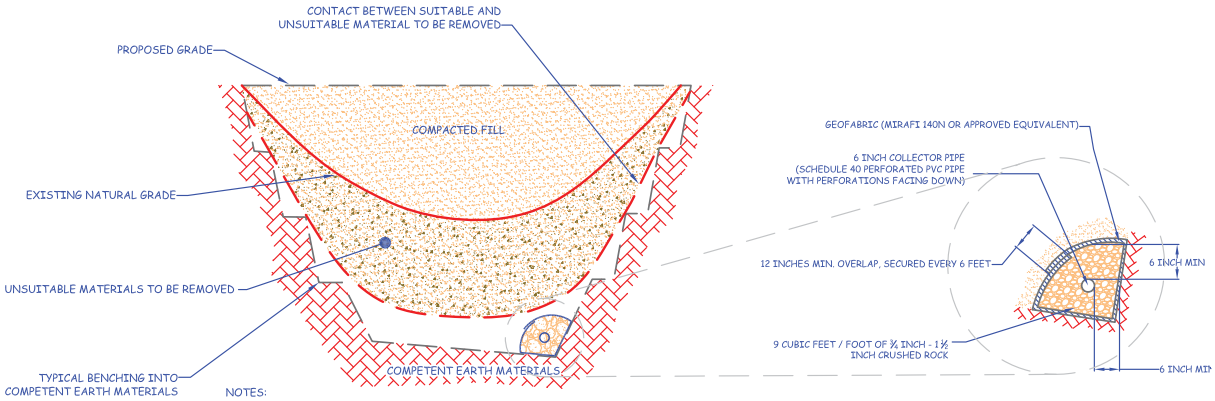
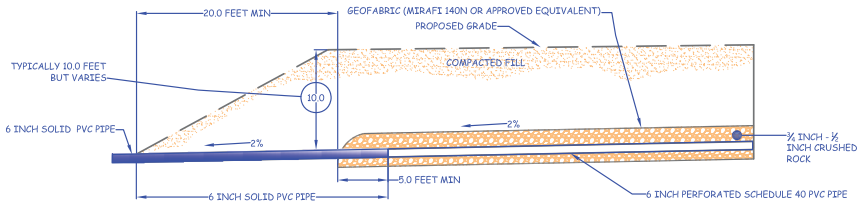
CANYON SUBDRAIN SYSTEM TYPICAL DETAIL



NOTES:
1 - CONTINUOUS RUNS IN EXCESS OF 500 FEET LONG WILL REQUIRE AN 8 INCH DIAMETER PIPE.

2 - FINAL 20 FEET OF PIPE AT OUTLET WILL BE SOLID AND BACKFILLED WITH COMPACTED FINE-GRAINED EARTH MATERIALS.

CANYON SUBDRAIN TYPICAL OUTLET



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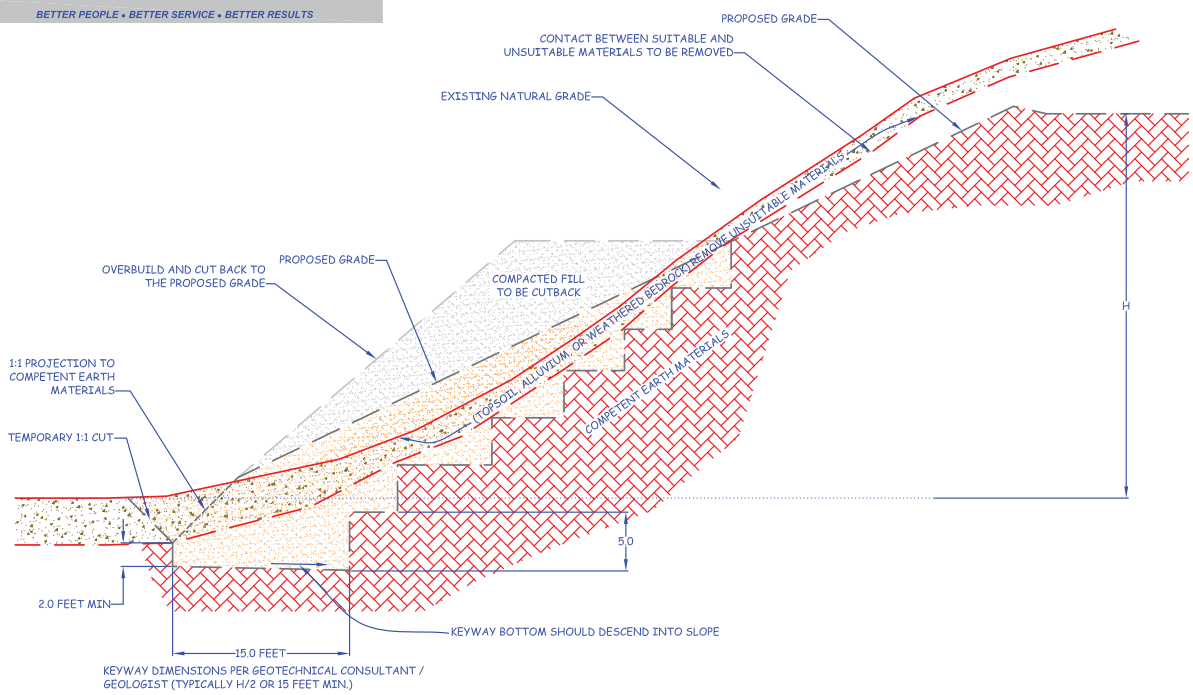
KEYWAY & BENCHING TYPICAL DETAILS
CUT OVER FILL SLOPE



NOTE:

NATURAL SLOPES STEEPER THAN 5:1 (H:V) MUST BE BENCHED INTO COMPETENT EARTH MATERIALS

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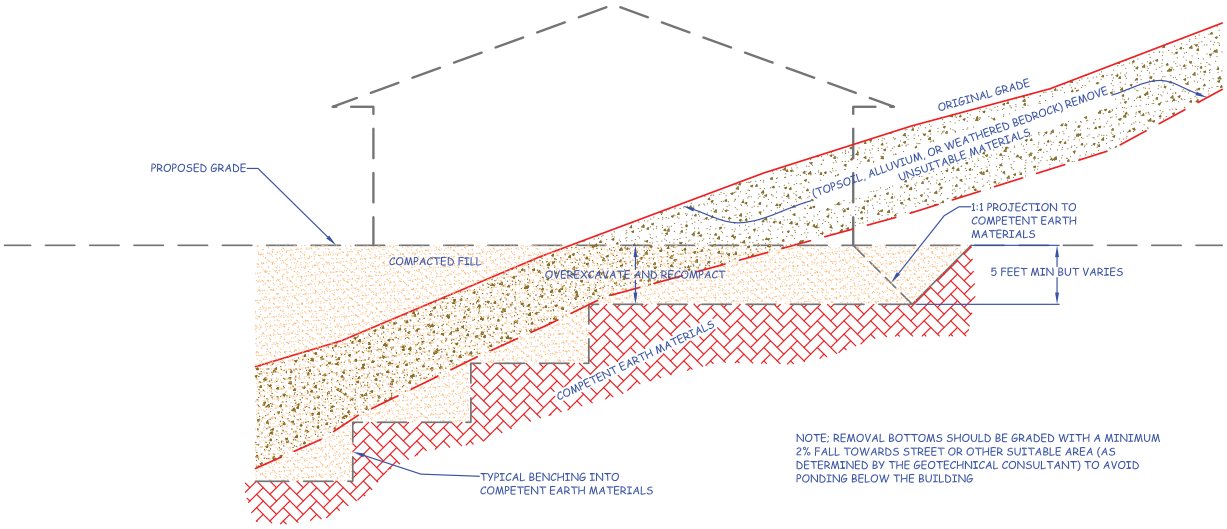
CUT / FILL TRANSITION LOT TYPICAL DETAIL



NOTE: REMOVAL BOTTOMS SHOULD BE GRADED WITH A MINIMUM 2% FALL TOWARDS STREET OR OTHER SUITABLE AREA (AS DETERMINED BY THE GEOTECHNICAL CONSULTANT) TO AVOID PONDING BELOW THE BUILDING

NOTE: WHERE DESIGN CUT LOTS ARE EXCAVATED ENTIRELY INTO COMPETENT EARTH MATERIALS, OVEREXCAVATION MAY STILL BY NEEDED FOR HARD-ROCK CONDITIONS OR MATERIALS WITH VARIABLE EXPANSION POTENTIALS

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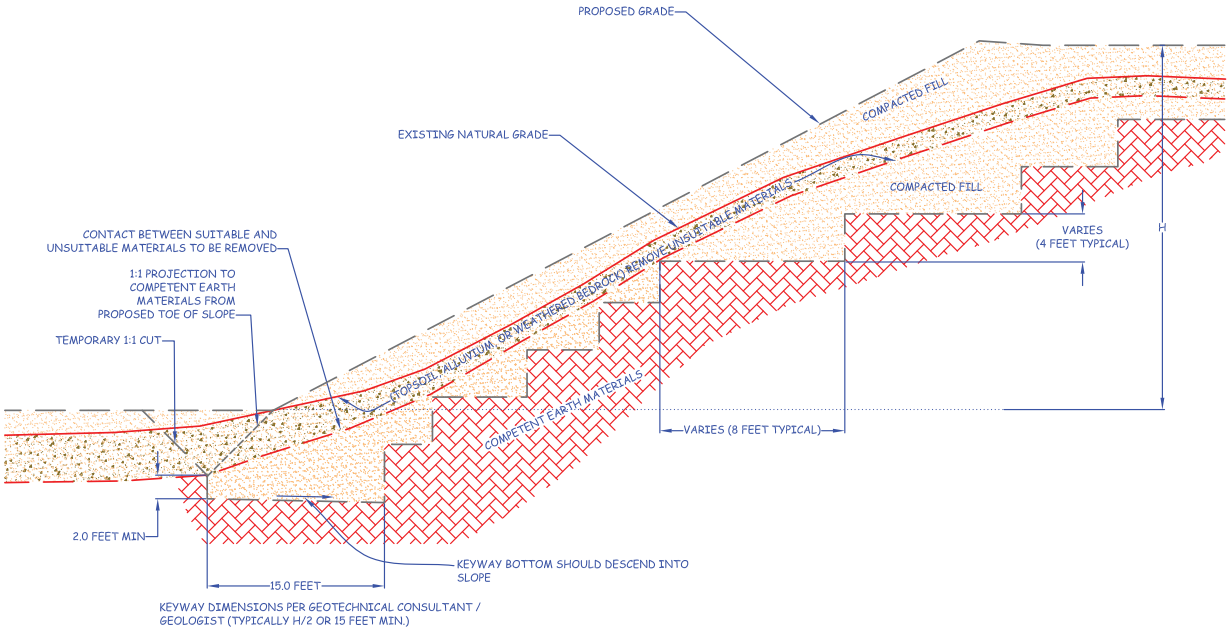
KEYWAY & BENCHING TYPICAL DETAILS
FILL SLOPE



NOTES:

NATURAL SLOPES STEEPER THAN 5:1 (H:V) MUST BE
BENCHED INTO COMPETENT EARTH MATERIALS

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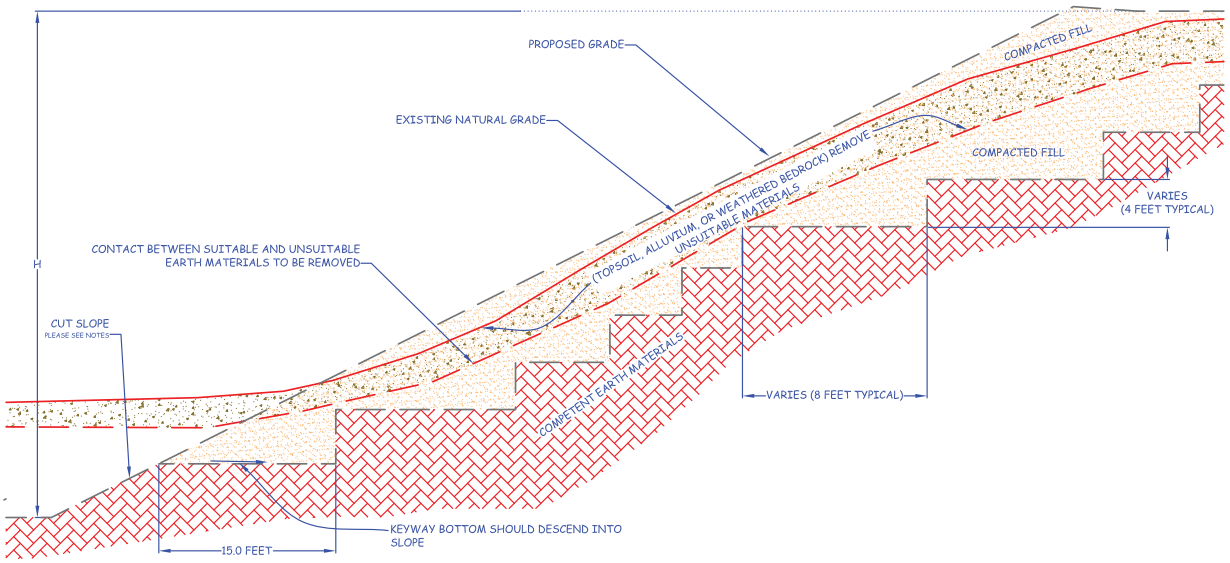
KEYWAY & BENCHING TYPICAL DETAILS
FILL OVER CUT SLOPE



NOTES:

NATURAL SLOPES STEEPER THAN 5:1 (H:V) MUST BE
BENCHED INTO COMPETENT EARTH MATERIALS

THE CUT SLOPE MUST BE CONSTRUCTED FIRST

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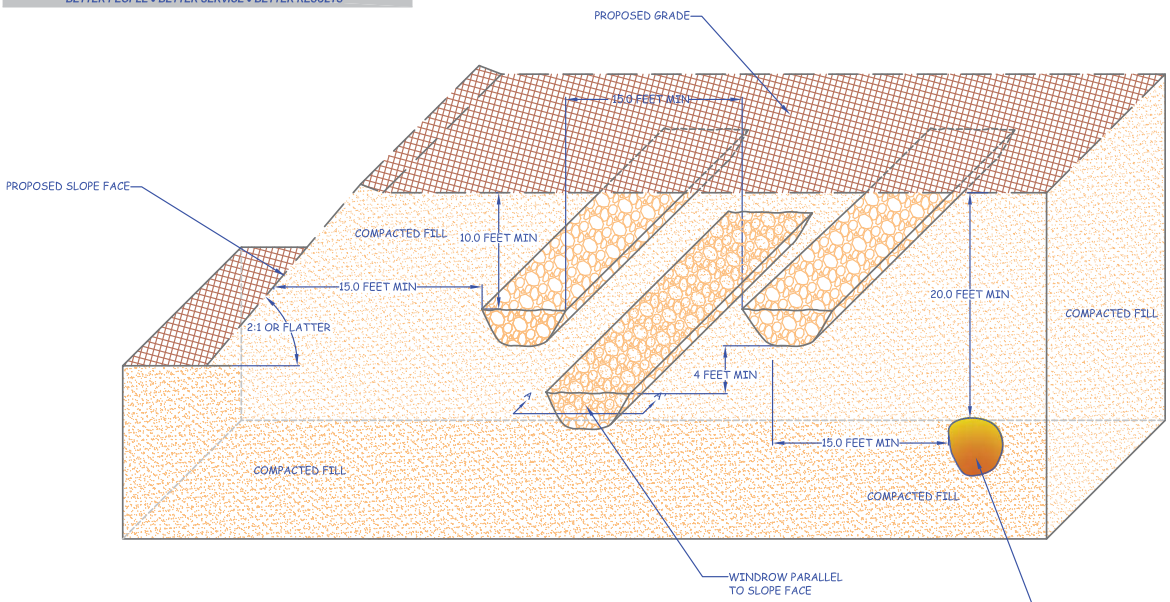
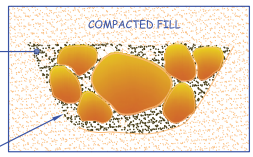
OVERSIZE ROCK TYPICAL DETAIL

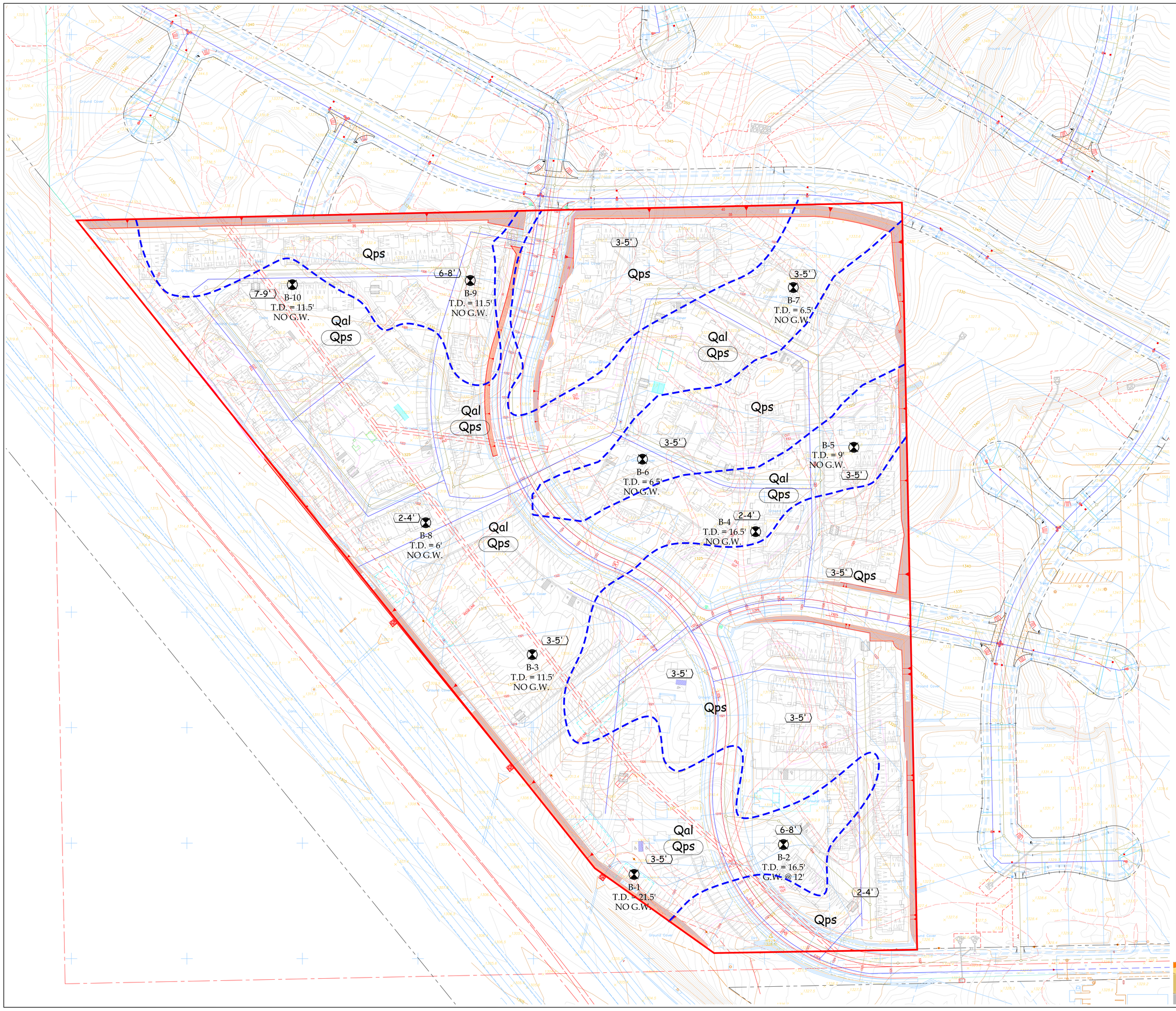


CROSS SECTION A-A'



NOTES:

OVERSIZE ROCK IS LARGER THAN
8 INCHES IN MAX DIAMETER



LEGEND

Locations are Approximate

Geologic Units

Qal - Alluvium

Qps - Quaternary Pauba Formation (Circled Where Buried)

Symbols

NORTH

- Limits of Report
- Geologic Contact
- Boring Location (Including Total Depth and Depth to Groundwater) — B-10, T.D. = 11.5', NO G.W.
- 7-9' - Recommended Removal Depth

GEOTECHNICAL MAP

APN 376-410-013, 025 AND 023

LOCATED NORTH OF CATT ROAD AND EAST OF INTERSTATE 15

CITY OF WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA

PROJECT	WESTPARK PROMENADE		
CLIENT	MR. JAMES KIECKHAFER		
PROJECT NO.	13351-10A		
DATE	AUGUST 2013		
SCALE	1:50		
DWG XREFS	CK_26 TOPO, CK 26_SITE, CK 26_BLP		
REVISION			
DRAWN BY	GWG	PLATE	1

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INTERPRETIVE REPORT
FOR INFILTRATION SYSTEM DESIGN, PROPOSED WESTPARK PROMENADE DEVELOPMENT, ASSESSOR'S PARCEL NUMBER 376-410-025, 376-410-013, AND 376-410-023, LOCATED NORTH OF CATT ROAD AND EAST OF INTERSTATE 15 (I-15), CITY OF WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA

PROJECT NO. 13351-11A

ISSUED: AUGUST 6, 2013

Earth - Strata, Inc.
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August 6, 2013 Project No. 13351-11A

Mr. James Kieckhafer
GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC.
6201 Oak Canyon, Suite 200
Irvine, CA 92618

Subject: Interpretive Report for Infiltration System Design, Proposed Westpark Promenade Development, Assessor's Parcel Number 376-410-025, 376-410-013, and 376-410-023, Located North of Catt Road and East of Interstate 15 (I-15), City of Wildomar, Riverside County, California

Earth-Strata, Inc. is pleased to present this interpretive report for the proposed commercial and residential development, located north of Catt Road and East of Interstate 15 (I-15), in the City of Wildomar, Riverside County, California. The purpose of our study was to determine the infiltration rates and physical characteristics of the subsurface earth materials within the proposed development. We have provided guidelines for the design of onsite bio swale retention systems, where applicable. This study is intended to provide onsite percolation rates for the earth materials at the approximate depth near the proposed retention basins.

PROPERTY DESCRIPTION

The subject property is located in the City of Wildomare, Riverside County, California (see Figure 1). The subject property consists of an undeveloped parcel of land with relatively hilly and flat terrain. The subject property is underlain by alluvium and Pauba Formation bedrock.

PROPOSED CONSTRUCTION

Based on information provided by you, the proposed development will consists of numerous buildings which includes interior driveways, utilities and three or more on-site retention basins located along the perimeter of the proposed development.

SUBSURFACE EXPLORATION AND PERCOLATION TESTING

SUBSURFACE EXPLORATION

Subsurface exploration of the subject site consisted of 4 exploratory excavations to a depth of 5 feet, conducted on June 15, 2013. The exploratory holes were excavated to evaluate insitu permeability rates. The boring logs are presented in Appendix A. The approximate location of the exploratory excavations are shown on the attached Percolation Location Map, Plate 1.

EARTH MATERIALS

A general description of the earth materials observed on site is provided below.

- Quaternary Alluvium (map symbol Qal): Quaternary alluvium was encountered to a maximum depth of 5 feet. These alluvial deposits consist predominately of interlayered light brown to brown, fine to coarse

grained clayey sand, and occasional sandy silt. These deposits were generally noted to be in a slightly moist to moist, loose to medium dense state.

Quaternary Pauba Sandstone (Qps): Quaternary Pauba Sandstone was encountered below the alluvium to a maximum depth of explored. This bedrock unit consists predominately of interbedded gray to medium brown, fine to medium grained silty sand, fine to coarse grained sandstone, with occasional siltstone and claystone layers.

GROUNDWATER

Groundwater was not observed within the exploratory excavations.

PERCOLATION TESTING

The continuous presoak test method was utilized to perform a total of four (4) percolation tests on June 15, 2013 to evaluate near surface percolation rates in order to estimate the amount of storm water runoff that can percolate into the onsite bio swale retention basins. The percolation tests were performed in general accordance with the requirements of insitu percolation testing.

The percolation tests were performed within 8 inch perforated pipes, 4.3 to 5 feet deep. The locations of the percolation test holes are indicated on the attached Percolation Location Map, Plate 1. The percolation test holes were located by property boundary measurement on the site plan and by using geographic features. For the continuous presoak testing method, the pipe was filled with water and allowed to stand.

After the presoak, testing was performed by adjusting the water level to near the top of the pipe. The drop in water level was measured from a fixed initial reference point for more reliable readings, with measurements having an accuracy of 1/8-inch. After each measurement, the water level was brought up to the original test level. Percolation test data recorded in the field is summarized in the following table and is included within Appendix A.

PERCOLATION TEST SUMMARY

TEST NUMBER	PERCOLATION HOLE DEPTH (ft.)	PERCOLATION RATE (mpi)	DESCRIPTION
P-1	5	170	Clayey Silt
P-2	5	275	Clayey Silt
P-3	4.3	153	Clayey Sand
P-4	5	23	Silty Sand

The percolation test rates ranged from 23 to 275 minutes per sec (mpi).

CONCLUSIONS AND RECOMMENDATIONS

Based on the data presented in this report and the recommendations set forth herein, it is the opinion of Earth-Strata that the retention basins cannot be designed for the infiltration rates measured. The infiltration rates are extremely slow.

GRADING PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of **GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC** and their authorized representative. It likely does not contain sufficient information for other parties or other uses. Earth-Strata should be engaged to review the final design plans and specifications prior to construction. This is to verify that the recommendations contained in this report have been properly incorporated into the project plans and specifications. Should Earth-Strata not be accorded the opportunity to review the project plans and specifications, we are not responsibility for misinterpretation of our recommendations.

Earth-Strata should be retained to provide observations during construction to validate this report. In order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

Earth-Strata should review any changes in the project and modify and approve in writing the conclusions and recommendations of this report. This report and the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions encountered during grading or construction operations appear to be different than those indicated in this report, this office should be notified immediately, as revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Earth materials vary in type, strength, and other geotechnical properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the subject property. No practical study can completely eliminate uncertainty with regard to the anticipated geotechnical conditions in connection with a subject property. The conclusions and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by Earth-Strata during construction. This report is considered valid for a period of one year from the time the report was issued.

This report was prepared with the understanding that it is the responsibility of the owner or their representative, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should properly implement the conclusions and recommendations during grading and construction, and notify the owner if they consider any of the recommendations presented herein to be unsafe or unsuitable.

Respectfully submitted,

EARTH-STRATA, INC.

Stephen M. Poole, PE 40219
President
Principal Engineer

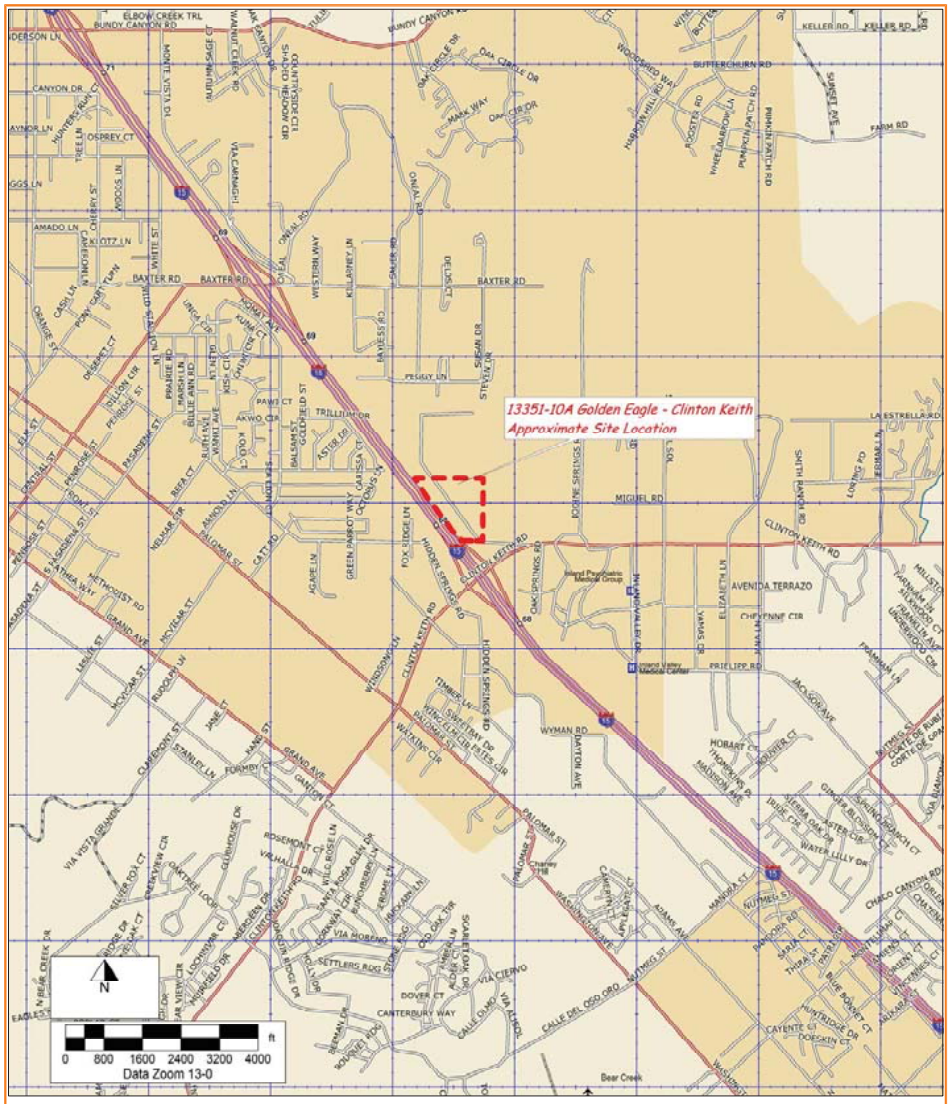
SMP/am

Distribution: (4) Addressee

Attachments: Figure 1 – Vicinity Map *(Rear of Text)*
Appendix A – Exploratory Logs *(Rear of Text)*
Appendix B – Percolation Test Sheets *(Rear of Text)*
Plate 1 – Percolation Location Map *(Rear of Text)*

FIGURE 1

VICINITY MAP



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Earth - Strata, Inc. Geotechnical, Environmental and Materials Testing Consultants	GOLDEN EAGLE - CLINTON KEITH	13351-11A
	VICINITY MAP	SEE BAR SCALE
BETTER PEOPLE • BETTER SERVICE • BETTER RESULTS		JULY 2013 / FIGURE 1

APPENDIX A

EXPLORATORY LOGS

SYMBOLS AND TERMS USED ON LOGS

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The No. 200 Standard Sieve is about the smallest particle visible to the naked eye.

Coarse-grained Soils >½ of materials larger than #200 sieve	**GRAVELS** Higher percentage of coarse fraction is larger than #4 sieve	Clean Gravels (less than 5% fines)		**GW**	Well-graded gravels, little or no fines
				GP	Poorly-graded gravels, little or no fines
		5 – 12% fines		**GW-GM**	Well-graded gravel with silt
				GW-GC	Well-graded gravel with clay
				GP-GM	Poorly-graded gravel with silt
				GP-GC	Poorly-graded gravel with clay
		Gravels with fines	PI < 4	**GM**	Silty Gravels
			PI > 7	**GC**	Clayey Gravels
	SANDS Higher percentage of coarse fraction is smaller than #4 sieve	Clean Sands (less than 5% fines)		**SW**	Well-graded sands, little or no fines
				SP	Poorly-graded sands, little or no fines
		5 – 12% fines		**SW-SM**	Well-graded sand with silt
				SW-SC	Well-graded sand with clay
				SP-SM	Poorly-graded sand with silt
				SP-SC	Poorly-graded sand with clay
		Sands with fines	PI < 4	**SM**	Silty Sands
			PI > 7	**SC**	Clayey Sands
			PI 4-7	**SC-SM**	Silty clayey sands
Fine-grained Soils ≥½ of materials smaller than #200 sieve	**SILTS & CLAYS** Liquid Limit Less Than 50		PI < 4	**ML**	Inorganic silts & sandy silts
			PI > 7	**CL**	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			PI 4-7	**ML-CL**	Silts & clays of low plasticity, sandy silty clay, silty clay
	SILTS & CLAYS Liquid Limit Greater Than 50			**MH**	Inorganic silts, micaceous or diatomaceous silt, sandy silt
				CH	Inorganic clays of high plasticity, fat clays, sandy clays, gravelly clays
				OH	Organic silts and clays of medium-to-high plasticity
Highly Organic Soils				**PT**	Peat, humus swamp soils with higher organic content

Symbols	
	Ring Sample
	SPT Sample
NR	No Recovery
▽	Groundwater

Grain Size				
Description		Sieve Size	Grain Size	Approximate Size
Boulders		>12"	>12"	Larger than basketball-sized
Cobbles		3-12"	3-12"	Fist-sized to basketball-sized
Gravel	Coarse	¾-3"	¾-3"	Thumb-sized to fist-sized
	Fine	#4-¾"	0.19-0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10-#4	0.079-0.19"	Rock salt-sized to pea-sized
	Medium	#40-#10	0.017-0.079"	Sugar-sized to rock salt-sized
	Fine	#200-#40	0.0029-0.017"	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029"	Flour-sized and smaller

Moisture Content
Slightly Moist
Moist
Very Moist
Wet

Consistency – Fine Grained Soils			
Apparent Density	SPT (# blows/foot)	Modified CA Sampler (# blows/foot)	Field Test
Very Soft	<1	<2	Easily penetrated by thumb; exudes between thumb and fingers when squeezed in hand
Soft	2-3	3-6	Easily penetrated one inch by thumb; molded by light finger pressure
Medium Stiff	4-6	7-12	Penetrated over ½ inch by thumb with moderate effort; molded by strong finger pressure
Stiff	7-10	13-15	Indented about ½ inch by thumb but penetrated only with great effort
Very Stiff	11-20	16-30	Readily indented thumbnail
Hard	>20	>30	Indented with difficulty by thumbnail

Relative Density – Coarse Grained Soils			
Apparent Density	SPT (# blows/foot)	Modified CA Sampler (# blows/foot)	Field Test
Very Loose	<2	<4	Easily penetrated with ½ inch reinforcing rod pushed by hand
Loose	3-5	4-10	Easily penetrated with ½ inch reinforcing rod pushed by hand
Medium Dense	6-15	11-30	Easily penetrated 1-foot with ½ inch reinforcing rod driven with a 5-lb hammer
Dense	16-25	31-50	Difficult to penetrate 1-foot with ½ inch reinforcing rod driven with a 5-lb hammer
Very Dense	>25	>50	Penetrated only a few inches with ½ inch reinforcing rod driven with a 5-lb hammer

JUNE 2007, Auto

Geotechnical Boring Log P-1

Date: June 17, 2013	**Project Name: Westpark Promenade** **Page: 1 of 1**
Project Number: 13351-11A	**Logged By: SMP**
Drilling Company: Drilling It	**Type of Rig: CME 45B**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft):	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SM	Silty SAND; reddish brown, slightly moist
					SC	Clayey SILT; light brown, moist
5						**E.O.B. @ 5 Feet**
						No Groundwater
10						
15						
20						
25						
30						

26047 JEFFERSON AVENUE, SUITE C, MURRIETA, CA 92562

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Geotechnical Boring Log P-2

Date: June 17, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-11A	Logged By: SMP
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SM	Silty SAND; dark brown, slightly moist
					SC	Clayey SILT; dark brown, moist
5						**E.O.B. @ 5 Feet**
						No Groundwater
10						
15						
20						
25						
30						

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Geotechnical Boring Log P-3

Date: June 17, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-11A	Logged By: SMP
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SC	Clayey SAND; light brown, slightly moist
5						**E.O.B. @ 5 Feet**
						No Groundwater
10						
15						
20						
25						
30						

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Geotechnical Boring Log P-4

Date: June 17, 2013	Project Name: Westpark Promenade — Page: 1 of 1
Project Number: 13351-11A	Logged By: SMP
Drilling Company: Drilling It	Type of Rig: CME 45B
Drive Weight (lbs): 140	Drop (in): 30 — Hole Diameter (in): 8
Top of Hole Elevation (ft):	Hole Location: See Geotechnical Map

Depth (ft)	Blow Count Per Foot	Sample Number	Dry Density (pcf)	Moisture (%)	ASTM Symbol	MATERIAL DESCRIPTION
0						***Quaternary Alluvial (Qal):***
					SM	Silty SAND; reddish brown, slightly moist
5						**E.O.B. @ 5 Feet**
						No Groundwater
10						
15						
20						
25						
30						

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APPENDIX B

PERCOLATION TEST SHEETS

PERCOLATION DATA SHEET

Job Number:	13351-11A	Check for Sandy Soil Criteria Tested By:	MWG
Project:	Westpark Promenade	Actual Percolation Tested By:	MWG
Test Hole Number:	P-1	Test Hole Diameter (inches):	8
Soil Classification:	Clayey Sand	Date of Presoak:	6/17/2013
Depth of Test Hole (ft):	5	Date Tested:	6/18/2013

NORMAL OR SANDY SOIL CRITERIA TEST

Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (inches)	Final Water Level (inches)	▲ in Water Level (inches)	Percolation Rate (min/inch)
7:35 8:05	30	30	54¼	54¾	½	60
8:05 8:35	30	60	54¾	54¾	0	-
8:35 9:05	30	90	54¾	55	¼	120
9:05 9:35	30	120	55	55	0	-
9:35 10:05	30	150	55	55	0	-
10:05 10:35	98	248	55	55¼	¼	392
10:35 11:05	57	305	55¼	56	¾	76
11:05 11:35	170	475	56	57	1	170

Porchet Method - Conversion of Percolation Rate to Infiltration Rate	Perc Test No.	Legend:	Required Entries Calculated Cells

Company Name: Earth-Strata
Designed by: SMPoole
Date: 2014
County/City Case No: P-1

Percolation Conversion to Infiltration Rate

The conversion equation is used:

$$I_t\,(\text{in/hr}) = \frac{\Delta H(\text{in}) \times 60\ (\text{min/hr}) \times r(\text{in})}{\Delta t(\text{min}) \times [r(\text{in}) + 2H_{avg}(\text{in})]}$$

If test hole is round - Enter radius here ⟶ $r =$ 8.00 inches

If test hole is square - Enter average side width below

$w =$ 9.00 inches $r_{eq} =$ 5.08 inches

Time interval $\Delta t =$ 170.0 minutes

Initial height of water during selected time interval $H_o =$ 57.00 inches

Final height of water during selected time interval $H_f =$ 56.00 inches

Change in height of water during selected time interval $\Delta H =$ 1.00 inches

Average head height over the selected time interval $H_{avg} =$ 56.50 inches

Converted infiltration rate per test data $I_t =$ 0.02 inches/hour

Comments

PRELIMINARY DRAFT - SUBJECT TO REVISION (MAY 2010)

PERCOLATION DATA SHEET

Job Number:	13351-11A	Check for Sandy Soil Criteria Tested By:	MWG
Project:	Westpark Promenade	Actual Percolation Tested By:	MWG
Test Hole Number:	P-2	Test Hole Diameter (inches):	8
Soil Classification:	Clayey Sand	Date of Presoak:	6/17/2013
Depth of Test Hole (ft):	5	Date Tested:	6/18/2013

NORMAL OR SANDY SOIL CRITERIA TEST

Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (inches)	Final Water Level (inches)	▲ in Water Level (inches)	Percolation Rate (min/inch)
7:38 8:08	30	30	51¾	51¾	0	-
8:08 8:38	30	60	51¾	51⅞	⅛	240
8:38 9:08	30	90	51⅞	51⅞	0	-
9:08 9:38	30	120	51⅞	52	⅛	240
9:38 10:08	30	150	52	52	0	-
10:08 10:38	97	247	52	52½	½	194
10:38 11:08	175	422	52½	53½	1	175
11:08 11:38	172	594	53½	54⅛	⅝	275

Porchet Method - Conversion of Percolation Rate to Infiltration Rate	Perc Test No.	Legend:	Required Entries Calculated Cells

Company Name: Earth-Strata — Date: 2014

Designed by: SMPoole — County/City Case No: P-2

Percolation Conversion to Infiltration Rate

The conversion equation is used:

$$I_t\,(\text{in/hr}) = \frac{\Delta H(\text{in}) \times 60\ (\text{min/hr}) \times r(\text{in})}{\Delta t(\text{min}) \times [r(\text{in}) + 2H_{avg}(\text{in})]}$$

If test hole is round - Enter radius here ⟶ $r =$ 8.00 inches

If test hole is square - Enter average side width below

$w =$ 9.00 inches — $r_{eq} =$ 5.08 inches

Time interval	$\Delta t =$	172.0	minutes
Initial height of water during selected time interval	$H_o =$	54.13	inches
Final height of water during selected time interval	$H_f =$	53.50	inches
Change in height of water during selected time interval	$\Delta H =$	0.63	inches
Average head height over the selected time interval	$H_{avg} =$	53.81	inches
Converted infiltration rate per test data	$I_t =$	0.01	inches/hour

Comments

PRELIMINARY DRAFT - SUBJECT TO REVISION (MAY 2010)

PERCOLATION DATA SHEET

Job Number:	13351-11A	Check for Sandy Soil Criteria Tested By:	MWG
Project:	Westpark Promenade	Actual Percolation Tested By:	MWG
Test Hole Number:	P-3	Test Hole Diameter (inches):	8
Soil Classification:	Clayey Sand	Date of Presoak:	6/17/2013
Depth of Test Hole (ft):	4.3	Date Tested:	6/18/2013

NORMAL OR SANDY SOIL CRITERIA TEST

Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (inches)	Final Water Level (inches)	▲ in Water Level (inches)	Percolation Rate (min/inch)
7:42 8:12	30	30	41	41⅞	⅞	34
8:12 8:42	30	60	41⅞	42⅜	½	60
8:42 9:12	30	90	42⅜	42⅜	0	-
9:12 9:42	30	120	42⅜	42½	⅛	240
9:42 10:12	30	150	42½	42⅝	⅛	240
10:12 10:42	90	240	42⅝	43¼	⅝	144
10:42 11:12	175	415	43¼	45	¾	233
11:12 11:42	172	587	45	46⅛	1⅛	153

Porchet Method - Conversion of Percolation Rate to Infiltration Rate	Perc Test No.	Legend:	Required Entries Calculated Cells

Company Name: Earth-Strata — Date: 2014

Designed by: SMPoole — County/City Case No: P-3

Percolation Conversion to Infiltration Rate

The conversion equation is used:

$$I_t\,(\text{in/hr}) = \frac{\Delta H(\text{in}) \times 60\ (\text{min/hr}) \times r(\text{in})}{\Delta t(\text{min}) \times [r(\text{in}) + 2H_{avg}(\text{in})]}$$

If test hole is round - Enter radius here ⟶ $r =$ 8.00 inches

If test hole is square - Enter average side width below

$w =$ 9.00 inches — $r_{eq} =$ 5.08 inches

Time interval	$\Delta t =$	172.0	minutes
Initial height of water during selected time interval	$H_o =$	46.13	inches
Final height of water during selected time interval	$H_f =$	45.00	inches
Change in height of water during selected time interval	$\Delta H =$	1.13	inches
Average head height over the selected time interval	$H_{avg} =$	45.56	inches
Converted infiltration rate per test data	$I_t =$	0.02	inches/hour

Comments

PRELIMINARY DRAFT - SUBJECT TO REVISION (MAY 2010)

PERCOLATION DATA SHEET

Job Number:	13351-11A	Check for Sandy Soil Criteria Tested By:	MWG
Project:	Westpark Promenade	Actual Percolation Tested By:	MWG
Test Hole Number:	P-4	Test Hole Diameter (inches):	8
Soil Classification:	Clayey Sand	Date of Presoak:	6/17/2013
Depth of Test Hole (ft):	5	Date Tested:	6/18/2013

NORMAL OR SANDY SOIL CRITERIA TEST

Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (inches)	Final Water Level (inches)	▲ in Water Level (inches)	Percolation Rate (min/inch)
7:45 8:15	30	30	51¼	55	¾	40
8:15 8:45	30	60	55	58	3	10
8:45 9:15	30	90	52	55	3	10
9:15 9:45	30	120	55	57	2	15
9:45 10:15	30	150	54⅝	56⅝	1¾	17
10:15 10:45	90	240	53⅜	60	3⅝	25
10:45 11:15	171	411	51⅛	60	8⅞	19
11:15 11:45	175	586	52⅜	60	7⅝	23

Porchet Method - Conversion of Percolation Rate to Infiltration Rate	Perc Test No.	Legend:	Required Entries Calculated Cells

Company Name: Earth-Strata — Date: 2014

Designed by: SMPoole — County/City Case No: P-4

Percolation Conversion to Infiltration Rate

The conversion equation is used:

$$I_t\,(\text{in/hr}) = \frac{\Delta H(\text{in}) \times 60\ (\text{min/hr}) \times r(\text{in})}{\Delta t(\text{min}) \times [r(\text{in}) + 2H_{avg}(\text{in})]}$$

If test hole is round - Enter radius here ⟶ $r =$ 8.00 inches

If test hole is square - Enter average side width below

$w =$ 9.00 inches — $r_{eq} =$ 5.08 inches

Time interval — $\Delta t =$ 175.0 minutes

Initial height of water during selected time interval — $H_o =$ 60.00 inches

Final height of water during selected time interval — $H_f =$ 53.38 inches

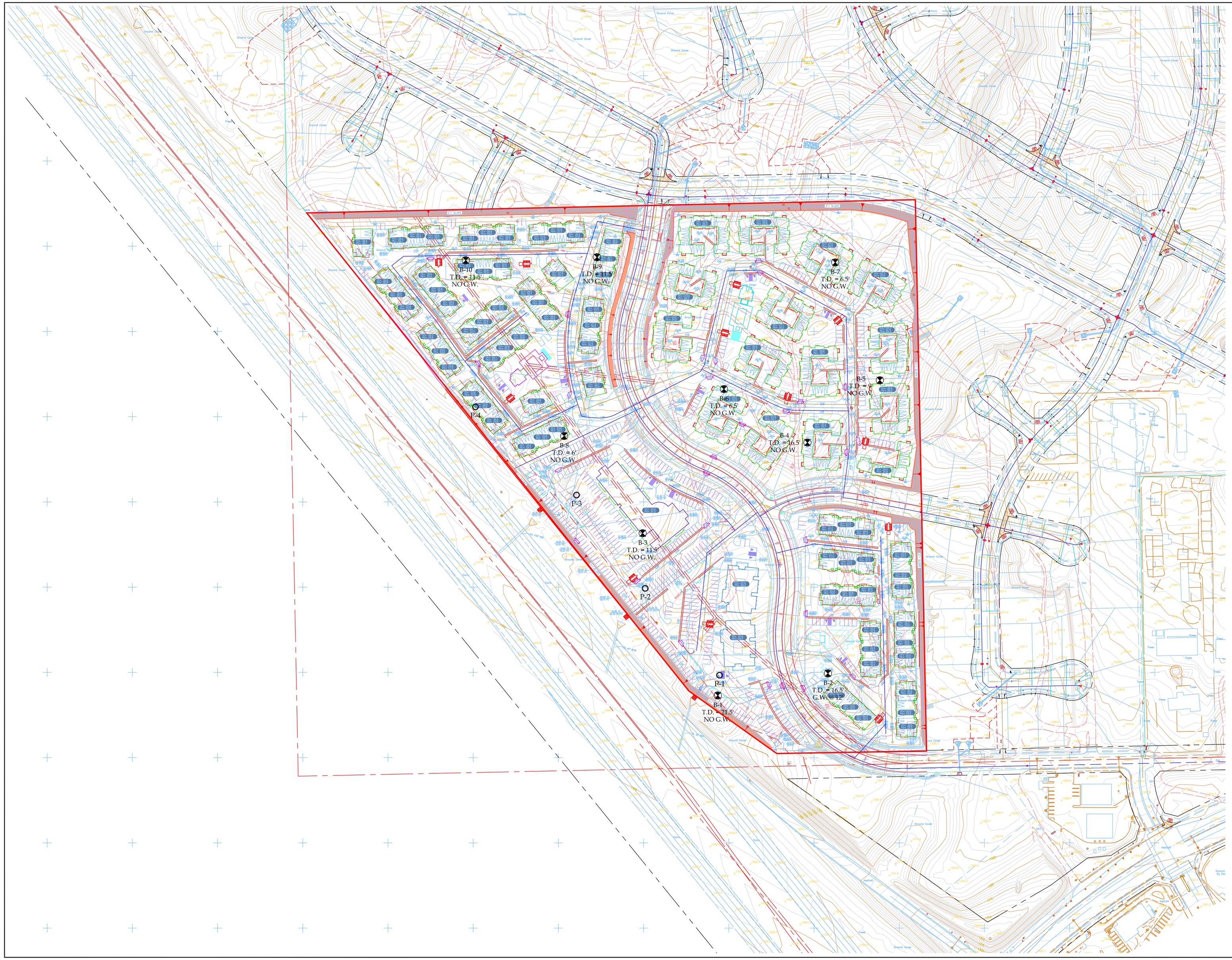
Change in height of water during selected time interval — $\Delta H =$ 6.63 inches

Average head height over the selected time interval — $H_{avg} =$ 56.69 inches

Converted infiltration rate per test data — $I_t =$ 0.10 inches/hour

Comments

PRELIMINARY DRAFT - SUBJECT TO REVISION (MAY 2010)



LEGEND

Locations are Approximate

Geologic Units

Qal - Alluvium

Qps - Quaternary Pauba Formation
(Circled Where Buried)

NORTH

Symbols

- Limits of Report

B-2
T.D. = 21.5'
NO G.W.

- Boring Location
Including Total Depth and Depth to Groundwater

P-4 - Percolation Test Location

INFILTRATION LOCATION MAP

APN 376-410-013, 025 AND 023

LOCATED NORTH OF CATT ROAD ADN EAST OF INTERSTATE 15

CITY OF WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA

PROJECT	WESTPARK PROMENADE		
CLIENT	MR. JAMES KIECKHAFER		
PROJECT NO.	13351-10A		
DATE	AUGUST 2013		
SCALE	1:100		
DWG XREFS	XREF		
REVISION			
DRAWN BY	GWG	PLATE	1

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APPENDIX F

Treatment Control BMP Sizing Calculations and Design Details

BMP Treatment Design

The site is unable to utilize infiltration as a BMP since the infiltration rates are less than 0.5 inches per hour, see Infiltration System Design Interpretive Report in Appendix E. The infiltration rate is 0.10 in/hr.

The site does not meet the minimum demands for Harvest and Use BMPs based upon the following calculations from the "Final" Santa Margarita WQMP" from Riverside County:

Design Capture Storm Depth (0.68 in)	Required Minimum Toilet Users per Acre (tu/ac)	Actual Residential Toilet Users per Acres (tu/ac)
POD 1	147	50
POD 2	113	37
POD 3	113	44

Design Capture Storm Depth (0.68 in)	Minimum Irrigated Area per Tributary Impervious Area (ac/ac)	Actual Irrigated Area per Tributary Impervious Area (ac/ac)
POD 1	1.21	0.23
POD 2	1.21	0.48
POD 3	1.21	0.38

BMP treatment design for DMA 1-1, 1-2, 1-3, 2-1, and 2-2 will be the use of a sand filter to be constructed under the parking lot utilizing CUDO water storage system, information included at end of this appendix. The treated flows from sand filters in DMA 1-1 and 2-1 will be directed to vault 1-1, located in DMA 1-1. The treated flows from the sand filters in DMA 1-2 and 2-2 will be directed to vault 1-2, located in DMA 1-2. The treated flows from the sand filter in DMA 1-3 will be directed to vault 1-3.

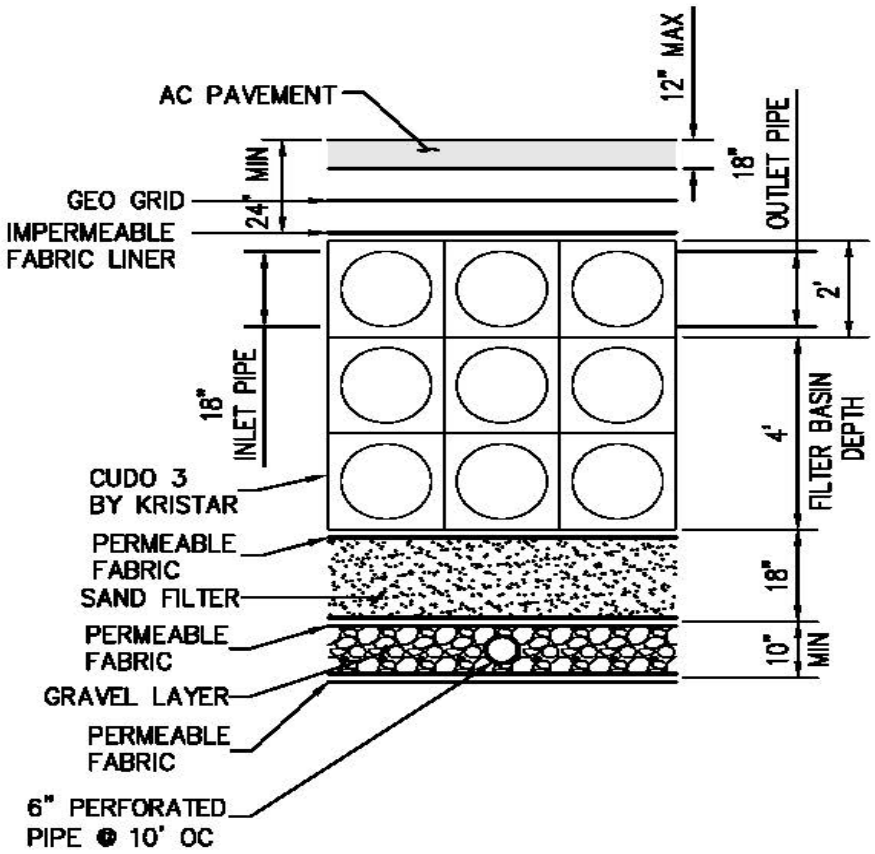
BMP treatment design for DMA 3-1 and 3-2 will utilize a bioretention system with underdrain and treated flows will be directed to vaults 3-1 and 3-2 respectfully.

The following work sheets were used BMP sizing.

Volume – Santa Margarita Water Watershed BMP Design Volume (Rev. 03-2012)
BMP Sizing – Sand Filter Basin
Bioretention Facility

DMA	Design Volume (CF)	BMP Size Req'd. (SF)	BMP Size Provided (SF)
1-1	12,659	3,165	3,206
1-2	3,933	983	1,040
1-3	3,574	894	1,008
2-1	5,462	1,366	1,612
2-2	5,332	1,333	1,408
3-1-A	1,625	940	952
3-1-B	1,545	894	963
3-2	2,136	1,235	1,308

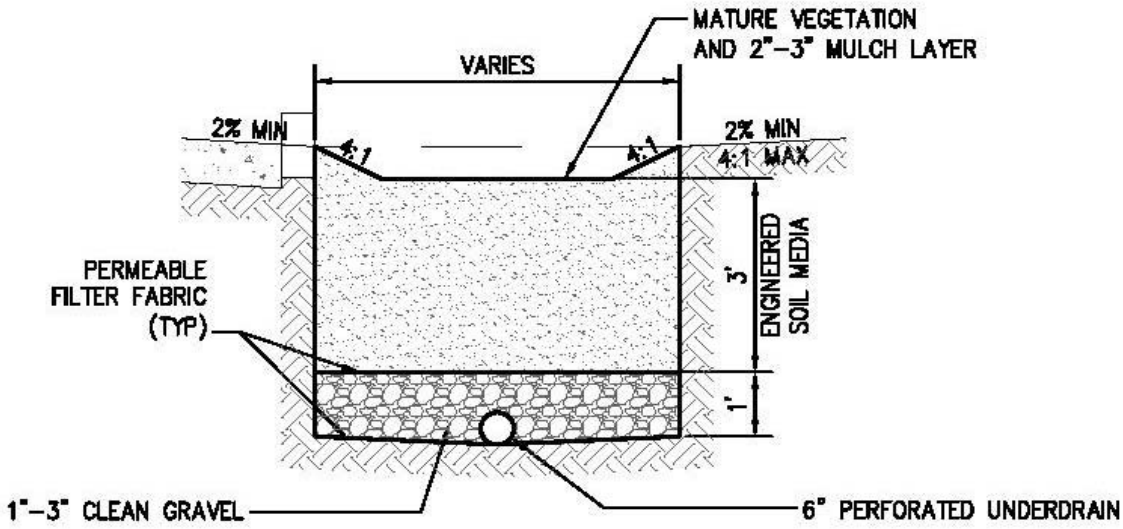
BMP FOR DMA 1-1, 1-2, 1-3, 2-1, 2-2



TYPICAL SECTION SAND FILTER WITH UNDERDRAIN BMP
DMA'S 1–1, 1–2, 1–3, 2–1 & 2–2
NOT TO SCALE

SEE SAND FILTER BASIN (SFR) – DESIGN PROCEDURE WORKSHEET

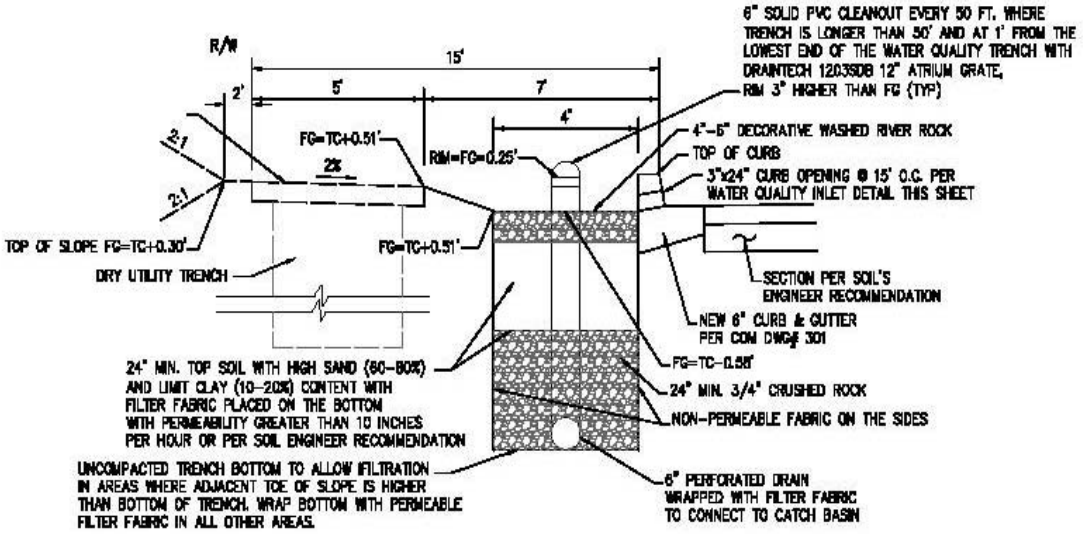
BMP FOR DMA 3-1-A, 3-1-B, 3-2



BIORETENTION FACILITY WITH UNDERDRAIN BMP
DMA'S 3–1–A, 3–1–B & 3–2
NOT TO SCALE

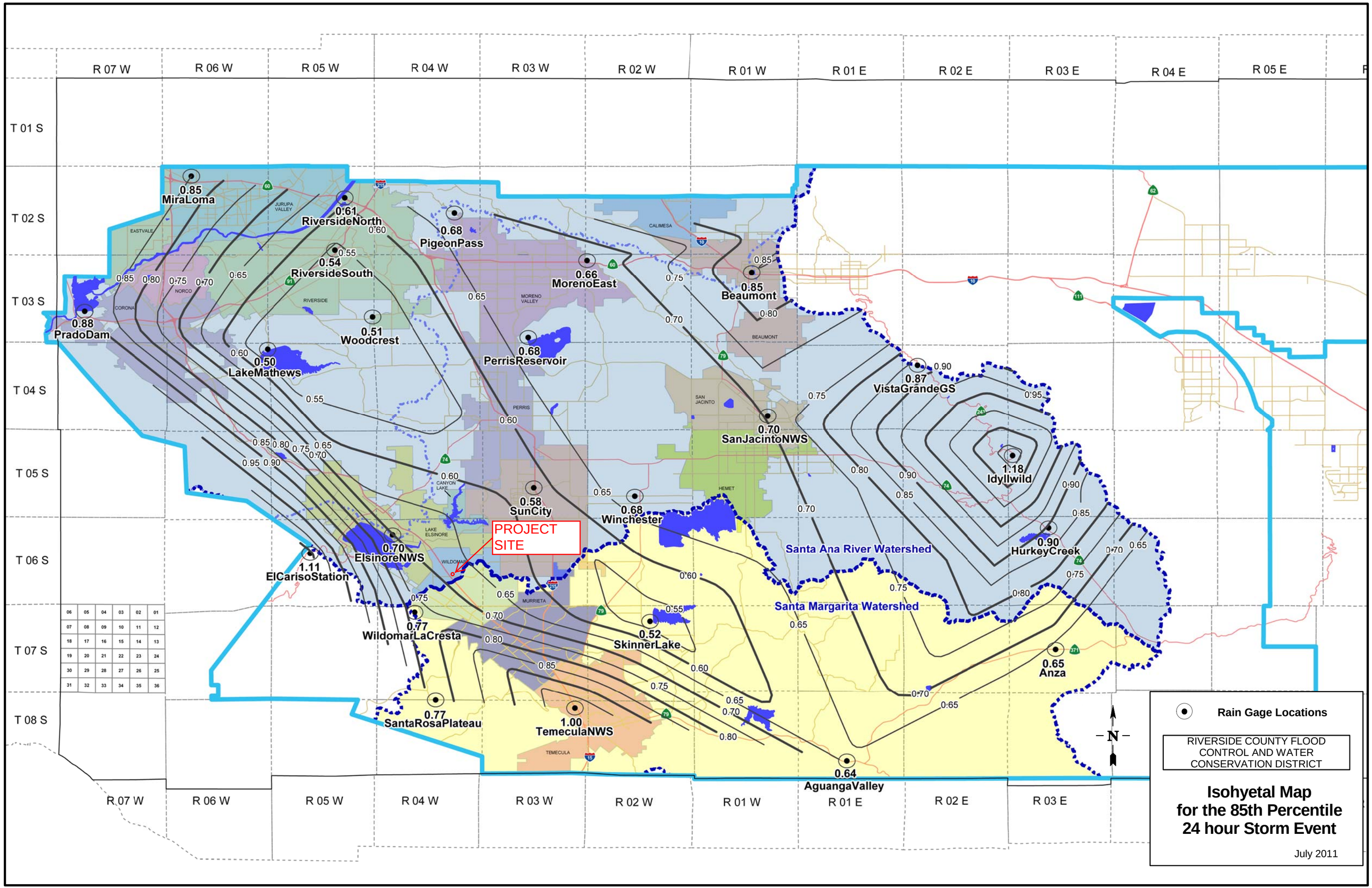
SEE BIORETENTION FACILITY – DESIGN PROCEDURE WORKSHEET

BMP FOR WESTPARK ST.



CITY WATER QUALITY TRENCH TYPICAL SECTION

NOT TO SCALE


R 07 W
R 06 W
R 05 W
R 04 W
R 03 W
R 02 W
R 01 W
R 01 E
R 02 E
R 03 E
R 04 E
R 05 E
T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S
0.85 MiraLoma
0.61 RiversideNorth
0.68 PigeonPass
0.54 RiversideSouth
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley
PROJECT SITE
Santa Ana River Watershed
Santa Margarita Watershed
EASTVALE
JURUPA VALLEY
NORCO
CORONA
RIVERSIDE
MORENO VALLEY
CALIMESA
BEAUMONT
SAN JACINTO
PERRIS
HEMET
CANYON LAKE
LAKE ELSINORE
WILDOMAR
MURRIETA
TEMECULA
N
Rain Gage Locations
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
Isohyetal Map for the 85th Percentile 24 hour Storm Event
July 2011

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	PCLC	Date	12/4/2014
Designed by	HOPPER	County/City Case No	13-0082
Company Project Number/Name	WESTPARK		
Drainage Area Number/Name	DMA 1-1		

Enter the Area Tributary to this Feature A_T = 8.11 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location — Township 6; Range 4; Section 36

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.83

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.64

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.43 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 12,659 ft^3

Notes:

$I_f = [(A_i \times 1.0)+(A_p \times 0.10)]/A_T$
A_T = 8.11 ac
A_i = 6.60 ac
A_p = 1.51 ac
I_f = 0.83

Sand Filter Basin (SFB) - Design Procedure

BMP ID: DMA 1-1

Legend: Required Entries / Calculated Cells

Company Name:	PCLC	Date:	12/4/2014
Designed by:	HOPPER	County/City Case No.:	13-0082

Design Volume

Total Tributary area A_{TRIB} = 8.11 ac

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 12,659 ft^3

Basin Geometry

Basin side slopes (no steeper than 4:1) — Slope no steeper than 4:1 — z = 0 :1

Proposed basin depth (see Figure 1) d_B = 4 ft

Depth of freeboard (if used) d_{fb} = 0 ft

Minimum bottom surface area of basin ($As = V_{BMP}/d_B$) A_s = 3164.75 ft^2

Minimum total depth required (includes freeboard, filter media and subdrains) d_{req} = 6.17 ft

Proposed Surface Area 3,200 ft^2

Forebay

Forebay volume (minimum 0.5% V_{BMP}) Volume = 63.295 ft^3

Forebay depth (height of berm/splashwall. 1 foot min.) Depth = ft

Forebay surface area (minimum) Area = ft^2

Full height notch-type weir Width (W) = in

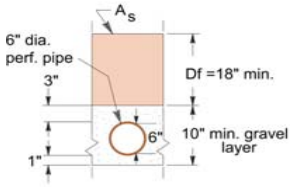
Filter Media

Description of filter media

Sand (ASTM C-33)

Other (Clarify in "Notes" below)

Media depth, df = inches



Underdrains

Diameter of perforated underdrain 6 in

Spacing of underdrains (maximum 20 feet on center) OK 20 ft

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	PCLC	Date	12/4/2014
Designed by	HOPPER	County/City Case No	PA13-0082
Company Project Number/Name	WESTPARK PROMENADE		
Drainage Area Number/Name	DMA 1-2		

Enter the Area Tributary to this Feature A_T = 2.52 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location — Township 6; Range 4; Section 36

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.83

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.64

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.43 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 3,933 ft^3

Notes:

$I_f = [(A_i \times 1.0)+(A_p \times 0.10)]/A_T$
A_T = 2.52 ac
A_i = 2.05 ac
A_p = 0.47 ac
I_f = 0.83

Sand Filter Basin (SFB) - Design Procedure

BMP ID: DMA 1-2

Legend: Required Entries / Calculated Cells

Company Name:	PCLC	Date:	12/4/2014
Designed by:	HOPPER	County/City Case No.:	13-0082

Design Volume

Total Tributary area A_{TRIB} = 2.52 ac

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 3,933 ft^3

Basin Geometry

Basin side slopes (no steeper than 4:1) — Slope no steeper than 4:1 — z = 0 :1

Proposed basin depth (see Figure 1) d_B = 4 ft

Depth of freeboard (if used) d_{fb} = 0 ft

Minimum bottom surface area of basin ($As = V_{BMP}/d_B$) A_s = 983.25 ft^2

Minimum total depth required (includes freeboard, filter media and subdrains) d_{req} = 6.17 ft

Proposed Surface Area 1,040 ft^2

Forebay

Forebay volume (minimum 0.5% V_{BMP}) Volume = 19.665 ft^3

Forebay depth (height of berm/splashwall. 1 foot min.) Depth = ft

Forebay surface area (minimum) Area = ft^2

Full height notch-type weir Width (W) = in

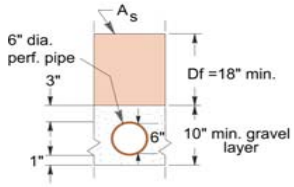
Filter Media

Description of filter media

Sand (ASTM C-33)

Other (Clarify in "Notes" below)

Media depth, df = inches



Underdrains

Diameter of perforated underdrain 6 in

Spacing of underdrains (maximum 20 feet on center) OK 20 ft

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	PCLC	Date	12/4/2014
Designed by	HOPPER	County/City Case No	PA13-0082
Company Project Number/Name	WESTPARK PROMENADE		
Drainage Area Number/Name	DMA 1-3		

Enter the Area Tributary to this Feature A_T = 2.29 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location — Township 6; Range 4; Section 36

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.83

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.64

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.43 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 3,574 ft^3

Notes:

$I_f = [(A_i \times 1.0)+(A_p \times 0.10)]/A_T$
A_T = 2.29 ac
A_i = 1.86 ac
A_p = 0.43 ac
I_f = 0.83

Sand Filter Basin (SFB) - Design Procedure

BMP ID: DMA 1-3

Legend: Required Entries / Calculated Cells

Company Name:	PCLC	Date:	12/4/2014
Designed by:	HOPPER	County/City Case No.:	13-0082

Design Volume

Total Tributary area A_{TRIB} = 2.29 ac

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 3,574 ft^3

Basin Geometry

Basin side slopes (no steeper than 4:1) — Slope no steeper than 4:1 — z = 0 :1

Proposed basin depth (see Figure 1) d_B = 4 ft

Depth of freeboard (if used) d_{fb} = 0 ft

Minimum bottom surface area of basin ($As = V_{BMP}/d_B$) A_s = 893.5 ft^2

Minimum total depth required (includes freeboard, filter media and subdrains) d_{req} = 6.17 ft

Proposed Surface Area 1,000 ft^2

Forebay

Forebay volume (minimum 0.5% V_{BMP}) Volume = 17.87 ft^3

Forebay depth (height of berm/splashwall. 1 foot min.) Depth = ft

Forebay surface area (minimum) Area = ft^2

Full height notch-type weir Width (W) = in

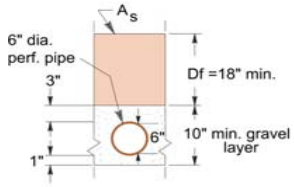
Filter Media

Description of filter media

Sand (ASTM C-33)

Other (Clarify in "Notes" below)

Media depth, df = inches



Underdrains

Diameter of perforated underdrain 6 in

Spacing of underdrains (maximum 20 feet on center) OK 20 ft

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	PCLC	Date	12/4/2014
Designed by	HOPPER	County/City Case No	
Company Project Number/Name	WESTPARK PROMENADE		
Drainage Area Number/Name	DMA 2-1		

Enter the Area Tributary to this Feature A_T = 4.18 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location
- Township: 6
- Range: 4
- Section: 36

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.73

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.52

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.36 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 5,462 ft^3

Notes:

$I_f = [(A_i \times 1.0)+(A_p \times 0.10)]/A_T$
A_T = 4.18 ac
A_i = 2.93 ac
A_p = 1.25 ac
I_f = 0.73

Sand Filter Basin (SFB) - Design Procedure

BMP ID: DMA 2-1

Legend: Required Entries / Calculated Cells

Company Name:	PCLC	Date:	12/4/2014
Designed by:	HOPPER	County/City Case No.:	13-0082

Design Volume

Total Tributary area A_{TRIB} = 4.18 ac

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 5,462 ft^3

Basin Geometry

Basin side slopes (no steeper than 4:1) Slope no steeper than 4:1 z = 0 :1

Proposed basin depth (see Figure 1) d_B = 4 ft

Depth of freeboard (if used) d_{fb} = 0 ft

Minimum bottom surface area of basin ($As = V_{BMP}/d_B$) A_s = 1365.5 ft^2

Minimum total depth required (includes freeboard, filter media and subdrains) d_{req} = 6.17 ft

Proposed Surface Area 1,400 ft^2

Forebay

Forebay volume (minimum 0.5% V_{BMP}) Volume = 27.31 ft^3

Forebay depth (height of berm/splashwall. 1 foot min.) Depth = ft

Forebay surface area (minimum) Area = ft^2

Full height notch-type weir Width (W) = in

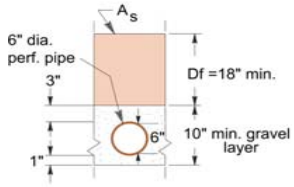
Filter Media

Description of filter media

Sand (ASTM C-33)

Other (Clarify in "Notes" below)

Media depth, df = inches



Underdrains

Diameter of perforated underdrain 6 in

Spacing of underdrains (maximum 20 feet on center) OK 20 ft

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	PCLC	Date	12/4/2014
Designed by	HOPPER	County/City Case No	PA 13-0082
Company Project Number/Name	WESTPARK PROMENADE		
Drainage Area Number/Name	DMA 2-2		

Enter the Area Tributary to this Feature A_T = 4.08 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location
- Township: 6
- Range: 4
- Section: 36

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.73

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.52

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.36 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 5,332 ft^3

Notes:

$I_f = [(A_i \times 1.0)+(A_p \times 0.10)]/A_T$
A_T = 4.08 ac
A_i = 2.86 ac
A_p = 1.32 ac
I_f = 0.73

Sand Filter Basin (SFB) - Design Procedure

BMP ID: DMA 2-2

Legend: Required Entries / Calculated Cells

Company Name:	PCLC	Date:	12/4/2014
Designed by:	HOPPER	County/City Case No.:	13-0082

Design Volume

Total Tributary area A_{TRIB} = 4.08 ac

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 5,332 ft^3

Basin Geometry

Basin side slopes (no steeper than 4:1) Slope no steeper than 4:1 z = 0 :1

Proposed basin depth (see Figure 1) d_B = 4 ft

Depth of freeboard (if used) d_{fb} = 0 ft

Minimum bottom surface area of basin ($As = V_{BMP}/d_B$) A_s = 1333 ft^2

Minimum total depth required (includes freeboard, filter media and subdrains) d_{req} = 6.17 ft

Proposed Surface Area 1,400 ft^2

Forebay

Forebay volume (minimum 0.5% V_{BMP}) Volume = 26.66 ft^3

Forebay depth (height of berm/splashwall. 1 foot min.) Depth = ft

Forebay surface area (minimum) Area = ft^2

Full height notch-type weir Width (W) = in

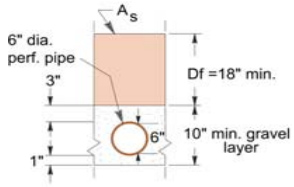
Filter Media

Description of filter media

Sand (ASTM C-33)

Other (Clarify in "Notes" below)

Media depth, df = inches



Underdrains

Diameter of perforated underdrain 6 in

Spacing of underdrains (maximum 20 feet on center) OK 20 ft

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	PCLC	Date	12/4/2014
Designed by	HOPPER	County/City Case No	PA 13-0082
Company Project Number/Name	WESTPARK PROMENADE		
Drainage Area Number/Name	DMA 3-1-A		

Enter the Area Tributary to this Feature A_T = 1.21 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location
- Township: 6
- Range: 4
- Section: 36

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.75

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.54

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.37 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 1,625 ft^3

Notes:

$I_f = [(A_i \times 1.0)+(A_p \times 0.10)]/A_T$
A_T = 1.21 ac
A_i = 0.88 ac
A_p = 0.33 ac
I_f = 0.75

Bioretention Facility - Design Procedure

BMP ID: DMA 3-1-A

Legend: Required Entries / Calculated Cells

Company Name:	PCLC	Date:	12/4/2014
Designed by:	HOPPER	County/City Case No.:	PA13-0082

Design Volume

Enter the area tributary to this feature A_T= 1.21 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 1,625 ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 10.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.73 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 940 ft^2

Proposed Surface Area A= 940 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	PCLC	Date	12/4/2014
Designed by	HOPPER	County/City Case No	PA 13-0082
Company Project Number/Name	WESTPARK PROMENADE		
Drainage Area Number/Name	DMA 3-1-B		

Enter the Area Tributary to this Feature A_T = 1.15 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location
- Township: 6
- Range: 4
- Section: 36

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.75

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.54

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.37 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 1,545 ft^3

Notes:

$I_f = [(A_i \times 1.0)+(A_p \times 0.10)]/A_T$
A_T = 1.15 ac
A_i = 0.84 ac
A_p = 0.31 ac
I_f = 0.75

Bioretention Facility - Design Procedure

BMP ID: DMA 3-1-B

Legend: Required Entries / Calculated Cells

Company Name:	PCLC	Date:	12/4/2014
Designed by:	HOPPER	County/City Case No.:	PA13-0082

Design Volume

Enter the area tributary to this feature A_T= 1.15 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 1,545 ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 10.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.73 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 894 ft^2

Proposed Surface Area A= 900 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	PCLC	Date	12/4/2014
Designed by	HOPPER	County/City Case No	PA 13-0082
Company Project Number/Name	WESTPARK PROMENADE		
Drainage Area Number/Name	DMA 3-2		

Enter the Area Tributary to this Feature A_T = 1.59 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location
- Township: 6
- Range: 4
- Section: 36

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.68

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.75

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.54

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.37 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 2,136 ft^3

Notes:

$I_f = [(A_i \times 1.0)+(A_p \times 0.10)]/A_T$
A_T = 1.59 ac
A_i = 1.16 ac
A_p = 0.43 ac
I_f = 0.75

Bioretention Facility - Design Procedure

BMP ID: DMA 3-2

Legend: Required Entries / Calculated Cells

Company Name:	PCLC	Date:	12/2014
Designed by:	HOPPER	County/City Case No.:	PA13-0082

Design Volume

Enter the area tributary to this feature A_T= 1.59 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 2,136 ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 10.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.73 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 1,235 ft^2

Proposed Surface Area A= 1,300 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

APPENDIX G

AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS FINAL PROJECT- SPECIFIC WQMP

CONTAINS:
CC&RS
DECLARATION OF WATER QUALITY MANAGEMENT PLAN RESTRICTIVE COVENANT
(TO BE INCLUDED AT FINAL WQMP)

GOLDEN EAGLE MULTI FAMILY PROPERTIES, LLC
January 5, 2015
Revised April 14, 2016

APPENDIX H

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS

TO BE INCLUDED IN FINAL WQMP