CONCEPTUAL WATER QUALITY MANAGEMENT PLAN

"The Preserve"
Vesting Tentative Tract Map No. 17270

Planning Application: PA130026

Project Address:
Southwest of Long Canyon Road and Ortega Highway
County of Orange, CA

Prepared for:
The Preserve at San Juan, LLC
100 Pacifica, Suite 345
Irvine, CA 92618
(949) 296-3078

Prepared by:

Hunsaker & Associates Irvine, Inc.
3 Hughes
Irvine, CA 92618
ATTN:
Kris Weber
(949) 583-1010

WQMP Preparation Date:
July 28, 2014
Revised: December 11, 2014

W.O. 3852-1

Conceptual
Water Quality Management Plan
(WQMP)

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APN's 125-120-26 and 125-120-31

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Three Hughes
Irvine, CA 92618
(949) 583-1010
Contact: Tommy I Hsu

Prepared: July 28, 2014
Revised: December 11, 2014

Project Owner's Certification			
Planning Application No. (If applicable)	PA130026	Grading Permit No.	N/A
Tract/Parcel Map No.	VTTM 17270	Building Permit No.	N/A
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract)			125-120-26 & 31

This Water Quality Management Plan (WQMP) has been prepared for The Preserve at San Juan, LLC by Hunsaker and Associates Irvine, Inc. The WQMP is intended to comply with the requirements of the County of Orange NPDES Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan, including the ongoing operation and maintenance of all best management practices (BMPs), and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the San Diego Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

Owner: The Preserve at San Juan, LLC			
Title	Jeff Weber, Managing Member		
Company	The Preserve at San Juan, LLC		
Address	100 Pacifica, Suite 345 Irvine, CA 92618		
Email	jweber@preserve.com		
Telephone #	(949) 296-3078		
I understand my responsibility to implement the provisions of this WQMP including the ongoing operation and maintenance of the best management practices (BMPs) described herein.			
Owner Signature		Date	

Preparer (Engineer):			
Title	Francisco Calderon	PE Registration #	RCE 58840
Company	Hunsaker and Associates Irvine, Inc.		
Address	Three Hughes, Irvine, CA 92618		
Email	fcalderon@hunsaker.com		
Telephone #	(949) 583-1010		
I hereby certify that this Water Quality Management Plan is in compliance with, and meets the requirements set forth in, Order No. R9-2009-0002/NPDES No. CAS0108740, of the San Diego Regional Water Quality Control Board.			
Preparer Signature		Date	
Place Stamp Here			

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Section I Permit(s) and Water Quality Conditions of Approval or Issuance

PROJECT INFOMATION			
Permit/Application No. (If applicable)	PA130026	Grading or Building Permit No. (If applicable)	N/A
Additional Information/Comments:	Construction of the proposed project is not anticipated to commence until after the adoption of Order No. R-9-2013-0001 (NPDES No. CAS0109266). As such, the WQMP shall be revised at a later date to ensure the project's compliance with the requirements of the most updated/current MS4 Permit.		
WATER QUALITY CONDITIONS			
Water Quality Conditions (Please list verbatim.)	This WQMP has been prepared pursuant to the requirements of the County of Orange MS4 Permit (Order No. R9-2009-0002/NPDES No. CAS0108740, of the San Diego Regional Water Quality Control Board) and the County of Orange Municipal Code (Title 6, Division 3, Article 5, Section 6-3-4—through 6-3-599) and the Local Implementation Plan (LIP) for Jurisdictional Runoff Management Program, which require the approval of a WQMP prior to issuance of a grading or building permit. Site specific conditions of approval will be provided once available from the County of Orange.		
WATERSHED-BASED PLAN CONDITIONS			
Provide applicable conditions from watershed-based plans including TMDLs	The project is located within the San Juan Creek Watershed Work Plan. Current conditions to meet the receiving water's water quality objectives include requirements for the preparation of a WQMP and BMPs to address potential storm water pollutants present in runoff. San Juan Creek currently has an established TMDL for pathogens.		

Section II Project Description

II.1 PROJECT DESCRIPTION

DESCRIPTION OF PROPOSED PROJECT		
Development Category (Verbatim from WQMP):	This project is considered a priority project under the following categories: Category 1 – New development projects that create or add 10,000 square feet or more of impervious surface. This category includes commercial, industrial, residential housing subdivisions, mixed-use and public projects on private or public property that falls under the planning and building authority of the Permittees. Category 4 – Hillside development greater than 5,000 square feet. Hillside development is defined as any development which is located in an area with known erosive soil conditions or where the natural slope is twenty-five percent or greater.	
Project Area (ft^2): 16,927,416 ft^2 (388.6 acres)	Number of Units: 43	SIC Code: N/A for residential.
Narrative Project Description:	The proposed project consists of Vesting Tentative Tract Map No. 17270, located on the south side of existing Long Canyon Road and west of Ortega Highway (SR-74), in the County of Orange, California. Specifically, the site is bound to the north by Long Canyon Road; and to the east, west and south by natural open space. Proposed improvements include the development of 43 detached, residential lots, an entry gate, a reservoir site, private streets, common drives, parkway improvements, open space/natural areas, infrastructure improvements (wet and dry utilities, including lot specific septic systems), storm drains and structural Best Management Practices (BMPs). Paved and other impervious portions of the site include the project's street and gutter improvements and the residential building footprint of each residential lot. Proposed common area landscaping consists of open space/natural land, parkway swales and landscaped slopes. These common landscape areas shall be considered private, to be maintained by the Homeowners' Association (HOA). Total common landscaping area is approximately 346.12 acres, or 89% of the project site. Other landscaping areas include those located within each individual lot, which is anticipated to consist of approximately 60% of each residential lot, totaling approximately 19.1 acres.	

DESCRIPTION OF PROPOSED PROJECT

A summary of the project site is as follows:

Lots	Use	Acreage
1-43	Residential	31.79
44	Reservoir Site	2.54
45	Entry Gate	0.5
A – F	Private Streets	7.55
G-Q	Open Space/Natural	346.12
--	Long Canyon Road	0.1
Total	**--**	**388.6**

Parking will be provided via covered (garage) and uncovered (surface) parking. Each dwelling unit will have, at minimum, a two car garage and driveway space for parking use, with additional parking provided within project streets. Project parking shall comply with the parking requirements of the County of Orange.

There are no proposed community facilities, such as car wash areas, trash enclosures, community center, pool, parks, tot lots or other similar facilities for the project.

All improvements are shown in the WQMP Site Plan for the project site, located in Section VI of this WQMP.

Activities similar to those of residential developments can be anticipated for the project. These are anticipated to include day to day activities such as recreation, commuting and other activities typical of residential developments.

Project Area	Pervious Surface		Impervious Surface	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	384.7 AC	99%	3.9 AC	1%
Post-Project Conditions	346.12	89%	42.48 AC	11%

DESCRIPTION OF PROPOSED PROJECT	
Drainage Patterns/Connections	In general, the site drains in a southerly direction. Runoff from the western portion of the site drains southerly via un-named tributaries to Lion Canyon Creek. Runoff from the eastern portion of the site (proposed development areas) drains via un-named tributaries southeasterly to Long Canyon Creek. Project flows are eventually conveyed to and drain to San Juan Creek located downstream and offsite. San Juan Creek is located in the San Juan (901.00) Hydrologic Unit in the South Orange County Watershed Management Area. The descriptions of the project's existing and proposed drainage conditions have been linked with adjacent, downstream VTTMs 35909, 35910 and 35911 located offsite in Riverside County. Relevant portions of a hydrology report covering both the drainage for this project and offsite, downstream VTTMs 35909, 35910 and 35911 and a related Hydromodification Report is included in Appendix C.

II.2 POTENTIAL STORMWATER POLLUTANTS

Table 2.1, Anticipated and Potential Pollutants Generated by Land Use Type, from the Technical Guidance Document (May 2011) lists the following Pollutants of Concern (POC's) associated with detached single-family residential developments:

POLLUTANTS OF CONCERN			
Pollutant	Check One: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Suspended Solids/Sediment	E ☒	N ☐	Pollutant is not a Primary Pollutant of Concern (POC). Potential sources of sediment include landscaping areas and disturbed earth surfaces.
Nutrients	E ☒	N ☐	Pollutant is a Primary POC. Potential sources onsite include fertilizers, sediment and trash/debris.
Metals	E ☐	N ☒	
Pathogens (Bacteria and Viruses)	E ☒	N ☐	Pollutant is a Primary POC. Potential sources for the project include food wastes, sediment and landscaping areas.

POLLUTANTS OF CONCERN			
Pollutant	Check One: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Pesticides	E ☒	N ☐	Pollutant is a Primary POC. Potential sources include landscaping areas onsite.
Oil and Grease	E ☒	N ☐	Pollutant is not Primary POC. Potential sources include automobiles in parking areas, drive aisles and drive through.
Toxic Organic Compounds	E ☐	N ☒	
Trash and Debris	E ☒	N ☐	Pollutant is not a Primary POC. Potential sources of trash and debris include landscaping activities, food wrappers and food wastes.

** Bold denotes primary pollutants of concern.*

II.3 HYDROLOGIC CONDITIONS OF CONCERN

The purpose of this section is to identify any hydrologic conditions of concern (HCOC) with respect to downstream flooding, erosion potential of natural channels downstream, impacts of increased flows on natural habitat, etc. that may occur as the result of project implementation. As specified in Section 2.3.3 of the 2011 Model WQMP, projects must identify and mitigate any HCOCs. A HCOC is a combination of upland hydrologic conditions and stream biological and physical conditions that presents a condition of concern for physical and/or biological degradation of streams.

Is the proposed project potentially susceptible to hydromodification impacts?

☐ No – Show map and/or describe and reference supporting documentation in the space below.

☒ Yes – Describe applicable hydrologic conditions of concern in the space below.

Based on the information provided in the South Orange County Hydromodification Management Plan (HMP), the project has the potential for downstream impacts (HCOC), as it discharges to natural creeks (Lion Creek, Long Canyon Creek and San Juan Creek).

The project's Hydromodification Analysis provided in Attachment C of this report, with implementation of the project's BMPs, post-development runoff flow rates and durations will not exceed the site's natural conditions by more than 10% of the time, from 10% of the 2-year runoff event up to the 10-year runoff event.

II.4 POST DEVELOPMENT DRAINAGE CHARACTERISTICS

Describe post development drainage characteristics

In the post-development condition, runoff from the improved areas of the site is conveyed as sheet flow to parkway swales for conveyance to one of the project's infiltration basins. Overflows from the swales will be conveyed along the project street gutters to catch basins prior to discharging to natural areas.

The swales and basins also serve to satisfy the project's Low Impact Development (LID) requirements for mitigating the project's pollutants of concern and HCOC/hydromodification impacts, with the vegetated swales designed to pre-treat runoff and to reduce runoff velocity, and the infiltration basins to capture and retain the water quality volume and the difference in runoff flow rates/volume between the site's natural and proposed conditions.

II.5 PROPERTY OWNERSHIP/MANAGEMENT

The property owner and developer, The Preserve at San Juan, LLC, shall assume all maintenance and inspection responsibilities for the project's BMPs, project streets, drainage system and common areas until such time, these improvements are accepted for responsibility by the Homeowner's Association, as appropriate. Thereafter, the HOA shall be mechanism to ensure long-term funding, maintenance and inspection responsibilities for the project's BMPs, drainage system and common areas.

Section III Site Description

III.1 PHYSICAL SETTING

General descriptions of the project area are provided below:

PHYSICAL SETTING	
Name of Planned Community/Planning Area (if applicable)	The Preserve – VTTM 17270
Location/Address	Unincorporated area of the County of Orange. The project is located approximately 2200' northwest of the intersection of Ortega Highway and Long Canyon Road.
General Plan Land Use Designation	Existing: Open Space and Cleveland National Forest; Proposed: Rural Residential (1A)
Zoning	Existing: General Agricultural (A1) Proposed: Planned Community
Acreage of Project Site	388.6 AC
Predominant Soil Type	Per NRCS, site consists primarily of C-Type soils. However, preliminary geotechnical studies have encountered soils with favorable infiltration rates.

III.2 SITE CHARACTERISTICS

The following table summarizes general characteristics of the project site:

SITE CHARACTERISTICS	
Precipitation Zone	1.0 in.
Topography	The San Juan Creek watershed, located in the southern portion of Orange County and in the South Orange County Watershed Management Area, encompasses a drainage area of approximately 176 square miles and extends from the Cleveland National Forest in the Santa Ana Mountains to the Pacific Ocean at Doheny State Beach near Dana Point Harbor. The project is sited within the upstream tributaries of the watershed with surface runoff that flows out of steep canyons and widen into several alluvial floodplains. The major streams in the watershed include downstream and offsite San Juan Creek, Bell Canyon Creek, Chiquita Creek, Gobernadora Creek, Verdugo Canyon Creek, Oso Creek, Trabuco Creek, and Lucas Canyon Creek. Elevations range from over 5,800 feet above sea level at Santiago

SITE CHARACTERISTICS	
	Peak to sea level at the mouth of San Juan Creek. Specifically, the project site consists of rough/steep terrain, sloping to the southeast.
Drainage Patterns/Connections	In general, the site drains in a southerly direction. Runoff from the western portion of the site drains southerly via un-named tributaries to Lion Canyon Creek. Runoff from the eastern portion of the site (proposed development areas) drains via un-named tributaries southeasterly to Long Canyon Creek. Project flows are eventually conveyed to and drain to San Juan Creek located downstream and offsite. San Juan Creek is located in the San Juan (901.00) Hydrologic Unit in the South Orange County Watershed Management Area. The descriptions of the project's existing and proposed drainage conditions have been linked with adjacent, downstream VTTMs 35909, 35910 and 35911 located offsite in Riverside County.

SITE CHARACTERISTICS	
Soil Type, Geology, and Infiltration Properties	In general, there are three major geomorphic terrains found within the San Juan Creek watershed: sandy and silty-sandy, clayey, and crystalline. These terrains are manifested primarily as roughly north-south oriented bands of different soil types. The soils and bedrock that comprise the western portions of the San Juan Creek watershed (i.e., Oso Creek, Arroyo Trabuco, and the lower third of San Juan Creek (the location of Planning Area 1) contain a high percentage of clays. The typical of the clayey terrain include the Alo and Bosanko clays on upland slopes and the Sorrento and Mocho loams in floodplain areas. In contrast, the middle portion of the San Juan basin, (i.e., Cañada Chiquita, Bell Canyon, and the middle reaches of San Juan Creek) is a region characterized by silty-sandy substrate that features the Cieneba, Anaheim, and Soper loams on the hillslopes and the Metz and San Emigdio loams on the floodplains. The upstream portions of the San Juan Creek watershed, including the headwaters of San Juan Creek (where the project is sited), Lucas Canyon Creek, Bell Creek, and Trabuco Creek, may be characterized as a "crystalline" terrain because the bedrock underlying this mountainous region is composed of igneous and metamorphic rocks. In this portion of the watershed, slopes are covered by the Friant, Exchequer, and Cieneba soils, while stream valleys contain deposits of rock and cobbly sand. Based on the County of Orange Technical Guidance Document for Preparation of WQMPs and NRCS Web Soil Survey, onsite soils consist primarily of Hydrologic Soil Group "C" soils. However, preliminary geotechnical investigation has encountered scattered areas of soils with characteristics resembling Group "A" and "B" soils.
Hydrogeologic (Groundwater) Conditions	The Mediterranean climate in Southern California is characterized by brief, intense storms between November and March. It is not unusual for a majority of the annual precipitation to fall during a few storms in close time proximity to one another. The higher elevation portions of the watershed typically receive significantly greater precipitation due to the effect of the Santa Ana Mountains. In addition, rainfall patterns are subject to extreme variations from year to year and longer term wet and dry cycles. The combination of steep watersheds, brief intense storms and extreme temporal variability in rainfall results in "flashy" systems

SITE CHARACTERISTICS	
	where stream discharge can vary by several orders of magnitude over very short periods of time. Southern California is characterized by wet and dry cycles, typically lasting up to 15 to 20 years. The area appears to be emerging from a wetter-than-normal cycle of years beginning in 1993. Previously, five consecutive years of sub-normal rainfall and runoff occurred in 1987 through 1991. Prior droughts of note include severe droughts in 1976-77 and 1946-51. Previous notable wet periods in the past occurred in 1937-44 and 1978-83. An unusually long period of generally dry years extended from 1945 through 1977. During this period, rainfall was approximately 25 percent below normal. Both groundwater recharge and sediment transport were considerably diminished during this period. Dry conditions were sufficiently persistent during this period to cause lower groundwater levels and to reduce the size of riparian corridors. Additionally, landslide activity was lessened during this period. The watersheds have been subject to numerous large-scale fires during the past 100 years. Most of these fire events were of human origin. The majority of ignitions have been associated with roadways, arson and person-related activities. Large fire events in the watersheds occurred in 1989, 1961, 1959, 1958, 1952, 1937, 1917 and 1915. The primary effects of these fires are a sharp increase in sediment yield and downstream channel aggradation for a period of time following the fire. Groundwater was not encountered onsite during the project's preliminary geotechnical investigations and percolation testing.
Geotechnical Conditions (relevant to infiltration)	Based on the soils report, the TGD and the NRCS Web Soil Survey, onsite soils consist primarily of Hydrologic Group C soils, which are not conducive for infiltration. However, percolation tests conducted onsite have shown the presence of soils that are more representative of Group B Soils.

SITE CHARACTERISTICS	
Off-Site Drainage	Run-on from natural offsite areas will be collected via proposed storm drain systems and conveyed through the site prior to discharging downstream and offsite. A bulking factor was used in determine the runoff flow rates to account for potential debris present in the storm water run-on from natural areas. Runoff from the proposed project will meet the County of Orange's requirements for hydromodification impacts and storm water pollutant treatment. Therefore, downstream receiving water impacts to the natural drainages for hydromodification and pollutant loading are not anticipated.
Utility and Infrastructure Information	There are no existing utilities and connections onsite. Project improvements will provide wet and dry utility connections to each individual homeowner, with an onsite septic system provided for each lot. Each lot will be subject to the State Water Resources Control Board (SWRCB) Onsite Wastewater Treatment Systems (OWTS) Policy, which establishes a statewide, risk-based, tiered approach for regulation and management of OWTS installations and replacements. Each lot will be considered a Tier 1 OWTS (Low Risk New or Replacement), with a maximum flow rate of 3,500 gpd.

III.3 WATERSHED DESCRIPTION

The following table provides descriptions of the project's receiving waters.

WATERSHED DESCRIPTION	
Receiving Waters	Long Canyon Creek, Lion Canyon Creek, San Juan Creek, San Juan Creek (Mouth), Pacific Ocean
303(d) Listed Impairments	Pesticides (DDE), Pathogens (Indicator Bacteria), Nutrients (Phosphorus & Total Nitrogen), Metals (Selenium), Toxicity
Applicable TMDLs	Pathogens (Indicator Bacteria)
Pollutants of Concern for the Project	Pollutants of Concern – Suspended Solids/Sediment, Oil and Grease, Trash and Debris Primary Pollutants of Concern – Nutrients, Pathogens, Pesticides

WATERSHED DESCRIPTION	
Environmentally Sensitive and Special Biological Significant Areas	Areas of Special Biological Significance (ASBS) are those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. There are no ASBS designations in the vicinity of the project. The project site does not contain any environmentally sensitive areas (ESAs), as defined in the Basin Plan and the County of Orange Drainage Area Management Plan (DAMP). Although the site does not discharge directly to areas defined as ESAs or Areas of Special Biological Significance (ASBS), the site is tributary to impaired water bodies, which are designated as ESAs under DAMP guidelines.

Section IV Best Management Practices (BMPs)

IV.1 PROJECT PERFORMANCE CRITERIA

PROJECT PERFORMANCE CRITERIA	
If HCOC exists, list applicable hydromodification control performance criteria (Per Section 4.1 of SOC HMP)	All Priority Development Projects (PDP) must use continuous simulation to ensure that post-project runoff flow rates and durations for the PDP shall not exceed pre-development, naturally occurring, runoff flow rates and durations by more than 10% of the time, from 10% of the 2-year runoff event up to the 10-year runoff event.
List applicable LID performance criteria (Per Section 7.II-2.4.3 of SOC MWQMP)	• LID BMPs must be designed to retain, on-site, (infiltrate, harvest and use, or evapotranspire) storm water runoff up to 80 percent average annual capture efficiency. • LID BMPs must be designed to: - Retain, onsite, (infiltrate, harvest and use, or evapotranspire) stormwater runoff as feasible up to the Design Capture Volume, and - Recover (i.e., draw down) the storage volume as soon as possible after a storm event, and if necessary - Biotreat, on-site, additional runoff, as feasible, up to 80 percent average annual capture efficiency (cumulative, retention plus biotreatment), and, if necessary - Fulfill alternative compliance obligations for runoff volume not retained or biotreated up to 80 percent average annual capture efficiency using treatment controls or other alternative approaches as described in Section 7.II-3 of the SOC MWQMP.
Calculate LID design storm capture volume for Project.	DCV = C x D x A x 43560 sf/ac x 1 ft/12 in Where: DCV = design storm capture volume, cu-ft C = runoff coefficient = (0.75 x imp + 0.15) Imp = impervious fraction of drainage area (ranges from 0 to 1) D = storm depth (inches) A = tributary area (acres) DCV for each Drainage Management Area is provided in Section IV.2.1.

IV.2 SITE DESIGN AND DRAINAGE PLAN

The primary goal of site design principles and techniques is to reduce land development impacts on water quality and downstream hydrologic conditions. Benefits of site design include reductions in the size of downstream BMPs, conveyance systems, pollutant loading and hydromodification impacts.

IV.2.1 Site Design BMPs

The following section describes the site design BMPs that have been incorporated into this project.

Minimize Impervious Area

The project will increase impervious surfaces as compared to pre-project conditions. However, development of the site will include conservation of existing natural land, open space landscaping areas and private landscaping areas located within each homeowner lot to minimize the project's impervious footprint.

Maximize Natural Infiltration Capacity

Where feasible, lot-specific improvements will be designed with roof downspout disconnection to direct runoff to landscaped areas. Runoff from paved walkways and patios will also be directed to adjacent landscaping areas. Project will also incorporate vegetated drainage swales for storm water conveyance.

Preserve Existing Drainage Patterns and Time of Concentration

The project has been designed to retain existing drainage patterns and the use of vegetated swales and infiltration basins to retain pre-project time of concentration.

Disconnect Impervious Areas

Landscaping will be provided adjacent to walkways, with open space/landscape lots located throughout the project site and within private residential lot areas to disconnect the project's impervious areas.

Protect Existing Vegetation and Sensitive Areas, and Revegetate Disturbed Areas

The project has been designed to conserve approximately 117.3 acres of natural land.

Re-Vegetate Disturbed Areas and Xeriscape Landscaping

Native and/or tolerant landscaping will be incorporated into site design, consistent with County guidelines, in proposed landscaping areas.

IV.2.1 Drainage Management Areas (DMAs)

Per the TGD, the project site has been divided into Drainage Management Areas (DMAs) to be utilized for defining drainage areas tributary to the project's BMPs. DMA limits have been delineated based on the tributary drainage area for each BMP.

The design capture volume (DCV) utilizing the "Simple Method" described in TGD Section III.1.1 is provided below. Locations of DMAs and associated treatment BMPs are provided on the exhibits in Section VI. Additional calculations and TGD Worksheets are provided in Attachment D of this WQMP.

DMA	Tributary Drainage Area (Ac.)	% Imp.	C-value	Design Storm Depth (in.)	Simple Method DCV (ft^3)	Design Intensity (in/hr)	Design Flowrate (cfs)
1	0.47	65	0.6375	1.0	1,087	0.23	0.07
2	8.69	65	0.6375	1.0	20,064	0.23	1.27
3	1.22	65	0.6375	1.0	2,817	0.23	0.18
4	4.99	65	0.6375	1.0	11,521	0.23	0.73
5	2.64	65	0.6375	1.0	6,095	0.23	0.39
6	1.29	65	0.6375	1.0	2,978	0.23	0.19
7	4.67	65	0.6375	1.0	10,782	0.23	0.68
8	3.42	65	0.6375	1.0	7,896	0.23	0.50
9	9.80	65	0.6375	1.0	22,626	0.23	1.44
10	3.73	65	0.6375	1.0	8,612	0.23	0.55
11	1.18	65	0.6375	1.0	2,724	0.23	0.17

IV.3 LID BMP SELECTION AND PROJECT CONFORMANCE ANALYSIS

Per the South County Model WQMP, Low Impact Development (LID) BMPs must be incorporated into design features and source controls to reduce project related storm water pollutants. The incorporation of LID BMPs into project design requires evaluation of LID measures in the following treatment hierarchy: infiltration, evapotranspiration, harvest/reuse and biotreatment.

IV.3.1 Hydrologic Source Controls (HSC)

Hydrologic source controls (HSCs) can be considered to be an integration of site design practices and LID BMPs. The goal of HSCs is to reduce runoff volume for a given drainage area without reducing the site's true impervious area.

Name	Included?
Localized on-lot infiltration	☐
Impervious area dispersion (e.g. roof top disconnection)	☒
Street trees (canopy interception)	☐
Residential rain barrels (not actively managed)	☐
Green roofs/Brown roofs	☐
Blue roofs	☐
Impervious area reduction (e.g. permeable pavers, site design)	☐

Runoff from the project's roof drains and pavement areas will be directed to adjacent landscaping areas (wherever feasible) to allow for some filtration of runoff prior to discharging to the project's drainage system.

Since the project has proposed infiltration BMPs to provide full retention of the project's DCV, the effects of individual HSC BMPs have not been calculated.

IV.3.2 Infiltration BMPs

Infiltration BMPs are LID BMPs that capture, store and infiltrate storm water runoff. These BMPs are engineered to store a specified volume of water and have no design surface discharge (underdrain or outlet structure) until this volume is exceeded. Examples of infiltration BMPs include infiltration trenches, bioretention without underdrains, drywells, permeable pavement, and underground infiltration galleries.

Infiltration basins were selected based on their ability to treat the project's pollutants of concern, in accordance with the Model WQMP and TGD requirements

Name	Included?
Bioretention without underdrains	☐
Rain gardens	☐
Porous landscaping	☐
Infiltration planters	☐
Retention swales	☐
Infiltration trenches	☐
Infiltration basins	☒
Drywells	☐
Subsurface infiltration galleries	☐
French drains	☐
Permeable asphalt	☐
Permeable concrete	☐
Permeable concrete pavers	☐
Other:	☐

The project will employ infiltration basins, as shown in the WQMP Site Plan. Although current County Soil Maps indicate that the underlying soil consists of Type C soils, percolation tests conducted onsite have found areas with favorable infiltration rates.

The project's proposed infiltration BMPs have been designed for the Design Capture Volume (DCV) and will function to capture, store and infiltrate runoff. Prior to runoff entering the basins, runoff will receive pre-treatment via proposed vegetated swales.

Summary of the basins is provided in the following table:

DMA	Simple Method DCV (ft^3)	Basin Footprint[1] (ft)	Basin Capacity (ft^3)
1	1,087	25x50x3	6,261
2	20,064	160x76x4	61,120
3	2,817	43x25x4	8,716
4	11,521	120x26x5	31,080
5	6,095	25x50x3	6,261
6	2,978	46x25x4	9,160
7	10,782	70x40x6	36,960
8	7,896	101x50x3	19,713
9	22,626	120x63x4	40,176
10	8,612	65x36x5	23,130
11	2,724	19x55x3	5,619

[1]Footprint based on variable depth and 3:1 side slopes

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

Name	Included?
EVAPOTRANSPIRATION	
All HSCs; *See Section IV.3.1*	☐
Surface-based infiltration BMPs	☐
Biotreatment BMPs	☐
HARVEST & REUSE/ RAINWATER HARVESTING	
Above-ground cisterns and basins	☐
Underground detention	☐
Other:	☐

Evapotranspiration

Evapotranspiration BMPs are a class of retention BMPs that discharges stored volume predominately to ET, through some infiltration may occur. ET includes both evaporation and transpiration, and ET BMPs may incorporate one or more of these processes. BMPs must be designed to achieve the maximum feasible ET, where required to demonstrate that the maximum amount of water has been retained on-site.

Harvest and Reuse

Harvest and Reuse (aka. Rainwater Harvesting) BMPs are LID BMPs that capture and store storm water runoff for later use. These BMPs are engineered to store a specified volume of water and have no design surface discharge until this volume is exceeded. Harvest and use BMPs include

both above-ground and below-ground cisterns. Examples of uses for harvested water include irrigation, toilet and urinal flushing, vehicle washing, evaporative cooling, industrial processes and other non-potable uses.

The project does not propose the use of evapotranspiration or harvesting BMPs, as the project's requirement for LID BMPs has addressed via infiltration basins.

IV.3.4 Biofiltration BMPs

Biotreatment BMPs are a class of structural LID BMPs that treat suspended solids and dissolved pollutants in storm water using mechanisms characteristic of biologically active systems. These BMPs are considered treat and release facilities and include treatment mechanisms that employ soil microbes and plants. Additional benefits of these BMPs may include aesthetic enjoyment, recreational use, wildlife habitat and reduction in storm water volume.

The project does not propose the use of biotreatment BMPs as the primary LID BMP to address project pollutants, as the project's requirement for LID BMPs has been addressed via infiltration basins. Rather, vegetated swales will be employed as a pre-treatment BMP to the project's infiltration basins and also for runoff conveyance.

BIOFILTRATION		
ID	Name	Included?
BIO-1	Bioretention with underdrains	☐
	Stormwater planter boxes with underdrains	☐
	Rain gardens with underdrains	☐
BIO-7	Proprietary vegetated biotreatment systems	☐
BIO-2	Other: Vegetated Swale	☒

A summary of the project's swales are as follows:

BIOTREATMENT (VEGETATED SWALE) DESIGN SUMMARY								
Drainage Management Area (DMA)[1]	Tributary Drainage Area (acres)	% Imp.	Runoff Coefficient	Tc (min)	Design Storm Intensity (in.)	Q (ft^3/s)	Swale Length (ft)*	Swale Width (ft)*
1	0.47	65	0.6375	10	0.23	0.05	350	2 at 4′
2	8.69	65	0.6375	10	0.23	1.23	3,000	2 at 7′
4	4.99	65	0.6375	10	0.23	0.73	472	2 at 4′
5	2.64	65	0.6375	10	0.23	0.41	952	2 at 7′
6	1.29	65	0.6375	10	0.23	0.15	556	2 at 4′
7	4.67	65	0.6375	10	0.23	0.50	605	2 at 7′
8	3.42	65	0.6375	10	0.23	0.48	387	2 at 7′
9	9.80	65	0.6375	10	0.23	1.31	1,300	2 at 7′
10	3.73	65	0.6375	10	0.23	0.49	635	2 at 4′

[1] No swales proposed for DMA 3 and 11.

IV.3.5 Hydromodification Control BMPs

The South Orange County Hydrology Model (SOCHM) was used to determine the project's hydromodification requirements.

HYDROMODIFICATION CONTROL BMPS	
BMP Name	BMP Description
Infiltration Basins	Infiltration basins will be employed to address the project's HCOC.
Vegetated Swales	Vegetated swales will be employed for storm water conveyance and pre-treatment. The swales will also be employed to address the project's HCOC.

With implementation of the proposed BMPs to address hydromodification impacts, the proposed project would not have any HCOC. The project's hydromodification analysis is provided in Attachment C of this WQMP.

Source Control BMPs

In accordance with the County DAMP and County of Orange Local Implementation Plan (LIP), both structural and non-structural source control BMPs are required for all priority projects unless deemed not applicable based on project characteristics. The following tables summarize the source control BMPs (Non-Structural and Structural) specified in the County DAMP and the Technical Guidance Document.

The following tables show source control BMPs (routine non-structural and routine structural) included in this project and those that were not included.

IV.3.8 Non-Structural Source Control BMPs

The Table below indicates all Non-Structural Source Control BMPs to be utilized in the project. Additional discussions of the selected BMPs are provided in the BMP Inspection and Maintenance Responsibility Matrix provided in Section V of this WQMP.

NON-STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☒	☐	
N2	Activity Restrictions	☒	☐	
N3	Common Area Landscape Management	☒	☐	
N4	BMP Maintenance	☒	☐	
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	Proposed project will not generate waste subject to Title 22 CCR compliance.

NON-STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N6	Local Industrial Permit Compliance	☐	☒	Not applicable to residential.
N7	Spill Contingency Plan	☐	☒	Proposed project will not generate waste or store materials subject to the requirements of Chapter 6.95 of the CA Health and Safety Code.
N8	Underground Storage Tank Compliance	☐	☒	No underground storage tanks proposed for the project.
N9	Hazardous Materials Disclosure Compliance	☐	☒	Proposed project will not store or generate hazardous materials subject to agency requirements.
N10	Uniform Fire Code Implementation	☐	☒	Proposed project does not propose to store toxic or highly toxic compressed gases.
N11	Common Area Litter Control	☒	☐	
N12	Employee Training	☐	☒	Not applicable to residential projects.
N13	Housekeeping of Loading Docks	☐	☒	No loading docks proposed for project.
N14	Common Area Catch Basin Inspection	☒	☐	
N15	Street Sweeping Private Streets and Parking Lots	☒	☐	
N16	Retail Gasoline Outlets	☐	☒	No gasoline outlets proposed.

N1 – Education for Property Owners, Tenants and Occupants

Educational materials will be provided to homeowners at close of escrow by owner/developer and periodically thereafter by the HOA to inform them of their potential impacts to downstream water quality. Materials include those described in Section VII of this WQMP and provided in the Final WQMP for the project.

N2 – Activity Restrictions

Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed by the project's Covenant, Conditions and Restrictions (CC&Rs), or other equally effective measure.

N3 – Common Area Landscape Management

Ongoing maintenance shall be consistent with County Water Conservation Resolution. Any fertilizer and/or pesticide usage shall be consistent with County Management Guidelines for Use of Fertilizers (DAMP Section 5.5) and per manufacturer's recommendations.

N4 – BMP Maintenance

Responsibility for implementation, inspection and maintenance of all BMPs (structural and non-structural) shall be consistent with the BMP Inspection and Maintenance Responsibilities Matrix provided in Section V of this WQMP, with documented records of inspections and maintenance activities completed.

N11 – Common Area Litter Control

Litter patrol, emptying of trash receptacles in common areas, and noting trash disposal violations by residents and reporting the violations to the HOA for investigation shall be conducted.

N14 – Common Area Catch Basin Inspection

As required by the TGD, at least 80% of all privately-maintained drainage facilities shall be inspected each year and, if necessary, cleaned and maintained prior to the storm season, no later than October 15th each year; 100 % of all privately-maintained drainage facilities shall be inspected, cleaned and maintained in a two year period. Drainage facilities include catch basins and inlets, detention basins, the project's treatment BMPs, open drainage channels, and lift stations.

N15 – Street Sweeping Private Streets and Parking Lots

Private streets shall be swept at a minimum prior to the storm season, in early fall or late summer.

Refer to Section V for implementation frequency and maintenance responsibilities.

IV.3.9 Structural Source Control BMPs

The source control BMPs have been selected in the following table to address the anticipated pollutants generated by the proposed project. These BMPs are designed to work in conjunction with the project's LID BMPs to minimize potential impacts to the site's receiving waters.

STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	No outdoor storage areas proposed for project.

STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☐	☒	No designated waste storage areas or trash enclosures proposed onsite.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☒	☐	
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☒	☐	
S6	Dock areas	☐	☒	No dock areas proposed for project.
S7	Maintenance bays	☐	☒	No maintenance bays proposed for project.
S8	Vehicle wash areas	☐	☒	No vehicle washing anticipated.
S9	Outdoor processing areas	☐	☒	No outdoor processing areas.
S10	Equipment wash areas	☐	☒	No equipment wash areas proposed.
S11	Fueling areas	☐	☒	No fueling areas in project scope.
S12	Hillside landscaping	☒	☐	
S13	Wash water control for food preparation areas	☐	☒	Project is residential.
S14	Community car wash racks	☐	☒	No community wash racks proposed.

S1 – Provide Storm Drain System Stenciling and Signage (CASQA SD-13)

Storm drain stenciling with a brief message or graphical icons with symbols, prohibiting the dumping of improper materials into the storm drain system shall be placed in highly visible areas adjacent to all storm drain inlets. The BMP is designed to alert, educate and discourage the public of the destination of pollutants discharged into storm drain systems. Legibility of stencils and signs shall be maintained.

S4 – Efficient Irrigation System & Landscape Design (CASQA SD-10 & SD-12)

Landscaping will be designed to consist of native species or drought tolerant, water conserving landscaping. Irrigation system will be designed, constructed and adjusted to eliminate overspray to hardscape areas, with timing and cycle lengths adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.

S5 – Project Slopes and Channels

Energy dissipation devices shall be included at culvert outlets to reduce runoff velocity and decrease the potential for erosion of slopes and/or channels.

S12 – Hillside Landscaping

Hillside areas that are disturbed by project development shall be landscaped with deep-rooted, drought tolerant plant species selected for erosion control and consistent with County of Orange requirements.

IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

The project is able to fully capture the design capture volume via onsite LID BMPs. Therefore, an alternative compliance plan is not applicable to this project.

IV.4.1 Request of Waiver of LID BMPs

Not applicable to project. Project will utilize LID BMPs to address project runoff.

IV.4.2 Water Quality Credits

Not applicable to project. Project will utilize LID BMPs to address project runoff.

IV.4.3 Treatment Control BMPs

Not applicable to project. Project will utilize LID BMPs to address project runoff.

IV.4.4 Regional/Sub-Regional LID BMPs

Not applicable. Project will incorporate onsite LID BMPs. Project will not participate in any regional/sub-regional programs.

IV.4.5 Other Alternative Compliance Measures

Not applicable. Project will capture and treat all runoff via a regional LID BMP.

Section V Inspection/Maintenance Responsibility for BMPs

It has been determined that the Owner, The Preserve at San Juan, LLC, shall assume all BMP funding, inspection and maintenance responsibilities for the project until such time, these responsibilities have been turned over to the HOA, as appropriate.

Contact/Title	Jeff Weber, Managing Member
Company	The Preserve at San Juan, LLC
Address	100 Pacifica, Suite 345 Irvine, CA 92618
Email	jweber@preserve.com
Telephone #	(949) 296-3078

The owner shall verify BMP implementation and ongoing maintenance through inspection, self-certification or other equally effective measure. The certification shall verify that the inspection and maintenance of all BMPs are performed in accordance to the requirements of this WQMP.

The BMP Inspection and Maintenance Responsibility Matrix is provided in the following table:

BMP INSPECTION & MAINTENANCE RESPONSIBILITIES MATRIX				
BMP		Inspection/ Maintenance Activities Required	Minimum Frequency	Reponsible Party(s)
INFILTRATION BMPs				
INF-1 (TC-11)	Infiltration Basin	Ensure that water infiltrates into the subsurface completely and that vegetation is carefully managed to prevent vectors. Inspect for erosion, standing water, trash, debris, excessive vegetation. Remove accumulated sediment and regrade when sediment volume exceeds 10% of basin.	Semi-Annually	HOA
HYDROLOGIC SOURCE CONTROL BMPs				
HSC-2	Impervious Area Dispersion	Conduct general inspection and maintenance weekly per routine landscaping maintenance activities. Trim, remove, replace mulch or vegetation as necessary. Inspect for standing water or saturated conditions. Conduct bi-annual landscaping health evaluations.	Weekly/Bi-Annual	Homeowner/ HOA

BMP INSPECTION & MAINTENANCE RESPONSIBILITIES MATRIX				
BIOFILTRATION BMPs				
BIO-2 (TC-30)	Vegetated Swales	Maintenance includes, weeding, and debris removal on a weekly basis and mowing on a monthly basis to maintain designed vegetation height. Trimming, reseeding, replanting and replacement of dying/deceased vegetation shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets. Inspect at minimum twice per year for erosion and with routine maintenance for burrows and standing water.	Weekly, Monthly and Semi-Annually	HOA
NON-STRUCTURAL SOURCE CONTROL BMPs				
N1	Education for Property Owners, Tenants and Occupants	Educational materials will be provided to homeowners at close of escrow by the developer and thereafter on an annual basis by the HOA. Materials shall include those provided listed in Section VII of this WQMP.	Annually	HOA
N2	Activity Restrictions	The Owner will prescribe activity restrictions to protect surface water quality, through a Covenant, Conditions and Restrictions (CC&Rs) agreement, or other equally effective measure, for the property. Upon takeover of site responsibilities by the Homeowners Association (HOA), the HOA shall be responsible for ensuring residents compliance.	Ongoing	HOA

BMP INSPECTION & MAINTENANCE RESPONSIBILITIES MATRIX				
N3	Common Area Landscape Management	Maintenance shall be consistent with County requirements, plus fertilizer and/or pesticide usages shall be consistent with County guidelines for use of fertilizers and pesticides (OC DAMP Section 5.5). Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting and replacement of mulch shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets.	Weekly	HOA
N4	BMP Maintenance	Maintenance of BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP. Records of inspections and BMP maintenance shall be maintained by the responsible party and documented with the WQMP, and shall be available for review upon request.	Ongoing	HOA
N11	Common Area Litter control	Litter patrol, violations investigation, reporting and other litter control activities shall be performed in conjunction with maintenance activities. Littler collection and removal shall be performed on a weekly basis.	Weekly	HOA
N12	Employee Training	The owner/HOA shall educate all new employees and contractors on storm water pollution prevention, particularly good housekeeping practices upon hire. Refresher courses shall be conducted on an annual basis, and as needed. Materials that may be used are attached to this WQMP.	Annually	HOA

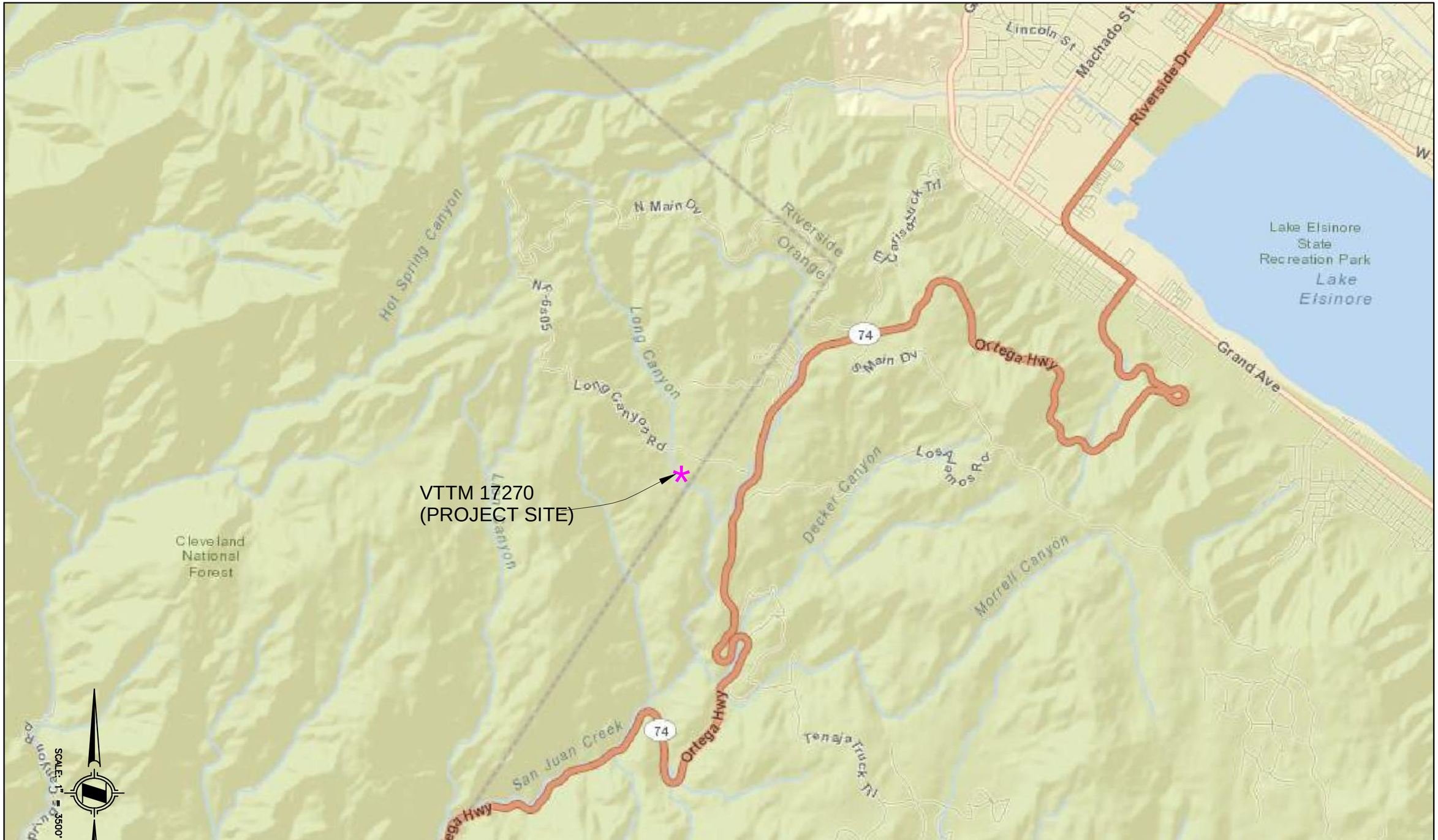
BMP INSPECTION & MAINTENANCE RESPONSIBILITIES MATRIX				
N14	Common Area Catch Basin Inspection	80% of the project's storm drain system, including catch basin inlets, area drains, swales, curb-and-gutter systems and other drainage systems shall be inspected, cleaned and maintained on an annual basis. 100% of the system shall be inspected, cleaned and maintained within a two-year period.	Annually	HOA
N15	Street Sweeping Private Streets	Streets shall be swept prior to the storm season, in late summer or early fall.	Annually	HOA
STRUCTURAL SOURCE CONTROL BMPs				
S1 SD-13	Provide storm drain system stencilling and signage	Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible will be re-stencilled as soon as possible.	Annually	HOA
S4 SD-12	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.	Monthly	HOA
S5	Protect Slopes and Channels	Slopes and swales shall be inspected for rills, dead or dying vegetation and repaired with routine landscaping maintenance. Energy dissipaters shall be inspected for signs of erosion.	Monthly and Annually	HOA
S12	Hillside Landscaping	Hillside landscaping shall be inspected for rills and dead or dying vegetation. Areas shall be repaired with routine landscaping maintenance operations.	Monthly	HOA

Section VI Site Plan and Drainage Plan

The exhibits provided in this section are to illustrate the post construction BMPs prescribed within this WQMP. Drainage flow information of the proposed project, such as general surface flow lines, concrete or other surface drainage conveyances, and storm drain facilities are also depicted. All structural source control and treatment control BMPs are shown as well.

Exhibits

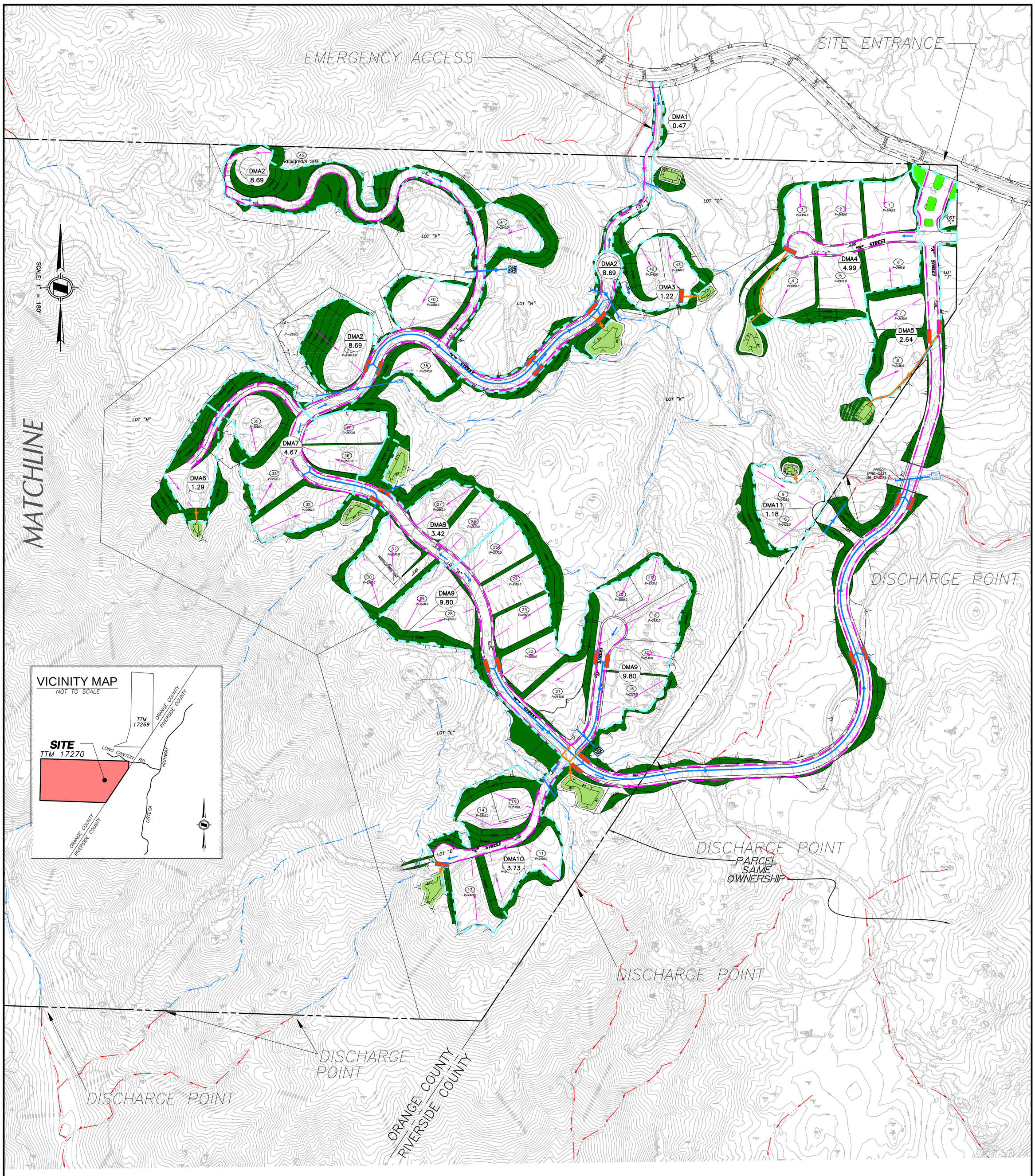
- Vicinity Map
- WQMP Site Plan Exhibit



DRAWN BY: TIH	PREPARED BY:	PREPARED FOR:	*"THE PRESERVE"*
DATE: 07/25/14	HUNSAKER & ASSOCIATES IRVINE, INC.	*THE PRESERVE AT SAN JUAN, LLC*	*VESTING TENTATIVE TRACT MAP NO. 17270*
REVISED:	PLANNING ▪ ENGINEERING ▪ SURVEYING	100 PACIFICA, SUITE 345	*PA 130026*
W.O. #: 3852-1	Three Hughes, Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759	IRVINE, CA 92618	*COUNTY OF ORANGE, CA*
		TELEPHONE: (949) 296-3078	

CONCEPTUAL WQMP VICINITY MAP

PLOTTED BY: Tommy Hsu DATE: Jul. 25, 2014 07:29:32 AM FILE: F:\0188\Planning\SY-WQ\WQMP\Exhibits\WQMP 17270 VIC.dwg



LEGEND

- TRACT BOUNDARY
- NAP — NOT A PART
- DIRECTION OF FLOW (ONSITE)
- DIRECTION OF FLOW (OFFSITE)
- DIRECTION OF DCV FLOW (TYPICAL) FROM LOT TO BIOSWALE
- DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
- 18B / 7.85 — DMA DESIGNATION AND ACREAGE
- BIO-2 VEGETATED SWALE & DCV FLOW DIRECTION SEE DETAILS ON SHEET 2
- PROPOSED STORM DRAIN & FLOW DIRECTION
- PROPOSED DCV DRAIN & FLOW DIRECTION
- LANDSCAPE AREAS (PRIVATE) WITH BMP's: S4 (SD-10, 12) SITE DESIGN/LANDSCAPE PLANNING, EFFICIENT IRRIGATION HSC-3 CANOPY INTERCEPTION
- LANDSCAPE SLOPES (PRIVATE) WITH BMP's: S4 (SD-10, 12) SITE DESIGN/LANDSCAPE PLANNING, EFFICIENT IRRIGATION HSC-3 CANOPY INTERCEPTION
- INF-1 INFILTRATION BASIN SEE DETAILS ON SHEET 2
- CATCH BASIN (PROPOSED) S1 (SD-13) STORM DRAIN SIGNAGE

NOTES

1. ASSESSOR PARCEL NUMBERS: 125-120-26 AND 125-120-31
2. DESIGN CAPTURE VOLUME (DCV) FLOWS FROM LOTS AND STREETS CONVEYED IN BIOSWALE PRIOR TO DISCHARGING TO INFILTRATION BASINS

BIOTREATMENT (VEGETATED SWALE) DESIGN SUMMARY

Drainage Management Area (DMA)[1]	Tributary Drainage Area (acres)	% Imp.	Runoff Coefficient	Tc (min)	Design Storm Intensity (in.)	Q (ft^3/s)	Swale Length (ft)*	Swale Width (ft)*
1	0.47	5	0.1875	10	0.23	0.05	350	2 at 4'
2	8.69	65	0.6375	10	0.23	1.23	3,000	2 at 7'
4	4.99	65	0.6375	10	0.23	0.73	472	2 at 4'
5	2.64	65	0.6375	10	0.23	0.41	952	2 at 7'
6	1.29	65	0.6375	10	0.23	0.15	556	2 at 4'
7	4.67	65	0.6375	10	0.23	0.50	605	2 at 7'
8	3.42	65	0.6375	10	0.23	0.48	387	2 at 7'
9	9.80	65	0.6375	10	0.23	1.31	1,300	2 at 7'
10	3.73	65	0.6375	10	0.23	0.49	635	2 at 4'

[1] No swales proposed for DMA 3 and 11.

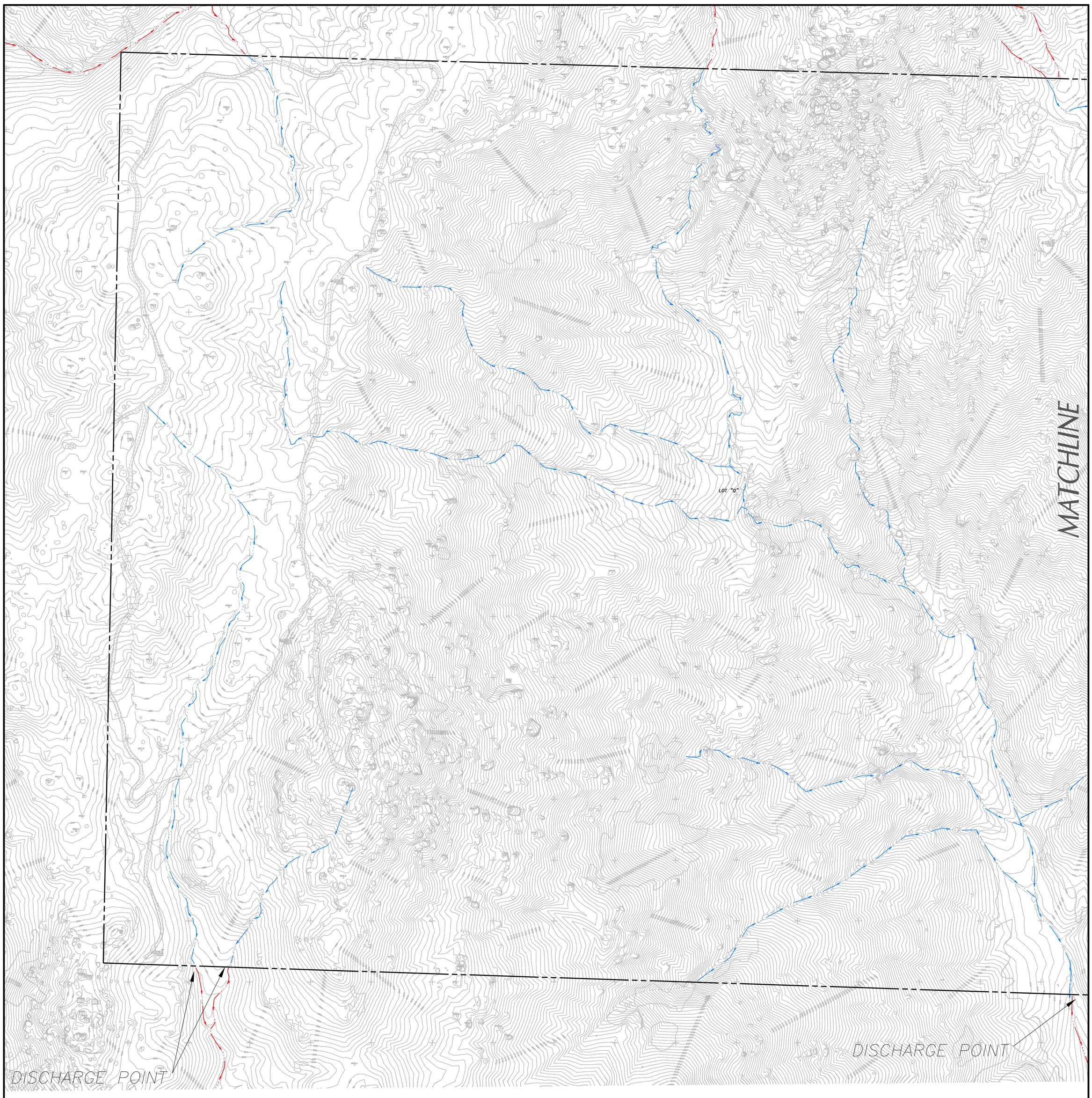
INFILTRATION BASIN SUMMARY

DMA	Simple Method DCV (ft^3)	Basin Footprint[1] (ft)	Basin Capacity (ft^3)
1	320	25x50x3	6,261
2	20,064	160x76x4	61,120
3	2,817	43x25x4	8,716
4	11,521	120x26x5	31,080
5	6,095	25x50x3	6,261
6	2,978	46x25x4	9,160
7	10,782	70x40x6	36,960
8	7,896	101x50x3	19,713
9	22,626	120x63x4	40,176
10	8,612	65x36x5	23,130
11	2,724	19x55x3	5,619

[1]Footprint based on variable depth and 3:1 side slopes

DRAWN BY: TIH DATE: 12/11/14 REVISED: W.O. #: 3852-1	PREPARED BY: HUNSAKER & ASSOCIATES IRVINE, INC. PLANNING ▪ ENGINEERING ▪ SURVEYING Three Hughes, Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759	PREPARED FOR: THE PRESERVE AT SAN JUAN, LLC 100 PACIFICA, SUITE 345 IRVINE, CA 92618 (949) 296-3078	"THE PRESERVE" VESTING TENTATIVE TRACT MAP NO. 17270 PA 130026 COUNTY OF ORANGE, CA	CONCEPTUAL WQMP SITE PLAN 1 OF 2

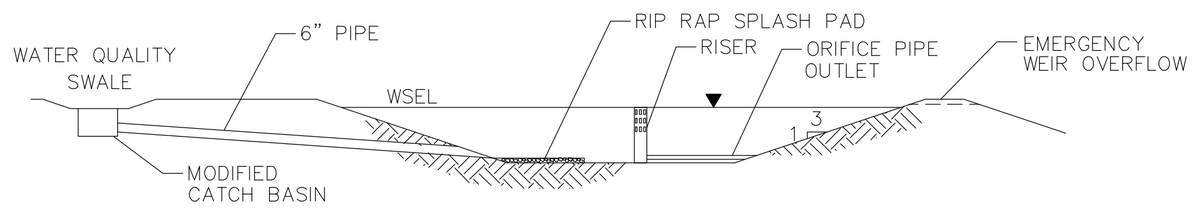
PLOTTED BY: Tommy Hsu DATE: Dec. 12, 2014 10:42:45 AM FILE: F:\0188\Planning\SY-WQ\WQMP\Exhibits\WQMP 17270 SP.dwg



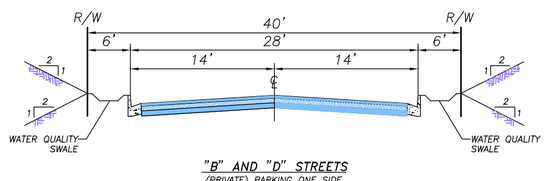
LEGEND

- TRACT BOUNDARY
- NAP — NOT A PART
- DIRECTION OF FLOW (ONSITE)
- DIRECTION OF FLOW (OFFSITE)
- DIRECTION OF DCV FLOW (TYPICAL) FROM LOT TO BIOSWALE
- DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
- 18B / 7.85 — DMA DESIGNATION AND ACREAGE
- BIO-2 VEGETATED SWALE & DCV FLOW DIRECTION
- PROPOSED STORM DRAIN & FLOW DIRECTION
- PROPOSED DCV DRAIN & FLOW DIRECTION
- LANDSCAPE AREAS (PRIVATE) WITH BMP's: S4 (SD-10, 12) SITE DESIGN/LANDSCAPE PLANNING, EFFICIENT IRRIGATION HSC-3 CANOPY INTERCEPTION
- LANDSCAPE SLOPES (PRIVATE) WITH BMP's: S4 (SD-10, 12) SITE DESIGN/LANDSCAPE PLANNING, EFFICIENT IRRIGATION HSC-3 CANOPY INTERCEPTION
- INF-1 INFILTRATION BASIN
- CATCH BASIN (PROPOSED) S1 (SD-13) STORM DRAIN SIGNAGE

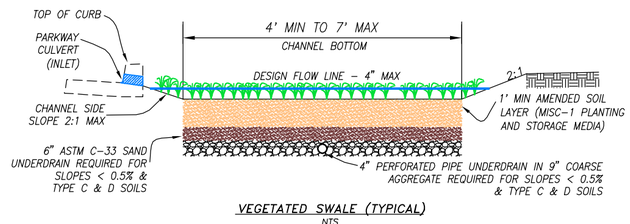
SCALE: 1" = 180'



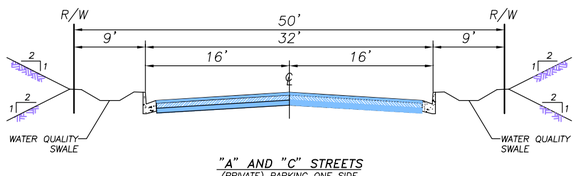
INFILTRATION BASIN, INLET/OUTLET DETAILS (TYPICAL)
NTS



"B" AND "D" STREETS
(PRIVATE) PARKING ONE SIDE
NTS



VEGETATED SWALE (TYPICAL)
NTS



"A" AND "C" STREETS
(PRIVATE) PARKING ONE SIDE
NTS

VEGETATED SWALE INLET
NTS

VEGETATED SWALE OUTLET
NTS

NOTES

1. ASSESSOR PARCEL NUMBERS: 125-120-26 AND 125-120-31
2. DESIGN CAPTURE VOLUME (DCV) FLOWS FROM LOTS AND STREETS CONVEYED IN BIOSWALE PRIOR TO DISCHARGING TO INFILTRATION BASINS

DRAWN BY: TIH	HUNSAKER & ASSOCIATES IRVINE, INC. PLANNING ▪ ENGINEERING ▪ SURVEYING Three Hughes, Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759	PREPARED FOR: THE PRESERVE AT SAN JUAN, LLC 100 PACIFICA, SUITE 345 IRVINE, CA 92618 (949) 296-3078	"THE PRESERVE" VESTING TENTATIVE TRACT MAP NO. 17270 PA 130026 COUNTY OF ORANGE, CA
DATE: 12/11/14			
REVISED:			
W.O. #: 3852-1			

CONCEPTUAL WQMP SITE PLAN 2 OF 2

PLOTTED BY: Tommy Hsu DATE: Dec. 12, 2014 10:43:33 AM FILE: F:\0188\Planning\SY-WQ\WQMP\Exhibits\WQMP 17270 SP.dwg

Section VII Educational Materials Included

EDUCATION MATERIALS			
Residential Material (http://www.ocwatersheds.com)	Check If Applicable	Business Material (http://www.ocwatersheds.com)	Check If Applicable
The Ocean Begins at Your Front Door	☒	Tips for the Automotive Industry	☐
Tips for Car Wash Fund-raisers	☐	Tips for Using Concrete and Mortar	☐
Tips for the Home Mechanic	☒	Tips for the Food Service Industry	☐
Homeowners Guide for Sustainable Water Use	☒	Proper Maintenance Practices for Your Business	☐
Household Tips	☒	Other Material	Check If Attached
Proper Disposal of Household Hazardous Waste	☒		
Recycle at Your Local Used Oil Collection Center (North County)	☐		☐
Recycle at Your Local Used Oil Collection Center (Central County)	☐		☐
Recycle at Your Local Used Oil Collection Center (South County)	☒		☐
Tips for Maintaining a Septic Tank System	☒		☐
Responsible Pest Control	☒		☐
Sewer Spill	☒		☐
Tips for the Home Improvement Projects	☒		☐
Tips for Horse Care	☐		☐
Tips for Landscaping and Gardening	☒		☐
Tips for Pet Care	☒		☐
Tips for Pool Maintenance	☐		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☒		☐
Tips for Projects Using Paint	☒		☐

Attachment A

Educational Materials

Educational materials to be provided at Final WQMP.

Attachment B

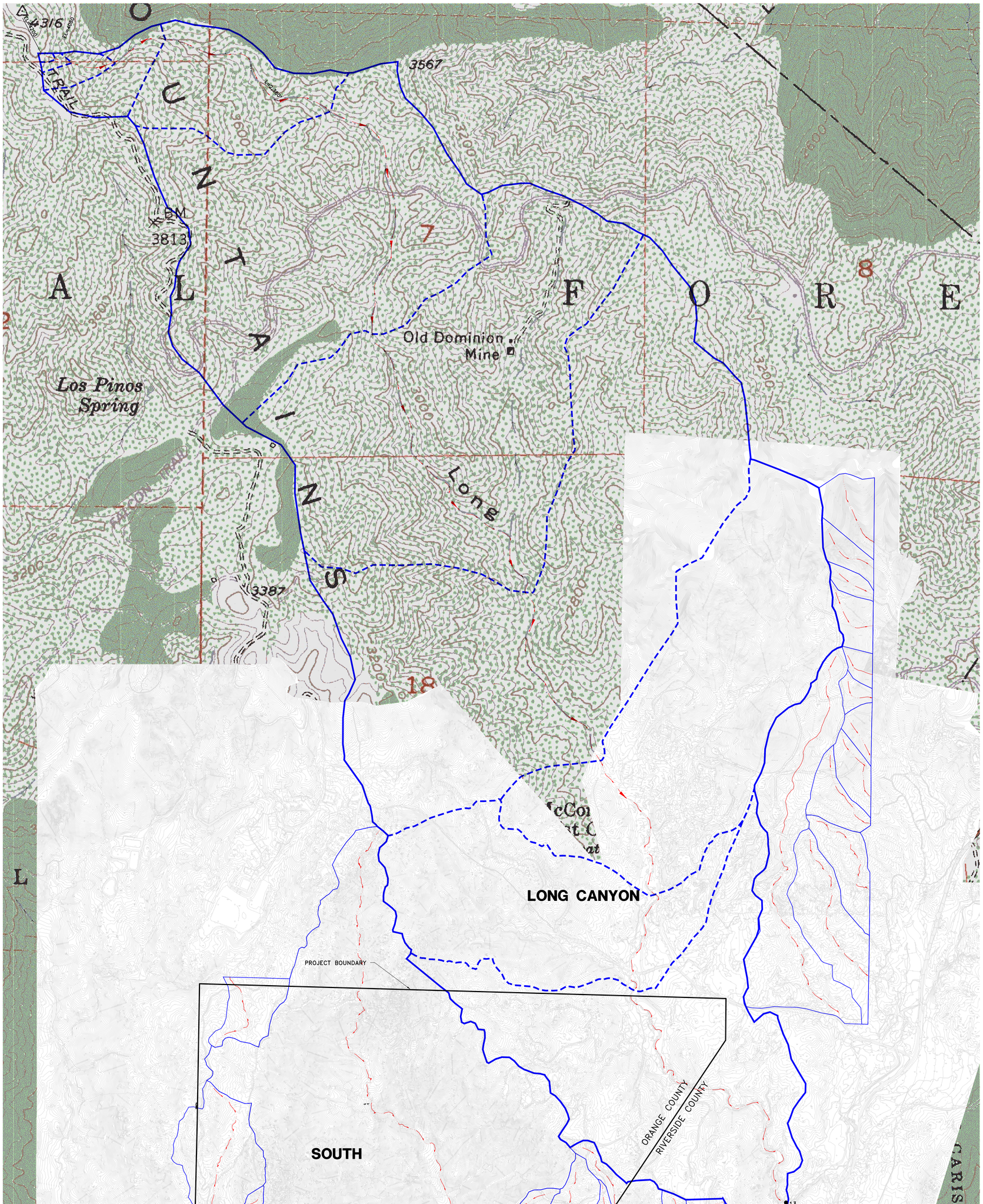
Conditions of Approval

Project Conditions of Approval are not available and have not yet been applied. Once Project Conditions of Approval have been approved by the County of Orange, they will be provided in this section.

Attachment C

Hydrology Maps/Hydromodification Management Plan

Hydrology Maps



VICINITY MAP

LEGEND

MAJOR DRAINAGE BOUNDARY
MINOR DRAINAGE BOUNDARY
NODE NUMBER
PEAK FLOW RATE
TIME OF CONCENTRATION
FLOW LINE

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IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

EXISTING HYDROLOGY MAP
THE PRESERVE AT SAN JUAN
LONG CANYON

WO: 3226-1
HYDROLOGY MAP THE PRESERVE

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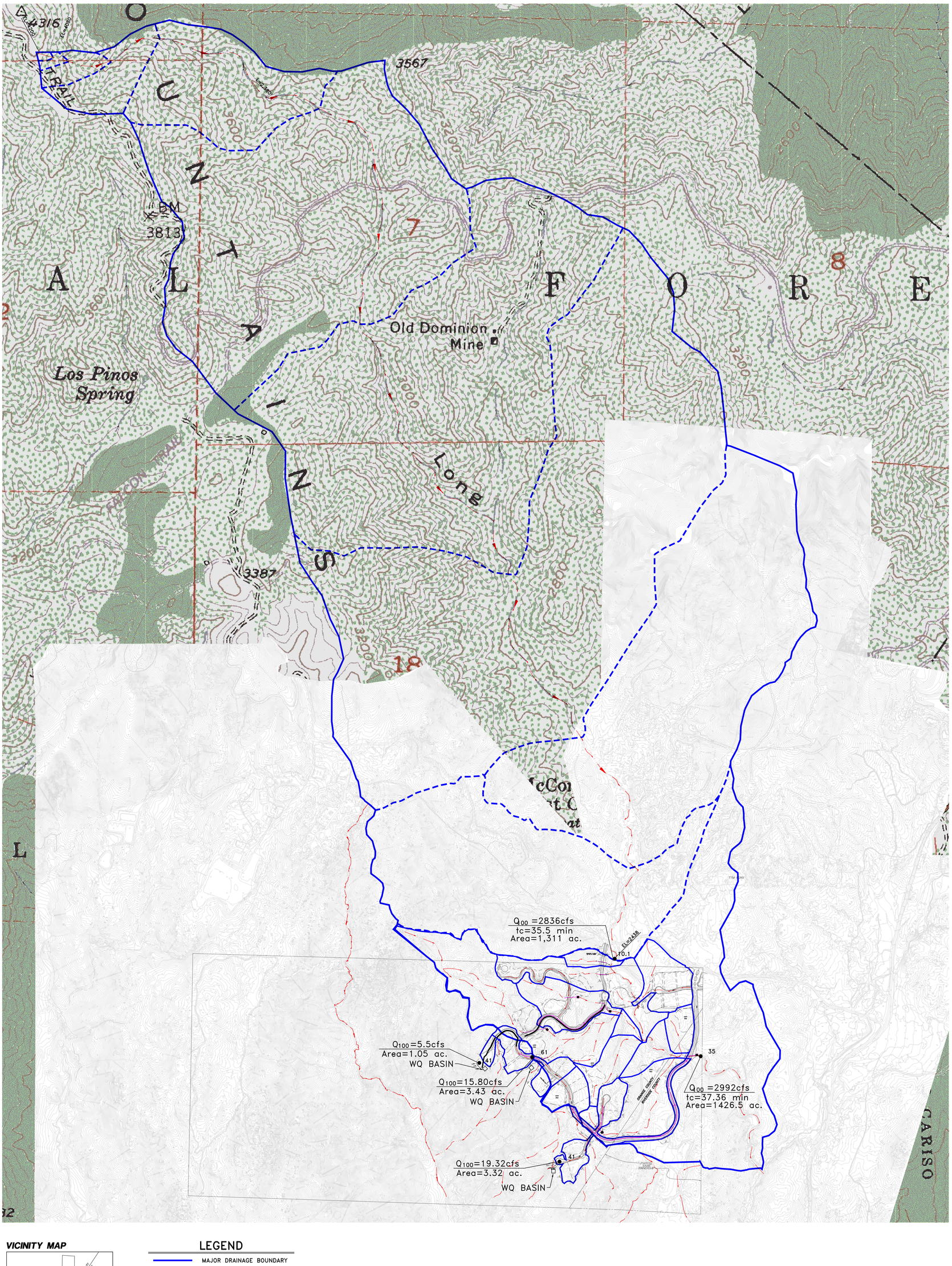
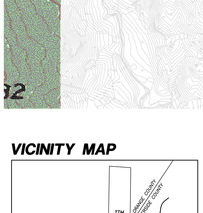


SCALE: 1" = 400'

VICINITY MAP



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- STORM DRAIN SYSTEM
- 10 NODE NUMBER
- Q100=3,366 cfs tc=22.04 min Area=1,178 ac — PEAK FLOW RATE / TIME OF CONCENTRATION
- FLOW LINE

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
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Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

PROPOSED HYDROLOGY MAP
THE PRESERVE AT SAN JUAN
LONG CANYON

SHT 1 OF 2

WO: 3226-1
HYDROLOGY MAP THE PRESERVE

\\ASHUR\Projects\0188\Planning\OA_Project\Hydrology\EXHIBIT Hydrology South – Proposed.dwg

Hydromodification Management Plan

PRELIMINARY HYDROMODIFICATION ANALYSIS

FOR

The Preserve at San Juan - South

Vesting Tentative Tract Map No. 171270
Planning Application PA130026

County of Orange
& Riverside

December 2014

PREPARED UNDER THE SUPERVISION OF:

Francisco Calderon, R.C.E. 58840, Exp. 6/30/16 Date:

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1	**INTRODUCTION**
	A. PROJECT LOCATION
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	C. ANALYSIS
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	E. CONCLUSION
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	B. Natural Peak Events / Proposed Peak Events
	C. Swale Summary Table
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	E. Hydromodification SOHM Full Report/Calculations
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	B. Proposed North Preserve Map

INTRODUCTION

A. PROJECT LOCATION

The Preserve project site is located in the City of Rancho Santa Margarita, County of Orange/Riverside. The Preserve is bounded by the Old Dominion Mine to the north and Ortega Highway to the east. Long Canyon runs between The Preserve at San Juan north and south (see attached vicinity map for details).

B. STUDY PURPOSE

The purpose of this study is to determine the basis for analyzing and designing hydromodification, mitigation, and improvements for the proposed redevelopment.

Hydromodification control facilities (structural BMP's) are required to comply with the South Orange County Hydromodification Management Plan (HMP) per current MS4 Permit. The method used to size the system is per Orange County's Model WQMP Technical Guidance Document in conjunction with South Orange County Hydrology Model.

The MS4 Permit (South Orange County) defines hydromodification as the change in the natural watershed due to urbanization. This urbanization can lead to increased flows in the stream and excess sediment transport. In addition biological impacts can occur in the streams. The following are the criteria in which projects must comply with according to the MS4 Permit:

1. Flow rates from 10 percent of the 2-year storm event to the 10 year storm event, the post-project peak flows shall not exceed predevelopment peak flows.
2. For flow rates from the 5 year storm event to the 10 year storm event, the post-project peak flows may exceed pre-development flows by up to 10 percent for a 1 year frequency interval.

C. ANALYSIS

The pre-development shows that the existing condition of our property was on land that was steep with a slope of 30%. For calculation purposes, we are using only 10% as a conservative approach. The soil type for the area is Type C in the majority of the area with patches of soil in the Type B category. For our approach, we used Type C for the soil. This tells us that permeability will be fairly low and our calculation approach will depend little on it. For the purpose of efficiency, we assumed the vegetation to be medium brush with the Impervious factor of 10%. This is enough to cover exposed rocks or concrete.

The proposed Preserve Development is comprised of lots with a lot of natural land. The streets vary between a 28’ to 32’ width with a swale on either side. The swale varied between a 6’ to 9’ wide. The purpose is to keep the development as close to natural state as possible with the swale used as a walking path and also as a pretreatment for Water Quality purposes. In our analysis, we were able to take advantage of the vegetative swales for Hydromod purposes. Since the swales are on either side of the street, we were able to increase the area being used for mitigation.

Breaking up the development into smaller areas was essential to accurately analyze the flow patterns and calculate what is needed for hydromodification. A total of 7 different areas were used for this study. Most the areas took advantage of the use of the vegetation swale and others needed both the vegetation swale with the additional basin for infiltration. A summary of the different basins with their corresponding basin sizes are located in our tables in this report.

D.SIMULATION

Hydrologic simulation was done with continuous rainfall data, Trabuco rain station (National Climatic Data Center or NCDC). The data was analyzed using South Orange County Hydrology Model (SOHM). The statistical data in SOHM was used to calculate the 2 yr. 5 yr. and 10 yr. Vegetation swales and basins were all modeled using SOHM. SOHM calculates flow duration curve by calculating several hundred iterations until the proposed flow duration curve matches closest to the pre-developed flow duration curve. Each plot demonstrates the proposed curves are below the predevelopment flow durations between 0.1Q2 and Q10.

E.CONCLUSION

The calculations herein this report conclude that each plot comparison demonstrates that the proposed BMP's satisfy the HMP requirements. The BMP's were designed so that the system is not contingent on any testing of the soil for infiltration. Any infiltration occurring during actual use will only improve system performance.

Area Summary Table

Hydrologic Characteristic	Natural Node 52D	Natural Node 59A	Natural Node 62A	Proposed Node 52D	Proposed Node 59A	Proposed Node 62A
Drainage Area	1.15 Ac	8.37 Ac	3.28 Ac	1.15 Ac	8.37 Ac	3.28 Ac
Soil Type	C	C	C	C	C	C
Vegetation Cover	Med. Shrub	Med. Shrub	Med. Shrub	LS C.A.	Med. Shrub	LS C.A.
Impervious Cover	10.00%	10.00%	10.00%	65.00%	65.00%	65.00%
Overland Slope	20.00%	20.00%	20.00%	8.00%	8.00%	8.00%

Hydrologic Characteristic	Natural Node 62B	Natural Node 62C	Natural Node 65	Proposed Node 62B	Proposed Node 62C	Proposed Node 65
Drainage Area	3.42 Ac	1.05 Ac	8.96 Ac	3.42 Ac	1.05 Ac	8.96 Ac
Soil Type	C	C	C	C	C	C
Vegetation Cover	Med. Shrub	Med. Shrub	Med. Shrub	Med. Shrub	Med. Shrub	LS C.A.
Impervious Cover	10.00%	10.00%	10.00%	65.00%	65.00%	65.00%
Overland Slope	20.00%	20.00%	20.00%	8.00%	8.00%	8.00%

Hydrologic Characteristic	Natural Node 65B	Natural Node 52E	Natural Node 67	Proposed Node 65B	Proposed Node 52E	Proposed Node 67
Drainage Area	3.32 Ac	5.38 Ac	1.18 Ac	3.32 Ac	5.38 Ac	1.18 Ac
Soil Type	C	C	C	C	C	C
Vegetation Cover	Med. Shrub	Med. Shrub	Med. Shrub	LS C.A.	LS C.A.	LS C.A.
Impervious Cover	10.00%	10.00%	10.00%	65.00%	65.00%	65.00%
Overland Slope	20.00%	20.00%	20.00%	8.00%	8.00%	8.00%

Hydrologic Characteristic	Natural Node 70	Natural Node 71	Proposed Node 65B	Proposed Node 52E
Drainage Area	3.32 Ac	.26 Ac	3.32 Ac	.26 Ac
Soil Type	C	C	C	C
Vegetation Cover	Med. Shrub	Med. Shrub	LS C.A.	LS C.A.
Impervious Cover	10.00%	10.00%	65.00%	85.00%
Overland Slope	20.00%	20.00%	8.00%	8.00%

Peak Event for Natural Condition Simulation

Node 52D

Q2	0.65 cfs
Q5	1.02 cfs
Q10	1.50 cfs

Node 52E

Q2	2.11 cfs
Q5	3.31 cfs
Q10	4.88 cfs

Node 59A

Q2	4.04 cfs
Q5	6.34 cfs
Q10	9.33 cfs

Node 62A

Q2	1.39 cfs
Q5	2.18 cfs
Q10	3.20 cfs

Node 62B

Q2	1.91 cfs
Q5	3.00 cfs
Q10	4.42 cfs

Node 62C

Q2	0.42 cfs
Q5	0.66 cfs
Q10	0.97 cfs

Node 65

Q2	3.79 cfs
Q5	5.96 cfs
Q10	8.76 cfs

Node 65B

Q2	1.40 cfs
Q5	2.20 cfs
Q10	3.24 cfs

Peak Event for Mitigated Condition Simulation

Node 52D

Q2	0.56 cfs
Q5	1.04 cfs
Q10	1.50 cfs

Node 52E

Q2	1.44 cfs
Q5	3.21 cfs
Q10	4.63 cfs

Node 59A

Q2	2.26 cfs
Q5	5.09 cfs
Q10	5.86 cfs

Node 62A

Q2	0.64 cfs
Q5	2.26 cfs
Q10	3.01 cfs

Node 62B

Q2	1.00 cfs
Q5	3.05 cfs
Q10	4.05 cfs

Node 62C

Q2	0.38 cfs
Q5	0.64 cfs
Q10	0.90 cfs

Node 65

Q2	2.48 cfs
Q5	5.47 cfs
Q10	8.27 cfs

Node 65B

Q2	0.67 cfs
Q5	2.22 cfs
Q10	3.09 cfs

Node 67

Q2	0.5 cfs
Q5	0.78 cfs
Q10	1.16 cfs

Node 67

Q2	0.49 cfs
Q5	0.83 cfs
Q10	1.16 cfs

Node 70

Q2	1.18 cfs
Q5	1.75 cfs
Q10	2.58 cfs

Node 70

Q2	0.90 cfs
Q5	1.56 cfs
Q10	2.08 cfs

Swale Summary Table

Node	Tc(min)	Area (Ac)	Swale Length	Swale Width	Slope (%)	%imp	C	Q (cfs)
52D	10	1.15	0	0	0	0.65	0.6375	0.17
52E	10	4.99	472	8	6	0.65	0.6375	0.73
65	10	8.96	1300	14	6	0.65	0.6375	1.31
65B	10	3.32	635	8	6	0.65	0.6375	0.49
62A	10	3.28	387	14	6	0.65	0.6375	0.48
62B	10	3.42	605	14	6	0.65	0.6375	0.50
62C	10	1.05	556	8	6	0.65	0.6375	0.15
59A	10	8.37	3000	14	8	0.65	0.6375	1.23
70	10	2.64	952	14	5	0.70	0.68	0.41
71	10	0.26	350	8	4	0.85	0.79	0.05

Ta

Hydromodification Basin Requirements

Location	Node	Area(Ac)	Basin Size Supplied	Basin Volume(ac-ft) Required
South	52D	1.54	43x25x4	0.09
South	52E	4.99	120x26x5	0.32
South	65	8.96	120x63x4	0.69
South	65B	3.32	65x36x5	0.27
South	62A	3.28	101x50x3	0.31
South	62B	4.52	70x40x6	0.39
South	62C	1.05	46x25x4	0.11
South	59A	9.54	160x76x4	1.11
South	67	1.18	19x55x3	0.08
South	70	2.64	25x50x3	0.02
South	71	0.26	25x50x3	0.02

SOHM

PROJECT REPORT

General Model Information

Project Name:	SOHM Node 52D
Site Name:	
Site Address:	
City:	
Report Date:	12/1/2014
Gage:	Trabuco Canyon
Data Start:	10/01/1958
Data End:	09/30/2005
Timestep:	15 Minute
Precip Scale:	1.00
Version:	2014/11/12

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	1.54
Pervious Total	1.54
Impervious Land Use	Acres
Impervious Total	0
Basin Total	1.54

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	0.87
Pervious Total	0.87
Impervious Land Use	Acres
Impervious,Mod(5-10)	0.67
Impervious Total	0.67
Basin Total	1.54

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	32.83 ft.	
Bottom Width:	32.83 ft.	
Depth:	4 ft.	
Volume at riser head:	0.1237 acre-ft.	
Infiltration On		
Infiltration rate:	0.5	
Infiltration safety factor:	1	
Total Volume Infiltrated (ac-ft):		13.473
Total Volume Through Riser (ac-ft):		39.077
Total Volume Through Facility (ac-ft):		52.55
Percent Infiltrated:		25.64
Total Precip Applied to Facility:		2.15
Total Evap From Facility:		0.118
Side slope 1:	3 To 1	
Side slope 2:	3 To 1	
Side slope 3:	3 To 1	
Side slope 4:	3 To 1	
Discharge Structure		
Riser Height:	3 ft.	
Riser Diameter:	18 in.	
Notch Type:	Rectangular	
Notch Width:	0.710 ft.	
Notch Height:	0.722 ft.	
Orifice 1 Diameter:	1.283 in. Elevation:0 ft.	
Element Flows To:		
Outlet 1	Outlet 2	

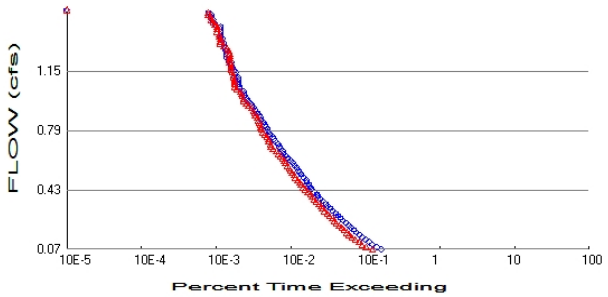
Pond Hydraulic Table

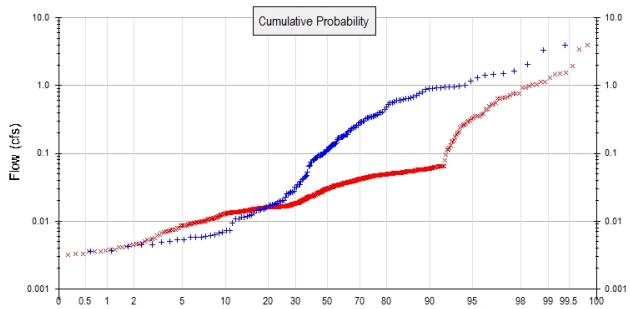
Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.024	0.000	0.000	0.000
0.0444	0.025	0.001	0.009	0.012
0.0889	0.025	0.002	0.012	0.012
0.1333	0.026	0.003	0.015	0.012
0.1778	0.026	0.004	0.018	0.012
0.2222	0.026	0.005	0.020	0.012
0.2667	0.027	0.006	0.022	0.012
0.3111	0.027	0.008	0.024	0.012
0.3556	0.028	0.009	0.025	0.012
0.4000	0.028	0.010	0.027	0.012
0.4444	0.028	0.011	0.028	0.012
0.4889	0.029	0.013	0.030	0.012
0.5333	0.029	0.014	0.031	0.012
0.5778	0.030	0.015	0.032	0.012
0.6222	0.030	0.017	0.034	0.012
0.6667	0.031	0.018	0.035	0.012
0.7111	0.031	0.020	0.036	0.012
0.7556	0.032	0.021	0.037	0.012
0.8000	0.032	0.022	0.038	0.012
0.8444	0.033	0.024	0.039	0.012
0.8889	0.033	0.025	0.040	0.012
0.9333	0.033	0.027	0.041	0.012
0.9778	0.034	0.028	0.042	0.012

1.0222	0.034	0.030	0.043	0.012
1.0667	0.035	0.031	0.044	0.012
1.1111	0.035	0.033	0.045	0.012
1.1556	0.036	0.035	0.046	0.012
1.2000	0.036	0.036	0.047	0.012
1.2444	0.037	0.038	0.048	0.012
1.2889	0.037	0.040	0.049	0.012
1.3333	0.038	0.041	0.049	0.012
1.3778	0.038	0.043	0.050	0.012
1.4222	0.039	0.045	0.051	0.012
1.4667	0.039	0.046	0.052	0.012
1.5111	0.040	0.048	0.053	0.012
1.5556	0.040	0.050	0.053	0.012
1.6000	0.041	0.052	0.054	0.012
1.6444	0.041	0.054	0.055	0.012
1.6889	0.042	0.056	0.056	0.012
1.7333	0.042	0.057	0.056	0.012
1.7778	0.043	0.059	0.057	0.012
1.8222	0.044	0.061	0.058	0.012
1.8667	0.044	0.063	0.059	0.012
1.9111	0.045	0.065	0.059	0.012
1.9556	0.045	0.067	0.060	0.012
2.0000	0.046	0.069	0.061	0.012
2.0444	0.046	0.071	0.061	0.012
2.0889	0.047	0.073	0.062	0.012
2.1333	0.047	0.076	0.063	0.012
2.1778	0.048	0.078	0.063	0.012
2.2222	0.048	0.080	0.064	0.012
2.2667	0.049	0.082	0.065	0.012
2.3111	0.050	0.084	0.079	0.012
2.3556	0.050	0.087	0.117	0.012
2.4000	0.051	0.089	0.167	0.012
2.4444	0.051	0.091	0.228	0.012
2.4889	0.052	0.093	0.297	0.012
2.5333	0.053	0.096	0.373	0.012
2.5778	0.053	0.098	0.457	0.012
2.6222	0.054	0.100	0.547	0.012
2.6667	0.054	0.103	0.643	0.012
2.7111	0.055	0.105	0.745	0.012
2.7556	0.055	0.108	0.851	0.012
2.8000	0.056	0.110	0.963	0.012
2.8444	0.057	0.113	1.080	0.012
2.8889	0.057	0.115	1.202	0.012
2.9333	0.058	0.118	1.328	0.012
2.9778	0.059	0.121	1.458	0.012
3.0222	0.059	0.123	1.573	0.012
3.0667	0.060	0.126	1.777	0.012
3.1111	0.060	0.129	2.067	0.012
3.1556	0.061	0.131	2.423	0.012
3.2000	0.062	0.134	2.834	0.012
3.2444	0.062	0.137	3.293	0.012
3.2889	0.063	0.140	3.797	0.012
3.3333	0.064	0.142	4.340	0.012
3.3778	0.064	0.145	4.921	0.012
3.4222	0.065	0.148	5.538	0.012
3.4667	0.066	0.151	6.188	0.012
3.5111	0.066	0.154	6.869	0.012
3.5556	0.067	0.157	7.581	0.012

3.6000	0.068	0.160	8.321	0.012
3.6444	0.068	0.163	9.090	0.012
3.6889	0.069	0.166	9.886	0.012
3.7333	0.070	0.169	10.70	0.012
3.7778	0.070	0.172	11.55	0.012
3.8222	0.071	0.176	12.42	0.012
3.8667	0.072	0.179	13.32	0.012
3.9111	0.072	0.182	14.24	0.012
3.9556	0.073	0.185	15.18	0.012
4.0000	0.074	0.188	16.14	0.012
4.0444	0.074	0.192	17.13	0.012

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.54
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.87
Total Impervious Area: 0.67

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.652636
5 year	1.024482
10 year	1.506196
25 year	2.808811

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.561578
5 year	1.046393
10 year	1.484288
25 year	2.842861

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0653	2670	2049	76	Pass
0.0798	2329	1686	72	Pass
0.0944	2047	1483	72	Pass
0.1089	1833	1354	73	Pass
0.1235	1644	1205	73	Pass
0.1380	1500	1093	72	Pass
0.1526	1369	1008	73	Pass
0.1671	1252	933	74	Pass
0.1817	1153	854	74	Pass
0.1963	1063	797	74	Pass
0.2108	979	724	73	Pass
0.2254	906	675	74	Pass
0.2399	837	635	75	Pass
0.2545	766	597	77	Pass
0.2690	712	545	76	Pass
0.2836	666	507	76	Pass
0.2981	598	467	78	Pass
0.3127	559	440	78	Pass
0.3273	516	419	81	Pass
0.3418	486	394	81	Pass
0.3564	443	362	81	Pass
0.3709	408	337	82	Pass
0.3855	381	318	83	Pass
0.4000	367	302	82	Pass
0.4146	342	280	81	Pass
0.4291	319	259	81	Pass
0.4437	307	243	79	Pass
0.4582	290	228	78	Pass
0.4728	270	218	80	Pass
0.4874	264	203	76	Pass
0.5019	243	191	78	Pass
0.5165	228	183	80	Pass
0.5310	215	171	79	Pass
0.5456	211	163	77	Pass
0.5601	199	158	79	Pass
0.5747	184	150	81	Pass
0.5892	177	141	79	Pass
0.6038	163	136	83	Pass
0.6183	151	128	84	Pass
0.6329	142	122	85	Pass
0.6475	132	111	84	Pass
0.6620	128	107	83	Pass
0.6766	121	95	78	Pass
0.6911	117	88	75	Pass
0.7057	113	88	77	Pass
0.7202	102	83	81	Pass
0.7348	98	83	84	Pass
0.7493	94	79	84	Pass
0.7639	86	74	86	Pass
0.7785	84	70	83	Pass
0.7930	81	66	81	Pass
0.8076	77	65	84	Pass
0.8221	74	64	86	Pass

0.8367	71	63	88	Pass
0.8512	67	61	91	Pass
0.8658	65	59	90	Pass
0.8803	62	55	88	Pass
0.8949	59	54	91	Pass
0.9094	55	52	94	Pass
0.9240	53	49	92	Pass
0.9386	50	45	90	Pass
0.9531	47	42	89	Pass
0.9677	44	38	86	Pass
0.9822	43	38	88	Pass
0.9968	40	37	92	Pass
1.0113	39	36	92	Pass
1.0259	38	35	92	Pass
1.0404	34	31	91	Pass
1.0550	34	29	85	Pass
1.0695	33	29	87	Pass
1.0841	33	29	87	Pass
1.0987	33	29	87	Pass
1.1132	32	28	87	Pass
1.1278	30	28	93	Pass
1.1423	30	27	90	Pass
1.1569	28	26	92	Pass
1.1714	27	26	96	Pass
1.1860	26	26	100	Pass
1.2005	26	25	96	Pass
1.2151	24	25	104	Pass
1.2297	23	25	108	Pass
1.2442	23	25	108	Pass
1.2588	23	25	108	Pass
1.2733	22	24	109	Pass
1.2879	22	23	104	Pass
1.3024	21	21	100	Pass
1.3170	21	19	90	Pass
1.3315	20	19	95	Pass
1.3461	20	19	95	Pass
1.3606	19	18	94	Pass
1.3752	19	18	94	Pass
1.3898	19	17	89	Pass
1.4043	19	17	89	Pass
1.4189	19	17	89	Pass
1.4334	16	16	100	Pass
1.4480	15	15	100	Pass
1.4625	15	14	93	Pass
1.4771	14	14	100	Pass
1.4916	14	13	92	Pass
1.5062	13	13	100	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

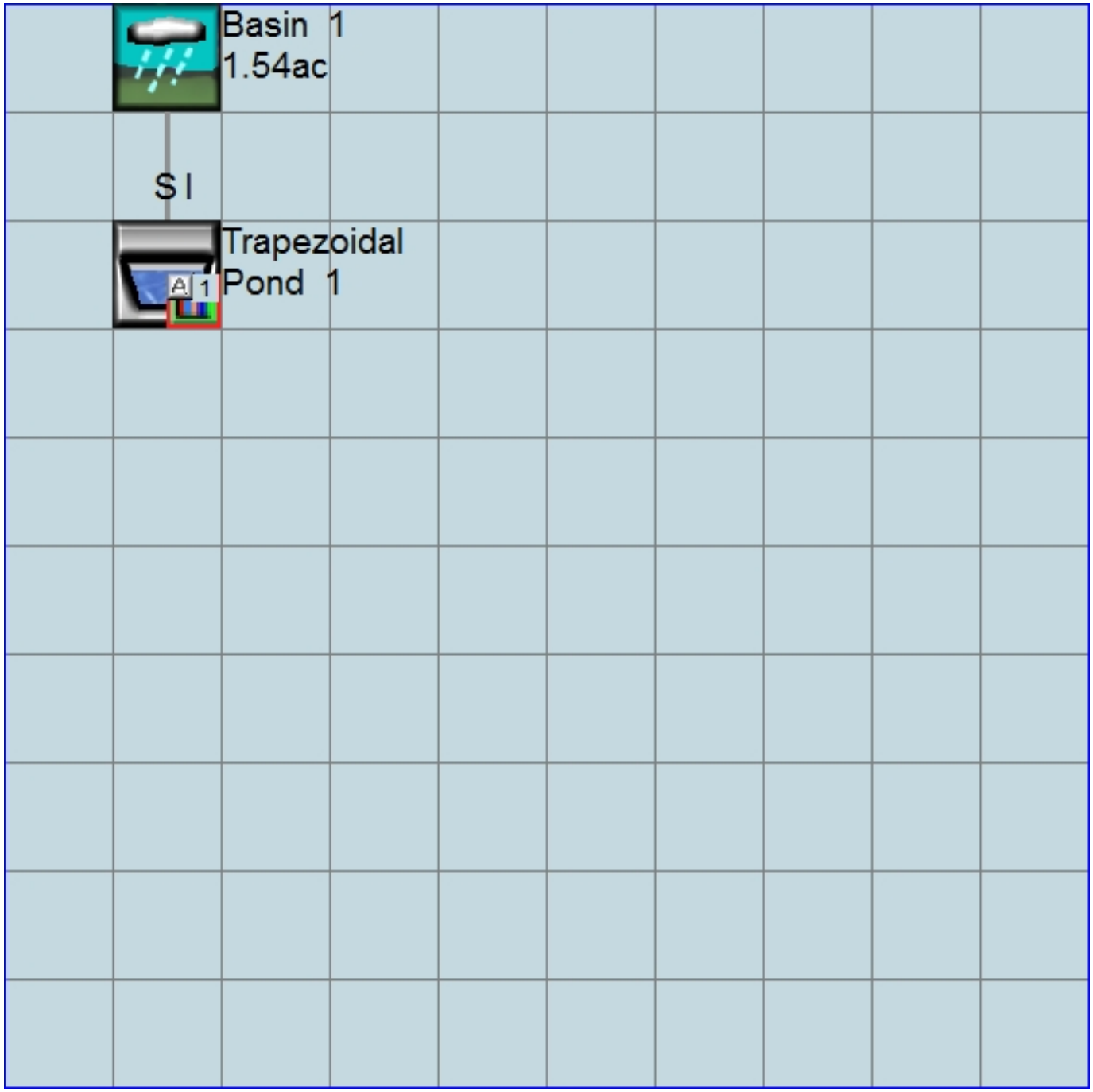
IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic

Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1958 10 01        END    2005 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   SOHM Node 52D.wdm
MESSU      25   PreSOHM Node 52D.MES
           27   PreSOHM Node 52D.L61
           28   PreSOHM Node 52D.L62
           30   POCSOHM Node 52D1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37            40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37      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  ***
   37     0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       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#   ***
Basin  1***
PERLND  37                        1.54     COPY   501     12
PERLND  37                        1.54     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       1958 10 01        END    2005 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   SOHM Node 52D.wdm
MESSU      25   MitSOHM Node 52D.MES
           27   MitSOHM Node 52D.L61
           28   MitSOHM Node 52D.L62
           30   POCSOHM Node 52D1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      IMPLND       2
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  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           ***
   37     D,Scrub,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 ***
   37         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  *********
```

```
  37         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 ***
  37         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
  37              0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  37              0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
  37       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  ***
  37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
  37              0         0      0.09         0      0.92       0.3      0.01
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                       in  out           ***
    2     Impervious,Mod(5-10)    1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         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     ***
    2         0    0    0    0    0
```

```
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            100       0.1       0.1      0.09
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  37                        0.87     RCHRES   1      2
IMPLND   2                        0.67     RCHRES   1      5

******Routing******
PERLND  37                        0.87     COPY     1     12
IMPLND   2                        0.67     COPY     1     15
RCHRES   1                           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     Trapezoidal Pond-004    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
  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
  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
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      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
  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  0.024740  0.000000  0.000000  0.000000
  0.044444  0.025144  0.001109  0.009114  0.012473
  0.088889  0.025551  0.002235  0.012890  0.012473
  0.133333  0.025961  0.003380  0.015786  0.012473
  0.177778  0.026374  0.004543  0.018229  0.012473
  0.222222  0.026791  0.005724  0.020380  0.012473
  0.266667  0.027211  0.006924  0.022325  0.012473
  0.311111  0.027634  0.008143  0.024114  0.012473
  0.355556  0.028060  0.009381  0.025779  0.012473
  0.400000  0.028490  0.010637  0.027343  0.012473
  0.444444  0.028923  0.011913  0.028822  0.012473
  0.488889  0.029359  0.013208  0.030229  0.012473
  0.533333  0.029799  0.014523  0.031573  0.012473
  0.577778  0.030242  0.015857  0.032862  0.012473
  0.622222  0.030688  0.017211  0.034102  0.012473
  0.666667  0.031137  0.018585  0.035299  0.012473
  0.711111  0.031589  0.019979  0.036457  0.012473
  0.755556  0.032045  0.021393  0.037579  0.012473
  0.800000  0.032504  0.022828  0.038669  0.012473
  0.844444  0.032967  0.024282  0.039728  0.012473
  0.888889  0.033432  0.025758  0.040760  0.012473
  0.933333  0.033901  0.027254  0.041767  0.012473
  0.977778  0.034373  0.028772  0.042750  0.012473
  1.022222  0.034849  0.030310  0.043710  0.012473
  1.066667  0.035327  0.031869  0.044651  0.012473
  1.111111  0.035809  0.033450  0.045571  0.012473
  1.155556  0.036294  0.035052  0.046474  0.012473
  1.200000  0.036783  0.036676  0.047359  0.012473
  1.244444  0.037275  0.038322  0.048228  0.012473
  1.288889  0.037770  0.039990  0.049082  0.012473
  1.333333  0.038268  0.041679  0.049921  0.012473
  1.377778  0.038769  0.043391  0.050746  0.012473
  1.422222  0.039274  0.045126  0.051558  0.012473
  1.466667  0.039782  0.046882  0.052357  0.012473
  1.511111  0.040293  0.048662  0.053145  0.012473
  1.555556  0.040808  0.050464  0.053921  0.012473
  1.600000  0.041326  0.052289  0.054686  0.012473
  1.644444  0.041847  0.054138  0.055440  0.012473
  1.688889  0.042371  0.056009  0.056184  0.012473
  1.733333  0.042899  0.057904  0.056918  0.012473
  1.777778  0.043430  0.059822  0.057644  0.012473
  1.822222  0.043964  0.061765  0.058360  0.012473
  1.866667  0.044502  0.063730  0.059067  0.012473
  1.911111  0.045042  0.065720  0.059766  0.012473
```

```
  1.955556  0.045586  0.067734  0.060457  0.012473
  2.000000  0.046133  0.069773  0.061140  0.012473
  2.044444  0.046684  0.071835  0.061816  0.012473
  2.088889  0.047238  0.073922  0.062484  0.012473
  2.133333  0.047795  0.076034  0.063145  0.012473
  2.177778  0.048355  0.078171  0.063800  0.012473
  2.222222  0.048919  0.080332  0.064448  0.012473
  2.266667  0.049485  0.082519  0.065089  0.012473
  2.311111  0.050055  0.084731  0.079947  0.012473
  2.355556  0.050629  0.086969  0.117384  0.012473
  2.400000  0.051205  0.089232  0.167683  0.012473
  2.444444  0.051785  0.091520  0.228093  0.012473
  2.488889  0.052368  0.093835  0.297122  0.012473
  2.533333  0.052955  0.096175  0.373795  0.012473
  2.577778  0.053545  0.098542  0.457409  0.012473
  2.622222  0.054137  0.100935  0.547424  0.012473
  2.666667  0.054734  0.103354  0.643410  0.012473
  2.711111  0.055333  0.105800  0.745015  0.012473
  2.755556  0.055936  0.108273  0.851941  0.012473
  2.800000  0.056542  0.110772  0.963934  0.012473
  2.844444  0.057151  0.113299  1.080772  0.012473
  2.888889  0.057764  0.115852  1.202262  0.012473
  2.933333  0.058379  0.118433  1.328231  0.012473
  2.977778  0.058999  0.121042  1.458524  0.012473
  3.022222  0.059621  0.123678  1.573918  0.012473
  3.066667  0.060246  0.126342  1.777535  0.012473
  3.111111  0.060875  0.129033  2.067677  0.012473
  3.155556  0.061507  0.131753  2.423424  0.012473
  3.200000  0.062143  0.134501  2.834327  0.012473
  3.244444  0.062781  0.137277  3.293772  0.012473
  3.288889  0.063423  0.140081  3.797077  0.012473
  3.333333  0.064069  0.142914  4.340705  0.012473
  3.377778  0.064717  0.145776  4.921857  0.012473
  3.422222  0.065369  0.148667  5.538247  0.012473
  3.466667  0.066024  0.151587  6.187964  0.012473
  3.511111  0.066682  0.154536  6.869376  0.012473
  3.555556  0.067343  0.157514  7.581072  0.012473
  3.600000  0.068008  0.160522  8.321812  0.012473
  3.644444  0.068676  0.163559  9.090499  0.012473
  3.688889  0.069347  0.166627  9.886149  0.012473
  3.733333  0.070022  0.169724  10.70788  0.012473
  3.777778  0.070700  0.172851  11.55488  0.012473
  3.822222  0.071381  0.176008  12.42643  0.012473
  3.866667  0.072065  0.179196  13.32185  0.012473
  3.911111  0.072753  0.182414  14.24051  0.012473
  3.955556  0.073444  0.185663  15.18185  0.012473
  4.000000  0.074138  0.188943  16.14533  0.012473
  END FTABLE  1
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      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    1              RCHRES   1     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   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1003 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 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        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  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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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
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SOHM

PROJECT REPORT

General Model Information

Project Name:	SOHM Node 52E
Site Name:	
Site Address:	
City:	
Report Date:	12/1/2014
Gage:	Trabuco Canyon
Data Start:	10/01/1958
Data End:	09/30/2005
Timestep:	15 Minute
Precip Scale:	1.00
Version:	2014/11/12

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	4.99
Pervious Total	4.99
Impervious Land Use	Acres
Impervious Total	0
Basin Total	4.99

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	3.77
Pervious Total	3.77
Impervious Land Use	Acres
Impervious,Mod(5-10)	1.22
Impervious Total	1.22
Basin Total	4.99

Element Flows To:

Surface	Interflow	Groundwater
Surface Bio Swale 1	Surface Bio Swale 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	58.22 ft.	
Bottom Width:	58.22 ft.	
Depth:	4 ft.	
Volume at riser head:	0.3161 acre-ft.	
Infiltration On		
Infiltration rate:	0.5	
Infiltration safety factor:	1	
Total Volume Infiltrated (ac-ft):		86.665
Total Volume Through Riser (ac-ft):		20.919
Total Volume Through Facility (ac-ft):		107.583
Percent Infiltrated:		80.56
Total Precip Applied to Facility:		25.419
Total Evap From Facility:		0.842
Side slope 1:	3 To 1	
Side slope 2:	3 To 1	
Side slope 3:	3 To 1	
Side slope 4:	3 To 1	
Discharge Structure		
Riser Height:	3 ft.	
Riser Diameter:	18 in.	
Notch Type:	Rectangular	
Notch Width:	1.500 ft.	
Notch Height:	0.706 ft.	
Orifice 1 Diameter:	2.305 in. Elevation:0 ft.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.077	0.000	0.000	0.000
0.0444	0.078	0.003	0.029	0.039
0.0889	0.079	0.007	0.041	0.039
0.1333	0.080	0.010	0.051	0.039
0.1778	0.080	0.014	0.058	0.039
0.2222	0.081	0.017	0.065	0.039
0.2667	0.082	0.021	0.072	0.039
0.3111	0.082	0.025	0.077	0.039
0.3556	0.083	0.028	0.083	0.039
0.4000	0.084	0.032	0.088	0.039
0.4444	0.085	0.036	0.093	0.039
0.4889	0.085	0.040	0.097	0.039
0.5333	0.086	0.043	0.101	0.039
0.5778	0.087	0.047	0.106	0.039
0.6222	0.088	0.051	0.110	0.039
0.6667	0.088	0.055	0.113	0.039
0.7111	0.089	0.059	0.117	0.039
0.7556	0.090	0.063	0.121	0.039
0.8000	0.091	0.067	0.124	0.039
0.8444	0.092	0.071	0.128	0.039
0.8889	0.092	0.075	0.131	0.039
0.9333	0.093	0.079	0.134	0.039
0.9778	0.094	0.084	0.138	0.039

1.0222	0.095	0.088	0.141	0.039
1.0667	0.095	0.092	0.144	0.039
1.1111	0.096	0.096	0.147	0.039
1.1556	0.097	0.101	0.150	0.039
1.2000	0.098	0.105	0.152	0.039
1.2444	0.099	0.109	0.155	0.039
1.2889	0.099	0.114	0.158	0.039
1.3333	0.100	0.118	0.161	0.039
1.3778	0.101	0.123	0.163	0.039
1.4222	0.102	0.127	0.166	0.039
1.4667	0.103	0.132	0.169	0.039
1.5111	0.104	0.136	0.171	0.039
1.5556	0.104	0.141	0.174	0.039
1.6000	0.105	0.146	0.176	0.039
1.6444	0.106	0.150	0.178	0.039
1.6889	0.107	0.155	0.181	0.039
1.7333	0.108	0.160	0.183	0.039
1.7778	0.109	0.165	0.186	0.039
1.8222	0.109	0.170	0.188	0.039
1.8667	0.110	0.175	0.190	0.039
1.9111	0.111	0.180	0.192	0.039
1.9556	0.112	0.184	0.195	0.039
2.0000	0.113	0.189	0.197	0.039
2.0444	0.114	0.195	0.199	0.039
2.0889	0.114	0.200	0.201	0.039
2.1333	0.115	0.205	0.203	0.039
2.1778	0.116	0.210	0.205	0.039
2.2222	0.117	0.215	0.208	0.039
2.2667	0.118	0.220	0.210	0.039
2.3111	0.119	0.226	0.223	0.039
2.3556	0.120	0.231	0.291	0.039
2.4000	0.121	0.236	0.389	0.039
2.4444	0.122	0.242	0.511	0.039
2.4889	0.122	0.247	0.651	0.039
2.5333	0.123	0.253	0.808	0.039
2.5778	0.124	0.258	0.981	0.039
2.6222	0.125	0.264	1.167	0.039
2.6667	0.126	0.269	1.366	0.039
2.7111	0.127	0.275	1.577	0.039
2.7556	0.128	0.281	1.800	0.039
2.8000	0.129	0.286	2.033	0.039
2.8444	0.130	0.292	2.277	0.039
2.8889	0.131	0.298	2.531	0.039
2.9333	0.132	0.304	2.795	0.039
2.9778	0.132	0.310	3.067	0.039
3.0222	0.133	0.316	3.256	0.039
3.0667	0.134	0.322	3.461	0.039
3.1111	0.135	0.328	3.753	0.039
3.1556	0.136	0.334	4.110	0.039
3.2000	0.137	0.340	4.522	0.039
3.2444	0.138	0.346	4.982	0.039
3.2889	0.139	0.352	5.487	0.039
3.3333	0.140	0.358	6.032	0.039
3.3778	0.141	0.365	6.614	0.039
3.4222	0.142	0.371	7.232	0.039
3.4667	0.143	0.377	7.882	0.039
3.5111	0.144	0.384	8.565	0.039
3.5556	0.145	0.390	9.278	0.039

3.6000	0.146	0.397	10.02	0.039
3.6444	0.147	0.403	10.79	0.039
3.6889	0.148	0.410	11.58	0.039
3.7333	0.149	0.416	12.41	0.039
3.7778	0.150	0.423	13.25	0.039
3.8222	0.151	0.430	14.13	0.039
3.8667	0.152	0.436	15.02	0.039
3.9111	0.153	0.443	15.94	0.039
3.9556	0.154	0.450	16.88	0.039
4.0000	0.155	0.457	17.85	0.039
4.0444	0.156	0.464	18.84	0.039

Bio Swale 1

Bottom Length:	472.00 ft.
Bottom Width:	8.00 ft.
Material thickness of first layer:	0.2
Material type for first layer:	GRAVEL
Material thickness of second layer:	0.2
Material type for second layer:	Sand
Material thickness of third layer:	0.2
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	50.618
Total Volume Through Riser (ac-ft):	83.033
Total Volume Through Facility (ac-ft):	133.651
Percent Infiltrated:	37.87
Total Precip Applied to Facility:	7.294
Total Evap From Facility:	2.466
Underdrain not used	
Discharge Structure	
Riser Height:	0.25 ft.
Riser Diameter:	48 in.
Notch Type:	Rectangular
Notch Width:	0.000 ft.
Notch Height:	0.000 ft.
Orifice 1 Diameter:	48 in. Elevation:0.05 ft.
Element Flows To:	
Outlet 1	Outlet 2
Trapezoidal Pond 1	

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.1127	0.0000	0.0000	0.0000
0.0148	0.1124	0.0003	0.0000	0.0000
0.0297	0.1118	0.0005	0.0000	0.0000
0.0445	0.1111	0.0008	0.0000	0.0000
0.0593	0.1105	0.0011	0.0000	0.0000
0.0742	0.1098	0.0014	0.0000	0.0000
0.0890	0.1092	0.0016	0.0000	0.0000
0.1038	0.1085	0.0019	0.0000	0.0000
0.1187	0.1079	0.0022	0.0000	0.0000
0.1335	0.1073	0.0025	0.0000	0.0000
0.1484	0.1066	0.0028	0.0000	0.0100
0.1632	0.1060	0.0031	0.0000	0.0235
0.1780	0.1053	0.0033	0.0000	0.0437
0.1929	0.1047	0.0036	0.0000	0.0437
0.2077	0.1040	0.0039	0.0000	0.0437
0.2225	0.1034	0.0042	0.0000	0.0437
0.2374	0.1028	0.0045	0.0000	0.0437
0.2522	0.1021	0.0048	0.0000	0.0437
0.2670	0.1015	0.0051	0.0000	0.0437
0.2819	0.1008	0.0054	0.0000	0.0437
0.2967	0.1002	0.0057	0.0000	0.0437
0.3115	0.0995	0.0060	0.0000	0.0437
0.3264	0.0989	0.0063	0.0000	0.0437
0.3412	0.0983	0.0066	0.0000	0.0437

0.3560	0.0976	0.0069	0.0000	0.0437
0.3709	0.0970	0.0072	0.0000	0.0437
0.3857	0.0963	0.0075	0.0000	0.0437
0.4005	0.0957	0.0078	0.0000	0.0437
0.4154	0.0950	0.0081	0.0000	0.0437
0.4302	0.0944	0.0084	0.0000	0.0437
0.4451	0.0938	0.0088	0.0000	0.0437
0.4599	0.0931	0.0091	0.0000	0.0437
0.4747	0.0925	0.0094	0.0000	0.0437
0.4896	0.0918	0.0097	0.0000	0.0437
0.5044	0.0912	0.0101	0.0000	0.0437
0.5192	0.0905	0.0104	0.0000	0.0437
0.5341	0.0899	0.0107	0.0000	0.0437
0.5489	0.0893	0.0111	0.0000	0.0437
0.5637	0.0886	0.0114	0.0000	0.0437
0.5786	0.0880	0.0118	0.0000	0.0437
0.5934	0.0873	0.0121	0.0000	0.0437
0.6000	0.0867	0.0123	0.0000	0.0437

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
0.6000	0.1127	0.0123	0.0000	0.8408	0.0000
0.6148	0.1133	0.0139	0.0000	0.8408	0.0000
0.6297	0.1140	0.0156	0.0000	0.8709	0.0000
0.6445	0.1146	0.0173	0.0000	0.9010	0.0000
0.6593	0.1153	0.0190	5.8483	0.9310	0.0000
0.6742	0.1159	0.0207	9.4088	0.9611	0.0000
0.6890	0.1165	0.0225	11.952	0.9912	0.0000
0.7038	0.1172	0.0242	14.042	1.0212	0.0000
0.7187	0.1178	0.0259	15.858	1.0513	0.0000
0.7335	0.1185	0.0277	17.487	1.0814	0.0000
0.7484	0.1191	0.0295	18.977	1.1114	0.0000
0.7632	0.1198	0.0312	20.358	1.1415	0.0000
0.7780	0.1204	0.0330	21.651	1.1716	0.0000
0.7929	0.1210	0.0348	22.871	1.2017	0.0000
0.8077	0.1217	0.0366	24.030	1.2317	0.0000
0.8225	0.1223	0.0384	25.135	1.2618	0.0000
0.8374	0.1230	0.0402	26.193	1.2919	0.0000
0.8522	0.1236	0.0421	27.214	1.3219	0.0000
0.8670	0.1243	0.0439	28.277	1.3520	0.0000
0.8819	0.1249	0.0458	29.360	1.3821	0.0000
0.8967	0.1256	0.0476	30.449	1.4121	0.0000
0.9115	0.1262	0.0495	31.541	1.4422	0.0000
0.9264	0.1268	0.0514	32.634	1.4723	0.0000
0.9412	0.1275	0.0532	33.728	1.5023	0.0000
0.9560	0.1281	0.0551	34.821	1.5324	0.0000
0.9709	0.1288	0.0570	35.915	1.5625	0.0000
0.9857	0.1294	0.0590	37.009	1.5926	0.0000
1.0005	0.1301	0.0609	38.103	1.6226	0.0000
1.0154	0.1307	0.0628	39.198	1.6527	0.0000
1.0302	0.1313	0.0648	40.293	1.6828	0.0000
1.0451	0.1320	0.0667	41.390	1.7128	0.0000
1.0599	0.1326	0.0687	42.487	1.7429	0.0000
1.0747	0.1333	0.0706	43.586	1.7730	0.0000
1.0896	0.1339	0.0726	44.687	1.8030	0.0000
1.1044	0.1346	0.0746	45.789	1.8331	0.0000
1.1192	0.1352	0.0766	46.893	1.8632	0.0000
1.1341	0.1358	0.0786	47.999	1.8932	0.0000

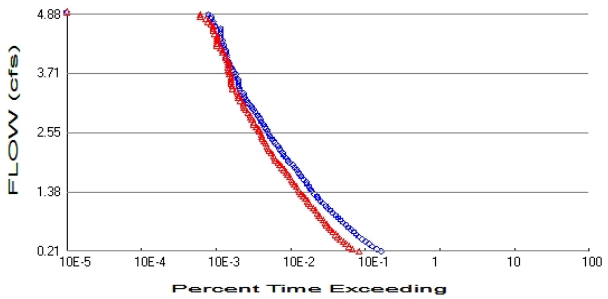
1.1489	0.1365	0.0807	49.107	1.9233	0.0000
1.1637	0.1371	0.0827	50.218	1.9534	0.0000
1.1786	0.1378	0.0847	51.331	1.9835	0.0000
1.1934	0.1384	0.0868	52.447	2.0135	0.0000
1.2082	0.1391	0.0888	53.565	2.0436	0.0000
1.2231	0.1397	0.0909	54.686	2.0737	0.0000
1.2379	0.1403	0.0930	55.810	2.1037	0.0000
1.2527	0.1410	0.0951	56.936	2.1338	0.0000
1.2676	0.1416	0.0972	58.066	2.1639	0.0000
1.2824	0.1423	0.0993	59.199	2.1939	0.0000
1.2973	0.1429	0.1014	60.335	2.2240	0.0000
1.3121	0.1436	0.1035	61.474	2.2541	0.0000
1.3269	0.1442	0.1056	62.617	2.2841	0.0000
1.3418	0.1448	0.1078	63.763	2.3142	0.0000
1.3500	0.1452	0.1090	64.912	2.3309	0.0000

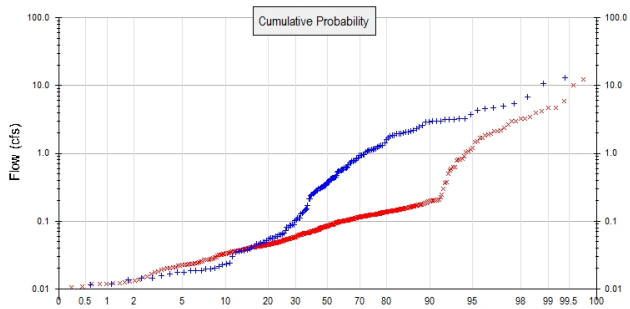
Surface Bio Swale 1

Element Flows To:

Outlet 1	Outlet 2
Trapezoidal Pond 1	Bio Swale 1

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 4.99
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 3.77
Total Impervious Area: 1.22

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	2.11471
5 year	3.319588
10 year	4.880464
25 year	9.101277

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	1.449999
5 year	3.213978
10 year	4.637998
25 year	8.451058

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2115	2670	1359	50	Pass
0.2586	2315	1098	47	Pass
0.3058	2047	997	48	Pass
0.3530	1819	905	49	Pass
0.4001	1640	831	50	Pass
0.4473	1500	765	51	Pass
0.4944	1362	704	51	Pass
0.5416	1252	655	52	Pass
0.5888	1150	607	52	Pass
0.6359	1063	568	53	Pass
0.6831	975	531	54	Pass
0.7302	906	502	55	Pass
0.7774	833	476	57	Pass
0.8246	765	448	58	Pass
0.8717	715	415	58	Pass
0.9189	662	396	59	Pass
0.9661	598	373	62	Pass
1.0132	558	352	63	Pass
1.0604	516	328	63	Pass
1.1075	485	304	62	Pass
1.1547	442	291	65	Pass
1.2019	407	277	68	Pass
1.2490	381	257	67	Pass
1.2962	367	243	66	Pass
1.3433	341	227	66	Pass
1.3905	319	216	67	Pass
1.4377	306	207	67	Pass
1.4848	290	195	67	Pass
1.5320	270	183	67	Pass
1.5792	264	175	66	Pass
1.6263	243	169	69	Pass
1.6735	227	159	70	Pass
1.7206	215	151	70	Pass
1.7678	210	143	68	Pass
1.8150	199	136	68	Pass
1.8621	184	126	68	Pass
1.9093	177	118	66	Pass
1.9564	160	111	69	Pass
2.0036	150	103	68	Pass
2.0508	142	100	70	Pass
2.0979	132	97	73	Pass
2.1451	128	91	71	Pass
2.1923	121	85	70	Pass
2.2394	117	82	70	Pass
2.2866	111	79	71	Pass
2.3337	102	76	74	Pass
2.3809	98	72	73	Pass
2.4281	93	69	74	Pass
2.4752	86	67	77	Pass
2.5224	84	66	78	Pass
2.5695	81	62	76	Pass
2.6167	77	61	79	Pass
2.6639	74	57	77	Pass

2.7110	71	53	74	Pass
2.7582	67	53	79	Pass
2.8054	65	50	76	Pass
2.8525	62	48	77	Pass
2.8997	59	47	79	Pass
2.9468	55	44	80	Pass
2.9940	53	41	77	Pass
3.0412	50	39	78	Pass
3.0883	47	38	80	Pass
3.1355	44	38	86	Pass
3.1826	43	35	81	Pass
3.2298	40	33	82	Pass
3.2770	39	33	84	Pass
3.3241	38	32	84	Pass
3.3713	34	31	91	Pass
3.4185	34	27	79	Pass
3.4656	33	27	81	Pass
3.5128	33	26	78	Pass
3.5599	33	26	78	Pass
3.6071	32	26	81	Pass
3.6543	30	26	86	Pass
3.7014	30	25	83	Pass
3.7486	28	25	89	Pass
3.7957	27	24	88	Pass
3.8429	26	24	92	Pass
3.8901	25	24	96	Pass
3.9372	24	24	100	Pass
3.9844	23	23	100	Pass
4.0316	23	22	95	Pass
4.0787	23	22	95	Pass
4.1259	22	20	90	Pass
4.1730	22	20	90	Pass
4.2202	21	19	90	Pass
4.2674	21	17	80	Pass
4.3145	20	17	85	Pass
4.3617	20	17	85	Pass
4.4088	19	17	89	Pass
4.4560	19	17	89	Pass
4.5032	19	16	84	Pass
4.5503	19	15	78	Pass
4.5975	19	15	78	Pass
4.6447	16	15	93	Pass
4.6918	15	14	93	Pass
4.7390	15	13	86	Pass
4.7861	14	12	85	Pass
4.8333	14	10	71	Pass
4.8805	13	10	76	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

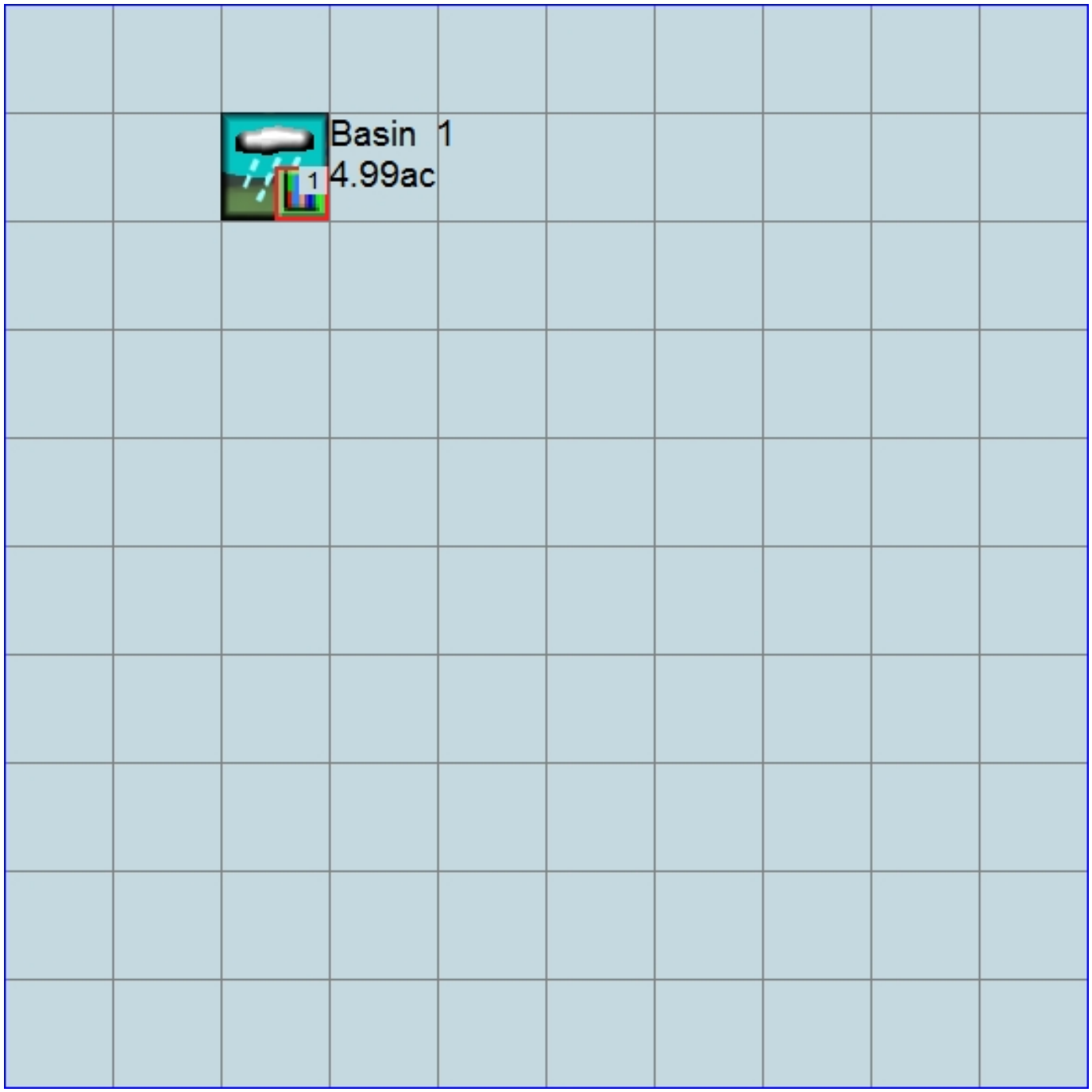
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1958 10 01        END    2005 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   SOHM Node 52E.wdm
MESSU      25   PreSOHM Node 52E.MES
           27   PreSOHM Node 52E.L61
           28   PreSOHM Node 52E.L62
           30   POCSOHM Node 52E1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37              0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37              0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37              0         0      0.09         0      0.92       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#   ***
Basin  1***
PERLND  37                        4.99     COPY   501     12
PERLND  37                        4.99     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       1958 10 01        END    2005 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   SOHM Node 52E.wdm
MESSU      25   MitSOHM Node 52E.MES
           27   MitSOHM Node 52E.L61
           28   MitSOHM Node 52E.L62
           30   POCSOHM Node 52E1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      IMPLND       2
      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        Trapezoidal Pond  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
  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       0.3      0.01
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                       in  out           ***
    2     Impervious,Mod(5-10)    1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         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     ***
    2         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            100       0.1       0.1      0.09
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  37                        3.77     RCHRES   1      2
PERLND  37                        3.77     RCHRES   1      3
IMPLND   2                        1.22     RCHRES   1      5

******Routing******
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 Bio Swal-007    3    1    1    1   28    0    1
    2     Bio Swale  1            2    1    1    1   28    0    1
    3     Trapezoidal Pond-004    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      0.09       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            =  501.
*** 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 3
91 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.077827	0.000000	0.000000	0.000000		
0.044444	0.078541	0.003475	0.029418	0.039238		
0.088889	0.079259	0.006982	0.041603	0.039238		
0.133333	0.079980	0.010520	0.050953	0.039238		
0.177778	0.080705	0.014091	0.058836	0.039238		
0.222222	0.081432	0.017694	0.065780	0.039238		
0.266667	0.082163	0.021329	0.072059	0.039238		
0.311111	0.082897	0.024997	0.077832	0.039238		
0.355556	0.083635	0.028698	0.083206	0.039238		
0.400000	0.084375	0.032432	0.088253	0.039238		
0.444444	0.085119	0.036198	0.093027	0.039238		
0.488889	0.085866	0.039998	0.097568	0.039238		
0.533333	0.086617	0.043831	0.101906	0.039238		
0.577778	0.087370	0.047697	0.106067	0.039238		
0.622222	0.088127	0.051597	0.110071	0.039238		
0.666667	0.088888	0.055531	0.113935	0.039238		
0.711111	0.089651	0.059498	0.117671	0.039238		
0.755556	0.090418	0.063500	0.121293	0.039238		
0.800000	0.091188	0.067536	0.124809	0.039238		
0.844444	0.091961	0.071606	0.128229	0.039238		
0.888889	0.092738	0.075710	0.131560	0.039238		
0.933333	0.093517	0.079849	0.134809	0.039238		
0.977778	0.094301	0.084023	0.137982	0.039238		
1.022222	0.095087	0.088231	0.141083	0.039238		
1.066667	0.095877	0.092475	0.144117	0.039238		
1.111111	0.096669	0.096754	0.147089	0.039238		
1.155556	0.097466	0.101068	0.150002	0.039238		
1.200000	0.098265	0.105417	0.152859	0.039238		
1.244444	0.099068	0.109803	0.155664	0.039238		
1.288889	0.099874	0.114224	0.158419	0.039238		
1.333333	0.100683	0.118680	0.161128	0.039238		
1.377778	0.101495	0.123173	0.163791	0.039238		
1.422222	0.102311	0.127702	0.166412	0.039238		
1.466667	0.103130	0.132268	0.168992	0.039238		
1.511111	0.103952	0.136869	0.171534	0.039238		
1.555556	0.104778	0.141508	0.174038	0.039238		
1.600000	0.105607	0.146183	0.176507	0.039238		
1.644444	0.106439	0.150895	0.178941	0.039238		
1.688889	0.107274	0.155644	0.181343	0.039238		
1.733333	0.108112	0.160431	0.183714	0.039238		
1.777778	0.108954	0.165254	0.186054	0.039238		
1.822222	0.109799	0.170116	0.188366	0.039238		
1.866667	0.110648	0.175014	0.190649	0.039238		
1.911111	0.111499	0.179951	0.192905	0.039238		
1.955556	0.112354	0.184926	0.195135	0.039238		
2.000000	0.113213	0.189938	0.197340	0.039238		
2.044444	0.114074	0.194989	0.199521	0.039238		
2.088889	0.114939	0.200078	0.201678	0.039238		
2.133333	0.115807	0.205206	0.203812	0.039238		
2.177778	0.116678	0.210372	0.205924	0.039238		
2.222222	0.117552	0.215577	0.208015	0.039238		
2.266667	0.118430	0.220821	0.210085	0.039238		
2.311111	0.119311	0.226104	0.223766	0.039238		
2.355556	0.120196	0.231427	0.291301	0.039238		
2.400000	0.121083	0.236789	0.389675	0.039238		
2.444444	0.121974	0.242190	0.510972	0.039238		
2.488889	0.122868	0.247631	0.651406	0.039238		
2.533333	0.123765	0.253111	0.808620	0.039238		
2.577778	0.124666	0.258632	0.980962	0.039238		
2.622222	0.125570	0.264193	1.167189	0.039238		
2.666667	0.126477	0.269794	1.366322	0.039238		
2.711111	0.127387	0.275435	1.577564	0.039238		
2.755556	0.128301	0.281117	1.800251	0.039238		
2.800000	0.129218	0.286840	2.033816	0.039238		
2.844444	0.130138	0.292604	2.277770	0.039238		

2.888889	0.131062	0.298408	2.531683	0.039238
2.933333	0.131988	0.304254	2.795176	0.039238
2.977778	0.132918	0.310140	3.067910	0.039238
3.022222	0.133852	0.316069	3.256932	0.039238
3.066667	0.134788	0.322038	3.461776	0.039238
3.111111	0.135728	0.328050	3.753136	0.039238
3.155556	0.136671	0.334103	4.110092	0.039238
3.200000	0.137618	0.340198	4.522195	0.039238
3.244444	0.138567	0.346336	4.982832	0.039238
3.288889	0.139520	0.352516	5.487322	0.039238
3.333333	0.140476	0.358738	6.032126	0.039238
3.377778	0.141435	0.365002	6.614446	0.039238
3.422222	0.142398	0.371310	7.231997	0.039238
3.466667	0.143364	0.377660	7.882866	0.039238
3.511111	0.144333	0.384053	8.565425	0.039238
3.555556	0.145306	0.390490	9.278259	0.039238
3.600000	0.146281	0.396970	10.02013	0.039238
3.644444	0.147260	0.403493	10.78994	0.039238
3.688889	0.148243	0.410059	11.58671	0.039238
3.733333	0.149228	0.416670	12.40955	0.039238
3.777778	0.150217	0.423324	13.25766	0.039238
3.822222	0.151209	0.430023	14.13031	0.039238
3.866667	0.152204	0.436765	15.02681	0.039238
3.911111	0.153203	0.443552	15.94656	0.039238
3.955556	0.154205	0.450383	16.88898	0.039238
4.000000	0.155210	0.457259	17.85353	0.039238

END FTABLE 3
FTABLE 2
42 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.112691	0.000000	0.000000	0.000000		
0.014835	0.112405	0.000268	0.000000	0.000000		
0.029670	0.111762	0.000538	0.000000	0.000000		
0.044505	0.111119	0.000809	0.000000	0.000000		
0.059341	0.110476	0.001083	0.000000	0.000000		
0.074176	0.109833	0.001359	0.000000	0.000000		
0.089011	0.109190	0.001637	0.000000	0.000000		
0.103846	0.108547	0.001916	0.000000	0.000000		
0.118681	0.107904	0.002198	0.000000	0.000000		
0.133516	0.107261	0.002482	0.000000	0.000000		
0.148352	0.106618	0.002767	0.000000	0.009963		
0.163187	0.105975	0.003055	0.000000	0.023495		
0.178022	0.105332	0.003345	0.000000	0.043704		
0.192857	0.104689	0.003636	0.000000	0.043704		
0.207692	0.104046	0.003919	0.000000	0.043704		
0.222527	0.103403	0.004204	0.000000	0.043704		
0.237363	0.102760	0.004491	0.000000	0.043704		
0.252198	0.102117	0.004779	0.000000	0.043704		
0.267033	0.101474	0.005070	0.000000	0.043704		
0.281868	0.100831	0.005363	0.000000	0.043704		
0.296703	0.100188	0.005657	0.000000	0.043704		
0.311538	0.099545	0.005953	0.000000	0.043704		
0.326374	0.098902	0.006251	0.000000	0.043704		
0.341209	0.098259	0.006552	0.000000	0.043704		
0.356044	0.097616	0.006854	0.000000	0.043704		
0.370879	0.096973	0.007158	0.000000	0.043704		
0.385714	0.096330	0.007463	0.000000	0.043704		
0.400549	0.095687	0.007783	0.000000	0.043704		
0.415385	0.095044	0.008104	0.000000	0.043704		
0.430220	0.094401	0.008427	0.000000	0.043704		
0.445055	0.093758	0.008752	0.000000	0.043704		
0.459890	0.093115	0.009080	0.000000	0.043704		
0.474725	0.092472	0.009409	0.000000	0.043704		
0.489560	0.091829	0.009740	0.000000	0.043704		
0.504396	0.091186	0.010073	0.000000	0.043704		
0.519231	0.090543	0.010408	0.000000	0.043704		
0.534066	0.089900	0.010745	0.000000	0.043704		
0.548901	0.089257	0.011084	0.000000	0.043704		
0.563736	0.088614	0.011426	0.000000	0.043704		

```
  0.578571  0.087971  0.011769  0.000000  0.043704
  0.593407  0.087328  0.012114  0.000000  0.043704
  0.600000  0.086685  0.025762  0.000000  0.043704
  END FTABLE  2
  FTABLE      1
   52    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.086685  0.000000  0.000000  0.000000  0.000000
  0.014835  0.113334  0.001677  0.000000  0.840825  0.000000
  0.029670  0.113977  0.003363  0.000000  0.870894  0.000000
  0.044505  0.114620  0.005058  0.000000  0.900964  0.000000
  0.059341  0.115263  0.006763  5.848309  0.931033  0.000000
  0.074176  0.115906  0.008478  9.408755  0.961102  0.000000
  0.089011  0.116549  0.010202  11.95185  0.991171  0.000000
  0.103846  0.117191  0.011936  14.04167  1.021241  0.000000
  0.118681  0.117834  0.013680  15.85845  1.051310  0.000000
  0.133516  0.118477  0.015432  17.48750  1.081379  0.000000
  0.148352  0.119120  0.017195  18.97721  1.111448  0.000000
  0.163187  0.119763  0.018967  20.35820  1.141518  0.000000
  0.178022  0.120406  0.020748  21.65129  1.171587  0.000000
  0.192857  0.121049  0.022539  22.87139  1.201656  0.000000
  0.207692  0.121692  0.024340  24.02961  1.231725  0.000000
  0.222527  0.122335  0.026150  25.13452  1.261795  0.000000
  0.237363  0.122978  0.027970  26.19286  1.291864  0.000000
  0.252198  0.123621  0.029799  27.21409  1.321933  0.000000
  0.267033  0.124264  0.031637  28.27720  1.352002  0.000000
  0.281868  0.124907  0.033486  29.35977  1.382072  0.000000
  0.296703  0.125550  0.035343  30.44903  1.412141  0.000000
  0.311538  0.126193  0.037211  31.54103  1.442210  0.000000
  0.326374  0.126836  0.039088  32.63414  1.472279  0.000000
  0.341209  0.127479  0.040974  33.72763  1.502349  0.000000
  0.356044  0.128122  0.042870  34.82124  1.532418  0.000000
  0.370879  0.128765  0.044775  35.91494  1.562487  0.000000
  0.385714  0.129408  0.046691  37.00883  1.592556  0.000000
  0.400549  0.130051  0.048615  38.10306  1.622626  0.000000
  0.415385  0.130694  0.050549  39.19782  1.652695  0.000000
  0.430220  0.131337  0.052493  40.29331  1.682764  0.000000
  0.445055  0.131980  0.054446  41.38975  1.712833  0.000000
  0.459890  0.132623  0.056409  42.48735  1.742903  0.000000
  0.474725  0.133266  0.058381  43.58628  1.772972  0.000000
  0.489560  0.133909  0.060363  44.68676  1.803041  0.000000
  0.504396  0.134552  0.062354  45.78895  1.833110  0.000000
  0.519231  0.135195  0.064355  46.89301  1.863180  0.000000
  0.534066  0.135838  0.066365  47.99911  1.893249  0.000000
  0.548901  0.136481  0.068385  49.10738  1.923318  0.000000
  0.563736  0.137124  0.070415  50.21797  1.953387  0.000000
  0.578571  0.137767  0.072454  51.33100  1.983457  0.000000
  0.593407  0.138410  0.074502  52.44658  2.013526  0.000000
  0.608242  0.139053  0.076561  53.56482  2.043595  0.000000
  0.623077  0.139696  0.078628  54.68582  2.073664  0.000000
  0.637912  0.140339  0.080705  55.80967  2.103734  0.000000
  0.652747  0.140982  0.082792  56.93646  2.133803  0.000000
  0.667582  0.141625  0.084888  58.06627  2.163872  0.000000
  0.682418  0.142268  0.086994  59.19916  2.193941  0.000000
  0.697253  0.142911  0.089110  60.33522  2.224011  0.000000
  0.712088  0.143554  0.091234  61.47449  2.254080  0.000000
  0.726923  0.144197  0.093369  62.61705  2.284149  0.000000
  0.741758  0.144840  0.095513  63.76293  2.314218  0.000000
  0.750000  0.145197  0.096708  64.91220  2.330923  0.000000
  END FTABLE  1
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      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    1              RCHRES   3     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   1000 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1003 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1001 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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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

SOHM

PROJECT REPORT

General Model Information

Project Name:	SOHM Node 59A
Site Name:	
Site Address:	
City:	
Report Date:	12/1/2014
Gage:	Trabuco Canyon
Data Start:	10/01/1958
Data End:	09/30/2005
Timestep:	15 Minute
Precip Scale:	1.00
Version:	2014/11/12

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	9.54
Pervious Total	9.54
Impervious Land Use	Acres
Impervious Total	0
Basin Total	9.54

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	4.98
Pervious Total	4.98
Impervious Land Use	Acres
Impervious,Mod(5-10)	4.55
Impervious Total	4.55
Basin Total	9.53

Element Flows To:

Surface	Interflow	Groundwater
Surface Bio Swale 1	Surface Bio Swale 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bio Swale 1

Bottom Length:	3000.00 ft.
Bottom Width:	16.00 ft.
Material thickness of first layer:	0.2
Material type for first layer:	GRAVEL
Material thickness of second layer:	0.2
Material type for second layer:	Sand
Material thickness of third layer:	0.2
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	151.343
Total Volume Through Riser (ac-ft):	245.674
Total Volume Through Facility (ac-ft):	397.017
Percent Infiltrated:	38.12
Total Precip Applied to Facility:	57.599
Total Evap From Facility:	16.61
Underdrain not used	
Discharge Structure	
Riser Height:	0.25 ft.
Riser Diameter:	18 in.
Notch Type:	Rectangular
Notch Width:	1.000 ft.
Notch Height:	0.500 ft.
Orifice 1 Diameter:	18 in. Elevation:0.05 ft.
Element Flows To:	
Outlet 1	Outlet 2
Trapezoidal Pond 1	Trapezoidal Pond 1

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	1.2672	0.0000	0.0000	0.0000
0.0148	1.2654	0.0034	0.0000	0.0000
0.0297	1.2613	0.0068	0.0000	0.0000
0.0445	1.2572	0.0102	0.0000	0.0000
0.0593	1.2531	0.0137	0.0000	0.0000
0.0742	1.2491	0.0171	0.0000	0.0000
0.0890	1.2450	0.0206	0.0000	0.0000
0.1038	1.2409	0.0241	0.0000	0.0000
0.1187	1.2368	0.0275	0.0000	0.0000
0.1335	1.2327	0.0310	0.0000	0.0000
0.1484	1.2286	0.0345	0.1267	0.1267
0.1632	1.2245	0.0381	0.2987	0.2987
0.1780	1.2204	0.0416	0.5556	0.5556
0.1929	1.2164	0.0452	0.5556	0.5556
0.2077	1.2123	0.0486	0.5556	0.5556
0.2225	1.2082	0.0520	0.5556	0.5556
0.2374	1.2041	0.0555	0.5556	0.5556
0.2522	1.2000	0.0590	0.5556	0.5556
0.2670	1.1959	0.0624	0.5556	0.5556
0.2819	1.1918	0.0659	0.5556	0.5556
0.2967	1.1878	0.0694	0.5556	0.5556
0.3115	1.1837	0.0730	0.5556	0.5556

0.3264	1.1796	0.0765	0.5556	0.5556
0.3412	1.1755	0.0800	0.5556	0.5556
0.3560	1.1714	0.0836	0.5556	0.5556
0.3709	1.1673	0.0872	0.5556	0.5556
0.3857	1.1632	0.0907	0.5556	0.5556
0.4005	1.1591	0.0945	0.5556	0.5556
0.4154	1.1551	0.0982	0.5556	0.5556
0.4302	1.1510	0.1020	0.5556	0.5556
0.4451	1.1469	0.1057	0.5556	0.5556
0.4599	1.1428	0.1095	0.5556	0.5556
0.4747	1.1387	0.1133	0.5556	0.5556
0.4896	1.1346	0.1171	0.5556	0.5556
0.5044	1.1305	0.1209	0.5556	0.5556
0.5192	1.1264	0.1247	0.5556	0.5556
0.5341	1.1224	0.1286	0.5556	0.5556
0.5489	1.1183	0.1324	0.5556	0.5556
0.5637	1.1142	0.1363	0.5556	0.5556
0.5786	1.1101	0.1401	0.5556	0.5556
0.5934	1.1060	0.1440	0.5556	0.5556
0.6000	1.1019	0.1458	0.5556	0.5556

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
0.6000	1.2672	0.1458	0.0000	10.688	0.0000
0.6148	1.2713	0.1646	0.0000	10.688	0.0000
0.6297	1.2754	0.1835	0.0000	11.071	0.0000
0.6445	1.2795	0.2024	0.0000	11.453	0.0000
0.6593	1.2836	0.2215	0.0000	11.835	0.0000
0.6742	1.2877	0.2405	0.0000	12.217	0.0000
0.6890	1.2917	0.2597	0.0000	12.600	0.0000
0.7038	1.2958	0.2789	0.0000	12.982	0.0000
0.7187	1.2999	0.2981	0.0000	13.364	0.0000
0.7335	1.3040	0.3174	0.0000	13.746	0.0000
0.7484	1.3081	0.3368	0.0000	14.129	0.0000
0.7632	1.3122	0.3562	0.0000	14.511	0.0000
0.7780	1.3163	0.3757	0.0000	14.893	0.0000
0.7929	1.3203	0.3953	0.0000	15.275	0.0000
0.8077	1.3244	0.4149	0.0000	15.658	0.0000
0.8225	1.3285	0.4346	0.0000	16.040	0.0000
0.8374	1.3326	0.4543	0.0000	16.422	0.0000
0.8522	1.3367	0.4741	0.0000	16.804	0.0000
0.8670	1.3408	0.4940	0.0000	17.186	0.0000
0.8819	1.3449	0.5139	0.0000	17.569	0.0000
0.8967	1.3490	0.5339	0.0000	17.951	0.0000
0.9115	1.3530	0.5539	0.0000	18.333	0.0000
0.9264	1.3571	0.5740	0.0000	18.715	0.0000
0.9412	1.3612	0.5942	0.0000	19.098	0.0000
0.9560	1.3653	0.6144	0.0000	19.480	0.0000
0.9709	1.3694	0.6347	0.0000	19.862	0.0000
0.9857	1.3735	0.6550	0.0000	20.244	0.0000
1.0005	1.3776	0.6755	0.0000	20.627	0.0000
1.0154	1.3816	0.6959	0.0000	21.009	0.0000
1.0302	1.3857	0.7164	0.0000	21.391	0.0000
1.0451	1.3898	0.7370	0.0000	21.773	0.0000
1.0599	1.3939	0.7577	0.0000	22.156	0.0000
1.0747	1.3980	0.7784	0.0000	22.538	0.0000
1.0896	1.4021	0.7992	0.0000	22.920	0.0000
1.1044	1.4062	0.8200	0.0000	23.302	0.0000

1.1192	1.4103	0.8409	0.0000	23.684	0.0000
1.1341	1.4143	0.8618	0.0000	24.067	0.0000
1.1489	1.4184	0.8828	0.0000	24.449	0.0000
1.1637	1.4225	0.9039	0.0000	24.831	0.0000
1.1786	1.4266	0.9251	0.0000	25.213	0.0000
1.1934	1.4307	0.9462	0.0000	25.596	0.0000
1.2082	1.4348	0.9675	0.0000	25.978	0.0000
1.2231	1.4389	0.9888	10.948	26.360	0.0000
1.2379	1.4430	1.0102	11.231	26.742	0.0000
1.2527	1.4470	1.0316	11.518	27.125	0.0000
1.2676	1.4511	1.0531	11.807	27.507	0.0000
1.2824	1.4552	1.0747	12.098	27.889	0.0000
1.2973	1.4593	1.0963	12.393	28.271	0.0000
1.3121	1.4634	1.1180	12.690	28.654	0.0000
1.3269	1.4675	1.1397	12.990	29.036	0.0000
1.3418	1.4716	1.1615	13.293	29.418	0.0000
1.3500	1.4738	1.1737	13.598	29.630	0.0000

Surface Bio Swale 1

Element Flows To:

Outlet 1	Outlet 2
Trapezoidal Pond 1	Bio Swale 1

Trapezoidal Pond 1

Bottom Length:	96.87 ft.
Bottom Width:	96.87 ft.
Depth:	5 ft.
Volume at riser head:	1.1116 acre-ft.
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	362.19
Total Volume Through Riser (ac-ft):	93.179
Total Volume Through Facility (ac-ft):	455.37
Percent Infiltrated:	79.54
Total Precip Applied to Facility:	64.934
Total Evap From Facility:	6.526
Side slope 1:	3 To 1
Side slope 2:	3 To 1
Side slope 3:	3 To 1
Side slope 4:	3 To 1
Discharge Structure	
Riser Height:	4 ft.
Riser Diameter:	18 in.
Notch Type:	Rectangular
Notch Width:	1.500 ft.
Notch Height:	0.965 ft.
Orifice 1 Diameter:	2.972 in. Elevation:0 ft.
Element Flows To:	
Outlet 1	Outlet 2

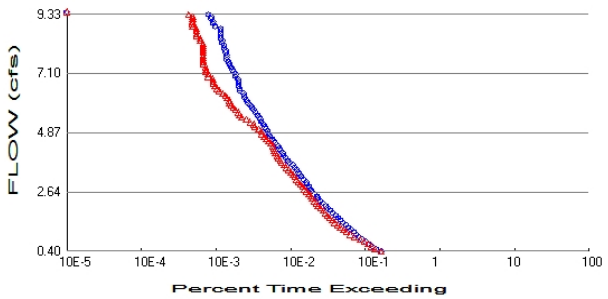
Pond Hydraulic Table

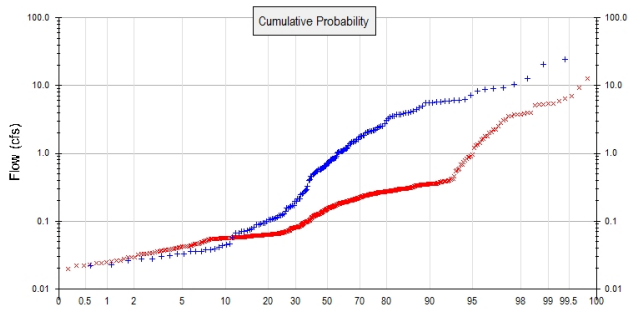
Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.215	0.000	0.000	0.000
0.0556	0.216	0.012	0.054	0.108
0.1111	0.218	0.024	0.077	0.108
0.1667	0.219	0.036	0.094	0.108
0.2222	0.221	0.048	0.109	0.108
0.2778	0.222	0.060	0.122	0.108
0.3333	0.224	0.073	0.133	0.108
0.3889	0.225	0.085	0.144	0.108
0.4444	0.227	0.098	0.154	0.108
0.5000	0.229	0.111	0.164	0.108
0.5556	0.230	0.123	0.172	0.108
0.6111	0.232	0.136	0.181	0.108
0.6667	0.233	0.149	0.189	0.108
0.7222	0.235	0.162	0.197	0.108
0.7778	0.236	0.175	0.204	0.108
0.8333	0.238	0.189	0.211	0.108
0.8889	0.239	0.202	0.218	0.108
0.9444	0.241	0.215	0.225	0.108
1.0000	0.243	0.229	0.232	0.108
1.0556	0.244	0.242	0.238	0.108
1.1111	0.246	0.256	0.244	0.108
1.1667	0.247	0.269	0.250	0.108
1.2222	0.249	0.283	0.256	0.108
1.2778	0.250	0.297	0.262	0.108
1.3333	0.252	0.311	0.267	0.108

1.3889	0.254	0.325	0.273	0.108
1.4444	0.255	0.339	0.278	0.108
1.5000	0.257	0.354	0.284	0.108
1.5556	0.259	0.368	0.289	0.108
1.6111	0.260	0.382	0.294	0.108
1.6667	0.262	0.397	0.299	0.108
1.7222	0.263	0.412	0.304	0.108
1.7778	0.265	0.426	0.309	0.108
1.8333	0.267	0.441	0.314	0.108
1.8889	0.268	0.456	0.318	0.108
1.9444	0.270	0.471	0.323	0.108
2.0000	0.272	0.486	0.328	0.108
2.0556	0.273	0.501	0.332	0.108
2.1111	0.275	0.516	0.337	0.108
2.1667	0.277	0.532	0.341	0.108
2.2222	0.278	0.547	0.345	0.108
2.2778	0.280	0.563	0.350	0.108
2.3333	0.282	0.578	0.354	0.108
2.3889	0.283	0.594	0.358	0.108
2.4444	0.285	0.610	0.362	0.108
2.5000	0.287	0.626	0.366	0.108
2.5556	0.289	0.642	0.370	0.108
2.6111	0.290	0.658	0.374	0.108
2.6667	0.292	0.674	0.378	0.108
2.7222	0.294	0.690	0.382	0.108
2.7778	0.295	0.707	0.386	0.108
2.8333	0.297	0.723	0.390	0.108
2.8889	0.299	0.740	0.394	0.108
2.9444	0.301	0.757	0.398	0.108
3.0000	0.302	0.773	0.401	0.108
3.0556	0.304	0.790	0.420	0.108
3.1111	0.306	0.807	0.514	0.108
3.1667	0.308	0.824	0.652	0.108
3.2222	0.310	0.841	0.822	0.108
3.2778	0.311	0.859	1.018	0.108
3.3333	0.313	0.876	1.239	0.108
3.3889	0.315	0.894	1.480	0.108
3.4444	0.317	0.911	1.741	0.108
3.5000	0.319	0.929	2.019	0.108
3.5556	0.320	0.947	2.315	0.108
3.6111	0.322	0.964	2.627	0.108
3.6667	0.324	0.982	2.954	0.108
3.7222	0.326	1.001	3.295	0.108
3.7778	0.328	1.019	3.650	0.108
3.8333	0.329	1.037	4.019	0.108
3.8889	0.331	1.055	4.401	0.108
3.9444	0.333	1.074	4.795	0.108
4.0000	0.335	1.092	5.201	0.108
4.0556	0.337	1.111	5.396	0.108
4.1111	0.339	1.130	5.749	0.108
4.1667	0.341	1.149	6.205	0.108
4.2222	0.342	1.168	6.744	0.108
4.2778	0.344	1.187	7.356	0.108
4.3333	0.346	1.206	8.032	0.108
4.3889	0.348	1.225	8.766	0.108
4.4444	0.350	1.245	9.555	0.108
4.5000	0.352	1.264	10.39	0.108
4.5556	0.354	1.284	11.28	0.108

4.6111	0.356	1.304	12.21	0.108
4.6667	0.358	1.324	13.19	0.108
4.7222	0.359	1.343	14.20	0.108
4.7778	0.361	1.364	15.26	0.108
4.8333	0.363	1.384	16.36	0.108
4.8889	0.365	1.404	17.49	0.108
4.9444	0.367	1.424	18.66	0.108
5.0000	0.369	1.445	19.86	0.108
5.0556	0.371	1.465	21.10	0.108

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 9.54
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 4.98
Total Impervious Area: 4.55

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	4.042953
5 year	6.346467
10 year	9.330588
25 year	17.400037

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	2.264621
5 year	5.093679
10 year	5.861542
25 year	8.375084

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.4043	2667	2667	100	Pass
0.4945	2312	2203	95	Pass
0.5846	2042	2007	98	Pass
0.6748	1816	1814	99	Pass
0.7650	1640	1594	97	Pass
0.8551	1498	1395	93	Pass
0.9453	1361	1168	85	Pass
1.0354	1252	1036	82	Pass
1.1256	1150	919	79	Pass
1.2158	1063	836	78	Pass
1.3059	975	766	78	Pass
1.3961	906	699	77	Pass
1.4863	831	644	77	Pass
1.5764	764	589	77	Pass
1.6666	713	546	76	Pass
1.7568	662	508	76	Pass
1.8469	598	475	79	Pass
1.9371	558	447	80	Pass
2.0273	516	412	79	Pass
2.1174	484	383	79	Pass
2.2076	442	364	82	Pass
2.2978	407	339	83	Pass
2.3879	381	323	84	Pass
2.4781	367	306	83	Pass
2.5682	341	290	85	Pass
2.6584	319	269	84	Pass
2.7486	306	252	82	Pass
2.8387	290	239	82	Pass
2.9289	270	223	82	Pass
3.0191	264	207	78	Pass
3.1092	243	199	81	Pass
3.1994	227	186	81	Pass
3.2896	215	176	81	Pass
3.3797	209	164	78	Pass
3.4699	199	155	77	Pass
3.5601	184	142	77	Pass
3.6502	177	136	76	Pass
3.7404	160	124	77	Pass
3.8305	150	120	80	Pass
3.9207	141	114	80	Pass
4.0109	132	108	81	Pass
4.1010	128	103	80	Pass
4.1912	121	99	81	Pass
4.2814	117	97	82	Pass
4.3715	111	95	85	Pass
4.4617	102	89	87	Pass
4.5519	98	84	85	Pass
4.6420	93	77	82	Pass
4.7322	86	73	84	Pass
4.8224	84	68	80	Pass
4.9125	81	66	81	Pass
5.0027	77	61	79	Pass
5.0929	74	54	72	Pass

5.1830	71	53	74	Pass
5.2732	67	47	70	Pass
5.3633	65	42	64	Pass
5.4535	62	36	58	Pass
5.5437	59	34	57	Pass
5.6338	55	33	60	Pass
5.7240	53	30	56	Pass
5.8142	50	28	56	Pass
5.9043	47	26	55	Pass
5.9945	44	25	56	Pass
6.0847	43	25	58	Pass
6.1748	40	23	57	Pass
6.2650	39	22	56	Pass
6.3552	38	20	52	Pass
6.4453	34	18	52	Pass
6.5355	34	17	50	Pass
6.6257	33	16	48	Pass
6.7158	33	15	45	Pass
6.8060	33	15	45	Pass
6.8961	32	15	46	Pass
6.9863	30	13	43	Pass
7.0765	30	13	43	Pass
7.1666	28	12	42	Pass
7.2568	27	12	44	Pass
7.3470	26	12	46	Pass
7.4371	25	11	44	Pass
7.5273	24	11	45	Pass
7.6175	23	11	47	Pass
7.7076	23	11	47	Pass
7.7978	23	11	47	Pass
7.8880	22	11	50	Pass
7.9781	22	11	50	Pass
8.0683	21	11	52	Pass
8.1584	21	11	52	Pass
8.2486	20	11	55	Pass
8.3388	20	10	50	Pass
8.4289	19	10	52	Pass
8.5191	19	9	47	Pass
8.6093	19	9	47	Pass
8.6994	19	9	47	Pass
8.7896	19	9	47	Pass
8.8798	16	8	50	Pass
8.9699	15	8	53	Pass
9.0601	15	8	53	Pass
9.1503	14	8	57	Pass
9.2404	14	8	57	Pass
9.3306	13	7	53	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

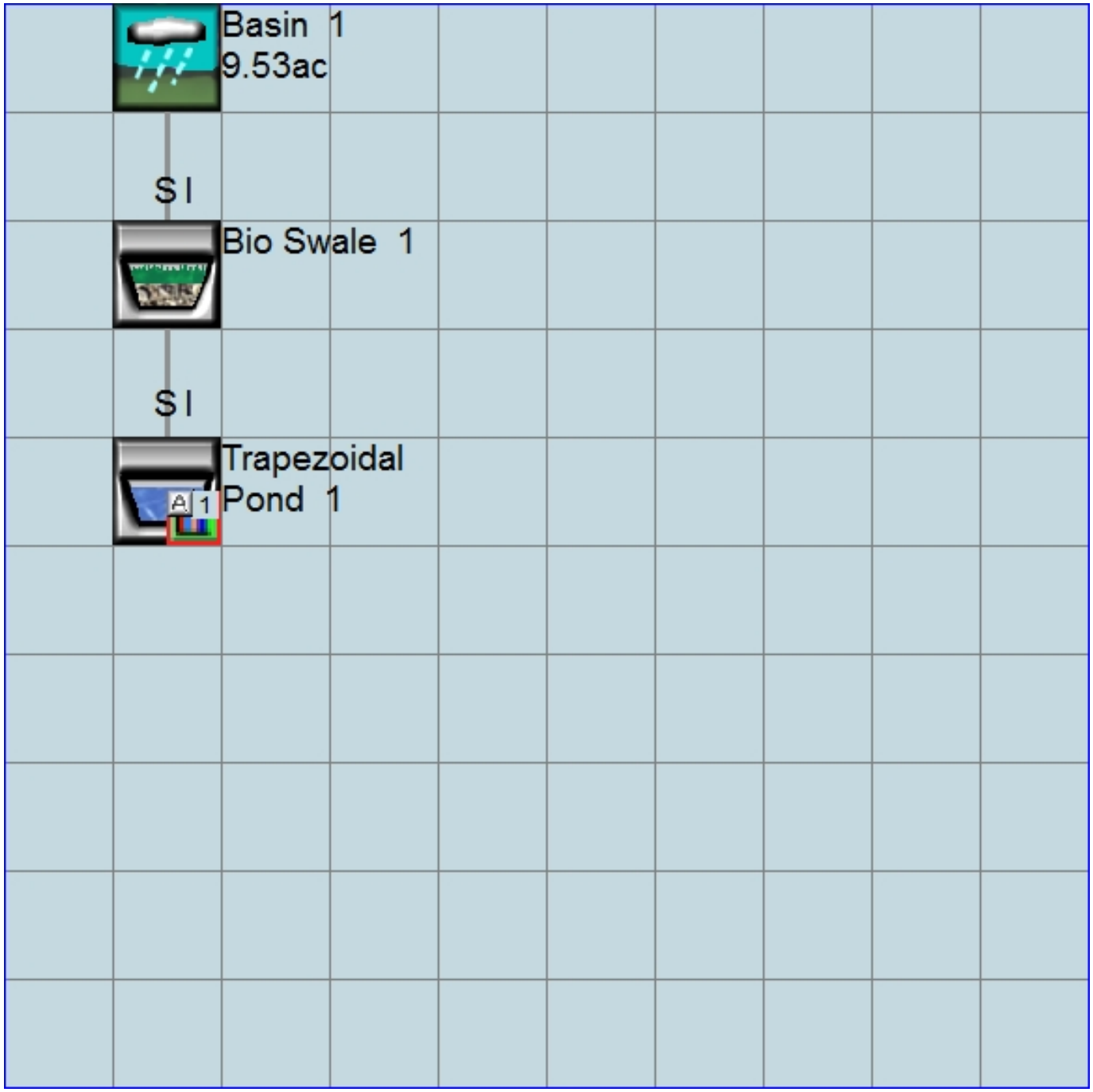
IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic

Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1958 10 01        END    2005 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   SOHM Node 59A.wdm
MESSU      25   PreSOHM Node 59A.MES
           27   PreSOHM Node 59A.L61
           28   PreSOHM Node 59A.L62
           30   POCSOHM Node 59A1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37              0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37              0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37              0         0      0.09         0      0.92       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#   ***
Basin  1***
PERLND  37                        9.54     COPY   501     12
PERLND  37                        9.54     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       1958 10 01        END    2005 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   SOHM Node 59A.wdm
MESSU      25   MitSOHM Node 59A.MES
           27   MitSOHM Node 59A.L61
           28   MitSOHM Node 59A.L62
           30   POCSOHM Node 59A1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      IMPLND       2
      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        Trapezoidal Pond  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
  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       0.3      0.01
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                       in  out           ***
    2     Impervious,Mod(5-10)    1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         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     ***
    2         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            100       0.1       0.1      0.09
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  37                        4.98     RCHRES   1      2
PERLND  37                        4.98     RCHRES   1      3
IMPLND   2                        4.55     RCHRES   1      5

******Routing******
RCHRES   2                           1     RCHRES   3      7
RCHRES   2                                 COPY     1     17
RCHRES   2                           1     RCHRES   3      8
RCHRES   2                                 COPY     1     18
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 Bio Swal-007    3    1    1    1   28    0    1
    2     Bio Swale  1            2    1    1    1   28    0    1
    3     Trapezoidal Pond-010    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      0.57       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  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            =  5960.
*** 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
   42    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  1.267218  0.000000  0.000000  0.000000
  0.014835  1.265401  0.003398  0.000000  0.000000
  0.029670  1.261314  0.006809  0.000000  0.000000
  0.044505  1.257228  0.010233  0.000000  0.000000
  0.059341  1.253141  0.013669  0.000000  0.000000
  0.074176  1.249054  0.017118  0.000000  0.000000
  0.089011  1.244967  0.020579  0.000000  0.000000
  0.103846  1.240880  0.024053  0.000000  0.000000
  0.118681  1.236794  0.027539  0.000000  0.000000
  0.133516  1.232707  0.031038  0.000000  0.000000
  0.148352  1.228620  0.034550  0.000000  0.126651
  0.163187  1.224533  0.038074  0.000000  0.298663
  0.178022  1.220446  0.041611  0.000000  0.555556
  0.192857  1.216359  0.045160  0.000000  0.555556
  0.207692  1.212273  0.048593  0.000000  0.555556
  0.222527  1.208186  0.052038  0.000000  0.555556
  0.237363  1.204099  0.055496  0.000000  0.555556
  0.252198  1.200012  0.058965  0.000000  0.555556
  0.267033  1.195925  0.062447  0.000000  0.555556
  0.281868  1.191838  0.065941  0.000000  0.555556
  0.296703  1.187752  0.069447  0.000000  0.555556
  0.311538  1.183665  0.072965  0.000000  0.555556
  0.326374  1.179578  0.076495  0.000000  0.555556
  0.341209  1.175491  0.080037  0.000000  0.555556
  0.356044  1.171404  0.083591  0.000000  0.555556
  0.370879  1.167318  0.087158  0.000000  0.555556
  0.385714  1.163231  0.090737  0.000000  0.555556
  0.400549  1.159144  0.094462  0.000000  0.555556
  0.415385  1.155057  0.098200  0.000000  0.555556
  0.430220  1.150970  0.101951  0.000000  0.555556
  0.445055  1.146883  0.105714  0.000000  0.555556
  0.459890  1.142797  0.109490  0.000000  0.555556
  0.474725  1.138710  0.113278  0.000000  0.555556
  0.489560  1.134623  0.117079  0.000000  0.555556
  0.504396  1.130536  0.120892  0.000000  0.555556
  0.519231  1.126449  0.124719  0.000000  0.555556
  0.534066  1.122362  0.128557  0.000000  0.555556
  0.548901  1.118276  0.132408  0.000000  0.555556
  0.563736  1.114189  0.136272  0.000000  0.555556
  0.578571  1.110102  0.140149  0.000000  0.555556
  0.593407  1.106015  0.144038  0.000000  0.555556
  0.600000  1.101928  0.553927  0.000000  0.555556
  END FTABLE  2
  FTABLE      1
   52    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  1.101928  0.000000  0.416250  0.000000  0.000000
  0.014835  1.271304  0.018830  0.453845  10.68846  0.000000
  0.029670  1.275391  0.037720  0.492509  11.07069  0.000000
  0.044505  1.279478  0.056671  0.532212  11.45293  0.000000
  0.059341  1.283565  0.075683  1.395346  11.83516  0.000000
  0.074176  1.287652  0.094755  1.937738  12.21740  0.000000
  0.089011  1.291739  0.113888  2.338030  12.59964  0.000000
  0.103846  1.295825  0.133081  2.675526  12.98187  0.000000
  0.118681  1.299912  0.152335  2.975549  13.36411  0.000000
  0.133516  1.303999  0.171650  3.250077  13.74635  0.000000
  0.148352  1.308086  0.191025  3.505899  14.12858  0.000000
  0.163187  1.312173  0.210461  3.747303  14.51082  0.000000
```

0.178022	1.316259	0.229958	3.977201	14.89305	0.000000
0.192857	1.320346	0.249515	4.197674	15.27529	0.000000
0.207692	1.324433	0.269133	4.410273	15.65753	0.000000
0.222527	1.328520	0.288811	4.616187	16.03976	0.000000
0.237363	1.332607	0.308551	4.816353	16.42200	0.000000
0.252198	1.336694	0.328350	5.005255	16.80424	0.000000
0.267033	1.340780	0.348211	5.174111	17.18647	0.000000
0.281868	1.344867	0.368132	5.357993	17.56871	0.000000
0.296703	1.348954	0.388113	5.551380	17.95094	0.000000
0.311538	1.353041	0.408156	5.752172	18.33318	0.000000
0.326374	1.357128	0.428259	5.959217	18.71542	0.000000
0.341209	1.361215	0.448422	6.171782	19.09765	0.000000
0.356044	1.365301	0.468646	6.389363	19.47989	0.000000
0.370879	1.369388	0.488931	6.611590	19.86212	0.000000
0.385714	1.373475	0.509276	6.838182	20.24436	0.000000
0.400549	1.377562	0.529682	7.068915	20.62660	0.000000
0.415385	1.381649	0.550149	7.303610	21.00883	0.000000
0.430220	1.385735	0.570676	7.542117	21.39107	0.000000
0.445055	1.389822	0.591264	7.784307	21.77331	0.000000
0.459890	1.393909	0.611913	8.030073	22.15554	0.000000
0.474725	1.397996	0.632622	8.279320	22.53778	0.000000
0.489560	1.402083	0.653392	8.531962	22.92001	0.000000
0.504396	1.406170	0.674222	8.787924	23.30225	0.000000
0.519231	1.410256	0.695113	9.047140	23.68449	0.000000
0.534066	1.414343	0.716065	9.309546	24.06672	0.000000
0.548901	1.418430	0.737077	9.575087	24.44896	0.000000
0.563736	1.422517	0.758150	9.843709	24.83119	0.000000
0.578571	1.426604	0.779284	10.11537	25.21343	0.000000
0.593407	1.430691	0.800478	10.39001	25.59567	0.000000
0.608242	1.434777	0.821733	10.66760	25.97790	0.000000
0.623077	1.438864	0.843049	10.94810	26.36014	0.000000
0.637912	1.442951	0.864425	11.23147	26.74238	0.000000
0.652747	1.447038	0.885861	11.51767	27.12461	0.000000
0.667582	1.451125	0.907359	11.80666	27.50685	0.000000
0.682418	1.455211	0.928917	12.09843	27.88908	0.000000
0.697253	1.459298	0.950535	12.39293	28.27132	0.000000
0.712088	1.463385	0.972215	12.69014	28.65356	0.000000
0.726923	1.467472	0.993954	12.99003	29.03579	0.000000
0.741758	1.471559	1.015755	13.29256	29.41803	0.000000
0.750000	1.473829	1.027893	13.59773	29.63038	0.000000

END FTABLE 1
FTABLE 3
91 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.215437	0.000000	0.000000	0.000000		
0.055556	0.216922	0.012010	0.054679	0.108616		
0.111111	0.218413	0.024103	0.077328	0.108616		
0.166667	0.219908	0.036278	0.094707	0.108616		
0.222222	0.221409	0.048537	0.109358	0.108616		
0.277778	0.222914	0.060879	0.122266	0.108616		
0.333333	0.224425	0.073305	0.133936	0.108616		
0.388889	0.225941	0.085816	0.144667	0.108616		
0.444444	0.227461	0.098410	0.154656	0.108616		
0.500000	0.228987	0.111089	0.164037	0.108616		
0.555556	0.230518	0.123853	0.172910	0.108616		
0.611111	0.232055	0.136702	0.181350	0.108616		
0.666667	0.233596	0.149637	0.189414	0.108616		
0.722222	0.235142	0.162658	0.197148	0.108616		
0.777778	0.236694	0.175764	0.204590	0.108616		
0.833333	0.238250	0.188957	0.211771	0.108616		
0.888889	0.239812	0.202237	0.218716	0.108616		
0.944444	0.241379	0.215603	0.225447	0.108616		
1.000000	0.242951	0.229057	0.231983	0.108616		
1.055556	0.244528	0.242598	0.238340	0.108616		
1.111111	0.246110	0.256227	0.244532	0.108616		
1.166667	0.247697	0.269943	0.250571	0.108616		
1.222222	0.249289	0.283749	0.256467	0.108616		
1.277778	0.250887	0.297642	0.262231	0.108616		
1.333333	0.252489	0.311625	0.267871	0.108616		

```
  1.388889  0.254097  0.325697  0.273395  0.108616
  1.444444  0.255709  0.339858  0.278809  0.108616
  1.500000  0.257327  0.354109  0.284120  0.108616
  1.555556  0.258950  0.368450  0.289334  0.108616
  1.611111  0.260578  0.382881  0.294455  0.108616
  1.666667  0.262211  0.397403  0.299489  0.108616
  1.722222  0.263849  0.412016  0.304440  0.108616
  1.777778  0.265493  0.426720  0.309311  0.108616
  1.833333  0.267141  0.441515  0.314107  0.108616
  1.888889  0.268795  0.456403  0.318830  0.108616
  1.944444  0.270453  0.471382  0.323485  0.108616
  2.000000  0.272117  0.486453  0.328074  0.108616
  2.055556  0.273786  0.501617  0.332599  0.108616
  2.111111  0.275460  0.516874  0.337064  0.108616
  2.166667  0.277139  0.532224  0.341470  0.108616
  2.222222  0.278823  0.547667  0.345820  0.108616
  2.277778  0.280512  0.563204  0.350116  0.108616
  2.333333  0.282206  0.578835  0.354360  0.108616
  2.388889  0.283906  0.594561  0.358554  0.108616
  2.444444  0.285610  0.610381  0.362699  0.108616
  2.500000  0.287320  0.626295  0.366798  0.108616
  2.555556  0.289035  0.642305  0.370851  0.108616
  2.611111  0.290754  0.658410  0.374860  0.108616
  2.666667  0.292479  0.674611  0.378827  0.108616
  2.722222  0.294209  0.690908  0.382753  0.108616
  2.777778  0.295944  0.707301  0.386639  0.108616
  2.833333  0.297685  0.723791  0.390486  0.108616
  2.888889  0.299430  0.740378  0.394296  0.108616
  2.944444  0.301180  0.757061  0.398069  0.108616
  3.000000  0.302936  0.773842  0.401807  0.108616
  3.055556  0.304697  0.790721  0.420624  0.108616
  3.111111  0.306462  0.807697  0.514818  0.108616
  3.166667  0.308233  0.824772  0.652452  0.108616
  3.222222  0.310009  0.841946  0.822247  0.108616
  3.277778  0.311790  0.859218  1.018858  0.108616
  3.333333  0.313576  0.876589  1.238965  0.108616
  3.388889  0.315368  0.894060  1.480245  0.108616
  3.444444  0.317164  0.911630  1.740953  0.108616
  3.500000  0.318965  0.929300  2.019716  0.108616
  3.555556  0.320772  0.947071  2.315416  0.108616
  3.611111  0.322584  0.964942  2.627121  0.108616
  3.666667  0.324400  0.982914  2.954037  0.108616
  3.722222  0.326222  1.000987  3.295479  0.108616
  3.777778  0.328049  1.019161  3.650845  0.108616
  3.833333  0.329881  1.037437  4.019605  0.108616
  3.888889  0.331718  1.055814  4.401282  0.108616
  3.944444  0.333561  1.074294  4.795450  0.108616
  4.000000  0.335408  1.092877  5.201719  0.108616
  4.055556  0.337260  1.111562  5.396222  0.108616
  4.111111  0.339118  1.130350  5.749174  0.108616
  4.166667  0.340981  1.149242  6.205269  0.108616
  4.222222  0.342848  1.168237  6.744769  0.108616
  4.277778  0.344721  1.187336  7.356269  0.108616
  4.333333  0.346599  1.206540  8.032071  0.108616
  4.388889  0.348482  1.225848  8.766528  0.108616
  4.444444  0.350371  1.245260  9.555261  0.108616
  4.500000  0.352264  1.264778  10.39475  0.108616
  4.555556  0.354162  1.284401  11.28208  0.108616
  4.611111  0.356066  1.304129  12.21478  0.108616
  4.666667  0.357974  1.323964  13.19075  0.108616
  4.722222  0.359888  1.343904  14.20814  0.108616
  4.777778  0.361807  1.363951  15.26531  0.108616
  4.833333  0.363731  1.384105  16.36083  0.108616
  4.888889  0.365660  1.404366  17.49338  0.108616
  4.944444  0.367594  1.424734  18.66179  0.108616
  5.000000  0.369533  1.445210  19.86498  0.108616
  END FTABLE  3
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      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    1              RCHRES   3     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   1010 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1012 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1013 FLOW     ENGL      REPL
RCHRES   3 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: 1978/ 3/ 4 14:30

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
52 4.4246E+04 4.4775E+04 4.6032E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1978/ 3/ 4 14:30

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
9.8879E+01 1.2820E+05 -4.332E+05    3.3703  3.3703E+00      3
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1988/ 4/21  1:30

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
-1.780E+02 1.0739E+05 -9.680E-06   -0.00042 -1.815E-10      2
```

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

SOHM

PROJECT REPORT

General Model Information

Project Name:	SOHM Node 62A
Site Name:	
Site Address:	
City:	
Report Date:	12/1/2014
Gage:	Trabuco Canyon
Data Start:	10/01/1958
Data End:	09/30/2005
Timestep:	15 Minute
Precip Scale:	1.00
Version:	2014/11/12

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	3.28
Pervious Total	3.28
Impervious Land Use	Acres
Impervious Total	0
Basin Total	3.28

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	2.28
Pervious Total	2.28
Impervious Land Use	Acres
Impervious,Flat(0-5)	1
Impervious Total	1
Basin Total	3.28

Element Flows To:

Surface	Interflow	Groundwater
Surface Bio Swale 1	Surface Bio Swale 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bio Swale 1

Bottom Length:	387.00 ft.
Bottom Width:	14.00 ft.
Material thickness of first layer:	0.2
Material type for first layer:	GRAVEL
Material thickness of second layer:	0.2
Material type for second layer:	Sand
Material thickness of third layer:	0.2
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.3
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	2.009
Total Volume Through Riser (ac-ft):	92.434
Total Volume Through Facility (ac-ft):	94.443
Percent Infiltrated:	2.13
Total Precip Applied to Facility:	1.017
Total Evap From Facility:	0.441
Underdrain not used	
Discharge Structure	
Riser Height:	0.1 ft.
Riser Diameter:	48 in.
Notch Type:	Rectangular
Notch Width:	1.000 ft.
Notch Height:	0.500 ft.
Orifice 1 Diameter:	36 in. Elevation:0.05 ft.
Element Flows To:	
Outlet 1	Outlet 2
Trapezoidal Pond 1	Trapezoidal Pond 1

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.1457	0.0000	0.0000	0.0000
0.0132	0.1455	0.0003	0.0000	0.0000
0.0264	0.1450	0.0007	0.0000	0.0000
0.0396	0.1445	0.0010	0.0000	0.0000
0.0527	0.1441	0.0014	0.0000	0.0000
0.0659	0.1436	0.0017	0.0000	0.0000
0.0791	0.1431	0.0021	0.0000	0.0000
0.0923	0.1427	0.0024	0.0000	0.0000
0.1055	0.1422	0.0028	0.0000	0.0000
0.1187	0.1417	0.0031	0.0000	0.0000
0.1319	0.1413	0.0035	0.0113	0.0113
0.1451	0.1408	0.0038	0.0261	0.0261
0.1582	0.1403	0.0042	0.0376	0.0376
0.1714	0.1398	0.0045	0.0376	0.0376
0.1846	0.1394	0.0049	0.0376	0.0376
0.1978	0.1389	0.0052	0.0376	0.0376
0.2110	0.1384	0.0056	0.0376	0.0376
0.2242	0.1380	0.0059	0.0376	0.0376
0.2374	0.1375	0.0063	0.0376	0.0376
0.2505	0.1370	0.0066	0.0376	0.0376
0.2637	0.1366	0.0070	0.0376	0.0376
0.2769	0.1361	0.0074	0.0376	0.0376

0.2901	0.1356	0.0077	0.0376	0.0376
0.3033	0.1352	0.0081	0.0376	0.0376
0.3165	0.1347	0.0084	0.0376	0.0376
0.3297	0.1342	0.0088	0.0376	0.0376
0.3429	0.1338	0.0091	0.0376	0.0376
0.3560	0.1333	0.0095	0.0376	0.0376
0.3692	0.1328	0.0099	0.0376	0.0376
0.3824	0.1323	0.0102	0.0376	0.0376
0.3956	0.1319	0.0106	0.0376	0.0376
0.4088	0.1314	0.0110	0.0376	0.0376
0.4220	0.1309	0.0113	0.0376	0.0376
0.4352	0.1305	0.0117	0.0376	0.0376
0.4484	0.1300	0.0121	0.0376	0.0376
0.4615	0.1295	0.0125	0.0376	0.0376
0.4747	0.1291	0.0129	0.0376	0.0376
0.4879	0.1286	0.0133	0.0376	0.0376
0.5011	0.1281	0.0137	0.0376	0.0376
0.5143	0.1277	0.0140	0.0376	0.0376
0.5275	0.1272	0.0144	0.0376	0.0376
0.5407	0.1267	0.0148	0.0376	0.0376
0.5538	0.1263	0.0152	0.0376	0.0376
0.5670	0.1258	0.0156	0.0376	0.0376
0.5802	0.1253	0.0160	0.0376	0.0376
0.5934	0.1248	0.0164	0.0376	0.0376
0.6000	0.1244	0.0166	0.0376	0.0376

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
0.6000	0.1457	0.0166	0.0000	1.2017	0.0000
0.6132	0.1462	0.0185	0.0000	1.2017	0.0000
0.6264	0.1466	0.0205	0.0000	1.2400	0.0000
0.6396	0.1471	0.0224	0.0000	1.2784	0.0000
0.6527	0.1476	0.0243	0.0000	1.3167	0.0000
0.6659	0.1480	0.0263	0.0000	1.3551	0.0000
0.6791	0.1485	0.0283	0.0000	1.3934	0.0000
0.6923	0.1490	0.0302	0.0000	1.4318	0.0000
0.7055	0.1495	0.0322	0.0000	1.4701	0.0000
0.7187	0.1499	0.0342	0.0000	1.5085	0.0000
0.7319	0.1504	0.0361	0.0000	1.5468	0.0000
0.7451	0.1509	0.0381	0.0000	1.5852	0.0000
0.7582	0.1513	0.0401	0.0000	1.6235	0.0000
0.7714	0.1518	0.0421	0.0000	1.6619	0.0000
0.7846	0.1523	0.0441	0.0000	1.7002	0.0000
0.7978	0.1527	0.0461	0.0000	1.7386	0.0000
0.8110	0.1532	0.0481	0.0000	1.7769	0.0000
0.8242	0.1537	0.0502	0.0000	1.8153	0.0000
0.8374	0.1541	0.0522	0.0000	1.8536	0.0000
0.8505	0.1546	0.0542	0.0000	1.8920	0.0000
0.8637	0.1551	0.0563	0.0000	1.9303	0.0000
0.8769	0.1555	0.0583	0.0000	1.9687	0.0000
0.8901	0.1560	0.0604	0.0000	2.0070	0.0000
0.9033	0.1565	0.0624	0.0000	2.0454	0.0000
0.9165	0.1569	0.0645	0.0000	2.0837	0.0000
0.9297	0.1574	0.0666	0.0000	2.1221	0.0000
0.9429	0.1579	0.0687	0.0000	2.1604	0.0000
0.9560	0.1584	0.0707	0.0000	2.1988	0.0000
0.9692	0.1588	0.0728	0.0000	2.2371	0.0000
0.9824	0.1593	0.0749	0.0000	2.2755	0.0000

0.9956	0.1598	0.0770	0.0000	2.3138	0.0000
1.0088	0.1602	0.0791	0.0000	2.3522	0.0000
1.0220	0.1607	0.0813	0.0000	2.3905	0.0000
1.0352	0.1612	0.0834	0.0000	2.4289	0.0000
1.0484	0.1616	0.0855	0.0000	2.4672	0.0000
1.0615	0.1621	0.0876	0.0000	2.5056	0.0000
1.0747	0.1626	0.0898	0.0000	2.5440	0.0000
1.0879	0.1630	0.0919	0.0000	2.5823	0.0000
1.1011	0.1635	0.0941	0.0000	2.6207	0.0000
1.1143	0.1640	0.0962	0.0000	2.6590	0.0000
1.1275	0.1644	0.0984	0.0000	2.6974	0.0000
1.1407	0.1649	0.1006	0.0000	2.7357	0.0000
1.1538	0.1654	0.1028	0.0000	2.7741	0.0000
1.1670	0.1659	0.1049	0.0000	2.8124	0.0000
1.1802	0.1663	0.1071	0.0000	2.8508	0.0000
1.1934	0.1668	0.1093	0.0000	2.8891	0.0000
1.2000	0.1670	0.1104	0.0000	2.9083	0.0000

Surface Bio Swale 1

Element Flows To:

Outlet 1	Outlet 2
Trapezoidal Pond 1	Bio Swale 1

Trapezoidal Pond 1

Bottom Length:	57.75 ft.
Bottom Width:	57.75 ft.
Depth:	4 ft.
Volume at riser head:	0.3116 acre-ft.
Infiltration On	
Infiltration rate:	0.3
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	86.428
Total Volume Through Riser (ac-ft):	31.186
Total Volume Through Facility (ac-ft):	117.615
Percent Infiltrated:	73.48
Total Precip Applied to Facility:	25.798
Total Evap From Facility:	2.645
Side slope 1:	3 To 1
Side slope 2:	3 To 1
Side slope 3:	3 To 1
Side slope 4:	3 To 1
Discharge Structure	
Riser Height:	3 ft.
Riser Diameter:	18 in.
Notch Type:	Rectangular
Notch Width:	1.500 ft.
Notch Height:	0.713 ft.
Orifice 1 Diameter:	1.87 in. Elevation:0 ft.
Element Flows To:	
Outlet 1	Outlet 2

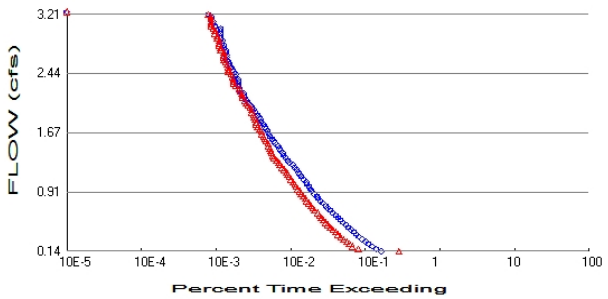
Pond Hydraulic Table

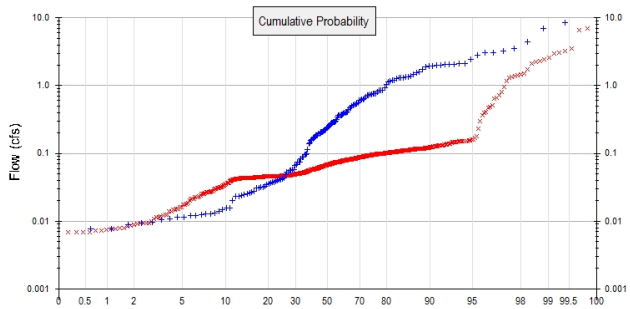
Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.076	0.000	0.000	0.000
0.0444	0.077	0.003	0.019	0.023
0.0889	0.078	0.006	0.027	0.023
0.1333	0.078	0.010	0.033	0.023
0.1778	0.079	0.013	0.038	0.023
0.2222	0.080	0.017	0.043	0.023
0.2667	0.080	0.021	0.047	0.023
0.3111	0.081	0.024	0.051	0.023
0.3556	0.082	0.028	0.054	0.023
0.4000	0.083	0.031	0.058	0.023
0.4444	0.083	0.035	0.061	0.023
0.4889	0.084	0.039	0.064	0.023
0.5333	0.085	0.043	0.067	0.023
0.5778	0.086	0.046	0.069	0.023
0.6222	0.086	0.050	0.072	0.023
0.6667	0.087	0.054	0.075	0.023
0.7111	0.088	0.058	0.077	0.023
0.7556	0.089	0.062	0.079	0.023
0.8000	0.089	0.066	0.082	0.023
0.8444	0.090	0.070	0.084	0.023
0.8889	0.091	0.074	0.086	0.023
0.9333	0.092	0.078	0.088	0.023
0.9778	0.092	0.082	0.090	0.023
1.0222	0.093	0.086	0.092	0.023
1.0667	0.094	0.091	0.094	0.023

1.1111	0.095	0.095	0.096	0.023
1.1556	0.096	0.099	0.098	0.023
1.2000	0.096	0.103	0.100	0.023
1.2444	0.097	0.108	0.102	0.023
1.2889	0.098	0.112	0.104	0.023
1.3333	0.099	0.116	0.106	0.023
1.3778	0.100	0.121	0.107	0.023
1.4222	0.100	0.125	0.109	0.023
1.4667	0.101	0.130	0.111	0.023
1.5111	0.102	0.134	0.112	0.023
1.5556	0.103	0.139	0.114	0.023
1.6000	0.104	0.144	0.116	0.023
1.6444	0.105	0.148	0.117	0.023
1.6889	0.105	0.153	0.119	0.023
1.7333	0.106	0.158	0.120	0.023
1.7778	0.107	0.162	0.122	0.023
1.8222	0.108	0.167	0.124	0.023
1.8667	0.109	0.172	0.125	0.023
1.9111	0.110	0.177	0.127	0.023
1.9556	0.110	0.182	0.128	0.023
2.0000	0.111	0.187	0.129	0.023
2.0444	0.112	0.192	0.131	0.023
2.0889	0.113	0.197	0.132	0.023
2.1333	0.114	0.202	0.134	0.023
2.1778	0.115	0.207	0.135	0.023
2.2222	0.116	0.212	0.136	0.023
2.2667	0.116	0.217	0.138	0.023
2.3111	0.117	0.222	0.158	0.023
2.3556	0.118	0.228	0.230	0.023
2.4000	0.119	0.233	0.331	0.023
2.4444	0.120	0.238	0.455	0.023
2.4889	0.121	0.244	0.597	0.023
2.5333	0.122	0.249	0.756	0.023
2.5778	0.123	0.254	0.930	0.023
2.6222	0.124	0.260	1.118	0.023
2.6667	0.124	0.266	1.318	0.023
2.7111	0.125	0.271	1.530	0.023
2.7556	0.126	0.277	1.754	0.023
2.8000	0.127	0.282	1.988	0.023
2.8444	0.128	0.288	2.233	0.023
2.8889	0.129	0.294	2.488	0.023
2.9333	0.130	0.300	2.752	0.023
2.9778	0.131	0.305	3.025	0.023
3.0222	0.132	0.311	3.215	0.023
3.0667	0.133	0.317	3.419	0.023
3.1111	0.134	0.323	3.710	0.023
3.1556	0.135	0.329	4.066	0.023
3.2000	0.135	0.335	4.477	0.023
3.2444	0.136	0.341	4.937	0.023
3.2889	0.137	0.347	5.441	0.023
3.3333	0.138	0.353	5.986	0.023
3.3778	0.139	0.360	6.567	0.023
3.4222	0.140	0.366	7.184	0.023
3.4667	0.141	0.372	7.835	0.023
3.5111	0.142	0.378	8.517	0.023
3.5556	0.143	0.385	9.229	0.023
3.6000	0.144	0.391	9.970	0.023
3.6444	0.145	0.398	10.74	0.023

3.6889	0.146	0.404	11.53	0.023
3.7333	0.147	0.411	12.35	0.023
3.7778	0.148	0.417	13.20	0.023
3.8222	0.149	0.424	14.07	0.023
3.8667	0.150	0.430	14.97	0.023
3.9111	0.151	0.437	15.89	0.023
3.9556	0.152	0.444	16.83	0.023
4.0000	0.153	0.451	17.79	0.023
4.0444	0.154	0.458	18.78	0.023

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 3.28
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 2.28
Total Impervious Area: 1

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	1.39003
5 year	2.182013
10 year	3.208001
25 year	5.982403

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.640931
5 year	2.264879
10 year	3.017853
25 year	5.316368

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1390	2665	4667	175	Fail
0.1700	2312	1331	57	Pass
0.2010	2040	1106	54	Pass
0.2320	1814	1007	55	Pass
0.2630	1640	924	56	Pass
0.2940	1497	836	55	Pass
0.3250	1361	768	56	Pass
0.3560	1252	710	56	Pass
0.3870	1149	653	56	Pass
0.4180	1063	604	56	Pass
0.4490	975	561	57	Pass
0.4800	906	523	57	Pass
0.5110	831	484	58	Pass
0.5420	764	451	59	Pass
0.5730	712	425	59	Pass
0.6040	661	400	60	Pass
0.6350	598	377	63	Pass
0.6660	558	342	61	Pass
0.6970	516	325	62	Pass
0.7280	484	306	63	Pass
0.7590	442	286	64	Pass
0.7900	407	270	66	Pass
0.8210	381	258	67	Pass
0.8520	367	242	65	Pass
0.8830	341	226	66	Pass
0.9140	319	219	68	Pass
0.9450	306	206	67	Pass
0.9760	290	193	66	Pass
1.0070	270	188	69	Pass
1.0380	263	176	66	Pass
1.0690	243	167	68	Pass
1.1000	227	158	69	Pass
1.1310	215	151	70	Pass
1.1620	209	145	69	Pass
1.1930	199	135	67	Pass
1.2240	184	127	69	Pass
1.2550	177	118	66	Pass
1.2860	160	114	71	Pass
1.3170	150	106	70	Pass
1.3480	141	99	70	Pass
1.3790	132	94	71	Pass
1.4100	128	91	71	Pass
1.4410	121	88	72	Pass
1.4720	117	86	73	Pass
1.5030	111	83	74	Pass
1.5340	102	82	80	Pass
1.5650	97	76	78	Pass
1.5960	93	74	79	Pass
1.6270	86	71	82	Pass
1.6580	84	67	79	Pass
1.6890	81	66	81	Pass
1.7200	77	63	81	Pass
1.7510	74	59	79	Pass
1.7820	71	57	80	Pass

1.8130	67	57	85	Pass
1.8440	65	55	84	Pass
1.8750	62	53	85	Pass
1.9060	59	52	88	Pass
1.9370	55	50	90	Pass
1.9680	53	49	92	Pass
1.9990	50	47	94	Pass
2.0300	47	44	93	Pass
2.0610	44	42	95	Pass
2.0920	43	40	93	Pass
2.1230	40	37	92	Pass
2.1540	39	37	94	Pass
2.1850	38	36	94	Pass
2.2160	34	35	102	Pass
2.2470	34	34	100	Pass
2.2780	33	30	90	Pass
2.3090	33	28	84	Pass
2.3400	33	28	84	Pass
2.3710	32	28	87	Pass
2.4020	30	27	90	Pass
2.4330	30	26	86	Pass
2.4640	28	24	85	Pass
2.4950	27	24	88	Pass
2.5260	26	24	92	Pass
2.5570	25	23	92	Pass
2.5880	24	22	91	Pass
2.6190	23	21	91	Pass
2.6500	23	21	91	Pass
2.6810	23	21	91	Pass
2.7120	22	21	95	Pass
2.7430	22	19	86	Pass
2.7740	21	19	90	Pass
2.8050	21	18	85	Pass
2.8360	20	18	90	Pass
2.8670	20	18	90	Pass
2.8980	19	17	89	Pass
2.9290	19	17	89	Pass
2.9600	19	16	84	Pass
2.9910	19	16	84	Pass
3.0220	19	15	78	Pass
3.0530	16	14	87	Pass
3.0840	15	14	93	Pass
3.1150	15	14	93	Pass
3.1460	14	14	100	Pass
3.1770	14	14	100	Pass
3.2080	13	13	100	Pass

The development has an increase in flow durations for more than a 20% increase from the 5 year to the 10 year flow.

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

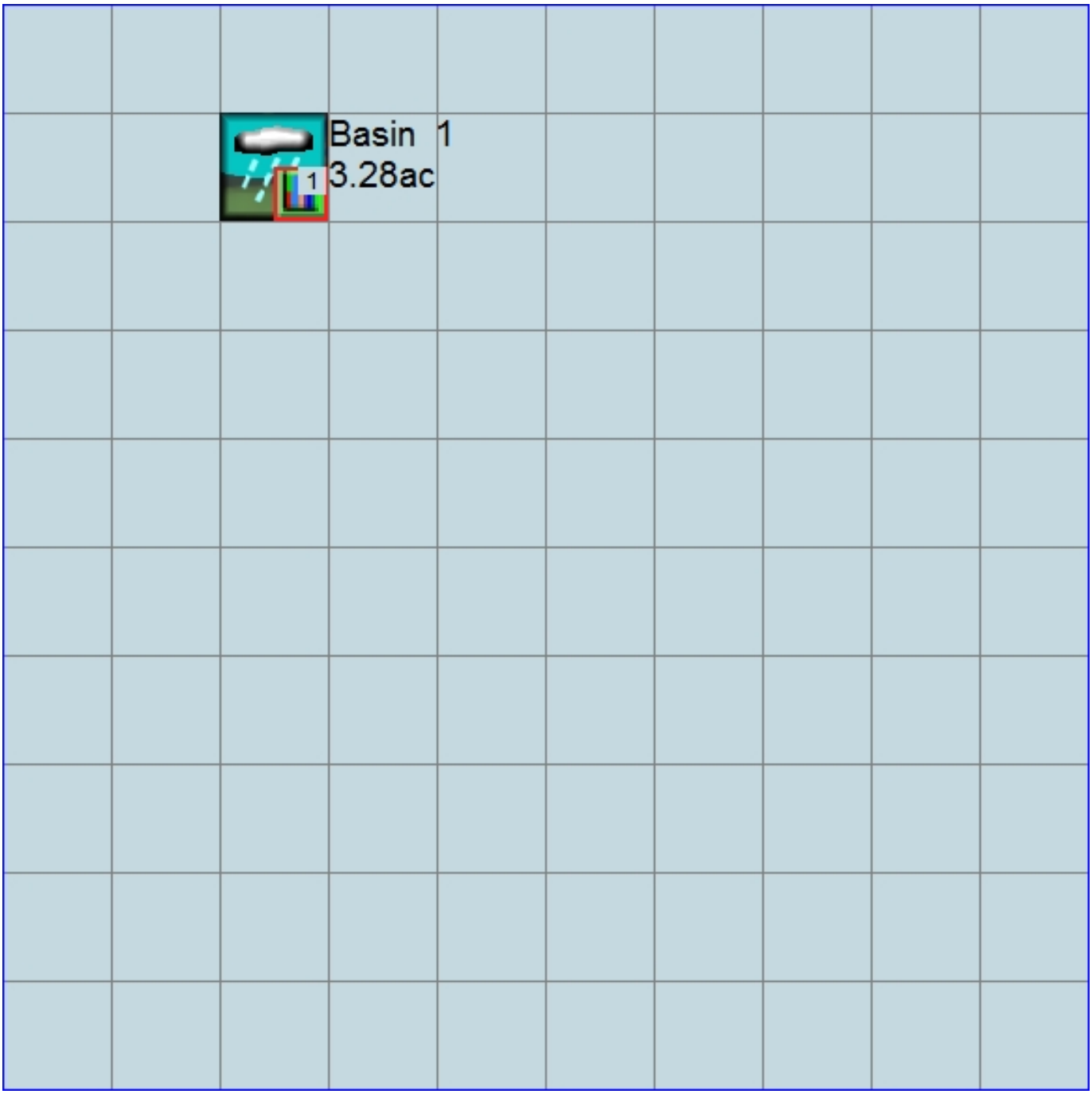
No PERLND changes have been made.

IMPLND Changes

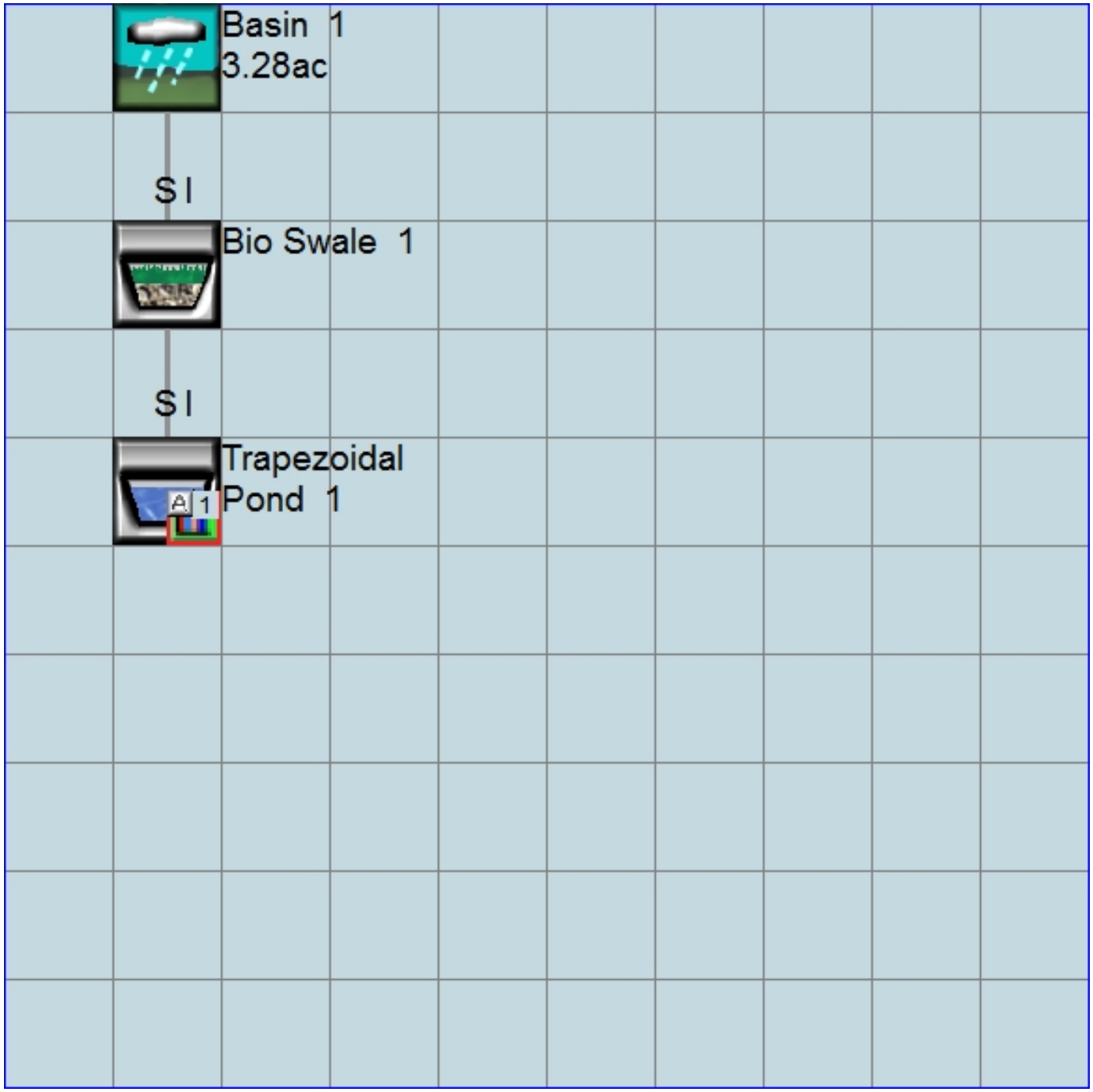
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1958 10 01        END    2005 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   SOHM Node 62A.wdm
MESSU      25   PreSOHM Node 62A.MES
           27   PreSOHM Node 62A.L61
           28   PreSOHM Node 62A.L62
           30   POCSOHM Node 62A1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37              0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37              0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37              0         0      0.09         0      0.92       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#   ***
Basin  1***
PERLND  37                        3.28     COPY   501     12
PERLND  37                        3.28     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       1958 10 01        END    2005 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   SOHM Node 62A.wdm
MESSU      25   MitSOHM Node 62A.MES
           27   MitSOHM Node 62A.L61
           28   MitSOHM Node 62A.L62
           30   POCSOHM Node 62A1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      IMPLND       1
      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        Trapezoidal Pond  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
  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       0.3      0.01
  END PWAT-STATE1

END PERLND

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

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

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         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     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  37                        2.28     RCHRES   1      2
PERLND  37                        2.28     RCHRES   1      3
IMPLND   1                           1     RCHRES   1      5

******Routing******
RCHRES   2                           1     RCHRES   3      7
RCHRES   2                                 COPY     1     17
RCHRES   2                           1     RCHRES   3      8
RCHRES   2                                 COPY     1     18
RCHRES   1                           1     RCHRES   3      7
RCHRES   1                                 COPY     1     17
RCHRES   1                           1     RCHRES   2      8
RCHRES   3                           1     COPY   501     16
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 Bio Swal-007    3    1    1    1   28    0    1
    2     Bio Swale  1            2    1    1    1   28    0    1
    3     Trapezoidal Pond-010    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      0.07       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            =  678.
*** 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
   47    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.145702  0.000000  0.000000  0.000000
  0.013187  0.145468  0.000341  0.000000  0.000000
  0.026374  0.145000  0.000683  0.000000  0.000000
  0.039560  0.144531  0.001027  0.000000  0.000000
  0.052747  0.144062  0.001372  0.000000  0.000000
  0.065934  0.143594  0.001718  0.000000  0.000000
  0.079121  0.143125  0.002065  0.000000  0.000000
  0.092308  0.142656  0.002414  0.000000  0.000000
  0.105495  0.142188  0.002764  0.000000  0.000000
  0.118681  0.141719  0.003115  0.000000  0.000000
  0.131868  0.141251  0.003467  0.000000  0.011301
  0.145055  0.140782  0.003821  0.000000  0.026091
  0.158242  0.140313  0.004176  0.000000  0.037625
  0.171429  0.139845  0.004533  0.000000  0.037625
  0.184615  0.139376  0.004890  0.000000  0.037625
  0.197802  0.138907  0.005249  0.000000  0.037625
  0.210989  0.138439  0.005597  0.000000  0.037625
  0.224176  0.137970  0.005945  0.000000  0.037625
  0.237363  0.137502  0.006295  0.000000  0.037625
  0.250549  0.137033  0.006645  0.000000  0.037625
  0.263736  0.136564  0.006998  0.000000  0.037625
  0.276923  0.136096  0.007351  0.000000  0.037625
  0.290110  0.135627  0.007706  0.000000  0.037625
  0.303297  0.135158  0.008061  0.000000  0.037625
  0.316484  0.134690  0.008419  0.000000  0.037625
  0.329670  0.134221  0.008777  0.000000  0.037625
  0.342857  0.133753  0.009136  0.000000  0.037625
  0.356044  0.133284  0.009497  0.000000  0.037625
  0.369231  0.132815  0.009859  0.000000  0.037625
  0.382418  0.132347  0.010222  0.000000  0.037625
  0.395604  0.131878  0.010587  0.000000  0.037625
  0.408791  0.131409  0.010966  0.000000  0.037625
  0.421978  0.130941  0.011347  0.000000  0.037625
  0.435165  0.130472  0.011729  0.000000  0.037625
  0.448352  0.130004  0.012112  0.000000  0.037625
  0.461538  0.129535  0.012497  0.000000  0.037625
  0.474725  0.129066  0.012883  0.000000  0.037625
  0.487912  0.128598  0.013270  0.000000  0.037625
  0.501099  0.128129  0.013658  0.000000  0.037625
  0.514286  0.127661  0.014048  0.000000  0.037625
  0.527473  0.127192  0.014439  0.000000  0.037625
  0.540659  0.126723  0.014831  0.000000  0.037625
  0.553846  0.126255  0.015225  0.000000  0.037625
  0.567033  0.125786  0.015620  0.000000  0.037625
  0.580220  0.125317  0.016016  0.000000  0.037625
  0.593407  0.124849  0.016413  0.000000  0.037625
  0.600000  0.124380  0.132900  0.000000  0.037625
  END FTABLE  2
  FTABLE      1
   47    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.124380  0.000000  0.842431  0.000000  0.000000
  0.013187  0.146171  0.001924  0.884431  1.201666  0.000000
  0.026374  0.146640  0.003855  0.927107  1.240017  0.000000
  0.039560  0.147108  0.005792  0.970448  1.278368  0.000000
  0.052747  0.147577  0.007735  2.798520  1.316719  0.000000
  0.065934  0.148046  0.009684  5.355709  1.355070  0.000000
  0.079121  0.148514  0.011639  6.912894  1.393421  0.000000
```

0.092308	0.148983	0.013601	8.151488	1.431772	0.000000
0.105495	0.149451	0.015569	9.211623	1.470123	0.000000
0.118681	0.149920	0.017542	10.19718	1.508474	0.000000
0.131868	0.150389	0.019522	11.13811	1.546825	0.000000
0.145055	0.150857	0.021509	12.04414	1.585176	0.000000
0.158242	0.151326	0.023501	12.92343	1.623527	0.000000
0.171429	0.151795	0.025500	13.78209	1.661878	0.000000
0.184615	0.152263	0.027505	14.62471	1.700229	0.000000
0.197802	0.152732	0.029515	15.45477	1.738580	0.000000
0.210989	0.153200	0.031533	16.27499	1.776931	0.000000
0.224176	0.153669	0.033556	17.08751	1.815282	0.000000
0.237363	0.154138	0.035585	17.89407	1.853633	0.000000
0.250549	0.154606	0.037621	18.69607	1.891984	0.000000
0.263736	0.155075	0.039663	19.49467	1.930335	0.000000
0.276923	0.155544	0.041711	20.29084	1.968686	0.000000
0.290110	0.156012	0.043765	21.08540	2.007037	0.000000
0.303297	0.156481	0.045826	21.87901	2.045388	0.000000
0.316484	0.156949	0.047892	22.67229	2.083739	0.000000
0.329670	0.157418	0.049965	23.46572	2.122090	0.000000
0.342857	0.157887	0.052044	24.25974	2.160441	0.000000
0.356044	0.158355	0.054129	25.05473	2.198792	0.000000
0.369231	0.158824	0.056220	25.85101	2.237143	0.000000
0.382418	0.159293	0.058318	26.64888	2.275494	0.000000
0.395604	0.159761	0.060421	27.44859	2.313845	0.000000
0.408791	0.160230	0.062531	28.25036	2.352197	0.000000
0.421978	0.160698	0.064647	29.05438	2.390548	0.000000
0.435165	0.161167	0.066769	29.86084	2.428899	0.000000
0.448352	0.161636	0.068898	30.66987	2.467250	0.000000
0.461538	0.162104	0.071032	31.48163	2.505601	0.000000
0.474725	0.162573	0.073173	32.29623	2.543952	0.000000
0.487912	0.163042	0.075320	33.11379	2.582303	0.000000
0.501099	0.163510	0.077473	33.93439	2.620654	0.000000
0.514286	0.163979	0.079632	34.75814	2.659005	0.000000
0.527473	0.164447	0.081798	35.58510	2.697356	0.000000
0.540659	0.164916	0.083969	36.41534	2.735707	0.000000
0.553846	0.165385	0.086147	37.24893	2.774058	0.000000
0.567033	0.165853	0.088331	38.08592	2.812409	0.000000
0.580220	0.166322	0.090521	38.92637	2.850760	0.000000
0.593407	0.166790	0.092718	39.77032	2.889111	0.000000
0.600000	0.167025	0.093818	40.61780	2.908286	0.000000

END FTABLE 1

FTABLE 3

91 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.076561	0.000000	0.000000	0.000000		
0.044444	0.077270	0.003418	0.019362	0.023160		
0.088889	0.077982	0.006869	0.027382	0.023160		
0.133333	0.078697	0.010350	0.033536	0.023160		
0.177778	0.079416	0.013864	0.038724	0.023160		
0.222222	0.080137	0.017409	0.043295	0.023160		
0.266667	0.080862	0.020987	0.047427	0.023160		
0.311111	0.081591	0.024597	0.051227	0.023160		
0.355556	0.082322	0.028240	0.054764	0.023160		
0.400000	0.083057	0.031915	0.058086	0.023160		
0.444444	0.083795	0.035623	0.061228	0.023160		
0.488889	0.084536	0.039363	0.064217	0.023160		
0.533333	0.085281	0.043137	0.067072	0.023160		
0.577778	0.086029	0.046944	0.069811	0.023160		
0.622222	0.086780	0.050784	0.072446	0.023160		
0.666667	0.087534	0.054658	0.074989	0.023160		
0.711111	0.088292	0.058565	0.077448	0.023160		
0.755556	0.089053	0.062506	0.079832	0.023160		
0.800000	0.089817	0.066481	0.082146	0.023160		
0.844444	0.090585	0.070490	0.084397	0.023160		
0.888889	0.091355	0.074533	0.086590	0.023160		
0.933333	0.092129	0.078611	0.088728	0.023160		
0.977778	0.092907	0.082722	0.090816	0.023160		
1.022222	0.093687	0.086869	0.092857	0.023160		
1.066667	0.094471	0.091050	0.094854	0.023160		

```
  1.111111  0.095258  0.095266  0.096810  0.023160
  1.155556  0.096048  0.099518  0.098727  0.023160
  1.200000  0.096842  0.103804  0.100608  0.023160
  1.244444  0.097639  0.108126  0.102454  0.023160
  1.288889  0.098439  0.112483  0.104268  0.023160
  1.333333  0.099242  0.116876  0.106050  0.023160
  1.377778  0.100049  0.121305  0.107803  0.023160
  1.422222  0.100859  0.125769  0.109528  0.023160
  1.466667  0.101672  0.130270  0.111226  0.023160
  1.511111  0.102488  0.134807  0.112899  0.023160
  1.555556  0.103308  0.139380  0.114547  0.023160
  1.600000  0.104131  0.143990  0.116172  0.023160
  1.644444  0.104957  0.148636  0.117775  0.023160
  1.688889  0.105787  0.153320  0.119356  0.023160
  1.733333  0.106620  0.158040  0.120916  0.023160
  1.777778  0.107456  0.162797  0.122456  0.023160
  1.822222  0.108295  0.167592  0.123978  0.023160
  1.866667  0.109138  0.172423  0.125480  0.023160
  1.911111  0.109983  0.177293  0.126965  0.023160
  1.955556  0.110832  0.182200  0.128433  0.023160
  2.000000  0.111685  0.187145  0.129884  0.023160
  2.044444  0.112540  0.192127  0.131320  0.023160
  2.088889  0.113399  0.197148  0.132739  0.023160
  2.133333  0.114261  0.202207  0.134144  0.023160
  2.177778  0.115127  0.207305  0.135534  0.023160
  2.222222  0.115996  0.212441  0.136910  0.023160
  2.266667  0.116868  0.217616  0.138273  0.023160
  2.311111  0.117743  0.222829  0.158266  0.023160
  2.355556  0.118621  0.228082  0.230523  0.023160
  2.400000  0.119503  0.233373  0.331897  0.023160
  2.444444  0.120388  0.238704  0.455501  0.023160
  2.488889  0.121276  0.244075  0.597840  0.023160
  2.533333  0.122168  0.249484  0.756690  0.023160
  2.577778  0.123063  0.254934  0.930471  0.023160
  2.622222  0.123961  0.260423  1.117984  0.023160
  2.666667  0.124862  0.265953  1.318283  0.023160
  2.711111  0.125767  0.271522  1.530593  0.023160
  2.755556  0.126674  0.277132  1.754264  0.023160
  2.800000  0.127586  0.282782  1.988742  0.023160
  2.844444  0.128500  0.288473  2.233547  0.023160
  2.888889  0.129418  0.294205  2.488259  0.023160
  2.933333  0.130338  0.299977  2.752503  0.023160
  2.977778  0.131263  0.305790  3.025946  0.023160
  3.022222  0.132190  0.311645  3.215004  0.023160
  3.066667  0.133121  0.317541  3.419240  0.023160
  3.111111  0.134055  0.323478  3.709997  0.023160
  3.155556  0.134992  0.329457  4.066354  0.023160
  3.200000  0.135933  0.335477  4.477863  0.023160
  3.244444  0.136876  0.341540  4.937909  0.023160
  3.288889  0.137823  0.347644  5.441813  0.023160
  3.333333  0.138774  0.353791  5.986034  0.023160
  3.377778  0.139727  0.359980  6.567775  0.023160
  3.422222  0.140684  0.366211  7.184752  0.023160
  3.466667  0.141644  0.372485  7.835050  0.023160
  3.511111  0.142608  0.378802  8.517041  0.023160
  3.555556  0.143574  0.385161  9.229311  0.023160
  3.600000  0.144544  0.391564  9.970622  0.023160
  3.644444  0.145517  0.398010  10.73988  0.023160
  3.688889  0.146494  0.404499  11.53609  0.023160
  3.733333  0.147473  0.411031  12.35838  0.023160
  3.777778  0.148456  0.417608  13.20595  0.023160
  3.822222  0.149443  0.424228  14.07805  0.023160
  3.866667  0.150432  0.430892  14.97401  0.023160
  3.911111  0.151425  0.437599  15.89323  0.023160
  3.955556  0.152421  0.444352  16.83511  0.023160
  4.000000  0.153420  0.451148  17.79913  0.023160
  END FTABLE  3
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      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    1              RCHRES   3     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   1010 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1011 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1012 FLOW     ENGL      REPL
RCHRES   3 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       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16

  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

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

SOHM

PROJECT REPORT

General Model Information

Project Name:	SOHM Node 62B
Site Name:	
Site Address:	
City:	
Report Date:	12/1/2014
Gage:	Trabuco Canyon
Data Start:	10/01/1958
Data End:	09/30/2005
Timestep:	15 Minute
Precip Scale:	1.00
Version:	2014/11/12

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	4.52
Pervious Total	4.52
Impervious Land Use	Acres
Impervious Total	0
Basin Total	4.52

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	3.16
Pervious Total	3.16
Impervious Land Use	Acres
Impervious,Flat(0-5)	1.36
Impervious Total	1.36
Basin Total	4.52

Element Flows To:

Surface	Interflow	Groundwater
Surface Bio Swale 1	Surface Bio Swale 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bio Swale 1

Bottom Length:	605.00 ft.
Bottom Width:	14.00 ft.
Material thickness of first layer:	0.2
Material type for first layer:	GRAVEL
Material thickness of second layer:	0.1
Material type for second layer:	Sand
Material thickness of third layer:	0.2
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.3
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	6.428
Total Volume Through Riser (ac-ft):	124.15
Total Volume Through Facility (ac-ft):	130.578
Percent Infiltrated:	4.92
Total Precip Applied to Facility:	3.349
Total Evap From Facility:	1.271
Underdrain not used	
Discharge Structure	
Riser Height:	0.1 ft.
Riser Diameter:	48 in.
Notch Type:	Rectangular
Notch Width:	0.750 ft.
Notch Height:	0.500 ft.
Orifice 1 Diameter:	48 in. Elevation:0.05 ft.
Element Flows To:	
Outlet 1	Outlet 2
Trapezoidal Pond 1	Trapezoidal Pond 1

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.2222	0.0000	0.0000	0.0000
0.0121	0.2220	0.0005	0.0000	0.0000
0.0242	0.2213	0.0010	0.0000	0.0000
0.0363	0.2206	0.0015	0.0000	0.0000
0.0484	0.2200	0.0020	0.0000	0.0000
0.0604	0.2193	0.0025	0.0000	0.0000
0.0725	0.2186	0.0030	0.0000	0.0000
0.0846	0.2179	0.0035	0.0000	0.0000
0.0967	0.2173	0.0040	0.0000	0.0000
0.1088	0.2166	0.0045	0.0000	0.0000
0.1209	0.2159	0.0050	0.0588	0.0588
0.1330	0.2153	0.0055	0.0588	0.0588
0.1451	0.2146	0.0060	0.0588	0.0588
0.1571	0.2139	0.0065	0.0588	0.0588
0.1692	0.2132	0.0070	0.0588	0.0588
0.1813	0.2126	0.0075	0.0588	0.0588
0.1934	0.2119	0.0080	0.0588	0.0588
0.2055	0.2112	0.0085	0.0588	0.0588
0.2176	0.2106	0.0090	0.0588	0.0588
0.2297	0.2099	0.0095	0.0588	0.0588
0.2418	0.2092	0.0100	0.0588	0.0588
0.2538	0.2085	0.0105	0.0588	0.0588

0.2659	0.2079	0.0110	0.0588	0.0588
0.2780	0.2072	0.0115	0.0588	0.0588
0.2901	0.2065	0.0120	0.0588	0.0588
0.3022	0.2059	0.0126	0.0588	0.0588
0.3143	0.2052	0.0131	0.0588	0.0588
0.3264	0.2045	0.0136	0.0588	0.0588
0.3385	0.2038	0.0142	0.0588	0.0588
0.3505	0.2032	0.0147	0.0588	0.0588
0.3626	0.2025	0.0152	0.0588	0.0588
0.3747	0.2018	0.0158	0.0588	0.0588
0.3868	0.2012	0.0163	0.0588	0.0588
0.3989	0.2005	0.0169	0.0588	0.0588
0.4110	0.1998	0.0174	0.0588	0.0588
0.4231	0.1991	0.0180	0.0588	0.0588
0.4352	0.1985	0.0185	0.0588	0.0588
0.4473	0.1978	0.0190	0.0588	0.0588
0.4593	0.1971	0.0196	0.0588	0.0588
0.4714	0.1965	0.0202	0.0588	0.0588
0.4835	0.1958	0.0207	0.0588	0.0588
0.4956	0.1951	0.0213	0.0588	0.0588
0.5000	0.1944	0.0215	0.0588	0.0588

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
0.5000	0.2222	0.0215	0.0000	1.8919	0.0000
0.5121	0.2229	0.0242	0.0000	1.8919	0.0000
0.5242	0.2236	0.0269	0.0000	1.9652	0.0000
0.5363	0.2242	0.0296	0.0000	2.0385	0.0000
0.5484	0.2249	0.0323	0.0000	2.1117	0.0000
0.5604	0.2256	0.0350	0.0000	2.1850	0.0000
0.5725	0.2263	0.0377	0.0000	2.2583	0.0000
0.5846	0.2269	0.0405	0.0000	2.3316	0.0000
0.5967	0.2276	0.0432	0.0000	2.4048	0.0000
0.6088	0.2283	0.0460	0.0000	2.4781	0.0000
0.6209	0.2289	0.0487	0.0000	2.5514	0.0000
0.6330	0.2296	0.0515	0.0000	2.6247	0.0000
0.6451	0.2303	0.0543	0.0000	2.6980	0.0000
0.6571	0.2310	0.0571	0.0000	2.7712	0.0000
0.6692	0.2316	0.0599	0.0000	2.8445	0.0000
0.6813	0.2323	0.0627	0.0000	2.9178	0.0000
0.6934	0.2330	0.0655	0.0000	2.9911	0.0000
0.7055	0.2336	0.0683	0.0000	3.0643	0.0000
0.7176	0.2343	0.0711	0.0000	3.1376	0.0000
0.7297	0.2350	0.0740	0.0000	3.2109	0.0000
0.7418	0.2357	0.0768	0.0000	3.2842	0.0000
0.7538	0.2363	0.0797	0.0000	3.3574	0.0000
0.7659	0.2370	0.0825	0.0000	3.4307	0.0000
0.7780	0.2377	0.0854	0.0000	3.5040	0.0000
0.7901	0.2383	0.0883	0.0000	3.5773	0.0000
0.8022	0.2390	0.0912	0.0000	3.6506	0.0000
0.8143	0.2397	0.0940	0.0000	3.7238	0.0000
0.8264	0.2404	0.0970	0.0000	3.7971	0.0000
0.8385	0.2410	0.0999	0.0000	3.8704	0.0000
0.8505	0.2417	0.1028	0.0000	3.9437	0.0000
0.8626	0.2424	0.1057	0.0000	4.0169	0.0000
0.8747	0.2430	0.1086	0.0000	4.0902	0.0000
0.8868	0.2437	0.1116	0.0000	4.1635	0.0000
0.8989	0.2444	0.1145	0.0000	4.2368	0.0000

0.9110	0.2451	0.1175	0.0000	4.3101	0.0000
0.9231	0.2457	0.1205	0.0000	4.3833	0.0000
0.9352	0.2464	0.1234	0.0000	4.4566	0.0000
0.9473	0.2471	0.1264	0.0000	4.5299	0.0000
0.9593	0.2477	0.1294	0.0000	4.6032	0.0000
0.9714	0.2484	0.1324	0.0000	4.6764	0.0000
0.9835	0.2491	0.1354	0.0000	4.7497	0.0000
0.9956	0.2498	0.1384	0.0000	4.8230	0.0000
1.0077	0.2504	0.1414	0.0000	4.8963	0.0000
1.0198	0.2511	0.1445	52.953	4.9696	0.0000
1.0319	0.2518	0.1475	53.945	5.0428	0.0000
1.0440	0.2524	0.1506	54.936	5.1161	0.0000
1.0560	0.2531	0.1536	55.927	5.1894	0.0000
1.0681	0.2538	0.1567	56.918	5.2627	0.0000
1.0802	0.2545	0.1598	57.909	5.3359	0.0000
1.0923	0.2551	0.1628	58.901	5.4092	0.0000
1.1000	0.2556	0.1648	59.894	5.4559	0.0000

Surface Bio Swale 1

Element Flows To:

Outlet 1	Outlet 2
Trapezoidal Pond 1	Bio Swale 1

Trapezoidal Pond 1

Bottom Length:	66.35 ft.
Bottom Width:	66.35 ft.
Depth:	4 ft.
Volume at riser head:	0.3965 acre-ft.
Infiltration On	
Infiltration rate:	0.3
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	118.72
Total Volume Through Riser (ac-ft):	43.485
Total Volume Through Facility (ac-ft):	162.205
Percent Infiltrated:	73.19
Total Precip Applied to Facility:	35.323
Total Evap From Facility:	3.636
Side slope 1:	3 To 1
Side slope 2:	3 To 1
Side slope 3:	3 To 1
Side slope 4:	3 To 1
Discharge Structure	
Riser Height:	3 ft.
Riser Diameter:	18 in.
Notch Type:	Rectangular
Notch Width:	1.500 ft.
Notch Height:	0.713 ft.
Orifice 1 Diameter:	2.195 in. Elevation:0 ft.
Element Flows To:	
Outlet 1	Outlet 2

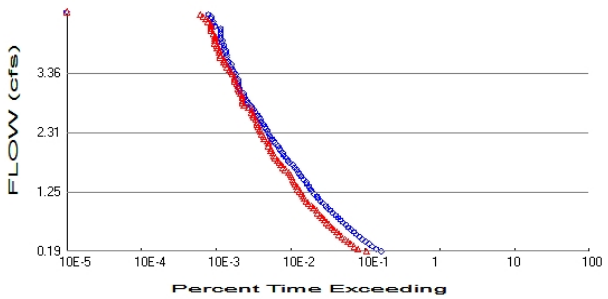
Pond Hydraulic Table

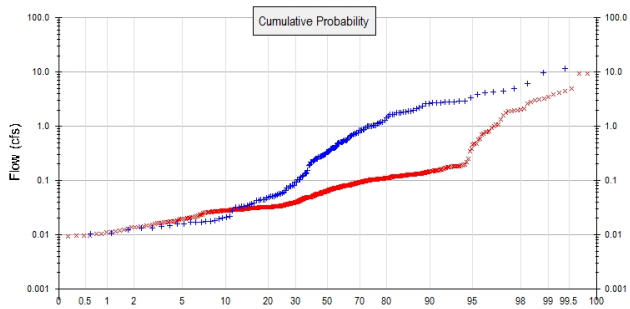
Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.101	0.000	0.000	0.000
0.0444	0.101	0.004	0.026	0.030
0.0889	0.102	0.009	0.037	0.030
0.1333	0.103	0.013	0.046	0.030
0.1778	0.104	0.018	0.053	0.030
0.2222	0.105	0.022	0.059	0.030
0.2667	0.106	0.027	0.065	0.030
0.3111	0.106	0.032	0.070	0.030
0.3556	0.107	0.037	0.075	0.030
0.4000	0.108	0.041	0.080	0.030
0.4444	0.109	0.046	0.084	0.030
0.4889	0.110	0.051	0.088	0.030
0.5333	0.111	0.056	0.092	0.030
0.5778	0.111	0.061	0.096	0.030
0.6222	0.112	0.066	0.099	0.030
0.6667	0.113	0.071	0.103	0.030
0.7111	0.114	0.076	0.106	0.030
0.7556	0.115	0.081	0.110	0.030
0.8000	0.116	0.086	0.113	0.030
0.8444	0.117	0.092	0.116	0.030
0.8889	0.118	0.097	0.119	0.030
0.9333	0.118	0.102	0.122	0.030
0.9778	0.119	0.107	0.125	0.030
1.0222	0.120	0.113	0.127	0.030
1.0667	0.121	0.118	0.130	0.030

1.1111	0.122	0.124	0.133	0.030
1.1556	0.123	0.129	0.136	0.030
1.2000	0.124	0.134	0.138	0.030
1.2444	0.125	0.140	0.141	0.030
1.2889	0.126	0.146	0.143	0.030
1.3333	0.126	0.151	0.146	0.030
1.3778	0.127	0.157	0.148	0.030
1.4222	0.128	0.163	0.150	0.030
1.4667	0.129	0.168	0.153	0.030
1.5111	0.130	0.174	0.155	0.030
1.5556	0.131	0.180	0.157	0.030
1.6000	0.132	0.186	0.160	0.030
1.6444	0.133	0.192	0.162	0.030
1.6889	0.134	0.198	0.164	0.030
1.7333	0.135	0.204	0.166	0.030
1.7778	0.136	0.210	0.168	0.030
1.8222	0.137	0.216	0.170	0.030
1.8667	0.138	0.222	0.172	0.030
1.9111	0.139	0.228	0.174	0.030
1.9556	0.140	0.234	0.177	0.030
2.0000	0.140	0.240	0.179	0.030
2.0444	0.141	0.247	0.180	0.030
2.0889	0.142	0.253	0.182	0.030
2.1333	0.143	0.259	0.184	0.030
2.1778	0.144	0.266	0.186	0.030
2.2222	0.145	0.272	0.188	0.030
2.2667	0.146	0.279	0.190	0.030
2.3111	0.147	0.285	0.210	0.030
2.3556	0.148	0.292	0.283	0.030
2.4000	0.149	0.299	0.384	0.030
2.4444	0.150	0.305	0.508	0.030
2.4889	0.151	0.312	0.651	0.030
2.5333	0.152	0.319	0.810	0.030
2.5778	0.153	0.326	0.984	0.030
2.6222	0.154	0.332	1.172	0.030
2.6667	0.155	0.339	1.373	0.030
2.7111	0.156	0.346	1.585	0.030
2.7556	0.157	0.353	1.810	0.030
2.8000	0.158	0.360	2.044	0.030
2.8444	0.159	0.367	2.290	0.030
2.8889	0.160	0.374	2.545	0.030
2.9333	0.161	0.382	2.809	0.030
2.9778	0.162	0.389	3.083	0.030
3.0222	0.163	0.396	3.273	0.030
3.0667	0.164	0.403	3.477	0.030
3.1111	0.165	0.411	3.768	0.030
3.1556	0.167	0.418	4.125	0.030
3.2000	0.168	0.426	4.537	0.030
3.2444	0.169	0.433	4.998	0.030
3.2889	0.170	0.441	5.502	0.030
3.3333	0.171	0.448	6.047	0.030
3.3778	0.172	0.456	6.629	0.030
3.4222	0.173	0.463	7.246	0.030
3.4667	0.174	0.471	7.897	0.030
3.5111	0.175	0.479	8.579	0.030
3.5556	0.176	0.487	9.292	0.030
3.6000	0.177	0.495	10.03	0.030
3.6444	0.178	0.503	10.80	0.030

3.6889	0.179	0.511	11.60	0.030
3.7333	0.180	0.519	12.42	0.030
3.7778	0.181	0.527	13.27	0.030
3.8222	0.183	0.535	14.14	0.030
3.8667	0.184	0.543	15.04	0.030
3.9111	0.185	0.551	15.96	0.030
3.9556	0.186	0.559	16.90	0.030
4.0000	0.187	0.568	17.86	0.030
4.0444	0.188	0.576	18.85	0.030

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 4.52
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 3.16
Total Impervious Area: 1.36

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	1.915529
5 year	3.006921
10 year	4.420782
25 year	8.244043

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	1.001292
5 year	3.055639
10 year	4.059811
25 year	7.590158

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1916	2670	1707	63	Pass
0.2343	2312	1316	56	Pass
0.2770	2047	1167	57	Pass
0.3197	1819	1055	57	Pass
0.3624	1640	959	58	Pass
0.4052	1500	872	58	Pass
0.4479	1363	800	58	Pass
0.4906	1252	730	58	Pass
0.5333	1150	677	58	Pass
0.5760	1063	627	58	Pass
0.6187	975	583	59	Pass
0.6615	906	542	59	Pass
0.7042	831	498	59	Pass
0.7469	766	467	60	Pass
0.7896	715	437	61	Pass
0.8323	662	411	62	Pass
0.8751	598	379	63	Pass
0.9178	559	363	64	Pass
0.9605	516	331	64	Pass
1.0032	484	312	64	Pass
1.0459	443	282	63	Pass
1.0887	407	265	65	Pass
1.1314	381	250	65	Pass
1.1741	367	242	65	Pass
1.2168	342	231	67	Pass
1.2595	319	220	68	Pass
1.3023	306	205	66	Pass
1.3450	290	198	68	Pass
1.3877	270	187	69	Pass
1.4304	264	180	68	Pass
1.4731	243	174	71	Pass
1.5159	228	169	74	Pass
1.5586	215	162	75	Pass
1.6013	209	153	73	Pass
1.6440	199	141	70	Pass
1.6867	184	129	70	Pass
1.7295	177	122	68	Pass
1.7722	160	116	72	Pass
1.8149	151	110	72	Pass
1.8576	142	103	72	Pass
1.9003	132	99	75	Pass
1.9431	128	95	74	Pass
1.9858	121	90	74	Pass
2.0285	117	88	75	Pass
2.0712	111	84	75	Pass
2.1139	102	83	81	Pass
2.1566	98	81	82	Pass
2.1994	93	73	78	Pass
2.2421	86	71	82	Pass
2.2848	84	67	79	Pass
2.3275	81	65	80	Pass
2.3702	77	63	81	Pass
2.4130	74	60	81	Pass

2.4557	71	59	83	Pass
2.4984	67	58	86	Pass
2.5411	65	56	86	Pass
2.5838	62	52	83	Pass
2.6266	59	51	86	Pass
2.6693	55	50	90	Pass
2.7120	53	49	92	Pass
2.7547	50	45	90	Pass
2.7974	47	39	82	Pass
2.8402	44	37	84	Pass
2.8829	43	37	86	Pass
2.9256	40	37	92	Pass
2.9683	39	37	94	Pass
3.0110	38	35	92	Pass
3.0538	34	34	100	Pass
3.0965	34	33	97	Pass
3.1392	33	32	96	Pass
3.1819	33	31	93	Pass
3.2246	33	29	87	Pass
3.2674	32	29	90	Pass
3.3101	30	29	96	Pass
3.3528	30	27	90	Pass
3.3955	28	26	92	Pass
3.4382	27	25	92	Pass
3.4810	26	23	88	Pass
3.5237	26	22	84	Pass
3.5664	24	21	87	Pass
3.6091	23	21	91	Pass
3.6518	23	19	82	Pass
3.6946	23	19	82	Pass
3.7373	22	18	81	Pass
3.7800	22	18	81	Pass
3.8227	21	17	80	Pass
3.8654	21	17	80	Pass
3.9081	20	16	80	Pass
3.9509	20	16	80	Pass
3.9936	19	16	84	Pass
4.0363	19	16	84	Pass
4.0790	19	15	78	Pass
4.1217	19	14	73	Pass
4.1645	19	14	73	Pass
4.2072	16	14	87	Pass
4.2499	15	14	93	Pass
4.2926	15	13	86	Pass
4.3353	14	12	85	Pass
4.3781	14	11	78	Pass
4.4208	13	10	76	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

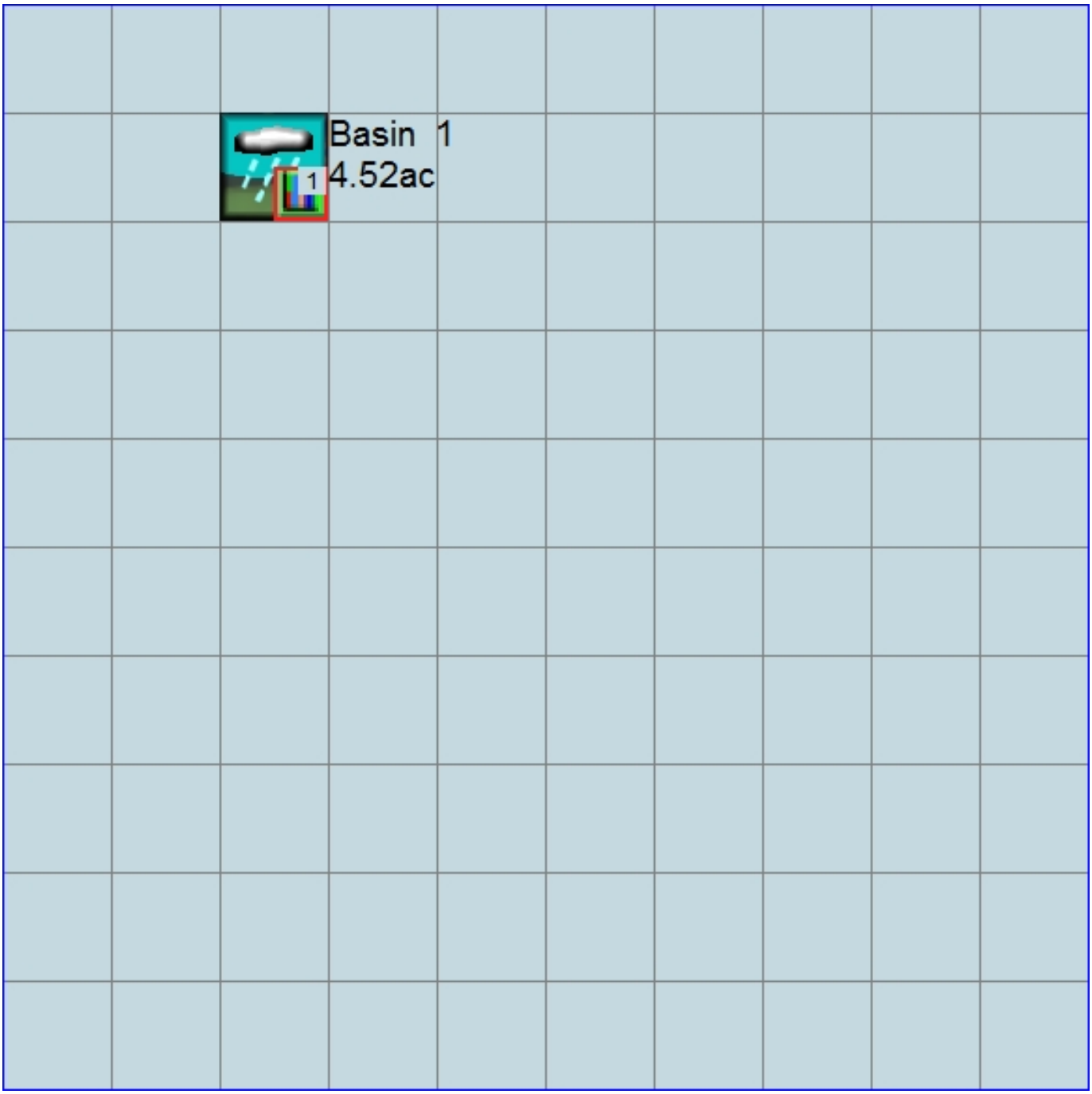
No PERLND changes have been made.

IMPLND Changes

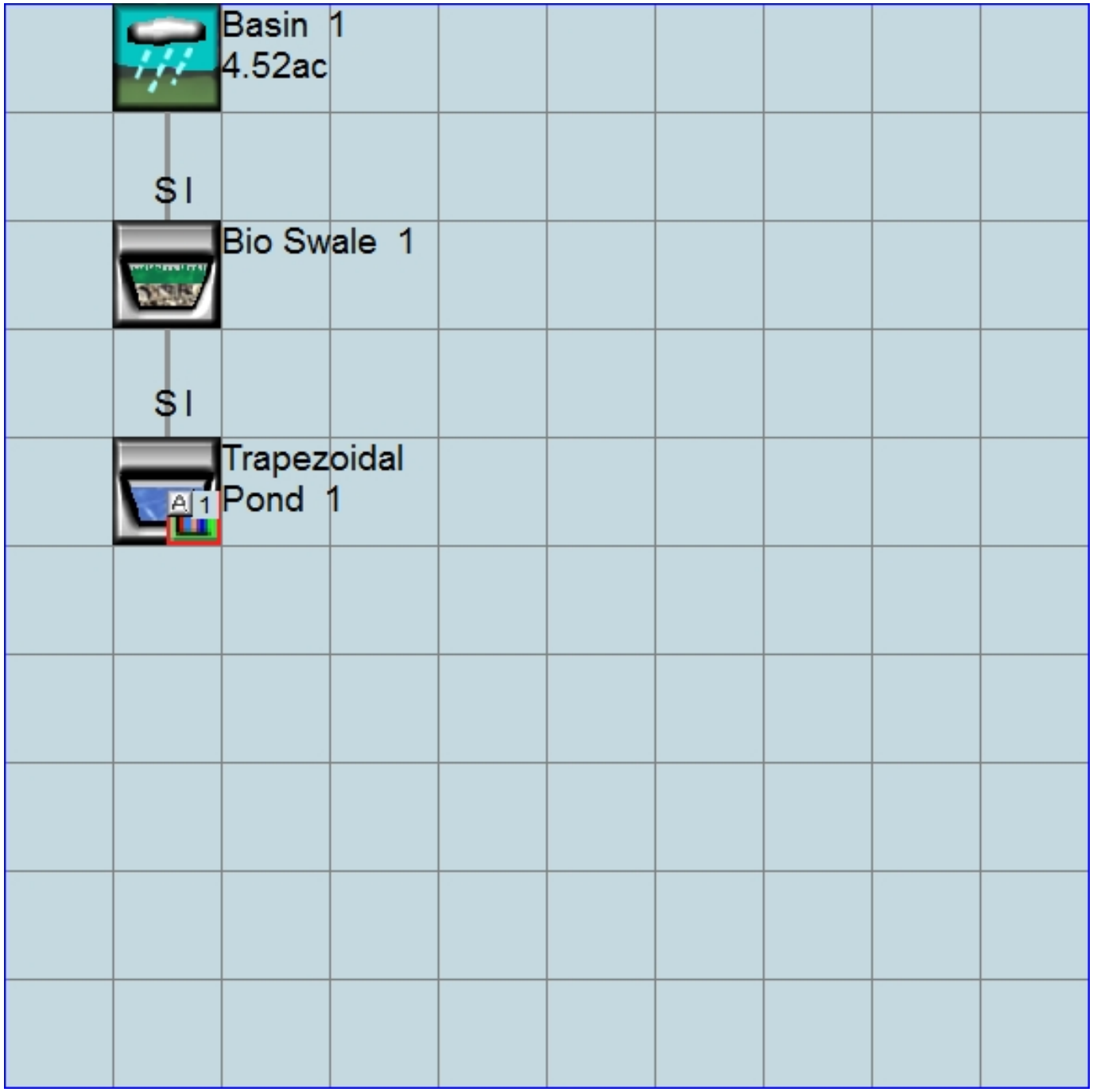
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1958 10 01        END    2005 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   SOHM Node 62B.wdm
MESSU      25   PreSOHM Node 62B.MES
           27   PreSOHM Node 62B.L61
           28   PreSOHM Node 62B.L62
           30   POCSOHM Node 62B1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37            40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       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#   ***
Basin  1***
PERLND  37                        4.52     COPY   501     12
PERLND  37                        4.52     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       1958 10 01        END    2005 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   SOHM Node 62B.wdm
MESSU      25   MitSOHM Node 62B.MES
           27   MitSOHM Node 62B.L61
           28   MitSOHM Node 62B.L62
           30   POCSOHM Node 62B1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      IMPLND       1
      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        Trapezoidal Pond  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
  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       0.3      0.01
  END PWAT-STATE1

END PERLND

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

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

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         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     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  37                        3.16     RCHRES   1      2
PERLND  37                        3.16     RCHRES   1      3
IMPLND   1                        1.36     RCHRES   1      5

******Routing******
RCHRES   2                           1     RCHRES   3      7
RCHRES   2                                 COPY     1     17
RCHRES   2                           1     RCHRES   3      8
RCHRES   2                                 COPY     1     18
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 Bio Swal-007    3    1    1    1   28    0    1
    2     Bio Swale  1            2    1    1    1   28    0    1
    3     Trapezoidal Pond-010    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      0.11       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            =  880.
*** 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
   43    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.222222  0.000000  0.000000  0.000000
  0.012088  0.221978  0.000489  0.000000  0.000000
  0.024176  0.221306  0.000979  0.000000  0.000000
  0.036264  0.220635  0.001471  0.000000  0.000000
  0.048352  0.219963  0.001964  0.000000  0.000000
  0.060440  0.219292  0.002460  0.000000  0.000000
  0.072527  0.218620  0.002957  0.000000  0.000000
  0.084615  0.217949  0.003455  0.000000  0.000000
  0.096703  0.217277  0.003956  0.000000  0.000000
  0.108791  0.216606  0.004458  0.000000  0.000000
  0.120879  0.215934  0.004961  0.000000  0.058819
  0.132967  0.215263  0.005467  0.000000  0.058819
  0.145055  0.214591  0.005974  0.000000  0.058819
  0.157143  0.213919  0.006483  0.000000  0.058819
  0.169231  0.213248  0.006993  0.000000  0.058819
  0.181319  0.212576  0.007505  0.000000  0.058819
  0.193407  0.211905  0.008019  0.000000  0.058819
  0.205495  0.211233  0.008516  0.000000  0.058819
  0.217582  0.210562  0.009014  0.000000  0.058819
  0.229670  0.209890  0.009515  0.000000  0.058819
  0.241758  0.209219  0.010016  0.000000  0.058819
  0.253846  0.208547  0.010520  0.000000  0.058819
  0.265934  0.207875  0.011025  0.000000  0.058819
  0.278022  0.207204  0.011531  0.000000  0.058819
  0.290110  0.206532  0.012039  0.000000  0.058819
  0.302198  0.205861  0.012568  0.000000  0.058819
  0.314286  0.205189  0.013099  0.000000  0.058819
  0.326374  0.204518  0.013631  0.000000  0.058819
  0.338462  0.203846  0.014166  0.000000  0.058819
  0.350549  0.203175  0.014701  0.000000  0.058819
  0.362637  0.202503  0.015239  0.000000  0.058819
  0.374725  0.201832  0.015778  0.000000  0.058819
  0.386813  0.201160  0.016318  0.000000  0.058819
  0.398901  0.200488  0.016861  0.000000  0.058819
  0.410989  0.199817  0.017405  0.000000  0.058819
  0.423077  0.199145  0.017951  0.000000  0.058819
  0.435165  0.198474  0.018498  0.000000  0.058819
  0.447253  0.197802  0.019048  0.000000  0.058819
  0.459341  0.197131  0.019598  0.000000  0.058819
  0.471429  0.196459  0.020151  0.000000  0.058819
  0.483516  0.195788  0.020705  0.000000  0.058819
  0.495604  0.195116  0.021261  0.000000  0.058819
  0.500000  0.194444  0.064391  0.000000  0.058819
  END FTABLE  2
  FTABLE      1
   51    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.194444  0.000000  0.631823  0.000000  0.000000
  0.012088  0.222894  0.002690  0.660679  1.891896  0.000000
  0.024176  0.223565  0.005389  0.689961  1.965174  0.000000
  0.036264  0.224237  0.008095  0.719663  2.038451  0.000000
  0.048352  0.224908  0.010810  0.749780  2.111729  0.000000
  0.060440  0.225580  0.013532  6.963068  2.185007  0.000000
  0.072527  0.226252  0.016263  9.893574  2.258284  0.000000
  0.084615  0.226923  0.019002  12.10095  2.331562  0.000000
  0.096703  0.227595  0.021749  13.95150  2.404840  0.000000
  0.108791  0.228266  0.024505  15.58739  2.478117  0.000000
  0.120879  0.228938  0.027268  17.11072  2.551395  0.000000
```

0.132967	0.229609	0.030039	18.54606	2.624673	0.000000
0.145055	0.230281	0.032819	19.91200	2.697950	0.000000
0.157143	0.230952	0.035607	21.22233	2.771228	0.000000
0.169231	0.231624	0.038402	22.48729	2.844506	0.000000
0.181319	0.232295	0.041206	23.71465	2.917783	0.000000
0.193407	0.232967	0.044018	24.91042	2.991061	0.000000
0.205495	0.233639	0.046838	26.07938	3.064339	0.000000
0.217582	0.234310	0.049667	27.22538	3.137616	0.000000
0.229670	0.234982	0.052503	28.35156	3.210894	0.000000
0.241758	0.235653	0.055348	29.46053	3.284172	0.000000
0.253846	0.236325	0.058200	30.55450	3.357449	0.000000
0.265934	0.236996	0.061061	31.63531	3.430727	0.000000
0.278022	0.237668	0.063930	32.70455	3.504005	0.000000
0.290110	0.238339	0.066807	33.76359	3.577282	0.000000
0.302198	0.239011	0.069692	34.81362	3.650560	0.000000
0.314286	0.239683	0.072585	35.85569	3.723838	0.000000
0.326374	0.240354	0.075486	36.89070	3.797115	0.000000
0.338462	0.241026	0.078396	37.91946	3.870393	0.000000
0.350549	0.241697	0.081313	38.94269	3.943671	0.000000
0.362637	0.242369	0.084239	39.96102	4.016948	0.000000
0.374725	0.243040	0.087173	40.97504	4.090226	0.000000
0.386813	0.243712	0.090115	41.98525	4.163504	0.000000
0.398901	0.244383	0.093065	42.99212	4.236781	0.000000
0.410989	0.245055	0.096023	43.99607	4.310059	0.000000
0.423077	0.245726	0.098989	44.99749	4.383337	0.000000
0.435165	0.246398	0.101964	45.99670	4.456614	0.000000
0.447253	0.247070	0.104946	46.99405	4.529892	0.000000
0.459341	0.247741	0.107937	47.98981	4.603170	0.000000
0.471429	0.248413	0.110935	48.98425	4.676447	0.000000
0.483516	0.249084	0.113942	49.97761	4.749725	0.000000
0.495604	0.249756	0.116957	50.97012	4.823003	0.000000
0.507692	0.250427	0.119980	51.96198	4.896280	0.000000
0.519780	0.251099	0.123011	52.95339	4.969558	0.000000
0.531868	0.251770	0.126051	53.94452	5.042836	0.000000
0.543956	0.252442	0.129098	54.93554	5.116113	0.000000
0.556044	0.253114	0.132154	55.92660	5.189391	0.000000
0.568132	0.253785	0.135217	56.91784	5.262669	0.000000
0.580220	0.254457	0.138289	57.90940	5.335946	0.000000
0.592308	0.255128	0.141369	58.90138	5.409224	0.000000
0.600000	0.255556	0.143333	59.89392	5.455855	0.000000

END FTABLE 1

FTABLE 3

91 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.101064	0.000000	0.000000	0.000000		
0.044444	0.101878	0.004510	0.026677	0.030572		
0.088889	0.102696	0.009056	0.037727	0.030572		
0.133333	0.103516	0.013638	0.046206	0.030572		
0.177778	0.104340	0.018257	0.053354	0.030572		
0.222222	0.105167	0.022913	0.059652	0.030572		
0.266667	0.105997	0.027606	0.065345	0.030572		
0.311111	0.106831	0.032335	0.070581	0.030572		
0.355556	0.107668	0.037102	0.075454	0.030572		
0.400000	0.108508	0.041906	0.080031	0.030572		
0.444444	0.109351	0.046747	0.084360	0.030572		
0.488889	0.110198	0.051626	0.088478	0.030572		
0.533333	0.111048	0.056543	0.092412	0.030572		
0.577778	0.111901	0.061497	0.096185	0.030572		
0.622222	0.112758	0.066489	0.099816	0.030572		
0.666667	0.113617	0.071520	0.103320	0.030572		
0.711111	0.114480	0.076589	0.106708	0.030572		
0.755556	0.115346	0.081696	0.109992	0.030572		
0.800000	0.116216	0.086842	0.113181	0.030572		
0.844444	0.117089	0.092026	0.116282	0.030572		
0.888889	0.117965	0.097250	0.119303	0.030572		
0.933333	0.118844	0.102512	0.122249	0.030572		
0.977778	0.119727	0.107814	0.125126	0.030572		
1.022222	0.120612	0.113155	0.127938	0.030572		
1.066667	0.121502	0.118535	0.130690	0.030572		

```
  1.111111  0.122394  0.123955  0.133385  0.030572
  1.155556  0.123290  0.129414  0.136026  0.030572
  1.200000  0.124188  0.134914  0.138618  0.030572
  1.244444  0.125091  0.140454  0.141161  0.030572
  1.288889  0.125996  0.146033  0.143660  0.030572
  1.333333  0.126905  0.151653  0.146116  0.030572
  1.377778  0.127817  0.157314  0.148531  0.030572
  1.422222  0.128732  0.163015  0.150908  0.030572
  1.466667  0.129650  0.168757  0.153248  0.030572
  1.511111  0.130572  0.174539  0.155552  0.030572
  1.555556  0.131497  0.180363  0.157823  0.030572
  1.600000  0.132425  0.186228  0.160062  0.030572
  1.644444  0.133357  0.192134  0.162270  0.030572
  1.688889  0.134292  0.198082  0.164448  0.030572
  1.733333  0.135230  0.204071  0.166598  0.030572
  1.777778  0.136171  0.210103  0.168720  0.030572
  1.822222  0.137116  0.216176  0.170816  0.030572
  1.866667  0.138064  0.222291  0.172887  0.030572
  1.911111  0.139015  0.228448  0.174933  0.030572
  1.955556  0.139969  0.234648  0.176955  0.030572
  2.000000  0.140927  0.240890  0.178955  0.030572
  2.044444  0.141888  0.247175  0.180932  0.030572
  2.088889  0.142852  0.253502  0.182888  0.030572
  2.133333  0.143819  0.259873  0.184824  0.030572
  2.177778  0.144790  0.266286  0.186739  0.030572
  2.222222  0.145764  0.272743  0.188635  0.030572
  2.266667  0.146741  0.279243  0.190512  0.030572
  2.311111  0.147722  0.285787  0.210588  0.030572
  2.355556  0.148706  0.292374  0.283054  0.030572
  2.400000  0.149693  0.299005  0.384723  0.030572
  2.444444  0.150683  0.305680  0.508654  0.030572
  2.488889  0.151677  0.312399  0.651339  0.030572
  2.533333  0.152673  0.319162  0.810545  0.030572
  2.577778  0.153674  0.325970  0.984689  0.030572
  2.622222  0.154677  0.332822  1.172571  0.030572
  2.666667  0.155684  0.339719  1.373242  0.030572
  2.711111  0.156693  0.346661  1.585924  0.030572
  2.755556  0.157707  0.353648  1.809969  0.030572
  2.800000  0.158723  0.360679  2.044822  0.030572
  2.844444  0.159743  0.367756  2.290003  0.030572
  2.888889  0.160766  0.374879  2.545089  0.030572
  2.933333  0.161792  0.382047  2.809708  0.030572
  2.977778  0.162821  0.389260  3.083524  0.030572
  3.022222  0.163854  0.396520  3.272990  0.030572
  3.066667  0.164890  0.403825  3.477668  0.030572
  3.111111  0.165929  0.411177  3.768864  0.030572
  3.155556  0.166972  0.418575  4.125657  0.030572
  3.200000  0.168018  0.426019  4.537598  0.030572
  3.244444  0.169067  0.433510  4.998074  0.030572
  3.288889  0.170119  0.441047  5.502404  0.030572
  3.333333  0.171175  0.448631  6.047049  0.030572
  3.377778  0.172234  0.456263  6.629211  0.030572
  3.422222  0.173296  0.463941  7.246606  0.030572
  3.466667  0.174361  0.471667  7.897320  0.030572
  3.511111  0.175430  0.479440  8.579723  0.030572
  3.555556  0.176502  0.487261  9.292404  0.030572
  3.600000  0.177577  0.495129  10.03412  0.030572
  3.644444  0.178656  0.503045  10.80378  0.030572
  3.688889  0.179737  0.511010  11.60040  0.030572
  3.733333  0.180822  0.519022  12.42309  0.030572
  3.777778  0.181911  0.527083  13.27105  0.030572
  3.822222  0.183002  0.535192  14.14355  0.030572
  3.866667  0.184097  0.543350  15.03991  0.030572
  3.911111  0.185195  0.551556  15.95951  0.030572
  3.955556  0.186296  0.559812  16.90179  0.030572
  4.000000  0.187401  0.568116  17.86619  0.030572
  END FTABLE  3
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      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    1              RCHRES   3     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   1010 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1011 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1012 FLOW     ENGL      REPL
RCHRES   3 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

  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

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

SOHM

PROJECT REPORT

General Model Information

Project Name:	SOHM Node 62C
Site Name:	
Site Address:	
City:	
Report Date:	12/1/2014
Gage:	Trabuco Canyon
Data Start:	10/01/1958
Data End:	09/30/2005
Timestep:	15 Minute
Precip Scale:	1.00
Version:	2014/11/12

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	1
Pervious Total	1
Impervious Land Use	Acres
Impervious Total	0
Basin Total	1

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	0.5
Pervious Total	0.5
Impervious Land Use	Acres
Impervious,Flat(0-5)	0.5
Impervious Total	0.5
Basin Total	1

Element Flows To:

Surface	Interflow	Groundwater
Surface Bio Swale 1	Surface Bio Swale 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	21.21 ft.	
Bottom Width:	21.21 ft.	
Depth:	5 ft.	
Volume at riser head:	0.1083 acre-ft.	
Infiltration On		
Infiltration rate:	0.2	
Infiltration safety factor:	1	
Total Volume Infiltrated (ac-ft):		20.523
Total Volume Through Riser (ac-ft):		14.356
Total Volume Through Facility (ac-ft):		34.879
Percent Infiltrated:		58.84
Total Precip Applied to Facility:		5.831
Total Evap From Facility:		0.376
Side slope 1:	3 To 1	
Side slope 2:	3 To 1	
Side slope 3:	3 To 1	
Side slope 4:	3 To 1	
Discharge Structure		
Riser Height:	4 ft.	
Riser Diameter:	18 in.	
Notch Type:	Rectangular	
Notch Width:	0.360 ft.	
Notch Height:	0.967 ft.	
Orifice 1 Diameter:	0.962 in. Elevation:0 ft.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.010	0.000	0.000	0.000
0.0556	0.010	0.000	0.005	0.002
0.1111	0.011	0.001	0.008	0.002
0.1667	0.011	0.001	0.009	0.002
0.2222	0.011	0.002	0.011	0.002
0.2778	0.012	0.003	0.012	0.002
0.3333	0.012	0.003	0.014	0.002
0.3889	0.012	0.004	0.015	0.002
0.4444	0.013	0.005	0.016	0.002
0.5000	0.013	0.005	0.017	0.002
0.5556	0.013	0.006	0.018	0.002
0.6111	0.014	0.007	0.019	0.002
0.6667	0.014	0.008	0.019	0.002
0.7222	0.015	0.009	0.020	0.002
0.7778	0.015	0.009	0.021	0.002
0.8333	0.015	0.010	0.022	0.002
0.8889	0.016	0.011	0.022	0.002
0.9444	0.016	0.012	0.023	0.002
1.0000	0.017	0.013	0.024	0.002
1.0556	0.017	0.014	0.025	0.002
1.1111	0.017	0.015	0.025	0.002
1.1667	0.018	0.016	0.026	0.002
1.2222	0.018	0.017	0.026	0.002

1.2778	0.019	0.018	0.027	0.002
1.3333	0.019	0.019	0.028	0.002
1.3889	0.020	0.020	0.028	0.002
1.4444	0.020	0.021	0.029	0.002
1.5000	0.021	0.023	0.029	0.002
1.5556	0.021	0.024	0.030	0.002
1.6111	0.021	0.025	0.030	0.002
1.6667	0.022	0.026	0.031	0.002
1.7222	0.022	0.027	0.031	0.002
1.7778	0.023	0.029	0.032	0.002
1.8333	0.023	0.030	0.032	0.002
1.8889	0.024	0.031	0.033	0.002
1.9444	0.024	0.033	0.033	0.002
2.0000	0.025	0.034	0.034	0.002
2.0556	0.025	0.036	0.034	0.002
2.1111	0.026	0.037	0.035	0.002
2.1667	0.026	0.038	0.035	0.002
2.2222	0.027	0.040	0.036	0.002
2.2778	0.027	0.041	0.036	0.002
2.3333	0.028	0.043	0.037	0.002
2.3889	0.029	0.045	0.037	0.002
2.4444	0.029	0.046	0.038	0.002
2.5000	0.030	0.048	0.038	0.002
2.5556	0.030	0.050	0.038	0.002
2.6111	0.031	0.051	0.039	0.002
2.6667	0.031	0.053	0.039	0.002
2.7222	0.032	0.055	0.040	0.002
2.7778	0.032	0.057	0.040	0.002
2.8333	0.033	0.059	0.040	0.002
2.8889	0.034	0.060	0.041	0.002
2.9444	0.034	0.062	0.041	0.002
3.0000	0.035	0.064	0.042	0.002
3.0556	0.035	0.066	0.046	0.002
3.1111	0.036	0.068	0.068	0.002
3.1667	0.037	0.070	0.100	0.002
3.2222	0.037	0.072	0.138	0.002
3.2778	0.038	0.074	0.181	0.002
3.3333	0.039	0.077	0.229	0.002
3.3889	0.039	0.079	0.280	0.002
3.4444	0.040	0.081	0.335	0.002
3.5000	0.040	0.083	0.392	0.002
3.5556	0.041	0.086	0.451	0.002
3.6111	0.042	0.088	0.511	0.002
3.6667	0.042	0.090	0.574	0.002
3.7222	0.043	0.093	0.637	0.002
3.7778	0.044	0.095	0.702	0.002
3.8333	0.044	0.098	0.768	0.002
3.8889	0.045	0.100	0.834	0.002
3.9444	0.046	0.103	0.900	0.002
4.0000	0.046	0.105	0.967	0.002
4.0556	0.047	0.108	1.159	0.002
4.1111	0.048	0.111	1.509	0.002
4.1667	0.049	0.113	1.962	0.002
4.2222	0.049	0.116	2.499	0.002
4.2778	0.050	0.119	3.108	0.002
4.3333	0.051	0.122	3.781	0.002
4.3889	0.051	0.124	4.512	0.002
4.4444	0.052	0.127	5.298	0.002

4.5000	0.053	0.130	6.135	0.002
4.5556	0.054	0.133	7.020	0.002
4.6111	0.054	0.136	7.950	0.002
4.6667	0.055	0.139	8.923	0.002
4.7222	0.056	0.142	9.938	0.002
4.7778	0.057	0.146	10.99	0.002
4.8333	0.057	0.149	12.08	0.002
4.8889	0.058	0.152	13.21	0.002
4.9444	0.059	0.155	14.38	0.002
5.0000	0.060	0.159	15.58	0.002
5.0556	0.061	0.162	16.81	0.002

Bio Swale 1

Bottom Length:	207.00 ft.
Bottom Width:	8.00 ft.
Material thickness of first layer:	0.2
Material type for first layer:	GRAVEL
Material thickness of second layer:	0.1
Material type for second layer:	Sand
Material thickness of third layer:	0.1
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.2
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	10.901
Total Volume Through Riser (ac-ft):	29.42
Total Volume Through Facility (ac-ft):	40.321
Percent Infiltrated:	27.04
Total Precip Applied to Facility:	3.037
Total Evap From Facility:	0.856
Underdrain not used	
Discharge Structure	
Riser Height:	0.25 ft.
Riser Diameter:	10 in.
Notch Type:	Rectangular
Notch Width:	0.000 ft.
Notch Height:	0.000 ft.
Orifice 1 Diameter:	10 in. Elevation:0.05 ft.
Element Flows To:	
Outlet 1	Outlet 2
Trapezoidal Pond 1	

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0456	0.0000	0.0000	0.0000
0.0181	0.0456	0.0001	0.0000	0.0000
0.0363	0.0453	0.0003	0.0000	0.0000
0.0544	0.0449	0.0004	0.0000	0.0000
0.0725	0.0446	0.0006	0.0000	0.0000
0.0907	0.0442	0.0007	0.0000	0.0000
0.1088	0.0439	0.0009	0.0000	0.0000
0.1269	0.0435	0.0010	0.0077	0.0077
0.1451	0.0432	0.0012	0.0077	0.0077
0.1632	0.0428	0.0013	0.0077	0.0077
0.1813	0.0425	0.0015	0.0077	0.0077
0.1995	0.0422	0.0017	0.0077	0.0077
0.2176	0.0418	0.0018	0.0077	0.0077
0.2357	0.0415	0.0020	0.0077	0.0077
0.2538	0.0411	0.0021	0.0077	0.0077
0.2720	0.0408	0.0023	0.0077	0.0077
0.2901	0.0404	0.0024	0.0077	0.0077
0.3082	0.0401	0.0026	0.0077	0.0077
0.3264	0.0397	0.0028	0.0077	0.0077
0.3445	0.0394	0.0029	0.0077	0.0077
0.3626	0.0391	0.0031	0.0077	0.0077
0.3808	0.0387	0.0033	0.0077	0.0077
0.3989	0.0384	0.0034	0.0077	0.0077
0.4000	0.0380	0.0034	0.0077	0.0077

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
0.4000	0.0456	0.0034	0.0000	0.3771	0.0000
0.4181	0.0460	0.0043	0.0000	0.3771	0.0000
0.4363	0.0463	0.0051	0.0000	0.3985	0.0000
0.4544	0.0467	0.0060	0.0000	0.4200	0.0000
0.4725	0.0470	0.0068	0.0000	0.4415	0.0000
0.4907	0.0473	0.0077	0.0000	0.4630	0.0000
0.5088	0.0477	0.0085	0.0000	0.4845	0.0000
0.5269	0.0480	0.0094	0.0000	0.5060	0.0000
0.5451	0.0484	0.0103	0.0000	0.5275	0.0000
0.5632	0.0487	0.0111	0.0000	0.5490	0.0000
0.5813	0.0491	0.0120	0.0000	0.5705	0.0000
0.5995	0.0494	0.0129	0.0000	0.5920	0.0000
0.6176	0.0498	0.0138	0.0000	0.6134	0.0000
0.6357	0.0501	0.0147	0.0000	0.6349	0.0000
0.6538	0.0504	0.0156	0.0000	0.6564	0.0000
0.6720	0.0508	0.0166	0.0000	0.6779	0.0000
0.6901	0.0511	0.0175	0.0000	0.6994	0.0000
0.7082	0.0515	0.0184	0.0000	0.7209	0.0000
0.7264	0.0518	0.0193	0.0000	0.7424	0.0000
0.7445	0.0522	0.0203	0.0000	0.7639	0.0000
0.7626	0.0525	0.0212	0.0000	0.7854	0.0000
0.7808	0.0529	0.0222	0.0000	0.8069	0.0000
0.7989	0.0532	0.0232	0.0000	0.8283	0.0000
0.8170	0.0535	0.0241	0.0000	0.8498	0.0000
0.8352	0.0539	0.0251	2.2766	0.8713	0.0000
0.8533	0.0542	0.0261	2.4118	0.8928	0.0000
0.8714	0.0546	0.0271	2.5506	0.9143	0.0000
0.8896	0.0549	0.0281	2.6929	0.9358	0.0000
0.9077	0.0553	0.0291	2.8385	0.9573	0.0000
0.9258	0.0556	0.0301	2.9873	0.9788	0.0000
0.9440	0.0560	0.0311	3.1393	1.0003	0.0000
0.9621	0.0563	0.0321	3.2944	1.0218	0.0000
0.9802	0.0566	0.0331	3.4525	1.0432	0.0000
0.9984	0.0570	0.0341	3.6135	1.0647	0.0000
1.0165	0.0573	0.0352	3.7773	1.0862	0.0000
1.0346	0.0577	0.0362	3.9440	1.1077	0.0000
1.0527	0.0580	0.0373	4.1134	1.1292	0.0000
1.0709	0.0584	0.0383	4.2855	1.1507	0.0000
1.0890	0.0587	0.0394	4.4602	1.1722	0.0000
1.1071	0.0591	0.0405	4.6375	1.1937	0.0000
1.1253	0.0594	0.0415	4.8174	1.2152	0.0000
1.1434	0.0598	0.0426	4.9998	1.2367	0.0000
1.1615	0.0601	0.0437	5.1847	1.2582	0.0000
1.1797	0.0604	0.0448	5.3720	1.2796	0.0000
1.1978	0.0608	0.0459	5.5617	1.3011	0.0000
1.2159	0.0611	0.0470	5.7538	1.3226	0.0000
1.2341	0.0615	0.0481	5.9482	1.3441	0.0000
1.2522	0.0618	0.0492	6.1450	1.3656	0.0000
1.2703	0.0622	0.0503	6.3440	1.3871	0.0000
1.2885	0.0625	0.0515	6.5453	1.4086	0.0000
1.3066	0.0629	0.0526	6.7487	1.4301	0.0000
1.3247	0.0632	0.0538	6.9544	1.4516	0.0000
1.3429	0.0635	0.0549	7.1623	1.4731	0.0000
1.3610	0.0639	0.0561	7.3723	1.4945	0.0000
1.3791	0.0642	0.0572	7.5844	1.5160	0.0000

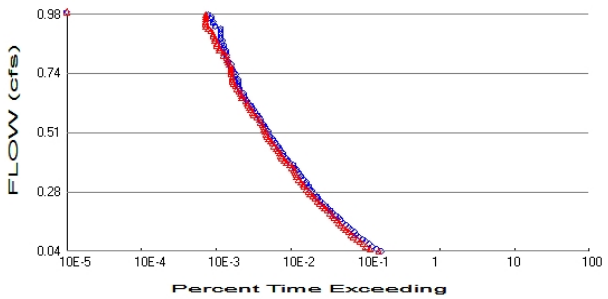
1.3973	0.0646	0.0584	7.7986	1.5375	0.0000
1.4154	0.0649	0.0596	8.0149	1.5590	0.0000
1.4335	0.0653	0.0607	8.2333	1.5805	0.0000
1.4516	0.0656	0.0619	8.4537	1.6020	0.0000
1.4698	0.0660	0.0631	8.6762	1.6235	0.0000
1.4879	0.0663	0.0643	8.9006	1.6450	0.0000
1.5060	0.0666	0.0655	9.1270	1.6665	0.0000
1.5242	0.0670	0.0667	9.3554	1.6880	0.0000
1.5423	0.0673	0.0680	9.5857	1.7094	0.0000
1.5604	0.0677	0.0692	9.8180	1.7309	0.0000
1.5786	0.0680	0.0704	10.052	1.7524	0.0000
1.5967	0.0684	0.0716	10.288	1.7739	0.0000
1.6148	0.0687	0.0729	10.526	1.7954	0.0000
1.6330	0.0691	0.0741	10.766	1.8169	0.0000
1.6500	0.0694	0.0753	11.008	1.8371	0.0000

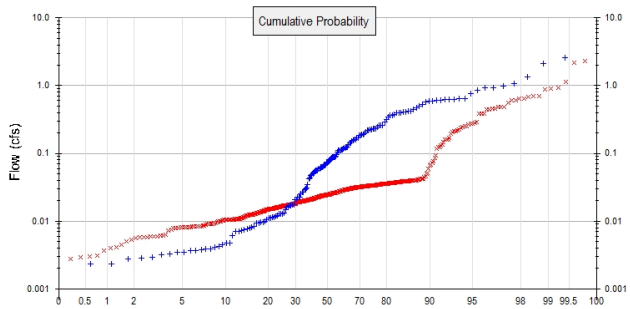
Surface Bio Swale 1

Element Flows To:

Outlet 1	Outlet 2
Trapezoidal Pond 1	Bio Swale 1

Analysis Results
POC 1





+ Predeveloped x Mitigated

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

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.5
Total Impervious Area: 0.5

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.42379
5 year	0.665248
10 year	0.978049
25 year	1.823903

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.383229
5 year	0.648788
10 year	0.900076
25 year	1.750725

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0424	2680	2507	93	Pass
0.0518	2335	1907	81	Pass
0.0613	2047	1694	82	Pass
0.0707	1834	1536	83	Pass
0.0802	1643	1394	84	Pass
0.0896	1512	1273	84	Pass
0.0991	1362	1145	84	Pass
0.1085	1256	1055	83	Pass
0.1180	1162	982	84	Pass
0.1274	1066	900	84	Pass
0.1369	983	833	84	Pass
0.1463	907	772	85	Pass
0.1558	840	724	86	Pass
0.1652	766	678	88	Pass
0.1747	717	630	87	Pass
0.1841	662	590	89	Pass
0.1936	600	558	93	Pass
0.2030	558	507	90	Pass
0.2125	517	467	90	Pass
0.2220	486	434	89	Pass
0.2314	443	398	89	Pass
0.2409	409	377	92	Pass
0.2503	381	347	91	Pass
0.2598	369	324	87	Pass
0.2692	342	301	88	Pass
0.2787	321	286	89	Pass
0.2881	306	263	85	Pass
0.2976	290	247	85	Pass
0.3070	270	240	88	Pass
0.3165	264	225	85	Pass
0.3259	243	212	87	Pass
0.3354	228	199	87	Pass
0.3448	215	193	89	Pass
0.3543	211	188	89	Pass
0.3637	199	183	91	Pass
0.3732	184	172	93	Pass
0.3826	178	161	90	Pass
0.3921	160	145	90	Pass
0.4015	151	135	89	Pass
0.4110	142	127	89	Pass
0.4204	133	121	90	Pass
0.4299	128	118	92	Pass
0.4393	121	112	92	Pass
0.4488	117	105	89	Pass
0.4582	113	98	86	Pass
0.4677	103	94	91	Pass
0.4771	98	89	90	Pass
0.4866	94	83	88	Pass
0.4960	86	79	91	Pass
0.5055	84	77	91	Pass
0.5149	83	75	90	Pass
0.5244	77	73	94	Pass
0.5338	74	71	95	Pass

0.5433	71	69	97	Pass
0.5527	67	65	97	Pass
0.5622	65	63	96	Pass
0.5716	62	58	93	Pass
0.5811	59	52	88	Pass
0.5905	55	51	92	Pass
0.6000	53	48	90	Pass
0.6095	50	46	92	Pass
0.6189	48	44	91	Pass
0.6284	44	43	97	Pass
0.6378	43	41	95	Pass
0.6473	40	36	90	Pass
0.6567	39	36	92	Pass
0.6662	38	35	92	Pass
0.6756	34	34	100	Pass
0.6851	34	31	91	Pass
0.6945	33	30	90	Pass
0.7040	33	28	84	Pass
0.7134	33	27	81	Pass
0.7229	32	27	84	Pass
0.7323	30	27	90	Pass
0.7418	30	26	86	Pass
0.7512	28	26	92	Pass
0.7607	27	26	96	Pass
0.7701	26	26	100	Pass
0.7796	26	25	96	Pass
0.7890	24	24	100	Pass
0.7985	23	23	100	Pass
0.8079	23	23	100	Pass
0.8174	23	21	91	Pass
0.8268	22	21	95	Pass
0.8363	22	18	81	Pass
0.8457	21	18	85	Pass
0.8552	21	17	80	Pass
0.8646	20	17	85	Pass
0.8741	20	16	80	Pass
0.8835	19	16	84	Pass
0.8930	19	15	78	Pass
0.9024	19	15	78	Pass
0.9119	19	14	73	Pass
0.9213	19	13	68	Pass
0.9308	16	12	75	Pass
0.9402	15	12	80	Pass
0.9497	15	12	80	Pass
0.9591	14	12	85	Pass
0.9686	14	12	85	Pass
0.9780	13	12	92	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

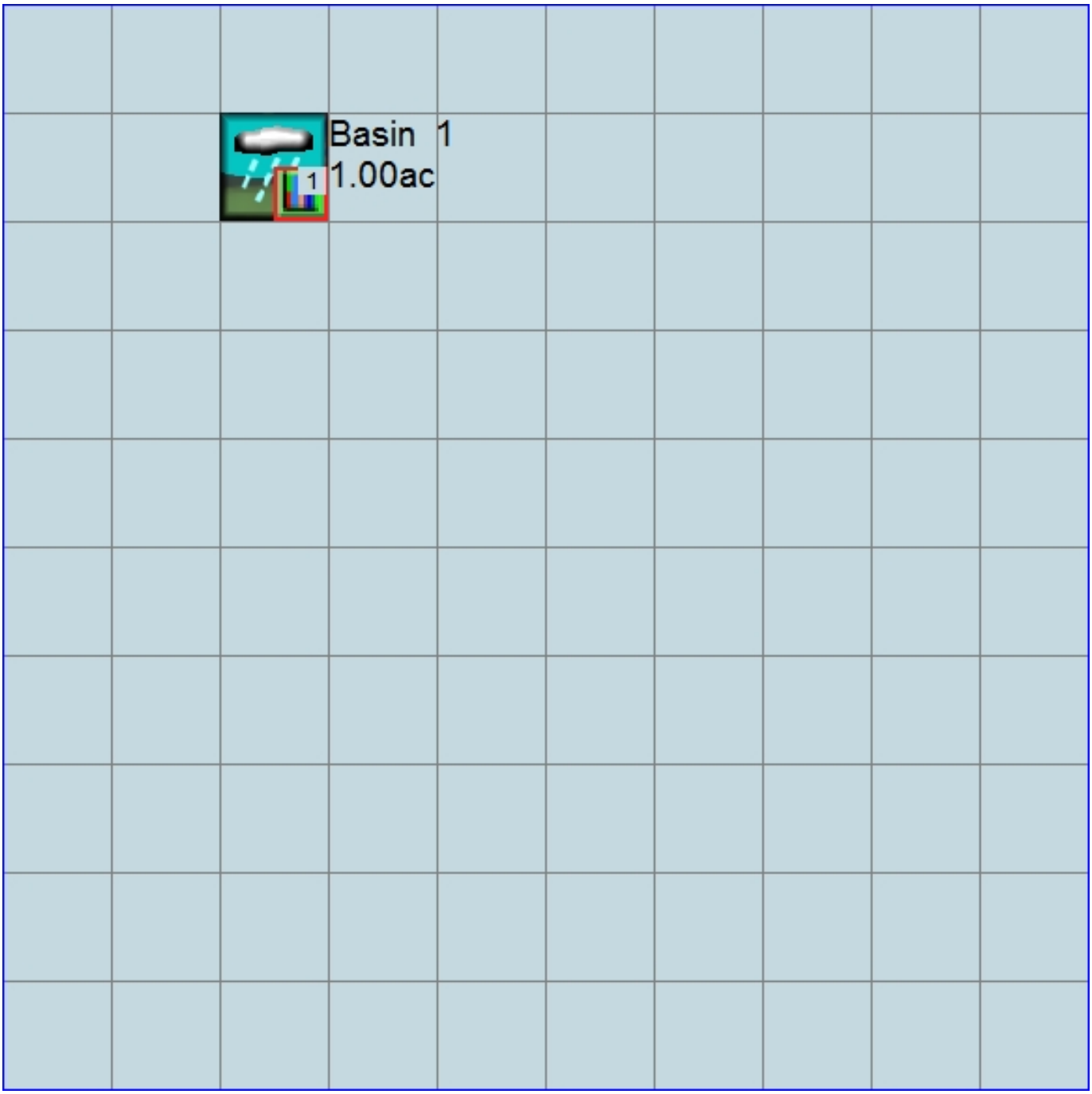
No PERLND changes have been made.

IMPLND Changes

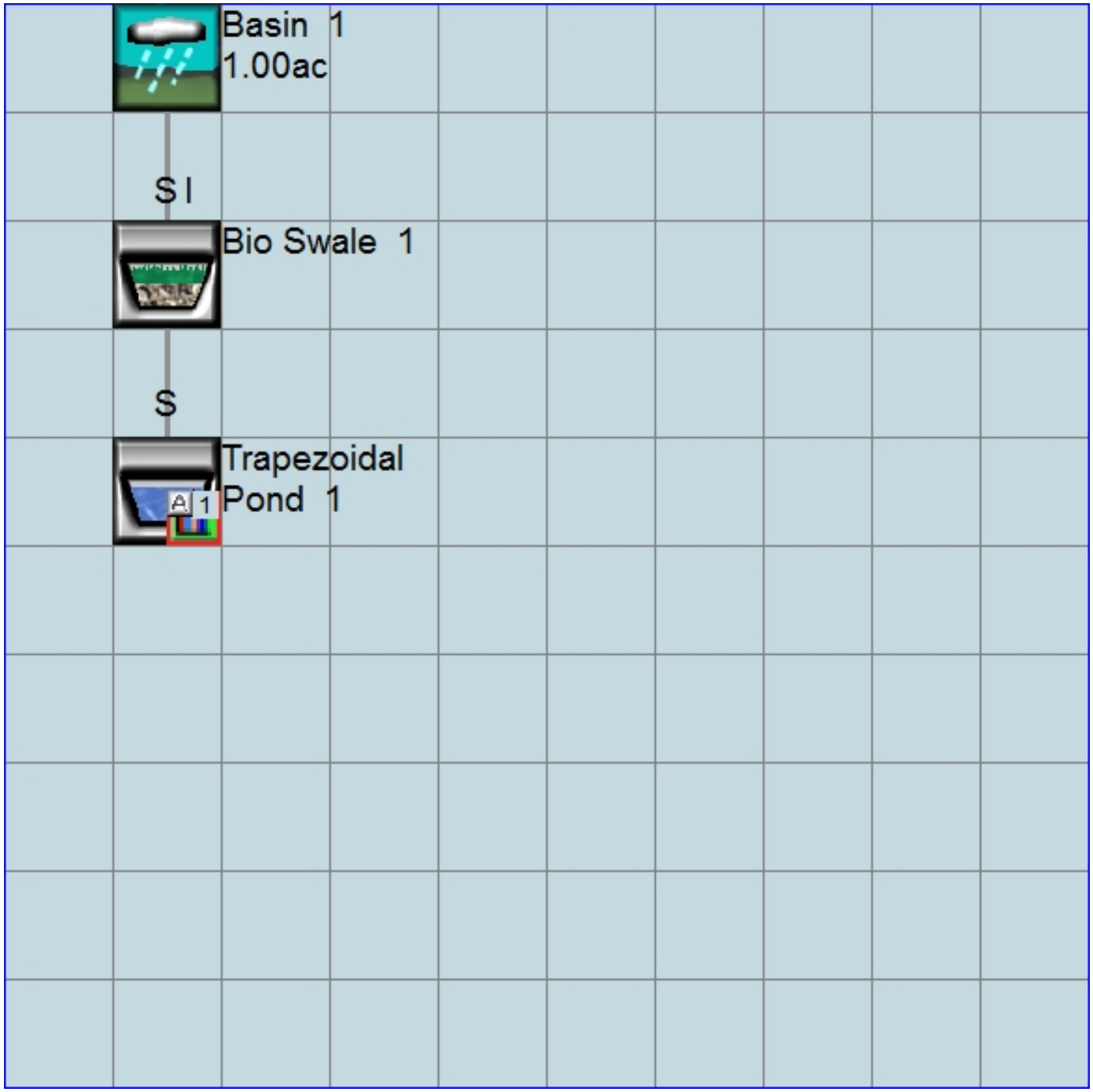
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1958 10 01        END    2005 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   SOHM Node 62C.wdm
MESSU      25   PreSOHM Node 62C.MES
           27   PreSOHM Node 62C.L61
           28   PreSOHM Node 62C.L62
           30   POCSOHM Node 62C1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37            40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       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#   ***
Basin  1***
PERLND  37                          1     COPY   501     12
PERLND  37                          1     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       1958 10 01        END    2005 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   SOHM Node 62C.wdm
MESSU      25   MitSOHM Node 62C.MES
           27   MitSOHM Node 62C.L61
           28   MitSOHM Node 62C.L62
           30   POCSOHM Node 62C1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      IMPLND       1
      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        Trapezoidal Pond  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
  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       0.3      0.01
  END PWAT-STATE1

END PERLND

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

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

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         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     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  37                        0.5     RCHRES   1      2
PERLND  37                        0.5     RCHRES   1      3
IMPLND   1                        0.5     RCHRES   1      5

******Routing******
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 Bio Swal-007    3    1    1    1   28    0    1
    2     Bio Swale  1            2    1    1    1   28    0    1
    3     Trapezoidal Pond-004    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      0.04       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            =  142.
*** 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 3
91 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.010328	0.000000	0.000000	0.000000		
0.055556	0.010655	0.000583	0.005729	0.002083		
0.111111	0.010987	0.001184	0.008102	0.002083		
0.166667	0.011325	0.001804	0.009923	0.002083		
0.222222	0.011667	0.002442	0.011458	0.002083		
0.277778	0.012015	0.003100	0.012810	0.002083		
0.333333	0.012367	0.003778	0.014033	0.002083		
0.388889	0.012725	0.004475	0.015157	0.002083		
0.444444	0.013088	0.005192	0.016204	0.002083		
0.500000	0.013456	0.005929	0.017187	0.002083		
0.555556	0.013829	0.006687	0.018116	0.002083		
0.611111	0.014207	0.007466	0.019001	0.002083		
0.666667	0.014591	0.008266	0.019846	0.002083		
0.722222	0.014979	0.009087	0.020656	0.002083		
0.777778	0.015372	0.009930	0.021436	0.002083		
0.833333	0.015771	0.010795	0.022188	0.002083		
0.888889	0.016175	0.011683	0.022916	0.002083		
0.944444	0.016584	0.012593	0.023621	0.002083		
1.000000	0.016997	0.013525	0.024306	0.002083		
1.055556	0.017416	0.014481	0.024972	0.002083		
1.111111	0.017841	0.015461	0.025621	0.002083		
1.166667	0.018270	0.016464	0.026253	0.002083		
1.222222	0.018704	0.017491	0.026871	0.002083		
1.277778	0.019143	0.018542	0.027475	0.002083		
1.333333	0.019588	0.019618	0.028066	0.002083		
1.388889	0.020038	0.020719	0.028645	0.002083		
1.444444	0.020492	0.021844	0.029212	0.002083		
1.500000	0.020952	0.022996	0.029768	0.002083		
1.555556	0.021417	0.024173	0.030315	0.002083		
1.611111	0.021887	0.025375	0.030851	0.002083		
1.666667	0.022362	0.026605	0.031379	0.002083		
1.722222	0.022842	0.027860	0.031897	0.002083		
1.777778	0.023328	0.029143	0.032408	0.002083		
1.833333	0.023818	0.030452	0.032910	0.002083		
1.888889	0.024314	0.031789	0.033405	0.002083		
1.944444	0.024814	0.033154	0.033893	0.002083		
2.000000	0.025320	0.034547	0.034374	0.002083		
2.055556	0.025831	0.035967	0.034848	0.002083		
2.111111	0.026347	0.037417	0.035315	0.002083		
2.166667	0.026868	0.038895	0.035777	0.002083		
2.222222	0.027394	0.040402	0.036233	0.002083		
2.277778	0.027925	0.041939	0.036683	0.002083		
2.333333	0.028461	0.043505	0.037128	0.002083		
2.388889	0.029003	0.045101	0.037567	0.002083		
2.444444	0.029549	0.046728	0.038001	0.002083		
2.500000	0.030101	0.048385	0.038431	0.002083		
2.555556	0.030658	0.050073	0.038855	0.002083		
2.611111	0.031219	0.051791	0.039276	0.002083		
2.666667	0.031786	0.053542	0.039691	0.002083		
2.722222	0.032358	0.055323	0.040102	0.002083		
2.777778	0.032936	0.057137	0.040510	0.002083		
2.833333	0.033518	0.058983	0.040913	0.002083		
2.888889	0.034105	0.060861	0.041312	0.002083		
2.944444	0.034698	0.062773	0.041707	0.002083		
3.000000	0.035295	0.064717	0.042099	0.002083		
3.055556	0.035898	0.066694	0.046440	0.002083		
3.111111	0.036506	0.068706	0.068470	0.002083		
3.166667	0.037118	0.070751	0.100061	0.002083		
3.222222	0.037736	0.072830	0.138326	0.002083		
3.277778	0.038359	0.074944	0.181804	0.002083		
3.333333	0.038988	0.077092	0.229540	0.002083		
3.388889	0.039621	0.079276	0.280831	0.002083		
3.444444	0.040259	0.081495	0.335126	0.002083		
3.500000	0.040903	0.083749	0.391973	0.002083		
3.555556	0.041551	0.086040	0.450987	0.002083		

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  3.611111  0.042205  0.088366  0.511837  0.002083
  3.666667  0.042864  0.090729  0.574228  0.002083
  3.722222  0.043528  0.093129  0.637896  0.002083
  3.777778  0.044196  0.095566  0.702604  0.002083
  3.833333  0.044871  0.098040  0.768133  0.002083
  3.888889  0.045550  0.100552  0.834281  0.002083
  3.944444  0.046234  0.103101  0.900860  0.002083
  4.000000  0.046923  0.105689  0.967697  0.002083
  4.055556  0.047618  0.108315  1.159326  0.002083
  4.111111  0.048317  0.110980  1.509423  0.002083
  4.166667  0.049022  0.113684  1.962682  0.002083
  4.222222  0.049732  0.116427  2.499365  0.002083
  4.277778  0.050447  0.119210  3.108067  0.002083
  4.333333  0.051167  0.122032  3.781089  0.002083
  4.388889  0.051892  0.124895  4.512783  0.002083
  4.444444  0.052622  0.127798  5.298771  0.002083
  4.500000  0.053357  0.130742  6.135531  0.002083
  4.555556  0.054098  0.133727  7.020148  0.002083
  4.611111  0.054843  0.136753  7.950161  0.002083
  4.666667  0.055594  0.139821  8.923452  0.002083
  4.722222  0.056350  0.142930  9.938175  0.002083
  4.777778  0.057110  0.146082  10.99270  0.002083
  4.833333  0.057876  0.149276  12.08558  0.002083
  4.888889  0.058647  0.152513  13.21552  0.002083
  4.944444  0.059423  0.155792  14.38133  0.002083
  5.000000  0.060204  0.159115  15.58193  0.002083
  END FTABLE  3
  FTABLE      2
   24    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.045620  0.000000  0.000000  0.000000
  0.018132  0.045599  0.000144  0.000000  0.000000
  0.036264  0.045254  0.000289  0.000000  0.000000
  0.054396  0.044910  0.000435  0.000000  0.000000
  0.072527  0.044565  0.000583  0.000000  0.000000
  0.090659  0.044220  0.000731  0.000000  0.000000
  0.108791  0.043876  0.000882  0.000000  0.000000
  0.126923  0.043531  0.001033  0.000000  0.007667
  0.145055  0.043186  0.001186  0.000000  0.007667
  0.163187  0.042842  0.001340  0.000000  0.007667
  0.181319  0.042497  0.001495  0.000000  0.007667
  0.199451  0.042152  0.001652  0.000000  0.007667
  0.217582  0.041808  0.001804  0.000000  0.007667
  0.235714  0.041463  0.001958  0.000000  0.007667
  0.253846  0.041118  0.002112  0.000000  0.007667
  0.271978  0.040774  0.002268  0.000000  0.007667
  0.290110  0.040429  0.002425  0.000000  0.007667
  0.308242  0.040084  0.002590  0.000000  0.007667
  0.326374  0.039740  0.002756  0.000000  0.007667
  0.344505  0.039395  0.002923  0.000000  0.007667
  0.362637  0.039050  0.003091  0.000000  0.007667
  0.380769  0.038706  0.003261  0.000000  0.007667
  0.398901  0.038361  0.003431  0.000000  0.007667
  0.400000  0.038017  0.011702  0.000000  0.007667
  END FTABLE  2
  FTABLE      1
   70    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.038017  0.000000  0.000000  0.000000  0.000000
  0.018132  0.045964  0.000830  0.000000  0.377055  0.000000
  0.036264  0.046309  0.001667  0.000000  0.398545  0.000000
  0.054396  0.046654  0.002510  0.174128  0.420035  0.000000
  0.072527  0.046998  0.003359  0.394199  0.441525  0.000000
  0.090659  0.047343  0.004214  0.529589  0.463015  0.000000
  0.108791  0.047688  0.005076  0.636818  0.484506  0.000000
  0.126923  0.048032  0.005943  0.728429  0.505996  0.000000
```

```
  0.145055  0.048377  0.006817  0.809741  0.527486  0.000000
  0.163187  0.048722  0.007698  0.883603  0.548976  0.000000
  0.181319  0.049066  0.008584  0.951749  0.570466  0.000000
  0.199451  0.049411  0.009477  1.015331  0.591956  0.000000
  0.217582  0.049756  0.010376  1.075160  0.613447  0.000000
  0.235714  0.050100  0.011281  1.131831  0.634937  0.000000
  0.253846  0.050445  0.012193  1.187733  0.656427  0.000000
  0.271978  0.050790  0.013111  1.263854  0.677917  0.000000
  0.290110  0.051134  0.014035  1.352151  0.699407  0.000000
  0.308242  0.051479  0.014965  1.448739  0.720897  0.000000
  0.326374  0.051824  0.015901  1.552022  0.742388  0.000000
  0.344505  0.052168  0.016844  1.661085  0.763878  0.000000
  0.362637  0.052513  0.017793  1.775320  0.785368  0.000000
  0.380769  0.052858  0.018749  1.894291  0.806858  0.000000
  0.398901  0.053202  0.019710  2.017667  0.828348  0.000000
  0.417033  0.053547  0.020678  2.145186  0.849838  0.000000
  0.435165  0.053892  0.021652  2.276633  0.871329  0.000000
  0.453297  0.054236  0.022632  2.411829  0.892819  0.000000
  0.471429  0.054581  0.023619  2.550623  0.914309  0.000000
  0.489560  0.054926  0.024612  2.692882  0.935799  0.000000
  0.507692  0.055270  0.025611  2.838489  0.957289  0.000000
  0.525824  0.055615  0.026616  2.987343  0.978779  0.000000
  0.543956  0.055959  0.027627  3.139350  1.000270  0.000000
  0.562088  0.056304  0.028645  3.294427  1.021760  0.000000
  0.580220  0.056649  0.029669  3.452497  1.043250  0.000000
  0.598352  0.056993  0.030699  3.613491  1.064740  0.000000
  0.616484  0.057338  0.031736  3.777344  1.086230  0.000000
  0.634615  0.057683  0.032779  3.943997  1.107720  0.000000
  0.652747  0.058027  0.033828  4.113394  1.129211  0.000000
  0.670879  0.058372  0.034883  4.285483  1.150701  0.000000
  0.689011  0.058717  0.035945  4.460216  1.172191  0.000000
  0.707143  0.059061  0.037012  4.637547  1.193681  0.000000
  0.725275  0.059406  0.038086  4.817433  1.215171  0.000000
  0.743407  0.059751  0.039167  4.999832  1.236661  0.000000
  0.761538  0.060095  0.040253  5.184707  1.258152  0.000000
  0.779670  0.060440  0.041346  5.372020  1.279642  0.000000
  0.797802  0.060785  0.042445  5.561737  1.301132  0.000000
  0.815934  0.061129  0.043550  5.753823  1.322622  0.000000
  0.834066  0.061474  0.044662  5.948248  1.344112  0.000000
  0.852198  0.061819  0.045779  6.144980  1.365602  0.000000
  0.870330  0.062163  0.046903  6.343991  1.387093  0.000000
  0.888462  0.062508  0.048034  6.545252  1.408583  0.000000
  0.906593  0.062853  0.049170  6.748737  1.430073  0.000000
  0.924725  0.063197  0.050313  6.954419  1.451563  0.000000
  0.942857  0.063542  0.051462  7.162273  1.473053  0.000000
  0.960989  0.063887  0.052617  7.372276  1.494543  0.000000
  0.979121  0.064231  0.053779  7.584404  1.516034  0.000000
  0.997253  0.064576  0.054946  7.798634  1.537524  0.000000
  1.015385  0.064921  0.056120  8.014946  1.559014  0.000000
  1.033516  0.065265  0.057301  8.233317  1.580504  0.000000
  1.051648  0.065610  0.058487  8.453728  1.601994  0.000000
  1.069780  0.065955  0.059680  8.676158  1.623484  0.000000
  1.087912  0.066299  0.060879  8.900589  1.644975  0.000000
  1.106044  0.066644  0.062084  9.127002  1.666465  0.000000
  1.124176  0.066988  0.063296  9.355379  1.687955  0.000000
  1.142308  0.067333  0.064514  9.585703  1.709445  0.000000
  1.160440  0.067678  0.065738  9.817956  1.730935  0.000000
  1.178571  0.068022  0.066968  10.05212  1.752425  0.000000
  1.196703  0.068367  0.068204  10.28818  1.773916  0.000000
  1.214835  0.068712  0.069447  10.52613  1.795406  0.000000
  1.232967  0.069056  0.070696  10.76594  1.816896  0.000000
  1.250000  0.069380  0.071875  11.00760  1.837084  0.000000
  END FTABLE  1
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      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    1              RCHRES   3     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   1000 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1003 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1001 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

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1960/ 4/28  2:45

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
-1.503E+01 3822.5     -1.444E-05   -0.00099 -3.708E-11      2
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1963/ 3/28 21:30

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
-1.503E+01 3822.5     -3.438E-07   -0.00099 -3.717E-09      2
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1990/ 5/28 21: 0

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
-1.503E+01 3822.5     -3.106E-06   -0.00099 -2.969E-09      2
```

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

SOHM

PROJECT REPORT

General Model Information

Project Name:	SOHM Node 65
Site Name:	
Site Address:	
City:	
Report Date:	12/1/2014
Gage:	Trabuco Canyon
Data Start:	10/01/1958
Data End:	09/30/2005
Timestep:	15 Minute
Precip Scale:	1.00
Version:	2014/11/12

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	8.96
Pervious Total	8.96
Impervious Land Use	Acres
Impervious Total	0
Basin Total	8.96

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	5
Pervious Total	5
Impervious Land Use	Acres
Impervious,Flat(0-5)	3.96
Impervious Total	3.96
Basin Total	8.96

Element Flows To:

Surface	Interflow	Groundwater
Surface Bio Swale 1	Surface Bio Swale 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bio Swale 1

Bottom Length:	1300.00 ft.
Bottom Width:	14.00 ft.
Material thickness of first layer:	0.2
Material type for first layer:	GRAVEL
Material thickness of second layer:	0.2
Material type for second layer:	Sand
Material thickness of third layer:	0.2
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.3
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	3.765
Total Volume Through Riser (ac-ft):	313.594
Total Volume Through Facility (ac-ft):	317.359
Percent Infiltrated:	1.19
Total Precip Applied to Facility:	1.789
Total Evap From Facility:	0.9
Underdrain not used	
Discharge Structure	
Riser Height:	0.1 ft.
Riser Diameter:	48 in.
Notch Type:	Rectangular
Notch Width:	1.500 ft.
Notch Height:	1.000 ft.
Orifice 1 Diameter:	48 in. Elevation:0.05 ft.
Element Flows To:	
Outlet 1	Outlet 2
Trapezoidal Pond 1	Trapezoidal Pond 1

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.4894	0.0000	0.0000	0.0000
0.0132	0.4887	0.0011	0.0000	0.0000
0.0264	0.4871	0.0023	0.0000	0.0000
0.0396	0.4855	0.0034	0.0000	0.0000
0.0527	0.4839	0.0046	0.0000	0.0000
0.0659	0.4824	0.0058	0.0000	0.0000
0.0791	0.4808	0.0069	0.0000	0.0000
0.0923	0.4792	0.0081	0.0000	0.0000
0.1055	0.4776	0.0093	0.0000	0.0000
0.1187	0.4761	0.0105	0.0000	0.0000
0.1319	0.4745	0.0116	0.0380	0.0380
0.1451	0.4729	0.0128	0.0876	0.0876
0.1582	0.4713	0.0140	0.1264	0.1264
0.1714	0.4698	0.0152	0.1264	0.1264
0.1846	0.4682	0.0164	0.1264	0.1264
0.1978	0.4666	0.0176	0.1264	0.1264
0.2110	0.4650	0.0188	0.1264	0.1264
0.2242	0.4635	0.0200	0.1264	0.1264
0.2374	0.4619	0.0211	0.1264	0.1264
0.2505	0.4603	0.0223	0.1264	0.1264
0.2637	0.4587	0.0235	0.1264	0.1264
0.2769	0.4572	0.0247	0.1264	0.1264

0.2901	0.4556	0.0259	0.1264	0.1264
0.3033	0.4540	0.0271	0.1264	0.1264
0.3165	0.4524	0.0283	0.1264	0.1264
0.3297	0.4509	0.0295	0.1264	0.1264
0.3429	0.4493	0.0307	0.1264	0.1264
0.3560	0.4477	0.0319	0.1264	0.1264
0.3692	0.4461	0.0331	0.1264	0.1264
0.3824	0.4446	0.0343	0.1264	0.1264
0.3956	0.4430	0.0356	0.1264	0.1264
0.4088	0.4414	0.0368	0.1264	0.1264
0.4220	0.4399	0.0381	0.1264	0.1264
0.4352	0.4383	0.0394	0.1264	0.1264
0.4484	0.4367	0.0407	0.1264	0.1264
0.4615	0.4351	0.0420	0.1264	0.1264
0.4747	0.4336	0.0433	0.1264	0.1264
0.4879	0.4320	0.0446	0.1264	0.1264
0.5011	0.4304	0.0459	0.1264	0.1264
0.5143	0.4288	0.0472	0.1264	0.1264
0.5275	0.4273	0.0485	0.1264	0.1264
0.5407	0.4257	0.0498	0.1264	0.1264
0.5538	0.4241	0.0511	0.1264	0.1264
0.5670	0.4225	0.0525	0.1264	0.1264
0.5802	0.4210	0.0538	0.1264	0.1264
0.5934	0.4194	0.0551	0.1264	0.1264
0.6000	0.4178	0.0558	0.1264	0.1264

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
0.6000	0.4894	0.0558	0.0000	4.0366	0.0000
0.6132	0.4910	0.0623	0.0000	4.0366	0.0000
0.6264	0.4926	0.0688	0.0000	4.1654	0.0000
0.6396	0.4942	0.0753	0.0000	4.2943	0.0000
0.6527	0.4957	0.0818	0.0000	4.4231	0.0000
0.6659	0.4973	0.0883	0.0000	4.5519	0.0000
0.6791	0.4989	0.0949	0.0000	4.6807	0.0000
0.6923	0.5005	0.1015	0.0000	4.8096	0.0000
0.7055	0.5020	0.1081	0.0000	4.9384	0.0000
0.7187	0.5036	0.1147	0.0000	5.0672	0.0000
0.7319	0.5052	0.1214	0.0000	5.1961	0.0000
0.7451	0.5068	0.1281	0.0000	5.3249	0.0000
0.7582	0.5083	0.1347	0.0000	5.4537	0.0000
0.7714	0.5099	0.1415	0.0000	5.5825	0.0000
0.7846	0.5115	0.1482	0.0000	5.7114	0.0000
0.7978	0.5131	0.1550	0.0000	5.8402	0.0000
0.8110	0.5146	0.1617	0.0000	5.9690	0.0000
0.8242	0.5162	0.1685	0.0000	6.0978	0.0000
0.8374	0.5178	0.1753	0.0000	6.2267	0.0000
0.8505	0.5193	0.1822	0.0000	6.3555	0.0000
0.8637	0.5209	0.1890	0.0000	6.4843	0.0000
0.8769	0.5225	0.1959	0.0000	6.6132	0.0000
0.8901	0.5241	0.2028	0.0000	6.7420	0.0000
0.9033	0.5256	0.2097	0.0000	6.8708	0.0000
0.9165	0.5272	0.2167	0.0000	6.9996	0.0000
0.9297	0.5288	0.2236	0.0000	7.1285	0.0000
0.9429	0.5304	0.2306	0.0000	7.2573	0.0000
0.9560	0.5319	0.2376	0.0000	7.3861	0.0000
0.9692	0.5335	0.2447	0.0000	7.5150	0.0000
0.9824	0.5351	0.2517	0.0000	7.6438	0.0000

0.9956	0.5367	0.2588	0.0000	7.7726	0.0000
1.0088	0.5382	0.2659	0.0000	7.9014	0.0000
1.0220	0.5398	0.2730	0.0000	8.0303	0.0000
1.0352	0.5414	0.2801	0.0000	8.1591	0.0000
1.0484	0.5430	0.2872	0.0000	8.2879	0.0000
1.0615	0.5445	0.2944	0.0000	8.4167	0.0000
1.0747	0.5461	0.3016	0.0000	8.5456	0.0000
1.0879	0.5477	0.3088	0.0000	8.6744	0.0000
1.1011	0.5493	0.3160	0.0000	8.8032	0.0000
1.1143	0.5508	0.3233	0.0000	8.9321	0.0000
1.1275	0.5524	0.3306	0.0000	9.0609	0.0000
1.1407	0.5540	0.3379	0.0000	9.1897	0.0000
1.1538	0.5556	0.3452	0.0000	9.3185	0.0000
1.1670	0.5571	0.3525	0.0000	9.4474	0.0000
1.1802	0.5587	0.3599	0.0000	9.5762	0.0000
1.1934	0.5603	0.3673	0.0000	9.7050	0.0000
1.2000	0.5611	0.3710	0.0000	9.7694	0.0000

Surface Bio Swale 1

Element Flows To:

Outlet 1	Outlet 2
Trapezoidal Pond 1	Bio Swale 1

Trapezoidal Pond 1

Bottom Length:	90.74 ft.
Bottom Width:	90.74 ft.
Depth:	4 ft.
Volume at riser head:	0.6931 acre-ft.
Infiltration On	
Infiltration rate:	0.3
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	292.529
Total Volume Through Riser (ac-ft):	95.562
Total Volume Through Facility (ac-ft):	388.091
Percent Infiltrated:	75.38
Total Precip Applied to Facility:	78.379
Total Evap From Facility:	7.646
Side slope 1:	3 To 1
Side slope 2:	3 To 1
Side slope 3:	3 To 1
Side slope 4:	3 To 1
Discharge Structure	
Riser Height:	3 ft.
Riser Diameter:	18 in.
Notch Type:	Rectangular
Notch Width:	1.500 ft.
Notch Height:	0.722 ft.
Orifice 1 Diameter:	3.095 in. Elevation:0 ft.
Element Flows To:	
Outlet 1	Outlet 2

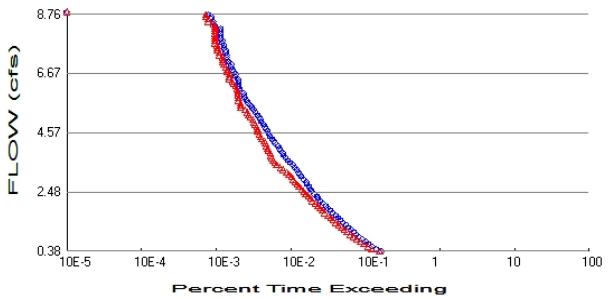
Pond Hydraulic Table

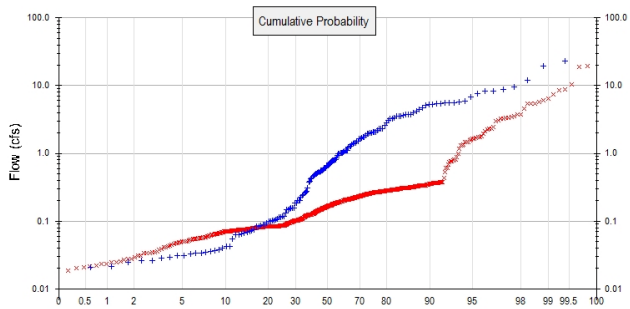
Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.189	0.000	0.000	0.000
0.0444	0.190	0.008	0.053	0.057
0.0889	0.191	0.016	0.075	0.057
0.1333	0.192	0.025	0.091	0.057
0.1778	0.193	0.034	0.106	0.057
0.2222	0.194	0.042	0.118	0.057
0.2667	0.195	0.051	0.129	0.057
0.3111	0.196	0.060	0.140	0.057
0.3556	0.198	0.068	0.150	0.057
0.4000	0.199	0.077	0.159	0.057
0.4444	0.200	0.086	0.167	0.057
0.4889	0.201	0.095	0.175	0.057
0.5333	0.202	0.104	0.183	0.057
0.5778	0.203	0.113	0.191	0.057
0.6222	0.204	0.122	0.198	0.057
0.6667	0.206	0.131	0.205	0.057
0.7111	0.207	0.140	0.212	0.057
0.7556	0.208	0.150	0.218	0.057
0.8000	0.209	0.159	0.225	0.057
0.8444	0.210	0.168	0.231	0.057
0.8889	0.211	0.178	0.237	0.057
0.9333	0.213	0.187	0.243	0.057
0.9778	0.214	0.197	0.248	0.057
1.0222	0.215	0.206	0.254	0.057
1.0667	0.216	0.216	0.259	0.057

1.1111	0.217	0.225	0.265	0.057
1.1556	0.219	0.235	0.270	0.057
1.2000	0.220	0.245	0.275	0.057
1.2444	0.221	0.255	0.280	0.057
1.2889	0.222	0.265	0.285	0.057
1.3333	0.223	0.274	0.290	0.057
1.3778	0.225	0.284	0.295	0.057
1.4222	0.226	0.294	0.300	0.057
1.4667	0.227	0.305	0.304	0.057
1.5111	0.228	0.315	0.309	0.057
1.5556	0.229	0.325	0.313	0.057
1.6000	0.231	0.335	0.318	0.057
1.6444	0.232	0.345	0.322	0.057
1.6889	0.233	0.356	0.326	0.057
1.7333	0.234	0.366	0.331	0.057
1.7778	0.236	0.377	0.335	0.057
1.8222	0.237	0.387	0.339	0.057
1.8667	0.238	0.398	0.343	0.057
1.9111	0.239	0.408	0.347	0.057
1.9556	0.241	0.419	0.351	0.057
2.0000	0.242	0.430	0.355	0.057
2.0444	0.243	0.441	0.359	0.057
2.0889	0.244	0.451	0.363	0.057
2.1333	0.246	0.462	0.367	0.057
2.1778	0.247	0.473	0.371	0.057
2.2222	0.248	0.484	0.375	0.057
2.2667	0.249	0.495	0.378	0.057
2.3111	0.251	0.507	0.413	0.057
2.3556	0.252	0.518	0.494	0.057
2.4000	0.253	0.529	0.603	0.057
2.4444	0.255	0.540	0.733	0.057
2.4889	0.256	0.552	0.881	0.057
2.5333	0.257	0.563	1.046	0.057
2.5778	0.259	0.575	1.225	0.057
2.6222	0.260	0.586	1.417	0.057
2.6667	0.261	0.598	1.622	0.057
2.7111	0.262	0.609	1.839	0.057
2.7556	0.264	0.621	2.067	0.057
2.8000	0.265	0.633	2.306	0.057
2.8444	0.266	0.645	2.555	0.057
2.8889	0.268	0.657	2.814	0.057
2.9333	0.269	0.669	3.082	0.057
2.9778	0.270	0.681	3.360	0.057
3.0222	0.272	0.693	3.552	0.057
3.0667	0.273	0.705	3.758	0.057
3.1111	0.274	0.717	4.051	0.057
3.1556	0.276	0.729	4.409	0.057
3.2000	0.277	0.741	4.823	0.057
3.2444	0.278	0.754	5.285	0.057
3.2889	0.280	0.766	5.791	0.057
3.3333	0.281	0.779	6.337	0.057
3.3778	0.282	0.791	6.920	0.057
3.4222	0.284	0.804	7.539	0.057
3.4667	0.285	0.817	8.192	0.057
3.5111	0.287	0.829	8.875	0.057
3.5556	0.288	0.842	9.590	0.057
3.6000	0.289	0.855	10.33	0.057
3.6444	0.291	0.868	11.10	0.057

3.6889	0.292	0.881	11.90	0.057
3.7333	0.293	0.894	12.72	0.057
3.7778	0.295	0.907	13.57	0.057
3.8222	0.296	0.920	14.45	0.057
3.8667	0.298	0.933	15.34	0.057
3.9111	0.299	0.947	16.26	0.057
3.9556	0.300	0.960	17.21	0.057
4.0000	0.302	0.973	18.17	0.057
4.0444	0.303	0.987	19.16	0.057

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 8.96
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 5
Total Impervious Area: 3.96

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	3.797155
5 year	5.960623
10 year	8.76332
25 year	16.342174

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	2.480613
5 year	5.471517
10 year	8.273016
25 year	15.465663

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.3797	2670	2556	95	Pass
0.4644	2312	2006	86	Pass
0.5491	2040	1778	87	Pass
0.6338	1816	1580	87	Pass
0.7184	1640	1418	86	Pass
0.8031	1498	1253	83	Pass
0.8878	1362	1141	83	Pass
0.9725	1252	1023	81	Pass
1.0572	1149	934	81	Pass
1.1419	1063	857	80	Pass
1.2265	975	789	80	Pass
1.3112	906	721	79	Pass
1.3959	834	667	79	Pass
1.4806	764	608	79	Pass
1.5653	712	562	78	Pass
1.6500	662	523	79	Pass
1.7346	598	472	78	Pass
1.8193	558	431	77	Pass
1.9040	516	404	78	Pass
1.9887	485	377	77	Pass
2.0734	442	352	79	Pass
2.1581	407	323	79	Pass
2.2427	381	303	79	Pass
2.3274	367	283	77	Pass
2.4121	341	261	76	Pass
2.4968	319	246	77	Pass
2.5815	306	229	74	Pass
2.6662	290	213	73	Pass
2.7508	270	201	74	Pass
2.8355	264	187	70	Pass
2.9202	243	178	73	Pass
3.0049	227	169	74	Pass
3.0896	215	156	72	Pass
3.1743	209	146	69	Pass
3.2589	199	130	65	Pass
3.3436	184	119	64	Pass
3.4283	177	107	60	Pass
3.5130	161	101	62	Pass
3.5977	150	96	64	Pass
3.6823	141	93	65	Pass
3.7670	132	89	67	Pass
3.8517	128	87	67	Pass
3.9364	121	82	67	Pass
4.0211	117	80	68	Pass
4.1058	111	78	70	Pass
4.1904	102	75	73	Pass
4.2751	97	73	75	Pass
4.3598	93	67	72	Pass
4.4445	86	65	75	Pass
4.5292	84	62	73	Pass
4.6139	81	59	72	Pass
4.6985	77	59	76	Pass
4.7832	74	58	78	Pass

4.8679	71	55	77	Pass
4.9526	67	53	79	Pass
5.0373	65	51	78	Pass
5.1220	62	47	75	Pass
5.2066	59	45	76	Pass
5.2913	55	43	78	Pass
5.3760	53	40	75	Pass
5.4607	50	35	70	Pass
5.5454	47	35	74	Pass
5.6301	44	35	79	Pass
5.7147	43	33	76	Pass
5.7994	40	33	82	Pass
5.8841	39	32	82	Pass
5.9688	38	32	84	Pass
6.0535	34	32	94	Pass
6.1382	34	31	91	Pass
6.2228	33	30	90	Pass
6.3075	33	28	84	Pass
6.3922	33	27	81	Pass
6.4769	32	25	78	Pass
6.5616	30	25	83	Pass
6.6462	30	25	83	Pass
6.7309	28	23	82	Pass
6.8156	27	23	85	Pass
6.9003	26	22	84	Pass
6.9850	26	21	80	Pass
7.0697	24	20	83	Pass
7.1543	23	20	86	Pass
7.2390	23	20	86	Pass
7.3237	23	18	78	Pass
7.4084	22	18	81	Pass
7.4931	22	17	77	Pass
7.5778	21	17	80	Pass
7.6624	21	17	80	Pass
7.7471	20	16	80	Pass
7.8318	20	16	80	Pass
7.9165	19	16	84	Pass
8.0012	19	16	84	Pass
8.0859	19	16	84	Pass
8.1705	19	16	84	Pass
8.2552	19	16	84	Pass
8.3399	16	16	100	Pass
8.4246	15	15	100	Pass
8.5093	15	13	86	Pass
8.5940	14	13	92	Pass
8.6786	14	12	85	Pass
8.7633	13	12	92	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

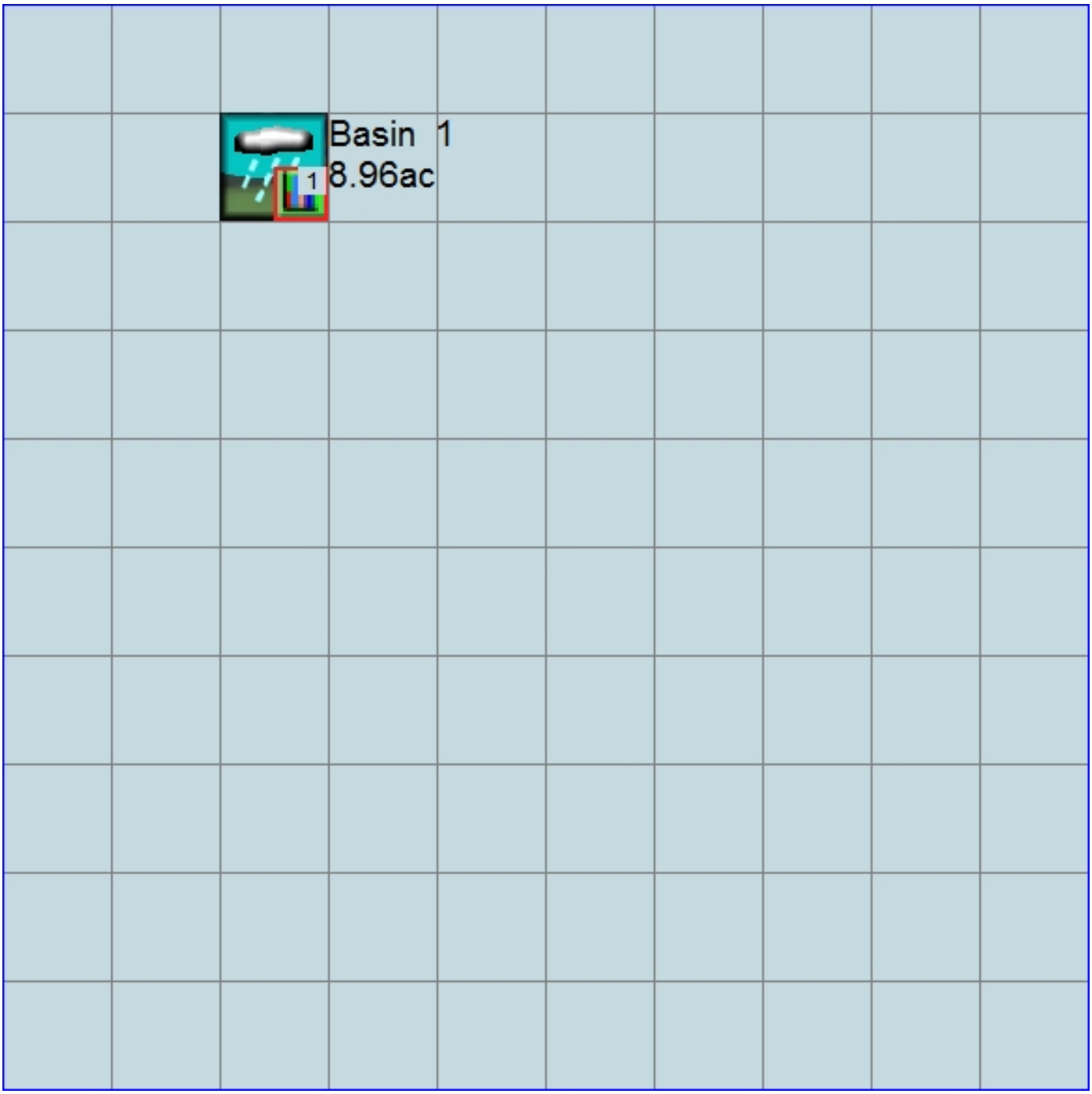
No PERLND changes have been made.

IMPLND Changes

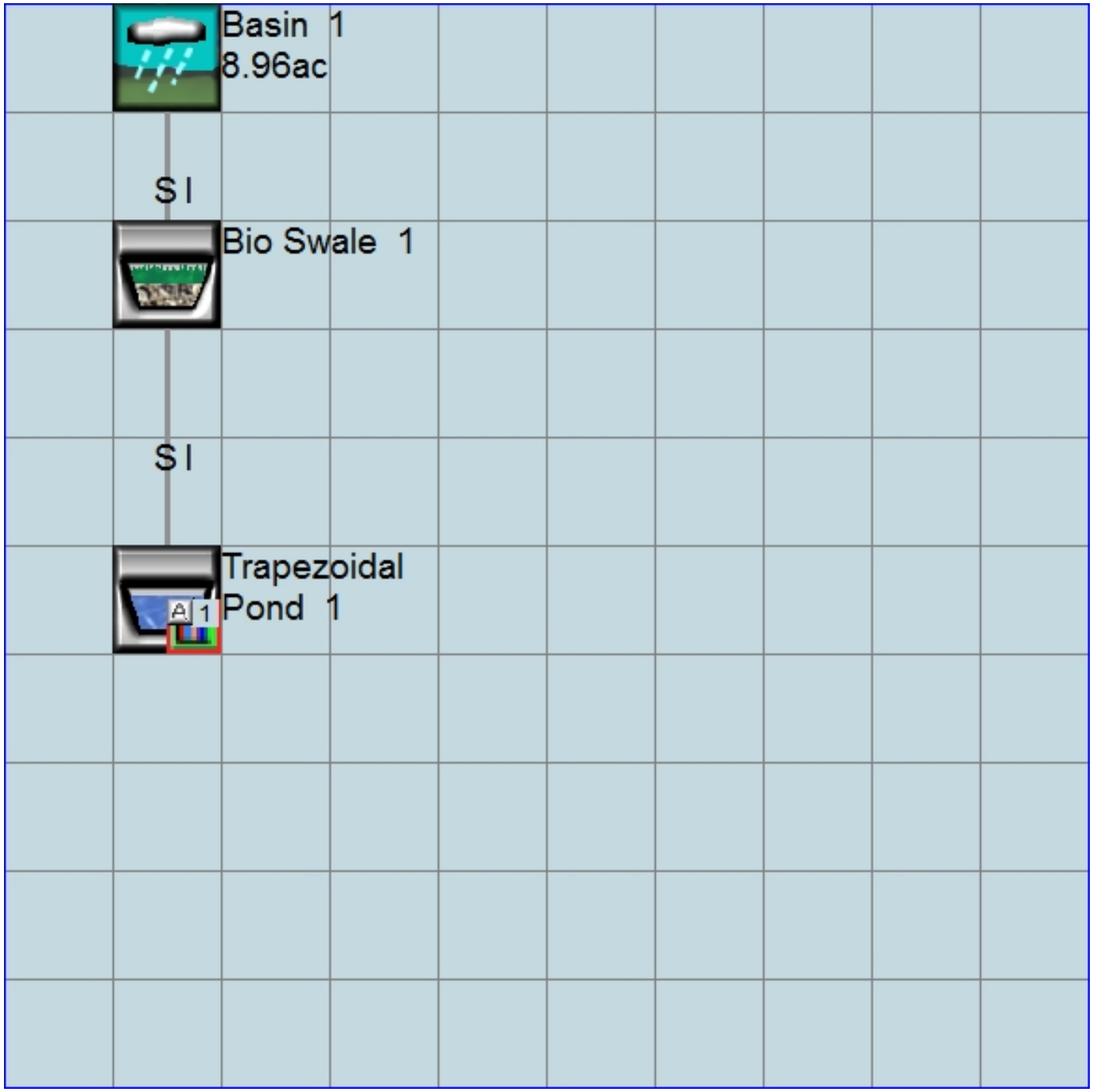
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1958 10 01        END    2005 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   SOHM Node 65.wdm
MESSU      25   PreSOHM Node 65.MES
           27   PreSOHM Node 65.L61
           28   PreSOHM Node 65.L62
           30   POCSOHM Node 651.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37            40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37      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  ***
   37     0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       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#   ***
Basin  1***
PERLND  37                        8.96     COPY   501     12
PERLND  37                        8.96     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       1958 10 01        END    2005 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   SOHM Node 65.wdm
MESSU      25   MitSOHM Node 65.MES
           27   MitSOHM Node 65.L61
           28   MitSOHM Node 65.L62
           30   POCSOHM Node 651.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      IMPLND       1
      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        Trapezoidal Pond  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
  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       0.3      0.01
  END PWAT-STATE1

END PERLND

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

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

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         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     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  37                          5     RCHRES   1      2
PERLND  37                          5     RCHRES   1      3
IMPLND   1                       3.96     RCHRES   1      5

******Routing******
RCHRES   2                          1     RCHRES   3      7
RCHRES   2                                COPY     1     17
RCHRES   2                          1     RCHRES   3      8
RCHRES   2                                COPY     1     18
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 Bio Swal-007    3    1    1    1   28    0    1
    2     Bio Swale  1            2    1    1    1   28    0    1
    3     Trapezoidal Pond-010    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      0.25       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  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            =  2281.
*** 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
   47    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.489440  0.000000  0.000000  0.000000
  0.013187  0.488653  0.001145  0.000000  0.000000
  0.026374  0.487079  0.002295  0.000000  0.000000
  0.039560  0.485504  0.003449  0.000000  0.000000
  0.052747  0.483930  0.004607  0.000000  0.000000
  0.065934  0.482356  0.005770  0.000000  0.000000
  0.079121  0.480782  0.006937  0.000000  0.000000
  0.092308  0.479208  0.008108  0.000000  0.000000
  0.105495  0.477633  0.009284  0.000000  0.000000
  0.118681  0.476059  0.010464  0.000000  0.000000
  0.131868  0.474485  0.011648  0.000000  0.037961
  0.145055  0.472911  0.012836  0.000000  0.087643
  0.158242  0.471337  0.014029  0.000000  0.126389
  0.171429  0.469763  0.015226  0.000000  0.126389
  0.184615  0.468188  0.016428  0.000000  0.126389
  0.197802  0.466614  0.017633  0.000000  0.126389
  0.210989  0.465040  0.018800  0.000000  0.126389
  0.224176  0.463466  0.019970  0.000000  0.126389
  0.237363  0.461892  0.021145  0.000000  0.126389
  0.250549  0.460317  0.022323  0.000000  0.126389
  0.263736  0.458743  0.023506  0.000000  0.126389
  0.276923  0.457169  0.024693  0.000000  0.126389
  0.290110  0.455595  0.025884  0.000000  0.126389
  0.303297  0.454021  0.027080  0.000000  0.126389
  0.316484  0.452447  0.028279  0.000000  0.126389
  0.329670  0.450872  0.029483  0.000000  0.126389
  0.342857  0.449298  0.030691  0.000000  0.126389
  0.356044  0.447724  0.031903  0.000000  0.126389
  0.369231  0.446150  0.033119  0.000000  0.126389
  0.382418  0.444576  0.034339  0.000000  0.126389
  0.395604  0.443001  0.035563  0.000000  0.126389
  0.408791  0.441427  0.036838  0.000000  0.126389
  0.421978  0.439853  0.038117  0.000000  0.126389
  0.435165  0.438279  0.039400  0.000000  0.126389
  0.448352  0.436705  0.040688  0.000000  0.126389
  0.461538  0.435131  0.041980  0.000000  0.126389
  0.474725  0.433556  0.043276  0.000000  0.126389
  0.487912  0.431982  0.044576  0.000000  0.126389
  0.501099  0.430408  0.045881  0.000000  0.126389
  0.514286  0.428834  0.047190  0.000000  0.126389
  0.527473  0.427260  0.048504  0.000000  0.126389
  0.540659  0.425685  0.049821  0.000000  0.126389
  0.553846  0.424111  0.051143  0.000000  0.126389
  0.567033  0.422537  0.052470  0.000000  0.126389
  0.580220  0.420963  0.053800  0.000000  0.126389
  0.593407  0.419389  0.055135  0.000000  0.126389
  0.600000  0.417815  0.212056  0.000000  0.126389
  END FTABLE  2
  FTABLE      1
   47    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.417815  0.000000  4.264806  0.000000  0.000000
  0.013187  0.491014  0.006465  4.358880  4.036603  0.000000
  0.026374  0.492588  0.012950  4.453636  4.165431  0.000000
  0.039560  0.494162  0.019456  4.549070  4.294258  0.000000
  0.052747  0.495737  0.025983  7.816865  4.423086  0.000000
  0.065934  0.497311  0.032530  12.38039  4.551914  0.000000
  0.079121  0.498885  0.039099  15.16566  4.680742  0.000000
```

0.092308	0.500459	0.045688	17.38409	4.809569	0.000000
0.105495	0.502033	0.052297	19.26584	4.938397	0.000000
0.118681	0.503608	0.058928	20.95292	5.067225	0.000000
0.131868	0.505182	0.065579	22.53068	5.196053	0.000000
0.145055	0.506756	0.072252	24.02400	5.324880	0.000000
0.158242	0.508330	0.078944	25.45107	5.453708	0.000000
0.171429	0.509904	0.085658	26.82505	5.582536	0.000000
0.184615	0.511478	0.092392	28.15568	5.711364	0.000000
0.197802	0.513053	0.099148	29.45038	5.840191	0.000000
0.210989	0.514627	0.105924	30.71493	5.969019	0.000000
0.224176	0.516201	0.112720	31.95394	6.097847	0.000000
0.237363	0.517775	0.119538	33.17111	6.226675	0.000000
0.250549	0.519349	0.126376	34.36952	6.355502	0.000000
0.263736	0.520924	0.133235	35.55170	6.484330	0.000000
0.276923	0.522498	0.140114	36.71978	6.613158	0.000000
0.290110	0.524072	0.147015	37.87559	6.741986	0.000000
0.303297	0.525646	0.153936	39.02067	6.870813	0.000000
0.316484	0.527220	0.160878	40.15637	6.999641	0.000000
0.329670	0.528794	0.167841	41.28386	7.128469	0.000000
0.342857	0.530369	0.174824	42.40415	7.257297	0.000000
0.356044	0.531943	0.181829	43.51814	7.386124	0.000000
0.369231	0.533517	0.188854	44.62662	7.514952	0.000000
0.382418	0.535091	0.195899	45.73031	7.643780	0.000000
0.395604	0.536665	0.202966	46.82983	7.772608	0.000000
0.408791	0.538240	0.210053	47.92574	7.901435	0.000000
0.421978	0.539814	0.217161	49.01854	8.030263	0.000000
0.435165	0.541388	0.224290	50.10871	8.159091	0.000000
0.448352	0.542962	0.231440	51.19663	8.287919	0.000000
0.461538	0.544536	0.238610	52.28271	8.416746	0.000000
0.474725	0.546110	0.245801	53.36726	8.545574	0.000000
0.487912	0.547685	0.253013	54.45061	8.674402	0.000000
0.501099	0.549259	0.260245	55.53303	8.803230	0.000000
0.514286	0.550833	0.267499	56.61479	8.932057	0.000000
0.527473	0.552407	0.274773	57.69613	9.060885	0.000000
0.540659	0.553981	0.282068	58.77727	9.189713	0.000000
0.553846	0.555556	0.289383	59.85840	9.318541	0.000000
0.567033	0.557130	0.296720	60.93972	9.447368	0.000000
0.580220	0.558704	0.304077	62.02140	9.576196	0.000000
0.593407	0.560278	0.311455	63.10359	9.705024	0.000000
0.600000	0.561065	0.315152	64.18645	9.769438	0.000000

END FTABLE 1

FTABLE 3

91 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.189033	0.000000	0.000000	0.000000		
0.044444	0.190145	0.008426	0.053038	0.057182		
0.088889	0.191261	0.016902	0.075007	0.057182		
0.133333	0.192381	0.025427	0.091865	0.057182		
0.177778	0.193503	0.034002	0.106076	0.057182		
0.222222	0.194629	0.042628	0.118597	0.057182		
0.266667	0.195758	0.051303	0.129917	0.057182		
0.311111	0.196890	0.060028	0.140326	0.057182		
0.355556	0.198025	0.068804	0.150015	0.057182		
0.400000	0.199164	0.077631	0.159115	0.057182		
0.444444	0.200306	0.086508	0.167722	0.057182		
0.488889	0.201452	0.095436	0.175908	0.057182		
0.533333	0.202600	0.104415	0.183730	0.057182		
0.577778	0.203752	0.113445	0.191232	0.057182		
0.622222	0.204907	0.122526	0.198451	0.057182		
0.666667	0.206065	0.131659	0.205416	0.057182		
0.711111	0.207227	0.140843	0.212153	0.057182		
0.755556	0.208392	0.150079	0.218682	0.057182		
0.800000	0.209560	0.159367	0.225022	0.057182		
0.844444	0.210732	0.168707	0.231188	0.057182		
0.888889	0.211906	0.178099	0.237194	0.057182		
0.933333	0.213084	0.187543	0.243052	0.057182		
0.977778	0.214265	0.197039	0.248771	0.057182		
1.022222	0.215450	0.206589	0.254362	0.057182		
1.066667	0.216638	0.216191	0.259833	0.057182		

```
  1.111111  0.217829  0.225845  0.265191  0.057182
  1.155556  0.219023  0.235553  0.270443  0.057182
  1.200000  0.220220  0.245314  0.275595  0.057182
  1.244444  0.221421  0.255129  0.280652  0.057182
  1.288889  0.222625  0.264996  0.285620  0.057182
  1.333333  0.223833  0.274918  0.290502  0.057182
  1.377778  0.225043  0.284893  0.295304  0.057182
  1.422222  0.226257  0.294921  0.300030  0.057182
  1.466667  0.227474  0.305004  0.304681  0.057182
  1.511111  0.228695  0.315141  0.309263  0.057182
  1.555556  0.229918  0.325333  0.313778  0.057182
  1.600000  0.231145  0.335579  0.318229  0.057182
  1.644444  0.232376  0.345879  0.322619  0.057182
  1.688889  0.233609  0.356234  0.326950  0.057182
  1.733333  0.234846  0.366644  0.331224  0.057182
  1.777778  0.236086  0.377110  0.335443  0.057182
  1.822222  0.237329  0.387630  0.339610  0.057182
  1.866667  0.238575  0.398206  0.343727  0.057182
  1.911111  0.239825  0.408837  0.347795  0.057182
  1.955556  0.241078  0.419523  0.351816  0.057182
  2.000000  0.242335  0.430266  0.355791  0.057182
  2.044444  0.243594  0.441064  0.359723  0.057182
  2.088889  0.244857  0.451919  0.363612  0.057182
  2.133333  0.246123  0.462830  0.367460  0.057182
  2.177778  0.247393  0.473797  0.371268  0.057182
  2.222222  0.248665  0.484820  0.375037  0.057182
  2.266667  0.249941  0.495900  0.378769  0.057182
  2.311111  0.251220  0.507037  0.413001  0.057182
  2.355556  0.252503  0.518231  0.494682  0.057182
  2.400000  0.253788  0.529482  0.603446  0.057182
  2.444444  0.255077  0.540790  0.733517  0.057182
  2.488889  0.256370  0.552155  0.881758  0.057182
  2.533333  0.257665  0.563578  1.046114  0.057182
  2.577778  0.258964  0.575059  1.225103  0.057182
  2.622222  0.260266  0.586598  1.417588  0.057182
  2.666667  0.261571  0.598194  1.622664  0.057182
  2.711111  0.262880  0.609848  1.839587  0.057182
  2.755556  0.264192  0.621561  2.067729  0.057182
  2.800000  0.265507  0.633332  2.306554  0.057182
  2.844444  0.266825  0.645162  2.555597  0.057182
  2.888889  0.268147  0.657050  2.814447  0.057182
  2.933333  0.269471  0.668997  3.082740  0.057182
  2.977778  0.270800  0.681003  3.360150  0.057182
  3.022222  0.272131  0.693068  3.552185  0.057182
  3.066667  0.273466  0.705193  3.758455  0.057182
  3.111111  0.274804  0.717376  4.051232  0.057182
  3.155556  0.276145  0.729620  4.409594  0.057182
  3.200000  0.277489  0.741923  4.823095  0.057182
  3.244444  0.278837  0.754285  5.285119  0.057182
  3.288889  0.280188  0.766708  5.790986  0.057182
  3.333333  0.281542  0.779191  6.337158  0.057182
  3.377778  0.282900  0.791734  6.920837  0.057182
  3.422222  0.284261  0.804338  7.539739  0.057182
  3.466667  0.285625  0.817002  8.191950  0.057182
  3.511111  0.286992  0.829727  8.875841  0.057182
  3.555556  0.288363  0.842512  9.590000  0.057182
  3.600000  0.289736  0.855359  10.33319  0.057182
  3.644444  0.291114  0.868267  11.10431  0.057182
  3.688889  0.292494  0.881236  11.90238  0.057182
  3.733333  0.293878  0.894266  12.72651  0.057182
  3.777778  0.295264  0.907358  13.57590  0.057182
  3.822222  0.296655  0.920512  14.44983  0.057182
  3.866667  0.298048  0.933728  15.34760  0.057182
  3.911111  0.299445  0.947005  16.26862  0.057182
  3.955556  0.300845  0.960345  17.21229  0.057182
  4.000000  0.302248  0.973747  18.17809  0.057182
  END FTABLE  3
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      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    1              RCHRES   3     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   1010 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1011 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1012 FLOW     ENGL      REPL
RCHRES   3 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

  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: 1978/ 3/ 4 14:30

RCHRES:     3

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 4.1833E+04 4.2416E+04 4.6207E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1978/ 3/ 4 14:30

RCHRES:     3

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
6.1115E+01 2.6210E+04 -1.969E+05    7.3836  7.3836E+00      3
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1980/ 1/30 17: 0

RCHRES:     3

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 4.1833E+04 4.2416E+04 4.4473E+04
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1980/ 1/30 17: 0

RCHRES:     3

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
6.1115E+01 2.6210E+04 -1.188E+05    4.4861     4.4861       3
```

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

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SOHM

PROJECT REPORT

General Model Information

Project Name:	SOHM Node 65B
Site Name:	
Site Address:	
City:	
Report Date:	12/1/2014
Gage:	Trabuco Canyon
Data Start:	10/01/1958
Data End:	09/30/2005
Timestep:	15 Minute
Precip Scale:	1.00
Version:	2014/11/12

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	3.32
Pervious Total	3.32
Impervious Land Use	Acres
Impervious Total	0
Basin Total	3.32

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	2.32
Pervious Total	2.32
Impervious Land Use	Acres
Impervious,Flat(0-5)	1
Impervious Total	1
Basin Total	3.32

Element Flows To:

Surface	Interflow	Groundwater
Surface Bio Swale 1	Surface Bio Swale 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	52.61 ft.	
Bottom Width:	52.61 ft.	
Depth:	4 ft.	
Volume at riser head:	0.2658 acre-ft.	
Infiltration On		
Infiltration rate:	0.5	
Infiltration safety factor:	1	
Total Volume Infiltrated (ac-ft):		95.843
Total Volume Through Riser (ac-ft):		18.068
Total Volume Through Facility (ac-ft):		113.912
Percent Infiltrated:		84.14
Total Precip Applied to Facility:		25.837
Total Evap From Facility:		2.48
Side slope 1:	3 To 1	
Side slope 2:	3 To 1	
Side slope 3:	3 To 1	
Side slope 4:	3 To 1	
Discharge Structure		
Riser Height:	3 ft.	
Riser Diameter:	18 in.	
Notch Type:	Rectangular	
Notch Width:	1.500 ft.	
Notch Height:	0.713 ft.	
Orifice 1 Diameter:	1.882 in. Elevation:0 ft.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.063	0.000	0.000	0.000
0.0444	0.064	0.002	0.019	0.032
0.0889	0.064	0.005	0.027	0.032
0.1333	0.065	0.008	0.034	0.032
0.1778	0.066	0.011	0.039	0.032
0.2222	0.066	0.014	0.043	0.032
0.2667	0.067	0.017	0.048	0.032
0.3111	0.068	0.020	0.051	0.032
0.3556	0.068	0.023	0.055	0.032
0.4000	0.069	0.026	0.058	0.032
0.4444	0.070	0.029	0.062	0.032
0.4889	0.070	0.032	0.065	0.032
0.5333	0.071	0.036	0.067	0.032
0.5778	0.072	0.039	0.070	0.032
0.6222	0.072	0.042	0.073	0.032
0.6667	0.073	0.045	0.076	0.032
0.7111	0.074	0.048	0.078	0.032
0.7556	0.075	0.052	0.080	0.032
0.8000	0.075	0.055	0.083	0.032
0.8444	0.076	0.059	0.085	0.032
0.8889	0.077	0.062	0.087	0.032
0.9333	0.077	0.065	0.089	0.032
0.9778	0.078	0.069	0.092	0.032

1.0222	0.079	0.072	0.094	0.032
1.0667	0.079	0.076	0.096	0.032
1.1111	0.080	0.079	0.098	0.032
1.1556	0.081	0.083	0.100	0.032
1.2000	0.082	0.087	0.101	0.032
1.2444	0.082	0.090	0.103	0.032
1.2889	0.083	0.094	0.105	0.032
1.3333	0.084	0.098	0.107	0.032
1.3778	0.085	0.102	0.109	0.032
1.4222	0.085	0.105	0.110	0.032
1.4667	0.086	0.109	0.112	0.032
1.5111	0.087	0.113	0.114	0.032
1.5556	0.088	0.117	0.116	0.032
1.6000	0.088	0.121	0.117	0.032
1.6444	0.089	0.125	0.119	0.032
1.6889	0.090	0.129	0.120	0.032
1.7333	0.091	0.133	0.122	0.032
1.7778	0.091	0.137	0.124	0.032
1.8222	0.092	0.141	0.125	0.032
1.8667	0.093	0.145	0.127	0.032
1.9111	0.094	0.149	0.128	0.032
1.9556	0.095	0.154	0.130	0.032
2.0000	0.095	0.158	0.131	0.032
2.0444	0.096	0.162	0.133	0.032
2.0889	0.097	0.166	0.134	0.032
2.1333	0.098	0.171	0.135	0.032
2.1778	0.099	0.175	0.137	0.032
2.2222	0.099	0.180	0.138	0.032
2.2667	0.100	0.184	0.140	0.032
2.3111	0.101	0.189	0.159	0.032
2.3556	0.102	0.193	0.231	0.032
2.4000	0.103	0.198	0.332	0.032
2.4444	0.103	0.202	0.456	0.032
2.4889	0.104	0.207	0.598	0.032
2.5333	0.105	0.212	0.757	0.032
2.5778	0.106	0.216	0.931	0.032
2.6222	0.107	0.221	1.118	0.032
2.6667	0.108	0.226	1.318	0.032
2.7111	0.108	0.231	1.530	0.032
2.7556	0.109	0.235	1.754	0.032
2.8000	0.110	0.240	1.988	0.032
2.8444	0.111	0.245	2.233	0.032
2.8889	0.112	0.250	2.488	0.032
2.9333	0.113	0.255	2.752	0.032
2.9778	0.114	0.260	3.025	0.032
3.0222	0.114	0.265	3.214	0.032
3.0667	0.115	0.271	3.419	0.032
3.1111	0.116	0.276	3.709	0.032
3.1556	0.117	0.281	4.066	0.032
3.2000	0.118	0.286	4.477	0.032
3.2444	0.119	0.291	4.937	0.032
3.2889	0.120	0.297	5.441	0.032
3.3333	0.121	0.302	5.986	0.032
3.3778	0.121	0.307	6.567	0.032
3.4222	0.122	0.313	7.184	0.032
3.4667	0.123	0.318	7.835	0.032
3.5111	0.124	0.324	8.517	0.032
3.5556	0.125	0.329	9.229	0.032

3.6000	0.126	0.335	9.970	0.032
3.6444	0.127	0.341	10.74	0.032
3.6889	0.128	0.346	11.53	0.032
3.7333	0.129	0.352	12.35	0.032
3.7778	0.130	0.358	13.20	0.032
3.8222	0.131	0.364	14.07	0.032
3.8667	0.131	0.370	14.97	0.032
3.9111	0.132	0.375	15.89	0.032
3.9556	0.133	0.381	16.83	0.032
4.0000	0.134	0.387	17.79	0.032
4.0444	0.135	0.393	18.78	0.032

Bio Swale 1

Bottom Length:	635.00 ft.
Bottom Width:	8.00 ft.
Material thickness of first layer:	0.2
Material type for first layer:	GRAVEL
Material thickness of second layer:	0.1
Material type for second layer:	Sand
Material thickness of third layer:	0.2
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	5.338
Total Volume Through Riser (ac-ft):	90.55
Total Volume Through Facility (ac-ft):	95.888
Percent Infiltrated:	5.57
Total Precip Applied to Facility:	2.374
Total Evap From Facility:	0.916
Underdrain not used	
Discharge Structure	
Riser Height:	0.25 ft.
Riser Diameter:	48 in.
Notch Type:	Rectangular
Notch Width:	1.000 ft.
Notch Height:	0.500 ft.
Orifice 1 Diameter:	48 in. Elevation:0.05 ft.
Element Flows To:	
Outlet 1	Outlet 2
Trapezoidal Pond 1	

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.1458	0.0000	0.0000	0.0000
0.0137	0.1455	0.0003	0.0000	0.0000
0.0275	0.1447	0.0007	0.0000	0.0000
0.0412	0.1439	0.0010	0.0000	0.0000
0.0549	0.1431	0.0013	0.0000	0.0000
0.0687	0.1423	0.0017	0.0000	0.0000
0.0824	0.1415	0.0020	0.0000	0.0000
0.0962	0.1406	0.0024	0.0000	0.0000
0.1099	0.1398	0.0027	0.0000	0.0000
0.1236	0.1390	0.0031	0.0000	0.0000
0.1374	0.1382	0.0034	0.0581	0.0581
0.1511	0.1374	0.0038	0.0588	0.0588
0.1648	0.1366	0.0042	0.0588	0.0588
0.1786	0.1358	0.0045	0.0588	0.0588
0.1923	0.1350	0.0049	0.0588	0.0588
0.2060	0.1342	0.0052	0.0588	0.0588
0.2198	0.1334	0.0056	0.0588	0.0588
0.2335	0.1326	0.0059	0.0588	0.0588
0.2473	0.1318	0.0063	0.0588	0.0588
0.2610	0.1310	0.0067	0.0588	0.0588
0.2747	0.1302	0.0070	0.0588	0.0588
0.2885	0.1294	0.0074	0.0588	0.0588
0.3022	0.1286	0.0078	0.0588	0.0588
0.3159	0.1278	0.0082	0.0588	0.0588

0.3297	0.1270	0.0085	0.0588	0.0588
0.3434	0.1262	0.0089	0.0588	0.0588
0.3571	0.1254	0.0093	0.0588	0.0588
0.3709	0.1246	0.0097	0.0588	0.0588
0.3846	0.1238	0.0101	0.0588	0.0588
0.3984	0.1230	0.0105	0.0588	0.0588
0.4121	0.1222	0.0109	0.0588	0.0588
0.4258	0.1214	0.0113	0.0588	0.0588
0.4396	0.1206	0.0117	0.0588	0.0588
0.4533	0.1198	0.0121	0.0588	0.0588
0.4670	0.1190	0.0125	0.0588	0.0588
0.4808	0.1182	0.0129	0.0588	0.0588
0.4945	0.1174	0.0134	0.0588	0.0588
0.5000	0.1166	0.0135	0.0588	0.0588

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
0.5000	0.1458	0.0135	0.0000	1.1407	0.0000
0.5137	0.1466	0.0155	0.0000	1.1407	0.0000
0.5275	0.1474	0.0175	0.0000	1.1906	0.0000
0.5412	0.1482	0.0196	0.0000	1.2406	0.0000
0.5549	0.1490	0.0216	0.0000	1.2905	0.0000
0.5687	0.1498	0.0237	0.0000	1.3405	0.0000
0.5824	0.1506	0.0257	0.0000	1.3904	0.0000
0.5962	0.1514	0.0278	0.0000	1.4403	0.0000
0.6099	0.1522	0.0299	0.0000	1.4903	0.0000
0.6236	0.1530	0.0320	0.0000	1.5402	0.0000
0.6374	0.1538	0.0341	0.0000	1.5902	0.0000
0.6511	0.1546	0.0362	0.0000	1.6401	0.0000
0.6648	0.1554	0.0383	0.0000	1.6901	0.0000
0.6786	0.1562	0.0405	0.0000	1.7400	0.0000
0.6923	0.1570	0.0426	0.0000	1.7899	0.0000
0.7060	0.1578	0.0448	0.0000	1.8399	0.0000
0.7198	0.1586	0.0470	0.0000	1.8898	0.0000
0.7335	0.1594	0.0491	0.0000	1.9398	0.0000
0.7473	0.1602	0.0513	0.0000	1.9897	0.0000
0.7610	0.1610	0.0535	0.0000	2.0396	0.0000
0.7747	0.1618	0.0558	0.0000	2.0896	0.0000
0.7885	0.1626	0.0580	0.0000	2.1395	0.0000
0.8022	0.1634	0.0602	0.0000	2.1895	0.0000
0.8159	0.1642	0.0625	0.0000	2.2394	0.0000
0.8297	0.1650	0.0647	0.0000	2.2894	0.0000
0.8434	0.1658	0.0670	0.0000	2.3393	0.0000
0.8571	0.1666	0.0693	0.0000	2.3892	0.0000
0.8709	0.1674	0.0716	0.0000	2.4392	0.0000
0.8846	0.1682	0.0739	0.0000	2.4891	0.0000
0.8984	0.1690	0.0762	0.0000	2.5391	0.0000
0.9121	0.1698	0.0785	0.0000	2.5890	0.0000
0.9258	0.1706	0.0809	0.0000	2.6390	0.0000
0.9396	0.1714	0.0832	0.0000	2.6889	0.0000
0.9533	0.1722	0.0856	0.0000	2.7388	0.0000
0.9670	0.1730	0.0880	0.0000	2.7888	0.0000
0.9808	0.1738	0.0903	0.0000	2.8387	0.0000
0.9945	0.1746	0.0927	0.0000	2.8887	0.0000
1.0082	0.1754	0.0951	0.0000	2.9386	0.0000
1.0220	0.1762	0.0976	48.275	2.9886	0.0000
1.0357	0.1770	0.1000	49.299	3.0385	0.0000
1.0495	0.1778	0.1024	50.326	3.0884	0.0000

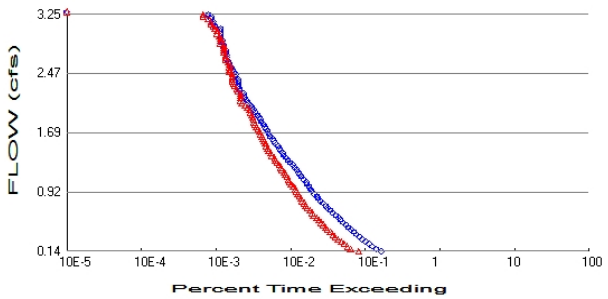
1.0632	0.1786	0.1049	51.354	3.1384	0.0000
1.0769	0.1794	0.1073	52.385	3.1883	0.0000
1.0907	0.1802	0.1098	53.417	3.2383	0.0000
1.1044	0.1810	0.1123	54.452	3.2882	0.0000
1.1181	0.1818	0.1148	55.489	3.3381	0.0000
1.1319	0.1826	0.1173	56.529	3.3881	0.0000
1.1456	0.1834	0.1198	57.571	3.4380	0.0000
1.1593	0.1842	0.1223	58.616	3.4880	0.0000
1.1731	0.1850	0.1248	59.663	3.5379	0.0000
1.1868	0.1858	0.1274	60.713	3.5879	0.0000
1.2005	0.1866	0.1299	61.765	3.6378	0.0000
1.2143	0.1874	0.1325	62.821	3.6877	0.0000
1.2280	0.1882	0.1351	63.879	3.7377	0.0000
1.2418	0.1890	0.1377	64.940	3.7876	0.0000
1.2500	0.1895	0.1392	66.004	3.8176	0.0000

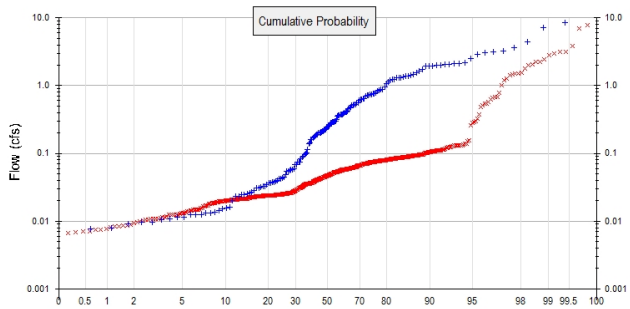
Surface Bio Swale 1

Element Flows To:

Outlet 1	Outlet 2
Trapezoidal Pond 1	Bio Swale 1

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 3.32
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 2.32
Total Impervious Area: 1

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	1.406982
5 year	2.208624
10 year	3.247123
25 year	6.055359

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.6715
5 year	2.227345
10 year	3.09462
25 year	5.694194

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1407	2671	1332	49	Pass
0.1721	2312	1041	45	Pass
0.2035	2045	947	46	Pass
0.2348	1823	854	46	Pass
0.2662	1640	780	47	Pass
0.2976	1501	706	47	Pass
0.3290	1366	652	47	Pass
0.3603	1252	607	48	Pass
0.3917	1150	560	48	Pass
0.4231	1063	512	48	Pass
0.4545	975	481	49	Pass
0.4859	906	450	49	Pass
0.5172	833	418	50	Pass
0.5486	766	392	51	Pass
0.5800	716	363	50	Pass
0.6114	662	333	50	Pass
0.6427	600	320	53	Pass
0.6741	558	298	53	Pass
0.7055	516	275	53	Pass
0.7369	485	261	53	Pass
0.7683	442	249	56	Pass
0.7996	407	233	57	Pass
0.8310	381	225	59	Pass
0.8624	367	216	58	Pass
0.8938	342	205	59	Pass
0.9251	319	195	61	Pass
0.9565	306	189	61	Pass
0.9879	290	179	61	Pass
1.0193	270	166	61	Pass
1.0507	264	158	59	Pass
1.0820	243	154	63	Pass
1.1134	228	147	64	Pass
1.1448	215	141	65	Pass
1.1762	209	136	65	Pass
1.2076	199	127	63	Pass
1.2389	184	121	65	Pass
1.2703	177	115	64	Pass
1.3017	161	108	67	Pass
1.3331	150	103	68	Pass
1.3644	142	100	70	Pass
1.3958	132	93	70	Pass
1.4272	128	88	68	Pass
1.4586	121	84	69	Pass
1.4900	117	81	69	Pass
1.5213	111	76	68	Pass
1.5527	102	75	73	Pass
1.5841	97	72	74	Pass
1.6155	94	70	74	Pass
1.6468	86	68	79	Pass
1.6782	84	65	77	Pass
1.7096	81	63	77	Pass
1.7410	77	60	77	Pass
1.7724	74	57	77	Pass

1.8037	71	55	77	Pass
1.8351	67	53	79	Pass
1.8665	65	52	80	Pass
1.8979	62	51	82	Pass
1.9292	59	49	83	Pass
1.9606	55	47	85	Pass
1.9920	53	46	86	Pass
2.0234	50	43	86	Pass
2.0548	47	40	85	Pass
2.0861	44	36	81	Pass
2.1175	43	35	81	Pass
2.1489	40	35	87	Pass
2.1803	39	35	89	Pass
2.2116	38	35	92	Pass
2.2430	34	32	94	Pass
2.2744	34	31	91	Pass
2.3058	33	29	87	Pass
2.3372	33	28	84	Pass
2.3685	33	27	81	Pass
2.3999	32	27	84	Pass
2.4313	30	27	90	Pass
2.4627	30	27	90	Pass
2.4941	28	25	89	Pass
2.5254	27	25	92	Pass
2.5568	26	25	96	Pass
2.5882	25	25	100	Pass
2.6196	24	24	100	Pass
2.6509	23	22	95	Pass
2.6823	23	22	95	Pass
2.7137	23	22	95	Pass
2.7451	22	21	95	Pass
2.7765	22	21	95	Pass
2.8078	21	21	100	Pass
2.8392	21	21	100	Pass
2.8706	20	19	95	Pass
2.9020	20	19	95	Pass
2.9333	19	19	100	Pass
2.9647	19	18	94	Pass
2.9961	19	17	89	Pass
3.0275	19	17	89	Pass
3.0589	19	16	84	Pass
3.0902	16	15	93	Pass
3.1216	15	14	93	Pass
3.1530	15	14	93	Pass
3.1844	14	13	92	Pass
3.2157	14	11	78	Pass
3.2471	13	11	84	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

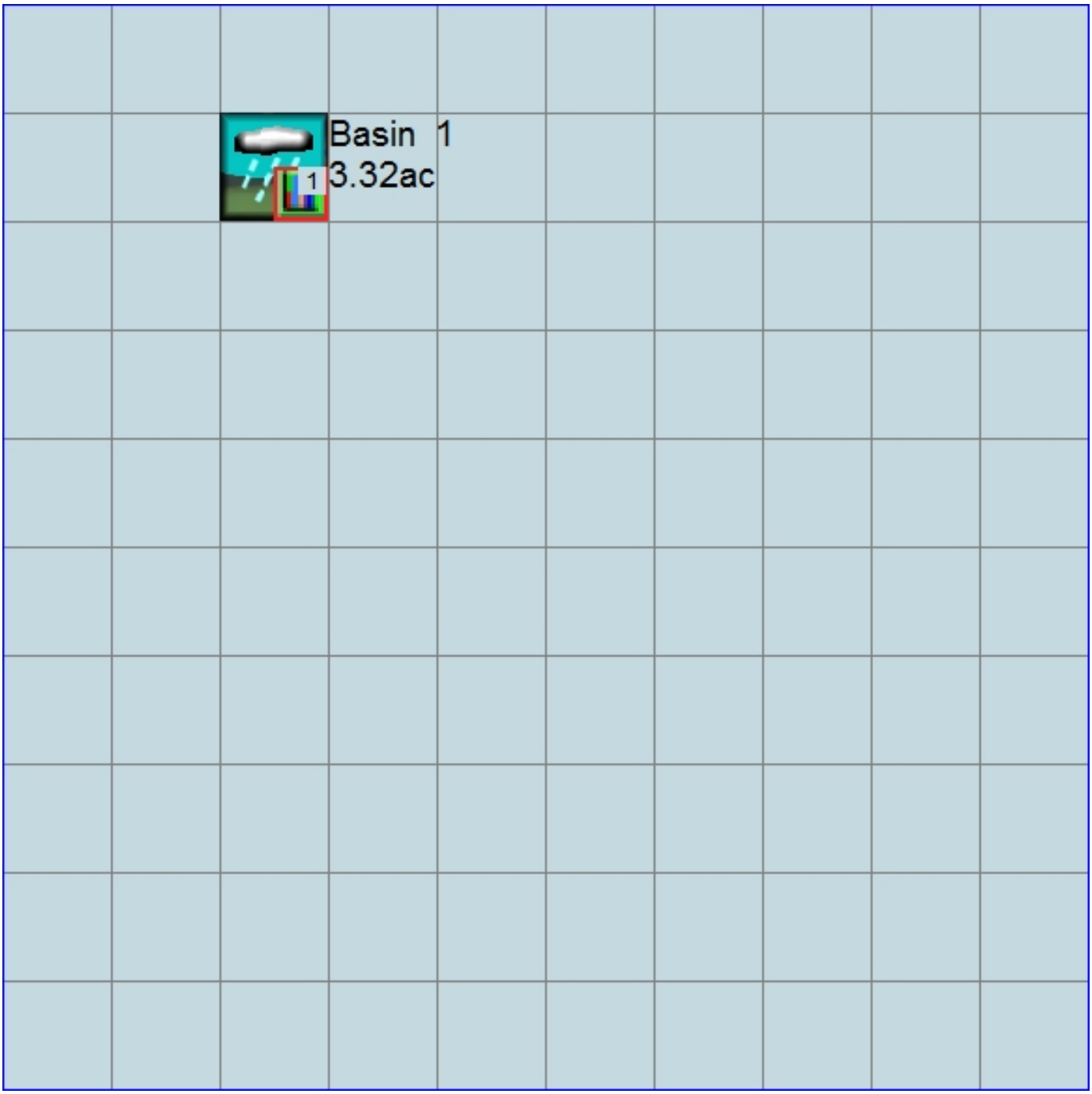
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1958 10 01        END    2005 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   SOHM Node 65B.wdm
MESSU      25   PreSOHM Node 65B.MES
           27   PreSOHM Node 65B.L61
           28   PreSOHM Node 65B.L62
           30   POCSOHM Node 65B1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37              0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37              0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37              0         0      0.09         0      0.92       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#   ***
Basin  1***
PERLND  37                        3.32     COPY   501     12
PERLND  37                        3.32     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       1958 10 01        END    2005 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   SOHM Node 65B.wdm
MESSU      25   MitSOHM Node 65B.MES
           27   MitSOHM Node 65B.L61
           28   MitSOHM Node 65B.L62
           30   POCSOHM Node 65B1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      IMPLND       1
      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        Trapezoidal Pond  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
  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       0.3      0.01
  END PWAT-STATE1

END PERLND

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

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

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         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     ***
    1         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  37                        2.32     RCHRES   1      2
PERLND  37                        2.32     RCHRES   1      3
IMPLND   1                           1     RCHRES   1      5

******Routing******
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 Bio Swal-007    3    1    1    1   28    0    1
    2     Bio Swale  1            2    1    1    1   28    0    1
    3     Trapezoidal Pond-004    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      0.12       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            =  552.
*** 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 3
91 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.063540	0.000000	0.000000	0.000000		
0.044444	0.064186	0.002838	0.019611	0.032035		
0.088889	0.064835	0.005705	0.027735	0.032035		
0.133333	0.065487	0.008602	0.033968	0.032035		
0.177778	0.066143	0.011527	0.039223	0.032035		
0.222222	0.066802	0.014481	0.043852	0.032035		
0.266667	0.067464	0.017465	0.048038	0.032035		
0.311111	0.068129	0.020478	0.051887	0.032035		
0.355556	0.068798	0.023521	0.055469	0.032035		
0.400000	0.069470	0.026593	0.058834	0.032035		
0.444444	0.070145	0.029696	0.062016	0.032035		
0.488889	0.070823	0.032828	0.065043	0.032035		
0.533333	0.071505	0.035991	0.067936	0.032035		
0.577778	0.072190	0.039184	0.070710	0.032035		
0.622222	0.072878	0.042408	0.073379	0.032035		
0.666667	0.073570	0.045663	0.075954	0.032035		
0.711111	0.074264	0.048948	0.078445	0.032035		
0.755556	0.074962	0.052264	0.080860	0.032035		
0.800000	0.075664	0.055611	0.083204	0.032035		
0.844444	0.076368	0.058990	0.085484	0.032035		
0.888889	0.077076	0.062400	0.087705	0.032035		
0.933333	0.077787	0.065841	0.089870	0.032035		
0.977778	0.078501	0.069314	0.091985	0.032035		
1.022222	0.079219	0.072819	0.094053	0.032035		
1.066667	0.079940	0.076356	0.096075	0.032035		
1.111111	0.080664	0.079925	0.098057	0.032035		
1.155556	0.081391	0.083526	0.099999	0.032035		
1.200000	0.082122	0.087160	0.101903	0.032035		
1.244444	0.082856	0.090826	0.103773	0.032035		
1.288889	0.083593	0.094525	0.105610	0.032035		
1.333333	0.084334	0.098256	0.107416	0.032035		
1.377778	0.085077	0.102021	0.109191	0.032035		
1.422222	0.085824	0.105819	0.110938	0.032035		
1.466667	0.086574	0.109650	0.112659	0.032035		
1.511111	0.087328	0.113514	0.114353	0.032035		
1.555556	0.088085	0.117412	0.116022	0.032035		
1.600000	0.088845	0.121344	0.117668	0.032035		
1.644444	0.089608	0.125310	0.119291	0.032035		
1.688889	0.090375	0.129309	0.120892	0.032035		
1.733333	0.091145	0.133343	0.122473	0.032035		
1.777778	0.091918	0.137411	0.124033	0.032035		
1.822222	0.092694	0.141514	0.125574	0.032035		
1.866667	0.093474	0.145651	0.127096	0.032035		
1.911111	0.094257	0.149823	0.128600	0.032035		
1.955556	0.095043	0.154029	0.130087	0.032035		
2.000000	0.095832	0.158271	0.131557	0.032035		
2.044444	0.096625	0.162548	0.133011	0.032035		
2.088889	0.097421	0.166860	0.134448	0.032035		
2.133333	0.098220	0.171207	0.135871	0.032035		
2.177778	0.099023	0.175591	0.137279	0.032035		
2.222222	0.099828	0.180010	0.138673	0.032035		
2.266667	0.100637	0.184464	0.140053	0.032035		
2.311111	0.101450	0.188955	0.159671	0.032035		
2.355556	0.102265	0.193482	0.231674	0.032035		
2.400000	0.103084	0.198045	0.332876	0.032035		
2.444444	0.103906	0.202645	0.456342	0.032035		
2.488889	0.104731	0.207282	0.598565	0.032035		
2.533333	0.105560	0.211955	0.757312	0.032035		
2.577778	0.106392	0.216665	0.930999	0.032035		
2.622222	0.107227	0.221412	1.118428	0.032035		
2.666667	0.108065	0.226196	1.318649	0.032035		
2.711111	0.108907	0.231018	1.530885	0.032035		
2.755556	0.109752	0.235877	1.754487	0.032035		
2.800000	0.110600	0.240774	1.988901	0.032035		
2.844444	0.111452	0.245708	2.233644	0.032035		

```
2.888889  0.112306  0.250680  2.488297  0.032035
2.933333  0.113164  0.255691  2.752486  0.032035
2.977778  0.114026  0.260740  3.025875  0.032035
3.022222  0.114890  0.265827  3.214914  0.032035
3.066667  0.115758  0.270952  3.419165  0.032035
3.111111  0.116629  0.276116  3.709937  0.032035
3.155556  0.117503  0.281319  4.066309  0.032035
3.200000  0.118381  0.286561  4.477833  0.032035
3.244444  0.119262  0.291842  4.937894  0.032035
3.288889  0.120146  0.297162  5.441812  0.032035
3.333333  0.121033  0.302522  5.986047  0.032035
3.377778  0.121924  0.307921  6.567803  0.032035
3.422222  0.122818  0.313359  7.184793  0.032035
3.466667  0.123715  0.318838  7.835106  0.032035
3.511111  0.124615  0.324356  8.517111  0.032035
3.555556  0.125519  0.329915  9.229395  0.032035
3.600000  0.126426  0.335514  9.970720  0.032035
3.644444  0.127336  0.341153  10.73999  0.032035
3.688889  0.128250  0.346833  11.53622  0.032035
3.733333  0.129167  0.352553  12.35852  0.032035
3.777778  0.130087  0.358314  13.20610  0.032035
3.822222  0.131010  0.364116  14.07821  0.032035
3.866667  0.131936  0.369960  14.97419  0.032035
3.911111  0.132866  0.375844  15.89342  0.032035
3.955556  0.133799  0.381770  16.83532  0.032035
4.000000  0.134736  0.387737  17.79935  0.032035
END FTABLE  3
FTABLE      2
 38    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.145776  0.000000  0.000000  0.000000
0.013736  0.145456  0.000334  0.000000  0.000000
0.027473  0.144655  0.000669  0.000000  0.000000
0.041209  0.143854  0.001007  0.000000  0.000000
0.054945  0.143053  0.001348  0.000000  0.000000
0.068681  0.142252  0.001691  0.000000  0.000000
0.082418  0.141451  0.002036  0.000000  0.000000
0.096154  0.140650  0.002383  0.000000  0.000000
0.109890  0.139849  0.002732  0.000000  0.000000
0.123626  0.139048  0.003084  0.000000  0.000000
0.137363  0.138247  0.003438  0.000000  0.058060
0.151099  0.137446  0.003795  0.000000  0.058796
0.164835  0.136645  0.004153  0.000000  0.058796
0.178571  0.135844  0.004514  0.000000  0.058796
0.192308  0.135043  0.004877  0.000000  0.058796
0.206044  0.134242  0.005230  0.000000  0.058796
0.219780  0.133441  0.005584  0.000000  0.058796
0.233516  0.132640  0.005941  0.000000  0.058796
0.247253  0.131839  0.006300  0.000000  0.058796
0.260989  0.131038  0.006661  0.000000  0.058796
0.274725  0.130237  0.007024  0.000000  0.058796
0.288462  0.129436  0.007390  0.000000  0.058796
0.302198  0.128635  0.007771  0.000000  0.058796
0.315934  0.127834  0.008155  0.000000  0.058796
0.329670  0.127033  0.008541  0.000000  0.058796
0.343407  0.126232  0.008929  0.000000  0.058796
0.357143  0.125431  0.009320  0.000000  0.058796
0.370879  0.124630  0.009713  0.000000  0.058796
0.384615  0.123829  0.010108  0.000000  0.058796
0.398352  0.123028  0.010505  0.000000  0.058796
0.412088  0.122228  0.010905  0.000000  0.058796
0.425824  0.121427  0.011307  0.000000  0.058796
0.439560  0.120626  0.011712  0.000000  0.058796
0.453297  0.119825  0.012118  0.000000  0.058796
0.467033  0.119024  0.012527  0.000000  0.058796
0.480769  0.118223  0.012938  0.000000  0.058796
0.494505  0.117422  0.013352  0.000000  0.058796
0.500000  0.116621  0.028387  0.000000  0.058796
END FTABLE  2
```

```
  FTABLE      1
   56    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.116621  0.000000  0.416250  0.000000  0.000000
  0.013736  0.146577  0.002008  0.451023  1.140684  0.000000
  0.027473  0.147378  0.004027  0.486714  1.190626  0.000000
  0.041209  0.148179  0.006057  0.523300  1.240569  0.000000
  0.054945  0.148980  0.008098  4.816029  1.290511  0.000000
  0.068681  0.149781  0.010150  8.869829  1.340454  0.000000
  0.082418  0.150582  0.012213  11.53333  1.390396  0.000000
  0.096154  0.151383  0.014286  13.67825  1.440338  0.000000
  0.109890  0.152184  0.016371  15.52772  1.490281  0.000000
  0.123626  0.152985  0.018467  17.17994  1.540223  0.000000
  0.137363  0.153786  0.020574  18.68846  1.590165  0.000000
  0.151099  0.154587  0.022692  20.08633  1.640108  0.000000
  0.164835  0.155388  0.024821  21.39563  1.690050  0.000000
  0.178571  0.156189  0.026961  22.63199  1.739993  0.000000
  0.192308  0.156989  0.029112  23.80692  1.789935  0.000000
  0.206044  0.157790  0.031274  24.92924  1.839877  0.000000
  0.219780  0.158591  0.033447  26.00583  1.889820  0.000000
  0.233516  0.159392  0.035631  27.04222  1.939762  0.000000
  0.247253  0.160193  0.037826  28.04293  1.989704  0.000000
  0.260989  0.160994  0.040032  29.01751  2.039647  0.000000
  0.274725  0.161795  0.042249  30.01462  2.089589  0.000000
  0.288462  0.162596  0.044477  31.02071  2.139532  0.000000
  0.302198  0.163397  0.046716  32.03061  2.189474  0.000000
  0.315934  0.164198  0.048966  33.04218  2.239416  0.000000
  0.329670  0.164999  0.051227  34.05445  2.289359  0.000000
  0.343407  0.165800  0.053499  35.06697  2.339301  0.000000
  0.357143  0.166601  0.055782  36.07958  2.389244  0.000000
  0.370879  0.167402  0.058076  37.09228  2.439186  0.000000
  0.384615  0.168203  0.060381  38.10512  2.489128  0.000000
  0.398352  0.169004  0.062697  39.11825  2.539071  0.000000
  0.412088  0.169805  0.065024  40.13181  2.589013  0.000000
  0.425824  0.170606  0.067362  41.14596  2.638955  0.000000
  0.439560  0.171407  0.069711  42.16087  2.688898  0.000000
  0.453297  0.172208  0.072071  43.17670  2.738840  0.000000
  0.467033  0.173009  0.074441  44.19362  2.788783  0.000000
  0.480769  0.173810  0.076823  45.21176  2.838725  0.000000
  0.494505  0.174611  0.079216  46.23129  2.888667  0.000000
  0.508242  0.175412  0.081620  47.25233  2.938610  0.000000
  0.521978  0.176213  0.084035  48.27502  2.988552  0.000000
  0.535714  0.177014  0.086461  49.29947  3.038494  0.000000
  0.549451  0.177815  0.088899  50.32581  3.088437  0.000000
  0.563187  0.178616  0.091347  51.35413  3.138379  0.000000
  0.576923  0.179417  0.093806  52.38454  3.188322  0.000000
  0.590659  0.180218  0.096276  53.41712  3.238264  0.000000
  0.604396  0.181018  0.098757  54.45197  3.288206  0.000000
  0.618132  0.181819  0.101249  55.48917  3.338149  0.000000
  0.631868  0.182620  0.103752  56.52879  3.388091  0.000000
  0.645604  0.183421  0.106266  57.57089  3.438034  0.000000
  0.659341  0.184222  0.108791  58.61555  3.487976  0.000000
  0.673077  0.185023  0.111327  59.66283  3.537918  0.000000
  0.686813  0.185824  0.113874  60.71277  3.587861  0.000000
  0.700549  0.186625  0.116432  61.76544  3.637803  0.000000
  0.714286  0.187426  0.119001  62.82089  3.687745  0.000000
  0.728022  0.188227  0.121581  63.87915  3.737688  0.000000
  0.741758  0.189028  0.124172  64.94027  3.787630  0.000000
  0.750000  0.189509  0.125732  66.00429  3.817596  0.000000
  END FTABLE  1
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      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    1              RCHRES   3     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   1000 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1003 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1001 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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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

SOHM

PROJECT REPORT

General Model Information

Project Name:	SOHM Node 67
Site Name:	
Site Address:	
City:	
Report Date:	12/1/2014
Gage:	Trabuco Canyon
Data Start:	10/01/1958
Data End:	09/30/2005
Timestep:	15 Minute
Precip Scale:	1.00
Version:	2014/11/12

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	1.18
Pervious Total	1.18
Impervious Land Use	Acres
Impervious Total	0
Basin Total	1.18

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	0.93
Pervious Total	0.93
Impervious Land Use	Acres
Impervious,Mod(5-10)	0.25
Impervious Total	0.25
Basin Total	1.18

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	17.67 ft.	
Bottom Width:	17.67 ft.	
Depth:	4 ft.	
Volume at riser head:	0.0515 acre-ft.	
Infiltration On		
Infiltration rate:	0.5	
Infiltration safety factor:	1	
Total Volume Infiltrated (ac-ft):		2.881
Total Volume Through Riser (ac-ft):		22.355
Total Volume Through Facility (ac-ft):		25.236
Percent Infiltrated:		11.42
Total Precip Applied to Facility:		0.762
Total Evap From Facility:		0.033
Side slope 1:	3 To 1	
Side slope 2:	3 To 1	
Side slope 3:	3 To 1	
Side slope 4:	3 To 1	
Discharge Structure		
Riser Height:	3 ft.	
Riser Diameter:	18 in.	
Notch Type:	Rectangular	
Notch Width:	0.570 ft.	
Notch Height:	0.702 ft.	
Orifice 1 Diameter:	1.12 in. Elevation:0 ft.	
Element Flows To:		
Outlet 1	Outlet 2	

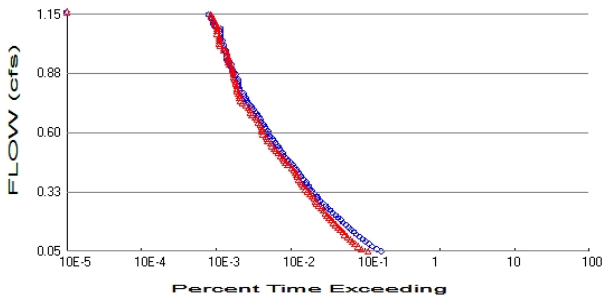
Pond Hydraulic Table

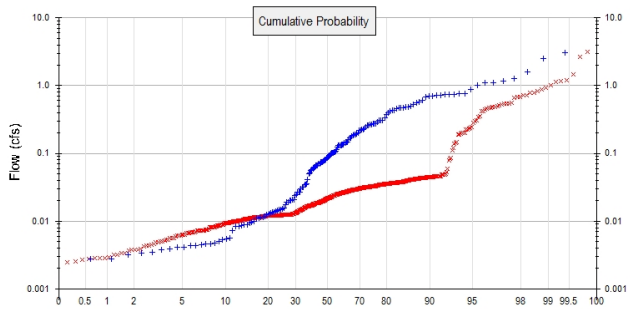
Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.007	0.000	0.000	0.000
0.0444	0.007	0.000	0.006	0.003
0.0889	0.007	0.000	0.009	0.003
0.1333	0.007	0.001	0.012	0.003
0.1778	0.008	0.001	0.013	0.003
0.2222	0.008	0.001	0.015	0.003
0.2667	0.008	0.002	0.017	0.003
0.3111	0.008	0.002	0.018	0.003
0.3556	0.009	0.002	0.019	0.003
0.4000	0.009	0.003	0.020	0.003
0.4444	0.009	0.003	0.022	0.003
0.4889	0.009	0.004	0.023	0.003
0.5333	0.010	0.004	0.024	0.003
0.5778	0.010	0.005	0.025	0.003
0.6222	0.010	0.005	0.026	0.003
0.6667	0.010	0.005	0.026	0.003
0.7111	0.011	0.006	0.027	0.003
0.7556	0.011	0.006	0.028	0.003
0.8000	0.011	0.007	0.029	0.003
0.8444	0.011	0.008	0.030	0.003
0.8889	0.012	0.008	0.031	0.003
0.9333	0.012	0.009	0.031	0.003
0.9778	0.012	0.009	0.032	0.003

1.0222	0.013	0.010	0.033	0.003
1.0667	0.013	0.010	0.034	0.003
1.1111	0.013	0.011	0.034	0.003
1.1556	0.013	0.012	0.035	0.003
1.2000	0.014	0.012	0.036	0.003
1.2444	0.014	0.013	0.036	0.003
1.2889	0.014	0.013	0.037	0.003
1.3333	0.015	0.014	0.038	0.003
1.3778	0.015	0.015	0.038	0.003
1.4222	0.015	0.015	0.039	0.003
1.4667	0.016	0.016	0.039	0.003
1.5111	0.016	0.017	0.040	0.003
1.5556	0.016	0.018	0.041	0.003
1.6000	0.017	0.018	0.041	0.003
1.6444	0.017	0.019	0.042	0.003
1.6889	0.017	0.020	0.042	0.003
1.7333	0.018	0.021	0.043	0.003
1.7778	0.018	0.022	0.043	0.003
1.8222	0.018	0.022	0.044	0.003
1.8667	0.019	0.023	0.045	0.003
1.9111	0.019	0.024	0.045	0.003
1.9556	0.019	0.025	0.046	0.003
2.0000	0.020	0.026	0.046	0.003
2.0444	0.020	0.027	0.047	0.003
2.0889	0.020	0.028	0.047	0.003
2.1333	0.021	0.029	0.048	0.003
2.1778	0.021	0.030	0.048	0.003
2.2222	0.022	0.031	0.049	0.003
2.2667	0.022	0.032	0.049	0.003
2.3111	0.022	0.033	0.052	0.003
2.3556	0.023	0.034	0.076	0.003
2.4000	0.023	0.035	0.112	0.003
2.4444	0.024	0.036	0.157	0.003
2.4889	0.024	0.037	0.210	0.003
2.5333	0.024	0.038	0.269	0.003
2.5778	0.025	0.039	0.333	0.003
2.6222	0.025	0.040	0.403	0.003
2.6667	0.026	0.041	0.478	0.003
2.7111	0.026	0.042	0.558	0.003
2.7556	0.026	0.044	0.642	0.003
2.8000	0.027	0.045	0.730	0.003
2.8444	0.027	0.046	0.822	0.003
2.8889	0.028	0.047	0.917	0.003
2.9333	0.028	0.048	1.017	0.003
2.9778	0.029	0.050	1.120	0.003
3.0222	0.029	0.051	1.221	0.003
3.0667	0.029	0.052	1.425	0.003
3.1111	0.030	0.054	1.715	0.003
3.1556	0.030	0.055	2.071	0.003
3.2000	0.031	0.056	2.481	0.003
3.2444	0.031	0.058	2.941	0.003
3.2889	0.032	0.059	3.444	0.003
3.3333	0.032	0.061	3.987	0.003
3.3778	0.033	0.062	4.568	0.003
3.4222	0.033	0.064	5.185	0.003
3.4667	0.034	0.065	5.834	0.003
3.5111	0.034	0.067	6.515	0.003
3.5556	0.034	0.068	7.227	0.003

3.6000	0.035	0.070	7.968	0.003
3.6444	0.035	0.071	8.736	0.003
3.6889	0.036	0.073	9.532	0.003
3.7333	0.036	0.075	10.35	0.003
3.7778	0.037	0.076	11.20	0.003
3.8222	0.037	0.078	12.07	0.003
3.8667	0.038	0.080	12.96	0.003
3.9111	0.038	0.081	13.88	0.003
3.9556	0.039	0.083	14.82	0.003
4.0000	0.039	0.085	15.79	0.003
4.0444	0.040	0.087	16.77	0.003

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.18
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.93
Total Impervious Area: 0.25

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.500072
5 year	0.784993
10 year	1.154098
25 year	2.152206

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.491859
5 year	0.834433
10 year	1.165516
25 year	2.171653

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0500	2665	1778	66	Pass
0.0612	2315	1448	62	Pass
0.0723	2047	1328	64	Pass
0.0835	1824	1199	65	Pass
0.0946	1646	1099	66	Pass
0.1058	1512	1028	67	Pass
0.1169	1371	943	68	Pass
0.1281	1252	878	70	Pass
0.1392	1150	824	71	Pass
0.1504	1064	760	71	Pass
0.1615	978	713	72	Pass
0.1727	908	664	73	Pass
0.1838	839	621	74	Pass
0.1950	771	575	74	Pass
0.2061	715	538	75	Pass
0.2173	664	504	75	Pass
0.2284	600	476	79	Pass
0.2396	560	451	80	Pass
0.2508	518	417	80	Pass
0.2619	486	388	79	Pass
0.2731	442	364	82	Pass
0.2842	407	352	86	Pass
0.2954	381	336	88	Pass
0.3065	368	321	87	Pass
0.3177	342	295	86	Pass
0.3288	321	278	86	Pass
0.3400	307	262	85	Pass
0.3511	290	241	83	Pass
0.3623	270	230	85	Pass
0.3734	264	222	84	Pass
0.3846	243	212	87	Pass
0.3957	228	201	88	Pass
0.4069	215	197	91	Pass
0.4180	209	191	91	Pass
0.4292	199	181	90	Pass
0.4403	184	168	91	Pass
0.4515	177	150	84	Pass
0.4626	163	140	85	Pass
0.4738	151	133	88	Pass
0.4850	142	129	90	Pass
0.4961	132	120	90	Pass
0.5073	128	111	86	Pass
0.5184	121	104	85	Pass
0.5296	117	98	83	Pass
0.5407	113	92	81	Pass
0.5519	103	88	85	Pass
0.5630	97	81	83	Pass
0.5742	94	79	84	Pass
0.5853	86	76	88	Pass
0.5965	84	70	83	Pass
0.6076	82	68	82	Pass
0.6188	77	68	88	Pass
0.6299	74	66	89	Pass

0.6411	71	64	90	Pass
0.6522	67	61	91	Pass
0.6634	65	58	89	Pass
0.6745	62	55	88	Pass
0.6857	59	50	84	Pass
0.6968	56	48	85	Pass
0.7080	53	47	88	Pass
0.7192	50	45	90	Pass
0.7303	47	41	87	Pass
0.7415	44	37	84	Pass
0.7526	43	35	81	Pass
0.7638	41	34	82	Pass
0.7749	39	34	87	Pass
0.7861	38	33	86	Pass
0.7972	34	31	91	Pass
0.8084	34	31	91	Pass
0.8195	33	31	93	Pass
0.8307	33	30	90	Pass
0.8418	33	30	90	Pass
0.8530	32	29	90	Pass
0.8641	30	28	93	Pass
0.8753	30	28	93	Pass
0.8864	28	28	100	Pass
0.8976	27	27	100	Pass
0.9087	26	27	103	Pass
0.9199	26	25	96	Pass
0.9310	24	24	100	Pass
0.9422	23	24	104	Pass
0.9534	23	24	104	Pass
0.9645	23	23	100	Pass
0.9757	22	23	104	Pass
0.9868	22	21	95	Pass
0.9980	21	21	100	Pass
1.0091	21	19	90	Pass
1.0203	20	18	90	Pass
1.0314	20	18	90	Pass
1.0426	19	18	94	Pass
1.0537	19	18	94	Pass
1.0649	19	17	89	Pass
1.0760	19	17	89	Pass
1.0872	19	17	89	Pass
1.0983	16	17	106	Pass
1.1095	15	16	106	Pass
1.1206	15	16	106	Pass
1.1318	14	15	107	Pass
1.1429	14	14	100	Pass
1.1541	13	14	107	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

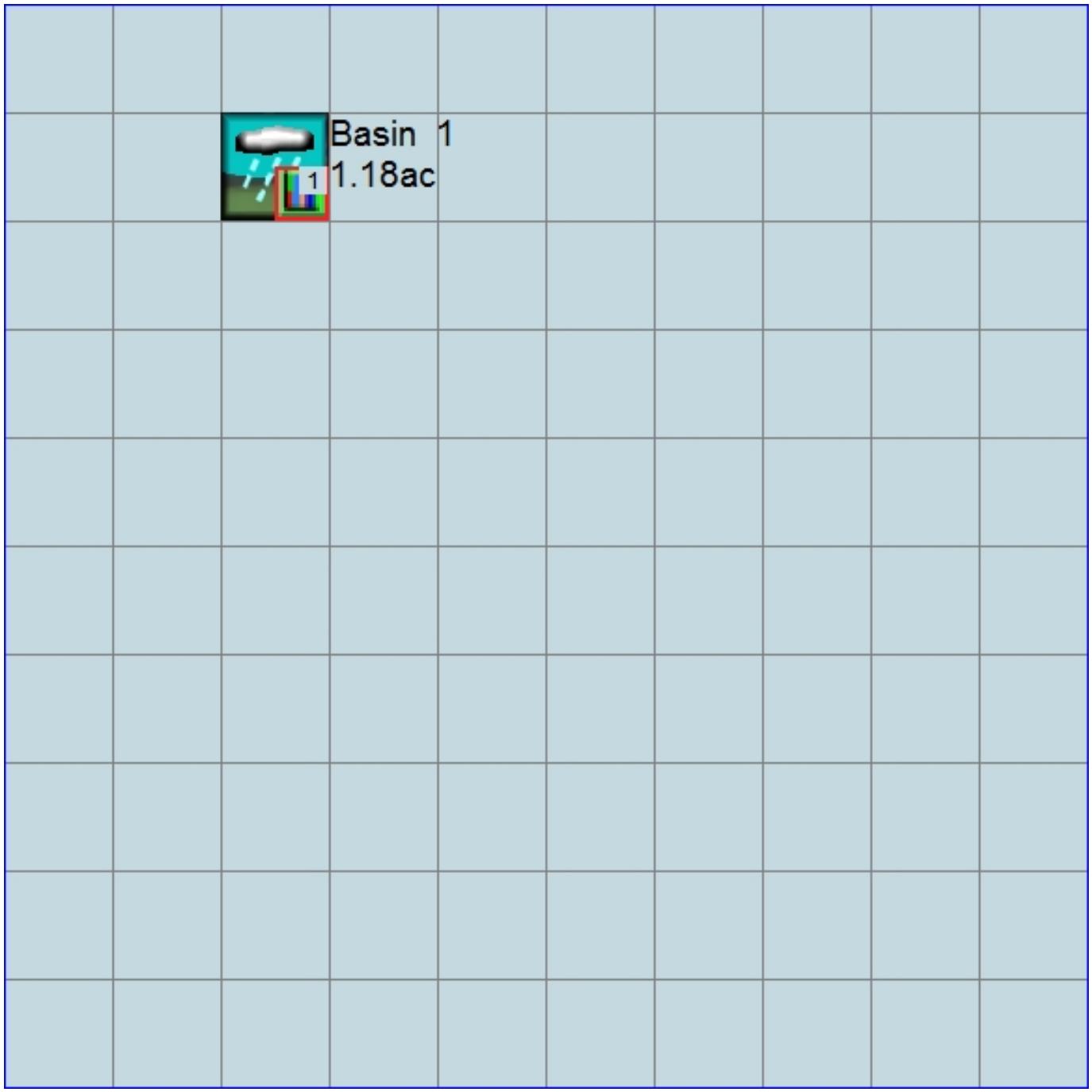
No PERLND changes have been made.

IMPLND Changes

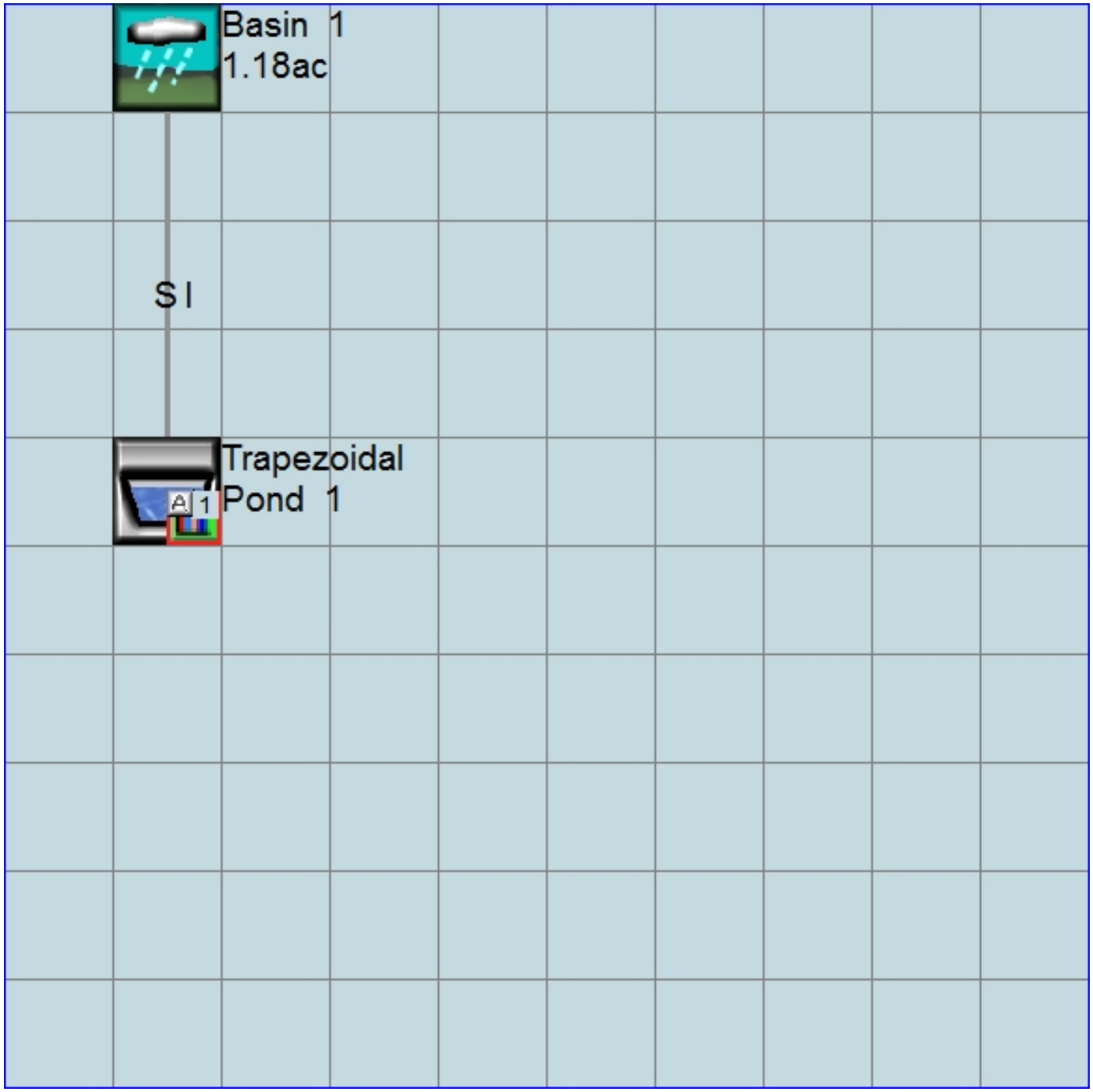
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1958 10 01        END    2005 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   SOHM Node 67.wdm
MESSU      25   PreSOHM Node 67.MES
           27   PreSOHM Node 67.L61
           28   PreSOHM Node 67.L62
           30   POCSOHM Node 671.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37              0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37              0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37              0         0      0.09         0      0.92       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#   ***
Basin  1***
PERLND  37                        1.18     COPY   501     12
PERLND  37                        1.18     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       1958 10 01        END    2005 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   SOHM Node 67.wdm
MESSU      25   MitSOHM Node 67.MES
           27   MitSOHM Node 67.L61
           28   MitSOHM Node 67.L62
           30   POCSOHM Node 671.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      IMPLND       2
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  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           ***
   37     D,Scrub,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 ***
   37         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  *********
```

```
  37         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 ***
  37         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
  37              0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  37              0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
  37       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  ***
  37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
  37              0         0      0.09         0      0.92       0.3      0.01
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                       in  out           ***
    2     Impervious,Mod(5-10)    1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         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     ***
    2         0    0    0    0    0
```

```
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            100       0.1       0.1      0.09
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  37                        0.93     RCHRES   1      2
IMPLND   2                        0.25     RCHRES   1      5

******Routing******
PERLND  37                        0.93     COPY     1     12
IMPLND   2                        0.25     COPY     1     15
RCHRES   1                           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     Trapezoidal Pond-004    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
  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
  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
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      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
  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  0.007165  0.000000  0.000000  0.000000
  0.044444  0.007383  0.000323  0.006946  0.003613
  0.088889  0.007605  0.000656  0.009822  0.003613
  0.133333  0.007829  0.000999  0.012030  0.003613
  0.177778  0.008057  0.001352  0.013891  0.003613
  0.222222  0.008288  0.001716  0.015531  0.003613
  0.266667  0.008522  0.002089  0.017013  0.003613
  0.311111  0.008760  0.002473  0.018376  0.003613
  0.355556  0.009000  0.002868  0.019645  0.003613
  0.400000  0.009244  0.003273  0.020837  0.003613
  0.444444  0.009492  0.003690  0.021964  0.003613
  0.488889  0.009742  0.004117  0.023036  0.003613
  0.533333  0.009996  0.004556  0.024060  0.003613
  0.577778  0.010253  0.005006  0.025042  0.003613
  0.622222  0.010514  0.005467  0.025988  0.003613
  0.666667  0.010777  0.005940  0.026900  0.003613
  0.711111  0.011044  0.006425  0.027782  0.003613
  0.755556  0.011315  0.006922  0.028637  0.003613
  0.800000  0.011588  0.007431  0.029467  0.003613
  0.844444  0.011865  0.007952  0.030275  0.003613
  0.888889  0.012145  0.008486  0.031061  0.003613
  0.933333  0.012428  0.009032  0.031828  0.003613
  0.977778  0.012714  0.009591  0.032577  0.003613
  1.022222  0.013004  0.010162  0.033309  0.003613
  1.066667  0.013297  0.010747  0.034026  0.003613
  1.111111  0.013594  0.011344  0.034728  0.003613
  1.155556  0.013893  0.011955  0.035415  0.003613
  1.200000  0.014196  0.012579  0.036090  0.003613
  1.244444  0.014502  0.013217  0.036752  0.003613
  1.288889  0.014811  0.013868  0.037403  0.003613
  1.333333  0.015124  0.014533  0.038042  0.003613
  1.377778  0.015440  0.015213  0.038671  0.003613
  1.422222  0.015759  0.015906  0.039290  0.003613
  1.466667  0.016081  0.016614  0.039899  0.003613
  1.511111  0.016407  0.017336  0.040499  0.003613
  1.555556  0.016736  0.018072  0.041090  0.003613
  1.600000  0.017068  0.018823  0.041673  0.003613
  1.644444  0.017404  0.019589  0.042248  0.003613
  1.688889  0.017743  0.020370  0.042815  0.003613
  1.733333  0.018085  0.021166  0.043375  0.003613
  1.777778  0.018430  0.021978  0.043927  0.003613
  1.822222  0.018778  0.022805  0.044473  0.003613
  1.866667  0.019130  0.023647  0.045012  0.003613
  1.911111  0.019485  0.024505  0.045545  0.003613
```

```
  1.955556  0.019844  0.025379  0.046071  0.003613
  2.000000  0.020205  0.026269  0.046592  0.003613
  2.044444  0.020570  0.027175  0.047107  0.003613
  2.088889  0.020938  0.028098  0.047616  0.003613
  2.133333  0.021310  0.029037  0.048120  0.003613
  2.177778  0.021684  0.029992  0.048619  0.003613
  2.222222  0.022062  0.030964  0.049112  0.003613
  2.266667  0.022443  0.031953  0.049601  0.003613
  2.311111  0.022828  0.032959  0.052902  0.003613
  2.355556  0.023216  0.033982  0.076706  0.003613
  2.400000  0.023607  0.035023  0.112783  0.003613
  2.444444  0.024001  0.036081  0.157775  0.003613
  2.488889  0.024398  0.037156  0.210157  0.003613
  2.533333  0.024799  0.038250  0.268995  0.003613
  2.577778  0.025203  0.039361  0.333640  0.003613
  2.622222  0.025610  0.040490  0.403606  0.003613
  2.666667  0.026021  0.041637  0.478514  0.003613
  2.711111  0.026435  0.042803  0.558054  0.003613
  2.755556  0.026852  0.043987  0.641969  0.003613
  2.800000  0.027272  0.045190  0.730041  0.003613
  2.844444  0.027696  0.046411  0.822080  0.003613
  2.888889  0.028123  0.047652  0.917922  0.003613
  2.933333  0.028553  0.048911  1.017421  0.003613
  2.977778  0.028986  0.050190  1.120445  0.003613
  3.022222  0.029423  0.051488  1.221847  0.003613
  3.066667  0.029863  0.052805  1.425333  0.003613
  3.111111  0.030306  0.054143  1.715345  0.003613
  3.155556  0.030753  0.055499  2.070963  0.003613
  3.200000  0.031203  0.056876  2.481738  0.003613
  3.244444  0.031656  0.058273  2.941055  0.003613
  3.288889  0.032112  0.059690  3.444234  0.003613
  3.333333  0.032571  0.061128  3.987736  0.003613
  3.377778  0.033034  0.062585  4.568763  0.003613
  3.422222  0.033500  0.064064  5.185029  0.003613
  3.466667  0.033970  0.065563  5.834623  0.003613
  3.511111  0.034442  0.067084  6.515913  0.003613
  3.555556  0.034918  0.068625  7.227487  0.003613
  3.600000  0.035397  0.070187  7.968106  0.003613
  3.644444  0.035880  0.071771  8.736673  0.003613
  3.688889  0.036365  0.073377  9.532204  0.003613
  3.733333  0.036854  0.075004  10.35382  0.003613
  3.777778  0.037347  0.076653  11.20070  0.003613
  3.822222  0.037842  0.078324  12.07213  0.003613
  3.866667  0.038341  0.080017  12.96743  0.003613
  3.911111  0.038843  0.081732  13.88598  0.003613
  3.955556  0.039348  0.083469  14.82721  0.003613
  4.000000  0.039856  0.085230  15.79057  0.003613
  END FTABLE  1
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      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    1              RCHRES   1     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   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1003 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 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        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  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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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

SOHM

PROJECT REPORT

General Model Information

Project Name:	SOHM Node 70
Site Name:	
Site Address:	
City:	
Report Date:	12/1/2014
Gage:	Trabuco Canyon
Data Start:	10/01/1958
Data End:	09/30/2005
Timestep:	15 Minute
Precip Scale:	1.00
Version:	2014/11/12

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	2.64
Pervious Total	2.64
Impervious Land Use	Acres
Impervious Total	0
Basin Total	2.64

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	Acres
D,Scrub,Flat(0-5%)	2.11
Pervious Total	2.11
Impervious Land Use	Acres
Impervious,Mod(5-10)	0.53
Impervious Total	0.53
Basin Total	2.64

Element Flows To:

Surface	Interflow	Groundwater
Surface Bio Swale 1	Surface Bio Swale 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	2.43 ft.	
Bottom Width:	2.43 ft.	
Depth:	5 ft.	
Volume at riser head:	0.0244 acre-ft.	
Infiltration On		
Infiltration rate:	0.5	
Infiltration safety factor:	1	
Total Volume Infiltrated (ac-ft):		14.308
Total Volume Through Riser (ac-ft):		6.119
Total Volume Through Facility (ac-ft):		20.427
Percent Infiltrated:		70.04
Total Precip Applied to Facility:		3.294
Total Evap From Facility:		0.108
Side slope 1:	3 To 1	
Side slope 2:	3 To 1	
Side slope 3:	3 To 1	
Side slope 4:	3 To 1	
Discharge Structure		
Riser Height:	4 ft.	
Riser Diameter:	18 in.	
Notch Type:	Rectangular	
Notch Width:	0.830 ft.	
Notch Height:	1.008 ft.	
Orifice 1 Diameter:	3.509 in. Elevation:0 ft.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.000	0.000	0.000	0.000
0.0556	0.000	0.000	0.076	0.000
0.1111	0.000	0.000	0.107	0.000
0.1667	0.000	0.000	0.132	0.000
0.2222	0.000	0.000	0.152	0.000
0.2778	0.000	0.000	0.170	0.000
0.3333	0.000	0.000	0.186	0.000
0.3889	0.000	0.000	0.201	0.000
0.4444	0.000	0.000	0.215	0.000
0.5000	0.000	0.000	0.228	0.000
0.5556	0.000	0.000	0.241	0.000
0.6111	0.000	0.000	0.252	0.000
0.6667	0.000	0.000	0.264	0.000
0.7222	0.001	0.000	0.274	0.000
0.7778	0.001	0.000	0.285	0.000
0.8333	0.001	0.000	0.295	0.000
0.8889	0.001	0.000	0.304	0.000
0.9444	0.001	0.000	0.314	0.000
1.0000	0.001	0.000	0.323	0.000
1.0556	0.001	0.000	0.332	0.000
1.1111	0.001	0.000	0.340	0.000
1.1667	0.002	0.001	0.349	0.000
1.2222	0.002	0.001	0.357	0.000

1.2778	0.002	0.001	0.365	0.000
1.3333	0.002	0.001	0.373	0.000
1.3889	0.002	0.001	0.381	0.000
1.4444	0.002	0.001	0.388	0.000
1.5000	0.003	0.001	0.396	0.000
1.5556	0.003	0.002	0.403	0.000
1.6111	0.003	0.002	0.410	0.000
1.6667	0.003	0.002	0.417	0.000
1.7222	0.003	0.002	0.424	0.000
1.7778	0.003	0.002	0.431	0.000
1.8333	0.004	0.003	0.437	0.000
1.8889	0.004	0.003	0.444	0.000
1.9444	0.004	0.003	0.450	0.000
2.0000	0.004	0.003	0.457	0.000
2.0556	0.005	0.004	0.463	0.000
2.1111	0.005	0.004	0.469	0.000
2.1667	0.005	0.004	0.476	0.000
2.2222	0.005	0.005	0.482	0.000
2.2778	0.005	0.005	0.488	0.000
2.3333	0.006	0.005	0.494	0.000
2.3889	0.006	0.006	0.499	0.000
2.4444	0.006	0.006	0.505	0.000
2.5000	0.007	0.006	0.511	0.000
2.5556	0.007	0.007	0.517	0.000
2.6111	0.007	0.007	0.522	0.000
2.6667	0.007	0.008	0.528	0.000
2.7222	0.008	0.008	0.533	0.000
2.7778	0.008	0.008	0.539	0.000
2.8333	0.008	0.009	0.544	0.000
2.8889	0.009	0.009	0.549	0.000
2.9444	0.009	0.010	0.554	0.000
3.0000	0.009	0.010	0.562	0.000
3.0556	0.009	0.011	0.609	0.000
3.1111	0.010	0.012	0.684	0.000
3.1667	0.010	0.012	0.777	0.000
3.2222	0.010	0.013	0.886	0.000
3.2778	0.011	0.013	1.008	0.000
3.3333	0.011	0.014	1.142	0.000
3.3889	0.011	0.015	1.286	0.000
3.4444	0.012	0.015	1.441	0.000
3.5000	0.012	0.016	1.606	0.000
3.5556	0.013	0.017	1.779	0.000
3.6111	0.013	0.017	1.961	0.000
3.6667	0.013	0.018	2.151	0.000
3.7222	0.014	0.019	2.349	0.000
3.7778	0.014	0.020	2.554	0.000
3.8333	0.014	0.021	2.766	0.000
3.8889	0.015	0.021	2.986	0.000
3.9444	0.015	0.022	3.212	0.000
4.0000	0.016	0.023	3.444	0.000
4.0556	0.016	0.024	3.640	0.000
4.1111	0.016	0.025	3.994	0.000
4.1667	0.017	0.026	4.452	0.000
4.2222	0.017	0.027	4.992	0.000
4.2778	0.018	0.028	5.605	0.000
4.3333	0.018	0.029	6.282	0.000
4.3889	0.019	0.030	7.018	0.000
4.4444	0.019	0.031	7.808	0.000

4.5000	0.019	0.032	8.648	0.000
4.5556	0.020	0.033	9.537	0.000
4.6111	0.020	0.034	10.47	0.000
4.6667	0.021	0.035	11.44	0.000
4.7222	0.021	0.037	12.46	0.000
4.7778	0.022	0.038	13.52	0.000
4.8333	0.022	0.039	14.62	0.000
4.8889	0.023	0.040	15.75	0.000
4.9444	0.023	0.042	16.92	0.000
5.0000	0.024	0.043	18.13	0.000
5.0556	0.024	0.044	19.36	0.000

Bio Swale 1

Bottom Length:	952.00 ft.
Bottom Width:	14.00 ft.
Material thickness of first layer:	0.2
Material type for first layer:	GRAVEL
Material thickness of second layer:	0.2
Material type for second layer:	Sand
Material thickness of third layer:	0.2
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	60.381
Total Volume Through Riser (ac-ft):	17.251
Total Volume Through Facility (ac-ft):	77.632
Percent Infiltrated:	77.78
Total Precip Applied to Facility:	21.967
Total Evap From Facility:	6.775
Underdrain not used	
Discharge Structure	
Riser Height:	0.25 ft.
Riser Diameter:	8 in.
Notch Type:	Rectangular
Notch Width:	0.000 ft.
Notch Height:	0.000 ft.
Orifice 1 Diameter:	12 in. Elevation:0.05 ft.
Element Flows To:	
Outlet 1	Outlet 2
Trapezoidal Pond 1	

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.3584	0.0000	0.0000	0.0000
0.0148	0.3578	0.0009	0.0000	0.0000
0.0297	0.3565	0.0019	0.0000	0.0000
0.0445	0.3553	0.0028	0.0000	0.0000
0.0593	0.3540	0.0038	0.0000	0.0000
0.0742	0.3527	0.0048	0.0000	0.0000
0.0890	0.3514	0.0057	0.0000	0.0000
0.1038	0.3501	0.0067	0.0000	0.0000
0.1187	0.3488	0.0077	0.0000	0.0000
0.1335	0.3475	0.0086	0.0000	0.0000
0.1484	0.3462	0.0096	0.0352	0.0352
0.1632	0.3449	0.0106	0.0829	0.0829
0.1780	0.3436	0.0116	0.1543	0.1543
0.1929	0.3423	0.0126	0.1543	0.1543
0.2077	0.3410	0.0135	0.1543	0.1543
0.2225	0.3397	0.0145	0.1543	0.1543
0.2374	0.3384	0.0155	0.1543	0.1543
0.2522	0.3371	0.0164	0.1543	0.1543
0.2670	0.3358	0.0174	0.1543	0.1543
0.2819	0.3345	0.0184	0.1543	0.1543
0.2967	0.3332	0.0194	0.1543	0.1543
0.3115	0.3319	0.0204	0.1543	0.1543
0.3264	0.3306	0.0214	0.1543	0.1543
0.3412	0.3293	0.0224	0.1543	0.1543

0.3560	0.3280	0.0234	0.1543	0.1543
0.3709	0.3267	0.0244	0.1543	0.1543
0.3857	0.3254	0.0254	0.1543	0.1543
0.4005	0.3241	0.0264	0.1543	0.1543
0.4154	0.3228	0.0275	0.1543	0.1543
0.4302	0.3215	0.0285	0.1543	0.1543
0.4451	0.3202	0.0296	0.1543	0.1543
0.4599	0.3189	0.0306	0.1543	0.1543
0.4747	0.3176	0.0317	0.1543	0.1543
0.4896	0.3163	0.0328	0.1543	0.1543
0.5044	0.3150	0.0339	0.1543	0.1543
0.5192	0.3138	0.0349	0.1543	0.1543
0.5341	0.3125	0.0360	0.1543	0.1543
0.5489	0.3112	0.0371	0.1543	0.1543
0.5637	0.3099	0.0382	0.1543	0.1543
0.5786	0.3086	0.0393	0.1543	0.1543
0.5934	0.3073	0.0404	0.1543	0.1543
0.6000	0.3060	0.0409	0.1543	0.1543

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
0.6000	0.3584	0.0409	0.0000	2.9678	0.0000
0.6148	0.3597	0.0462	0.0000	2.9678	0.0000
0.6297	0.3610	0.0516	0.0000	3.0740	0.0000
0.6445	0.3623	0.0569	0.0000	3.1801	0.0000
0.6593	0.3636	0.0623	0.0000	3.2862	0.0000
0.6742	0.3649	0.0677	0.0000	3.3924	0.0000
0.6890	0.3662	0.0731	0.0000	3.4985	0.0000
0.7038	0.3675	0.0786	0.0000	3.6046	0.0000
0.7187	0.3688	0.0840	0.0000	3.7108	0.0000
0.7335	0.3701	0.0895	0.0000	3.8169	0.0000
0.7484	0.3714	0.0950	0.0000	3.9230	0.0000
0.7632	0.3727	0.1005	0.0000	4.0292	0.0000
0.7780	0.3740	0.1061	0.0000	4.1353	0.0000
0.7929	0.3753	0.1116	0.0000	4.2414	0.0000
0.8077	0.3766	0.1172	0.0000	4.3476	0.0000
0.8225	0.3779	0.1228	0.0000	4.4537	0.0000
0.8374	0.3792	0.1284	0.0000	4.5598	0.0000
0.8522	0.3805	0.1341	0.0000	4.6660	0.0000
0.8670	0.3818	0.1397	0.0000	4.7721	0.0000
0.8819	0.3831	0.1454	0.0000	4.8782	0.0000
0.8967	0.3844	0.1511	0.0000	4.9844	0.0000
0.9115	0.3857	0.1568	0.0000	5.0905	0.0000
0.9264	0.3870	0.1625	0.0000	5.1966	0.0000
0.9412	0.3882	0.1683	0.0000	5.3028	0.0000
0.9560	0.3895	0.1740	0.0000	5.4089	0.0000
0.9709	0.3908	0.1798	0.0000	5.5150	0.0000
0.9857	0.3921	0.1856	0.0000	5.6212	0.0000
1.0005	0.3934	0.1915	0.0000	5.7273	0.0000
1.0154	0.3947	0.1973	0.0000	5.8335	0.0000
1.0302	0.3960	0.2032	0.0000	5.9396	0.0000
1.0451	0.3973	0.2091	0.0000	6.0457	0.0000
1.0599	0.3986	0.2150	0.0000	6.1519	0.0000
1.0747	0.3999	0.2209	0.0000	6.2580	0.0000
1.0896	0.4012	0.2268	0.0000	6.3641	0.0000
1.1044	0.4025	0.2328	0.0000	6.4703	0.0000
1.1192	0.4038	0.2388	0.0000	6.5764	0.0000
1.1341	0.4051	0.2448	0.0000	6.6825	0.0000

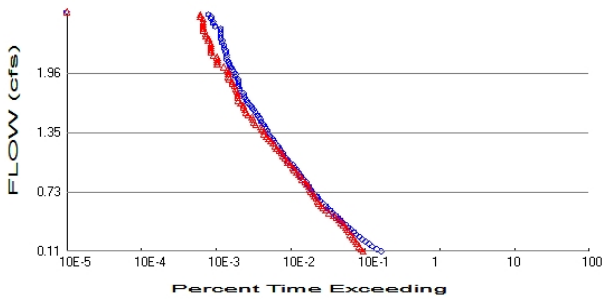
1.1489	0.4064	0.2508	0.0000	6.7887	0.0000
1.1637	0.4077	0.2568	0.0000	6.8948	0.0000
1.1786	0.4090	0.2629	0.0000	7.0009	0.0000
1.1934	0.4103	0.2690	0.0000	7.1071	0.0000
1.2082	0.4116	0.2751	0.0000	7.2132	0.0000
1.2231	0.4129	0.2812	4.3426	7.3193	0.0000
1.2379	0.4142	0.2873	4.4685	7.4255	0.0000
1.2527	0.4155	0.2935	4.5957	7.5316	0.0000
1.2676	0.4168	0.2996	4.7241	7.6377	0.0000
1.2824	0.4181	0.3058	4.8538	7.7439	0.0000
1.2973	0.4194	0.3120	4.9847	7.8500	0.0000
1.3121	0.4207	0.3183	5.1168	7.9561	0.0000
1.3269	0.4220	0.3245	5.2501	8.0623	0.0000
1.3418	0.4233	0.3308	5.3845	8.1684	0.0000
1.3500	0.4240	0.3343	5.5202	8.2274	0.0000

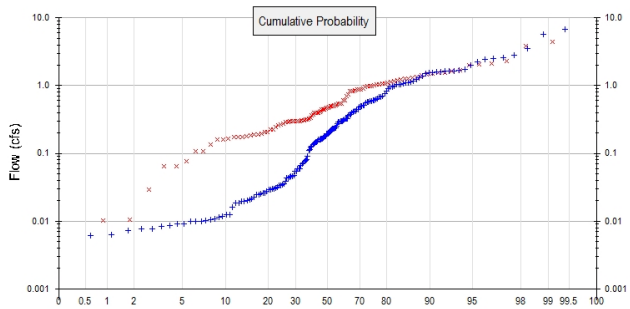
Surface Bio Swale 1

Element Flows To:

Outlet 1	Outlet 2
Trapezoidal Pond 1	Bio Swale 1

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 2.64
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 2.11
Total Impervious Area: 0.53

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	1.118805
5 year	1.756255
10 year	2.58205
25 year	4.815105

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	1.068608
5 year	1.532685
10 year	2.034178
25 year	3.243811

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1119	2676	1540	57	Pass
0.1368	2324	1437	61	Pass
0.1618	2047	1356	66	Pass
0.1867	1823	1274	69	Pass
0.2117	1644	1216	73	Pass
0.2366	1506	1154	76	Pass
0.2616	1364	1100	80	Pass
0.2865	1253	1042	83	Pass
0.3115	1150	979	85	Pass
0.3364	1063	933	87	Pass
0.3614	975	893	91	Pass
0.3863	906	850	93	Pass
0.4113	834	787	94	Pass
0.4362	765	724	94	Pass
0.4612	714	672	94	Pass
0.4861	662	616	93	Pass
0.5111	598	540	90	Pass
0.5361	558	487	87	Pass
0.5610	516	444	86	Pass
0.5860	486	418	86	Pass
0.6109	443	395	89	Pass
0.6359	408	375	91	Pass
0.6608	381	361	94	Pass
0.6858	367	344	93	Pass
0.7107	342	324	94	Pass
0.7357	319	309	96	Pass
0.7606	306	295	96	Pass
0.7856	290	286	98	Pass
0.8105	270	270	100	Pass
0.8355	264	255	96	Pass
0.8604	243	236	97	Pass
0.8854	228	222	97	Pass
0.9103	215	211	98	Pass
0.9353	209	196	93	Pass
0.9602	199	183	91	Pass
0.9852	184	175	95	Pass
1.0101	177	163	92	Pass
1.0351	160	151	94	Pass
1.0600	150	147	98	Pass
1.0850	142	137	96	Pass
1.1099	133	129	96	Pass
1.1349	128	123	96	Pass
1.1598	121	115	95	Pass
1.1848	117	106	90	Pass
1.2097	113	100	88	Pass
1.2347	102	96	94	Pass
1.2596	98	89	90	Pass
1.2846	94	83	88	Pass
1.3095	86	77	89	Pass
1.3345	84	73	86	Pass
1.3594	81	72	88	Pass
1.3844	77	67	87	Pass
1.4093	74	65	87	Pass

1.4343	71	56	78	Pass
1.4592	67	53	79	Pass
1.4842	65	51	78	Pass
1.5091	62	50	80	Pass
1.5341	59	44	74	Pass
1.5591	55	41	74	Pass
1.5840	53	40	75	Pass
1.6090	50	38	76	Pass
1.6339	47	38	80	Pass
1.6589	44	35	79	Pass
1.6838	43	33	76	Pass
1.7088	40	32	80	Pass
1.7337	39	32	82	Pass
1.7587	38	32	84	Pass
1.7836	34	31	91	Pass
1.8086	34	30	88	Pass
1.8335	33	29	87	Pass
1.8585	33	27	81	Pass
1.8834	33	27	81	Pass
1.9084	32	25	78	Pass
1.9333	30	24	80	Pass
1.9583	30	24	80	Pass
1.9832	28	24	85	Pass
2.0082	27	23	85	Pass
2.0331	26	21	80	Pass
2.0581	25	17	68	Pass
2.0830	24	17	70	Pass
2.1080	23	17	73	Pass
2.1329	23	17	73	Pass
2.1579	23	15	65	Pass
2.1828	22	14	63	Pass
2.2078	22	14	63	Pass
2.2327	21	14	66	Pass
2.2577	21	14	66	Pass
2.2826	20	14	70	Pass
2.3076	20	13	65	Pass
2.3325	19	13	68	Pass
2.3575	19	12	63	Pass
2.3824	19	12	63	Pass
2.4074	19	11	57	Pass
2.4323	19	11	57	Pass
2.4573	16	11	68	Pass
2.4822	15	11	73	Pass
2.5072	15	11	73	Pass
2.5321	14	11	78	Pass
2.5571	14	10	71	Pass
2.5821	13	10	76	Pass

Water Quality

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       1958 10 01        END    2005 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   SOHM Node 70.wdm
MESSU      25   PreSOHM Node 70.MES
           27   PreSOHM Node 70.L61
           28   PreSOHM Node 70.L62
           30   POCSOHM Node 701.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37              0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37              0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37              0         0      0.09         0      0.92       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#   ***
Basin  1***
PERLND  37                        2.64     COPY   501     12
PERLND  37                        2.64     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       1958 10 01        END    2005 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   SOHM Node 70.wdm
MESSU      25   MitSOHM Node 70.MES
           27   MitSOHM Node 70.L61
           28   MitSOHM Node 70.L62
           30   POCSOHM Node 701.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      37
      IMPLND       2
      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        Trapezoidal Pond  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
  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           ***
   37     D,Scrub,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 ***
   37         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  *********
   37         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 ***
   37         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
   37             0       4.6      0.04       400      0.05       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   37             40        35         4         2         0      0.03         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   37             0       0.9       0.3         1       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   37       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  ***
   37      0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 0.13 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
   37             0         0      0.09         0      0.92       0.3      0.01
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                       in  out           ***
    2     Impervious,Mod(5-10)    1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         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     ***
    2         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            100       0.1       0.1      0.09
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  37                        2.11     RCHRES   1      2
PERLND  37                        2.11     RCHRES   1      3
IMPLND   2                        0.53     RCHRES   1      5

******Routing******
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 Bio Swal-007    3    1    1    1   28    0    1
    2     Bio Swale  1            2    1    1    1   28    0    1
    3     Trapezoidal Pond-004    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      0.18       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            =  1671.
*** 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 3
91 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.000136	0.000000	0.000000	0.000000		
0.055556	0.000175	0.000009	0.076224	0.000068		
0.111111	0.000220	0.000020	0.107796	0.000068		
0.166667	0.000270	0.000033	0.132023	0.000068		
0.222222	0.000325	0.000050	0.152447	0.000068		
0.277778	0.000385	0.000069	0.170441	0.000068		
0.333333	0.000450	0.000093	0.186709	0.000068		
0.388889	0.000521	0.000120	0.201669	0.000068		
0.444444	0.000596	0.000151	0.215593	0.000068		
0.500000	0.000677	0.000186	0.228671	0.000068		
0.555556	0.000762	0.000226	0.241040	0.000068		
0.611111	0.000853	0.000271	0.252805	0.000068		
0.666667	0.000949	0.000321	0.264046	0.000068		
0.722222	0.001050	0.000376	0.274828	0.000068		
0.777778	0.001156	0.000438	0.285203	0.000068		
0.833333	0.001267	0.000505	0.295213	0.000068		
0.888889	0.001383	0.000579	0.304894	0.000068		
0.944444	0.001505	0.000659	0.314278	0.000068		
1.000000	0.001631	0.000746	0.323389	0.000068		
1.055556	0.001763	0.000840	0.332251	0.000068		
1.111111	0.001899	0.000942	0.340882	0.000068		
1.166667	0.002041	0.001052	0.349300	0.000068		
1.222222	0.002188	0.001169	0.357520	0.000068		
1.277778	0.002340	0.001295	0.365556	0.000068		
1.333333	0.002497	0.001429	0.373418	0.000068		
1.388889	0.002659	0.001572	0.381118	0.000068		
1.444444	0.002827	0.001725	0.388666	0.000068		
1.500000	0.002999	0.001887	0.396069	0.000068		
1.555556	0.003176	0.002058	0.403337	0.000068		
1.611111	0.003359	0.002240	0.410477	0.000068		
1.666667	0.003547	0.002431	0.417494	0.000068		
1.722222	0.003739	0.002634	0.424395	0.000068		
1.777778	0.003937	0.002847	0.431186	0.000068		
1.833333	0.004140	0.003072	0.437871	0.000068		
1.888889	0.004348	0.003307	0.444456	0.000068		
1.944444	0.004562	0.003555	0.450945	0.000068		
2.000000	0.004780	0.003814	0.457342	0.000068		
2.055556	0.005003	0.004086	0.463650	0.000068		
2.111111	0.005232	0.004370	0.469874	0.000068		
2.166667	0.005465	0.004667	0.476016	0.000068		
2.222222	0.005704	0.004978	0.482080	0.000068		
2.277778	0.005948	0.005301	0.488069	0.000068		
2.333333	0.006197	0.005639	0.493985	0.000068		
2.388889	0.006451	0.005990	0.499832	0.000068		
2.444444	0.006710	0.006356	0.505610	0.000068		
2.500000	0.006974	0.006736	0.511324	0.000068		
2.555556	0.007243	0.007131	0.516974	0.000068		
2.611111	0.007518	0.007541	0.522563	0.000068		
2.666667	0.007797	0.007966	0.528093	0.000068		
2.722222	0.008082	0.008407	0.533565	0.000068		
2.777778	0.008372	0.008864	0.538982	0.000068		
2.833333	0.008666	0.009338	0.544345	0.000068		
2.888889	0.008966	0.009827	0.549656	0.000068		
2.944444	0.009271	0.010334	0.554916	0.000068		
3.000000	0.009581	0.010858	0.562172	0.000068		
3.055556	0.009897	0.011399	0.609764	0.000068		
3.111111	0.010217	0.011957	0.684284	0.000068		
3.166667	0.010542	0.012534	0.777551	0.000068		
3.222222	0.010873	0.013129	0.886174	0.000068		
3.277778	0.011208	0.013742	1.008132	0.000068		
3.333333	0.011549	0.014374	1.142041	0.000068		
3.388889	0.011895	0.015026	1.286875	0.000068		
3.444444	0.012246	0.015696	1.441835	0.000068		
3.500000	0.012602	0.016386	1.606274	0.000068		
3.555556	0.012963	0.017097	1.779657	0.000068		

3.611111	0.013329	0.017827	1.961530	0.000068
3.666667	0.013701	0.018578	2.151499	0.000068
3.722222	0.014077	0.019349	2.349225	0.000068
3.777778	0.014459	0.020142	2.554405	0.000068
3.833333	0.014845	0.020956	2.766770	0.000068
3.888889	0.015237	0.021792	2.986078	0.000068
3.944444	0.015634	0.022649	3.212110	0.000068
4.000000	0.016036	0.023529	3.444667	0.000068
4.055556	0.016443	0.024431	3.640435	0.000068
4.111111	0.016855	0.025356	3.994644	0.000068
4.166667	0.017272	0.026304	4.451986	0.000068
4.222222	0.017695	0.027275	4.992726	0.000068
4.277778	0.018122	0.028270	5.605457	0.000068
4.333333	0.018555	0.029289	6.282484	0.000068
4.388889	0.018992	0.030332	7.018156	0.000068
4.444444	0.019435	0.031399	7.808097	0.000068
4.500000	0.019883	0.032491	8.648785	0.000068
4.555556	0.020336	0.033609	9.537307	0.000068
4.611111	0.020794	0.034751	10.47120	0.000068
4.666667	0.021257	0.035919	11.44835	0.000068
4.722222	0.021725	0.037113	12.46691	0.000068
4.777778	0.022199	0.038333	13.52525	0.000068
4.833333	0.022677	0.039580	14.62192	0.000068
4.888889	0.023161	0.040853	15.75562	0.000068
4.944444	0.023649	0.042153	16.92517	0.000068
5.000000	0.024143	0.043481	18.12951	0.000068

END FTABLE 3
FTABLE 2
42 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.358421	0.000000	0.000000	0.000000		
0.014835	0.357844	0.000944	0.000000	0.000000		
0.029670	0.356547	0.001892	0.000000	0.000000		
0.044505	0.355250	0.002844	0.000000	0.000000		
0.059341	0.353954	0.003799	0.000000	0.000000		
0.074176	0.352657	0.004759	0.000000	0.000000		
0.089011	0.351360	0.005723	0.000000	0.000000		
0.103846	0.350063	0.006691	0.000000	0.000000		
0.118681	0.348766	0.007663	0.000000	0.000000		
0.133516	0.347469	0.008638	0.000000	0.000000		
0.148352	0.346172	0.009618	0.000000	0.035167		
0.163187	0.344875	0.010602	0.000000	0.082929		
0.178022	0.343578	0.011590	0.000000	0.154259		
0.192857	0.342282	0.012582	0.000000	0.154259		
0.207692	0.340985	0.013541	0.000000	0.154259		
0.222527	0.339688	0.014505	0.000000	0.154259		
0.237363	0.338391	0.015472	0.000000	0.154259		
0.252198	0.337094	0.016444	0.000000	0.154259		
0.267033	0.335797	0.017419	0.000000	0.154259		
0.281868	0.334500	0.018398	0.000000	0.154259		
0.296703	0.333203	0.019381	0.000000	0.154259		
0.311538	0.331906	0.020367	0.000000	0.154259		
0.326374	0.330610	0.021358	0.000000	0.154259		
0.341209	0.329313	0.022352	0.000000	0.154259		
0.356044	0.328016	0.023351	0.000000	0.154259		
0.370879	0.326719	0.024353	0.000000	0.154259		
0.385714	0.325422	0.025359	0.000000	0.154259		
0.400549	0.324125	0.026406	0.000000	0.154259		
0.415385	0.322828	0.027458	0.000000	0.154259		
0.430220	0.321531	0.028514	0.000000	0.154259		
0.445055	0.320235	0.029573	0.000000	0.154259		
0.459890	0.318938	0.030637	0.000000	0.154259		
0.474725	0.317641	0.031704	0.000000	0.154259		
0.489560	0.316344	0.032776	0.000000	0.154259		
0.504396	0.315047	0.033852	0.000000	0.154259		
0.519231	0.313750	0.034931	0.000000	0.154259		
0.534066	0.312453	0.036015	0.000000	0.154259		
0.548901	0.311156	0.037102	0.000000	0.154259		
0.563736	0.309859	0.038194	0.000000	0.154259		

```
  0.578571  0.308563  0.039290  0.000000  0.154259
  0.593407  0.307266  0.040389  0.000000  0.154259
  0.600000  0.305969  0.085846  0.000000  0.154259
  END FTABLE  2
  FTABLE      1
   52    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.305969  0.000000  0.000000  0.000000  0.000000
  0.014835  0.359717  0.005327  0.000000  2.967828  0.000000
  0.029670  0.361014  0.010673  0.000000  3.073962  0.000000
  0.044505  0.362311  0.016038  0.000000  3.180096  0.000000
  0.059341  0.363608  0.021423  0.365519  3.286231  0.000000
  0.074176  0.364905  0.026827  0.588047  3.392365  0.000000
  0.089011  0.366202  0.032250  0.746990  3.498499  0.000000
  0.103846  0.367499  0.037692  0.877605  3.604633  0.000000
  0.118681  0.368796  0.043153  0.991153  3.710768  0.000000
  0.133516  0.370093  0.048634  1.092968  3.816902  0.000000
  0.148352  0.371389  0.054134  1.186076  3.923036  0.000000
  0.163187  0.372686  0.059654  1.272388  4.029170  0.000000
  0.178022  0.373983  0.065192  1.353206  4.135305  0.000000
  0.192857  0.375280  0.070750  1.429462  4.241439  0.000000
  0.207692  0.376577  0.076327  1.501851  4.347573  0.000000
  0.222527  0.377874  0.081923  1.570908  4.453707  0.000000
  0.237363  0.379171  0.087538  1.637054  4.559842  0.000000
  0.252198  0.380468  0.093173  1.701299  4.665976  0.000000
  0.267033  0.381764  0.098827  1.776346  4.772110  0.000000
  0.281868  0.383061  0.104500  1.858071  4.878244  0.000000
  0.296703  0.384358  0.110192  1.944021  4.984379  0.000000
  0.311538  0.385655  0.115904  2.033262  5.090513  0.000000
  0.326374  0.386952  0.121635  2.125282  5.196647  0.000000
  0.341209  0.388249  0.127385  2.219755  5.302781  0.000000
  0.356044  0.389546  0.133154  2.316458  5.408916  0.000000
  0.370879  0.390843  0.138943  2.415225  5.515050  0.000000
  0.385714  0.392140  0.144751  2.515933  5.621184  0.000000
  0.400549  0.393436  0.150578  2.618481  5.727318  0.000000
  0.415385  0.394733  0.156424  2.722790  5.833453  0.000000
  0.430220  0.396030  0.162290  2.828793  5.939587  0.000000
  0.445055  0.397327  0.168175  2.936433  6.045721  0.000000
  0.459890  0.398624  0.174079  3.045663  6.151855  0.000000
  0.474725  0.399921  0.180002  3.156439  6.257990  0.000000
  0.489560  0.401218  0.185944  3.268724  6.364124  0.000000
  0.504396  0.402515  0.191906  3.382485  6.470258  0.000000
  0.519231  0.403812  0.197887  3.497692  6.576392  0.000000
  0.534066  0.405108  0.203887  3.614317  6.682527  0.000000
  0.548901  0.406405  0.209907  3.732335  6.788661  0.000000
  0.563736  0.407702  0.215946  3.851723  6.894795  0.000000
  0.578571  0.408999  0.222004  3.972459  7.000929  0.000000
  0.593407  0.410296  0.228081  4.094524  7.107064  0.000000
  0.608242  0.411593  0.234177  4.217898  7.213198  0.000000
  0.623077  0.412890  0.240293  4.342563  7.319332  0.000000
  0.637912  0.414187  0.246428  4.468504  7.425466  0.000000
  0.652747  0.415484  0.252582  4.595704  7.531601  0.000000
  0.667582  0.416780  0.258755  4.724147  7.637735  0.000000
  0.682418  0.418077  0.264948  4.853821  7.743869  0.000000
  0.697253  0.419374  0.271160  4.984711  7.850003  0.000000
  0.712088  0.420671  0.277391  5.116803  7.956138  0.000000
  0.726923  0.421968  0.283641  5.250086  8.062272  0.000000
  0.741758  0.423265  0.289911  5.384547  8.168406  0.000000
  0.750000  0.423985  0.293402  5.520175  8.227370  0.000000
  END FTABLE  1
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      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    1              RCHRES   3     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   1000 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1003 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1001 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

Disclaimer

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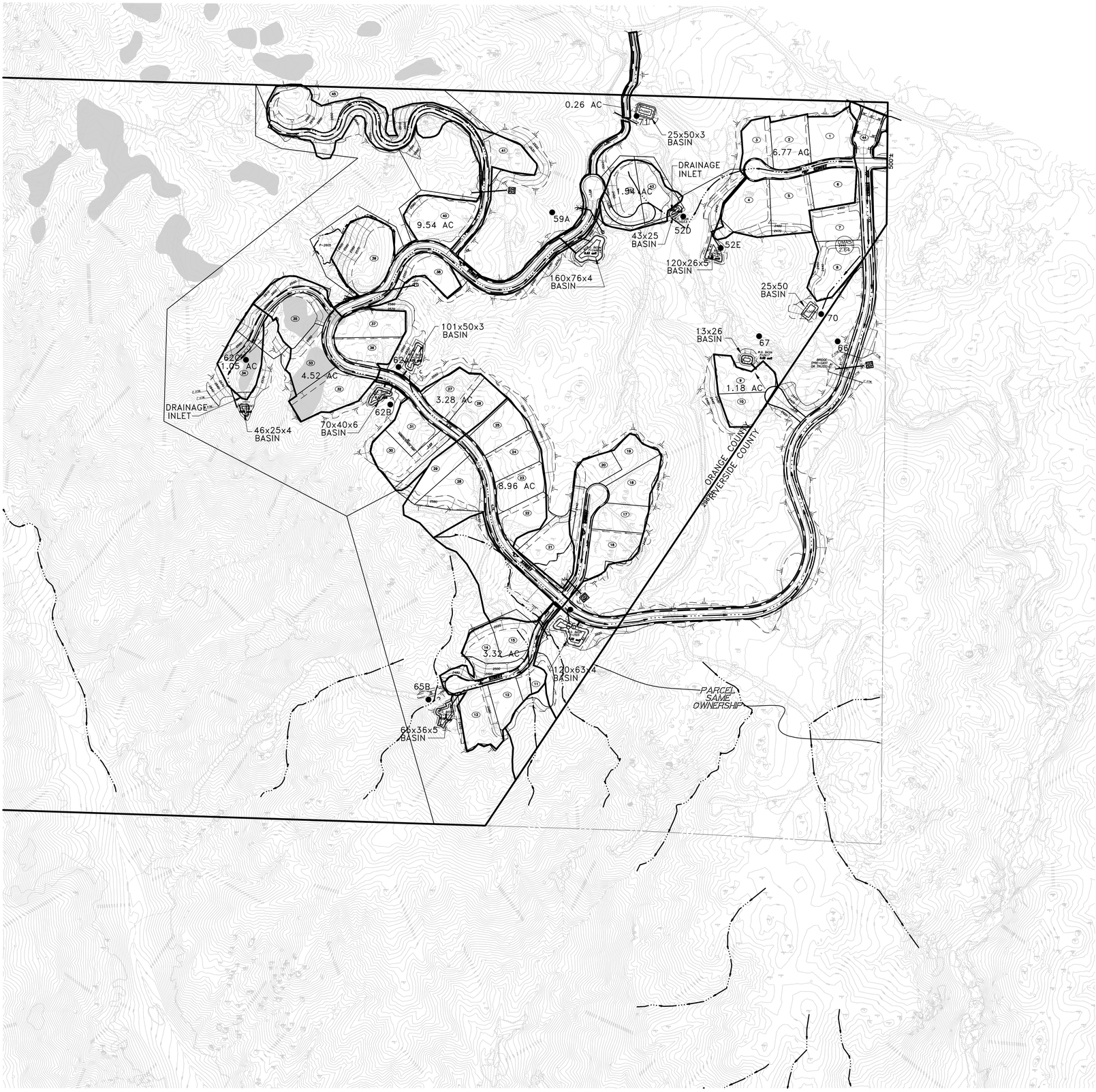
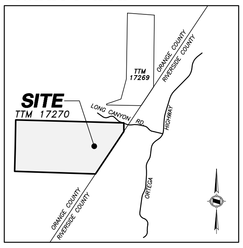
Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com



VICINITY MAP



LEGEND

- MITIGATED AREA
- VEGETATED SWALE
- 13 NODE NUMBER
- BASIN
- FLOW LINE

SCALE: 1" = 200'

200 100 0 200 600

GRAPHIC SCALE 1"=200'

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

MAP DATE IDENTIFIER
DATE OF LATEST CHANGE TO THIS MAP
01/08/08 BY: T.LEE
DATE OF THIS PLOT
11/26/13

HYDROMODIFICATION MAP
THE PRESERVE
AT SAN JUAN - LONG CANYON

WO: 3226-1
HYDROLOGY MAP THE PRESERVE

F:\0188\Planning\0A_Project\Hydromodification\Proposed Hydromodification South MapHC.dwg

Attachment D

BMP Calculations &

BMP Details

HSC-2 – Impervious Area Dispersion

INF-1 – Infiltration Basin

BIO-2 – Vegetated Swale

BMP Calculations

Worksheet B: Simple Design Capture Volume Sizing Method – DMA 1 through 11

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter design capture storm depth from Figure III.1, *d* (inches)	d=	1.0	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=	1.0	inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	SEE CALCULATION SUMMARY	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.65	
3	Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$	C=	0.6375	
4	Calculate runoff volume, $V_{design} = (C \times d_{remainder} \times A \times 43560 \times (1/12))$	V_{design}=	SEE CALCULATION SUMMARY	cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate				
1	Enter measured infiltration rate, $K_{measured}$ (in/hr) (Appendix VII)	$K_{measured}$=	TBD	In/hr
2	Enter combined safety factor from Worksheet H, S_{final} (unitless)	S_{final}=		
3	Calculate design infiltration rate, $K_{design} = K_{measured} / S_{final}$	K_{design}=		In/hr
Step 3b: Determine minimum BMP footprint				
4	Enter drawdown time, *T* (max 48 hours)	T=	TBD	Hours
5	Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$	D_{max}=		feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$	A_{min}=		sq-ft
Calculation Summary				

DMA	Area (Ac.)	Imp.	C-value	d (in.)	V_{design} (ft^3)
1	0.47	65	0.6375	1.0	1,087
2	8.69	65	0.6375	1.0	20,064
3	1.22	65	0.6375	1.0	2,817
4	4.99	65	0.6375	1.0	11,521
5	2.64	65	0.6375	1.0	6,095
6	1.29	65	0.6375	1.0	2,978
7	4.67	65	0.6375	1.0	10,782
8	3.42	65	0.6375	1.0	7,896
9	9.80	65	0.6375	1.0	22,626
10	3.73	65	0.6375	1.0	8,612
11	1.18	65	0.6375	1.0	2,724

Worksheet D: Capture Efficiency Method for Flow-Based BMPs – DMA 1through 11

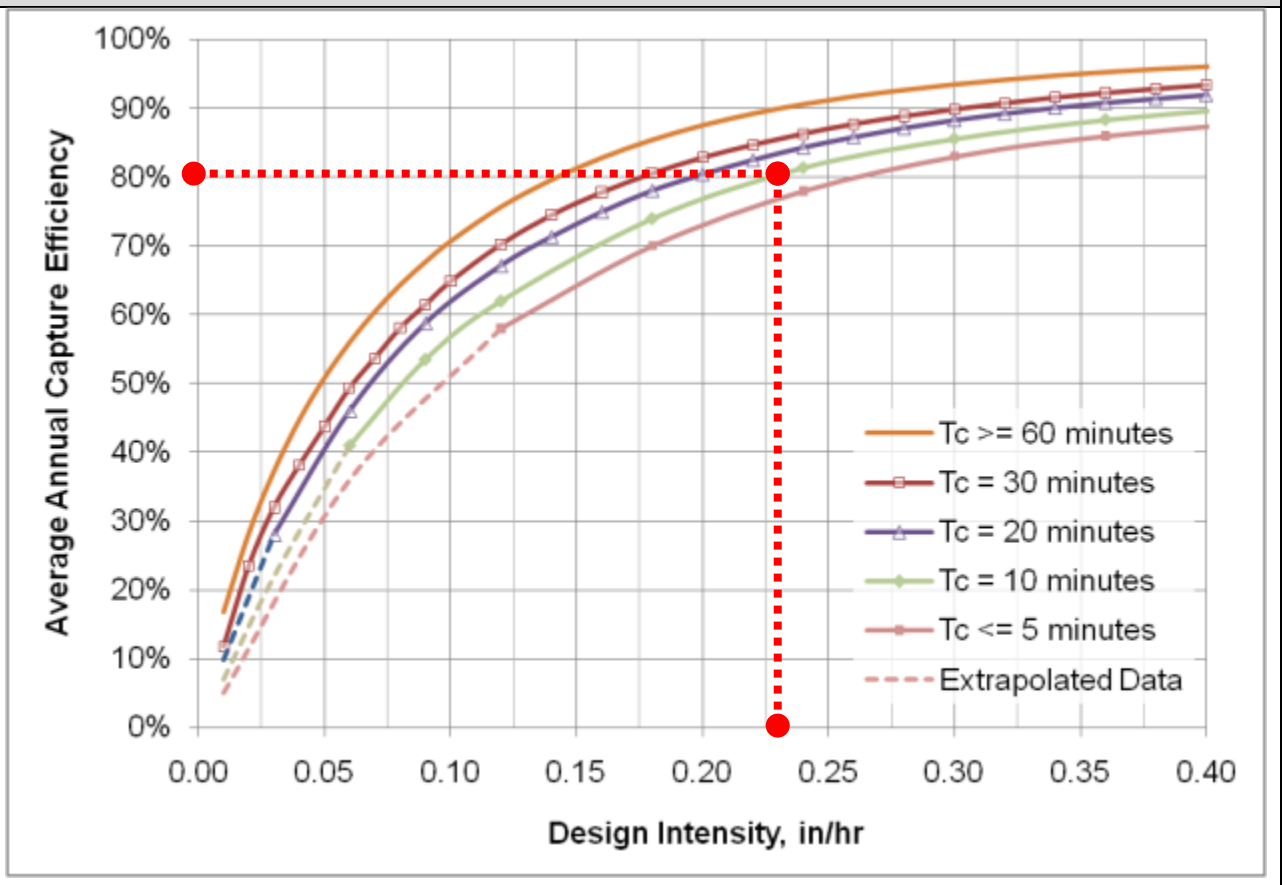
Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter the time of concentration, T_c (min) (See Appendix IV.2)	T_c=	10	
2	Using Figure III.4, determine the design intensity at which the estimated time of concentration (T_c) achieves 80% capture efficiency, I_1	I_1=	0.23	in/hr
3	Enter the effect depth of provided HSCs upstream, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
4	Enter capture efficiency corresponding to d_{HSC}, Y_2 *(Worksheet A)*	Y_2=	0	%
5	Using Figure III.4, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_2), I_2	I_2=	0	
6	Determine the design intensity that must be provided by BMP, $I_{design} = I_1 - I_2$	I_{design}=	0.23	
Step 2: Calculate the design flowrate				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	SEE SUPPORTING CALCULATIONS	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.65	
3	Calculate runoff coefficient, $C = (0.75 \times imp) + 0.15$	C=	0.6375	
4	Calculate design flowrate, $Q_{design} = (C \times i_{design} \times A)$	Q_{design}=	SEE SUPPORTING CALCULATIONS	cfs
Supporting Calculations				

Describe system: Runoff from residential lots conveyed as sheet flow to parkway swales. Runoff from streets conveyed as gutter flow to swale via parkway culverts. Swales designed to provide pre-treatment of runoff and conveyance to downstream infiltration basin.

DMA	Area (Ac.)	Imp.	C-Value	Tc (min)	I_{design} (in.)	Q_{design} (ft^3/s)
1	0.47	65	0.6375	10	0.23	0.07
2	8.69	65	0.6375	10	0.23	1.27
3	1.22	65	0.6375	10	0.23	0.18
4	4.99	65	0.6375	10	0.23	0.73
5	2.64	65	0.6375	10	0.23	0.39
6	1.29	65	0.6375	10	0.23	0.19
7	4.67	65	0.6375	10	0.23	0.68
8	3.42	65	0.6375	10	0.23	0.50
9	9.80	65	0.6375	10	0.23	1.44
10	3.73	65	0.6375	10	0.23	0.55
11	1.18	65	0.6375	10	0.23	0.17

Provide time of concentration assumptions: Assume 10 minutes minimum.

Graphical Operations



Provide supporting graphical operations. See Example III.7.

Worksheet H: Factor of Safety and Design Infiltration Rate Worksheet					
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	TBD	TBD
		Predominant soil texture	0.25	TBD	TBD
		Site soil variability	0.25	TBD	TBD
		Depth to groundwater / impervious layer	0.25	TBD	TBD
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			TBD
B	Design	Tributary area size	0.25	2	0.5
		Level of pretreatment/ expected sediment loads	0.25	1	0.25
		Redundancy	0.25	2	0.5
		Compaction during construction	0.25	1	0.25
		Design Safety Factor, $S_B = \Sigma p$			1.5
Combined Safety Factor, $S_{TOT} = S_A \times S_B$					TBD
Measured Infiltration Rate, inch/hr, K_M (corrected for test-specific bias)					TBD
Design Infiltration Rate, in/hr, $K_{DESIGN} = S_{TOT} / K_M$					TBD
Supporting Data					
Briefly describe infiltration test and provide reference to test forms:					

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

Worksheet I: Summary of Groundwater-related Feasibility Criteria

1	Is project large or small? (as defined by Table VIII.2) circle one	Large		Small
2	What is the tributary area to the BMP?	A	8.69; 1.22; 4.99; 2.64; 1.29; 4.67; 3.42; 9.80; 3.73; 1.18	acres
3	What type of BMP is proposed?	Infiltration basins and drywells		
4	What is the infiltrating surface area of the proposed BMP?	A_{BMP}		sq-ft
5	What land use activities are present in the tributary area (list all) Currently natural/open space.			
6	What land use-based risk category is applicable?	L	M	H
7	If M or H, what pretreatment and source isolation BMPs have been considered and are proposed (describe all): Project is considered low potential. However, swales will be used as pre-treatment for infiltration basins and one drywell unit. The remaining drywell unit will be equipped with a pre-treatment manhole unit (e.g. Maxwell Plus or equivalent).			
8	What minimum separation to mounded seasonally high groundwater applies to the proposed BMP? See Section VIII.2 (circle one) TBD	5 ft		10 ft
9	Provide rationale for selection of applicable minimum separation to seasonally high mounded groundwater: To be determined. Will be provided once site specific infiltration rates are known.			
10	What is separation from the infiltrating surface to seasonally high groundwater?	SHGWT	TBD	ft
11	What is separation from the infiltrating surface to mounded seasonally high groundwater?	Mounded SHGWT	TBD	ft
12	Describe assumptions and methods used for mounding analysis: TBD			
13	Is the site within a plume protection boundary (See Figure VIII.2)?	Y	N	N/A
14	Is the site within a selenium source area or other natural plume area (See Figure VIII.2)?	Y	N	N/A
15	Is the site within 250 feet of a contaminated site?	Y	N	N/A
16	If site-specific study has been prepared, provide citation and briefly summarize relevant findings: A site specific study was preliminary conducted to examine the feasibility for use of leach fields. The study determined that percolation rates onsite ranged from 0.5″ per hour to 1.0″ per hour. A site specific study of the locations of the proposed infiltration BMPs will provide additional information regarding the feasibility of infiltration BMPs for the project.			

Worksheet I: Summary of Groundwater-related Feasibility Criteria

17	Is the site within 100 feet of a water supply well, spring, septic system?	Y	N	N/A
18	Is infiltration feasible on the site relative to groundwater-related criteria?	Y	N	N/A
Provide rationale for feasibility determination: Site specific infiltration testing of the proposed infiltration BMP areas is necessary to ensure that infiltration BMPs are feasible for the project.				

BMP Details

HSC-2: Impervious Area Dispersion

Impervious area dispersion refers to the practice of routing runoff from impervious areas, such as rooftops, walkways, and patios onto the surface of adjacent pervious areas. Runoff is dispersed uniformly via splash block or dispersion trench and soaks into the ground as it move slowly across the surface of pervious areas. Minor ponding may occur, but it is not the intent of this practice to actively promote localized on-lot storage (See HSC-1: Localized On-Lot Infiltration).

Also known as:

- *Downspout disconnection*
- *Impervious area disconnection*
- *Sheet flow dispersion*

Simple Downspout Dispersion
Source: toronto.ca/environment/water.htm

Feasibility Screening Considerations

- Impervious area dispersion can be used where infiltration would otherwise be infeasible, however dispersion depth over landscaped areas should be limited by site-specific conditions to prevent standing water or geotechnical issues.

Opportunity Criteria

- Rooftops and other low traffic impervious surface present in drainage area.
- Soils are adequate for infiltration. If not, soils can be amended to improve capacity to absorb dispersed water (see MISC-2: Amended Soils).
- Significant pervious area present in drainage area with shallow slope
- Overflow from pervious area can be safely managed.

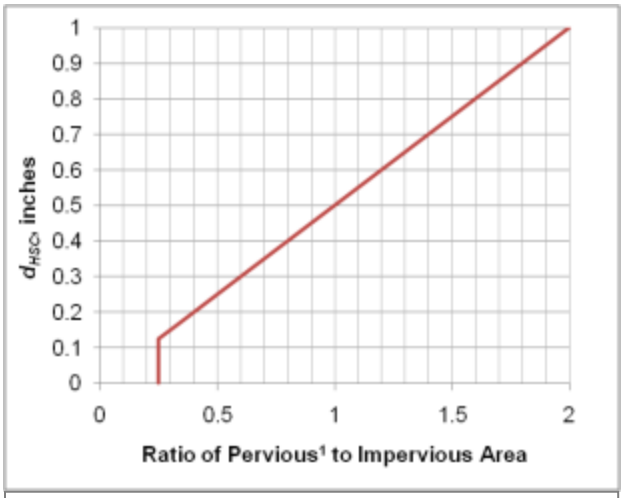
OC-Specific Design Criteria and Considerations

- ☐ Soils should be preserved from their natural condition or restored via soil amendments to meet minimum criteria described in Section .
- ☐ A minimum of 1 part pervious area capable of receiving flow should be provided for every 2 parts of impervious area disconnected.
- ☐ The pervious area receiving flow should have a slope ≤ 2 percent and path lengths of ≥ 20 feet per 1000 sf of impervious area.
- ☐ Dispersion areas should be maintained to remove trash and debris, loose vegetation, and protect any areas of bare soil from erosion.
- ☐ Velocity of dispersed flow should not be greater than 0.5 ft per second to avoid scour.

Calculating HSC Retention Volume

- The retention volume provided by downspout dispersion is a function of the ratio of impervious to pervious area and the condition of soils in the pervious area.
- Determine flow patterns in pervious area and estimate footprint of pervious area receiving dispersed flow. Calculate the ratio of pervious to impervious area.
- Check soil conditions using the soil condition design criteria below; amend if necessary.
- Look up the storm retention depth, d_{HSC} from the chart below.

- The max d_{HSC} is equal to the design storm depth for the project site.



[1] Pervious area used in calculation should only include the pervious area receiving flow, not pervious area receiving only direct rainfall or upslope pervious drainage.

Soil Condition Design Criteria

- ☐ Maximum slope of 2 percent
- ☐ Well-established lawn or landscaping
- ☐ Minimum soil amendments per criteria in MISC-2: Amended Soils.

Configuration for Use in a Treatment Train

- Impervious area disconnection is an HSC that may be used as the first element in any treatment train
- The use of impervious area disconnection reduces the sizing requirement for downstream LID and/or treatment control BMPs

Additional References for Design Guidance

- SMC LID Manual (pp 131) http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCalLID_Manual_FINAL_040910.pdf
- City of Portland Bureau of Environmental Services. 2010. How to manage stormwater – Disconnect Downspouts. http://www.portlandonline.com/bes/index.cfm?c=43081&a=177702
- Seattle Public Utility: http://www.cityofseattle.org/util/stellent/groups/public/@spu/@usm/documents/webcontent/spu01_006395.pdf
- Thurston County, Washington State (pp 10): http://www.co.thurston.wa.us/stormwater/manual/docs-faqs/DG-5-Roof-Runoff-Control_Rev11Jan24.pdf

XIV.3. Infiltration BMP Fact Sheets (INF)

INF-1: Infiltration Basin Fact Sheet

An infiltration basin consists of an earthen basin constructed in naturally pervious soils (Type A or B soils) with a flat bottom. An energy dissipating inlet must be provided, along with an emergency spillway to control excess flows. An optional relief underdrain may be provided to drain the basin if standing water conditions occur. A forebay settling basin or separate treatment control measure must be provided as pretreatment. An infiltration basin retains the stormwater quality design volume in the basin and allows the retained runoff to percolate into the underlying soils in 72 hours or less. The bottom of an infiltration basin is typically vegetated with dryland grasses or irrigated turf grass; however other types of vegetation are permissible if they can survive periodic inundation and long inter-event dry periods.

Feasibility Screening Considerations

- Infiltration bains shall pass infeasibility screening criteria to be considered for use
- Infiltration basins pose a potential risk of groundwater contamination if underlying soils have very high permeability and low pollutant assimilation capacity; pretreatment should always be provided.
- Evaporation tends to be minor, therefore increases in infiltration compared to natural conditions may result.
- The potential for groundwater mounding should be evaluated if depth to seasonally high groundwater (unmounded) is less than 15 feet.

Also known as:

- *Recharge basins*
- *Infiltration pond*

Infiltration Basin

Source: Pennsylvania Stormwater BMP Manual

Opportunity Criteria

- Soils are adequate for infiltration or can be amended to provide an adequate infiltration rate.
- Typically need 2-5 percent of drainage area available for infiltration.
- Space available for pretreatment (biotreatment or treatment control BMP as described below).
- Potential for groundwater contamination can be mitigated through isolation of pollutant sources, pretreatment of inflow, and/or demonstration of adequate treatment capacity of underlying soils.
- Infiltration is into native soil, or
- The depth of engineered fill is ≤ 5 feet from the bottom of the facility to native material and infiltration into fill is approved by a geotechnical professional.
- Tributary area land uses include mixed-use and commercial, sngle-family and multi-family, roads and parking lots, and parks and open spaces. Basins can be integrated into parks and open spaces. High pollutant land uses should not be tributary to infiltration BMPs.

OC-Specific Design Criteria and Considerations

☐ Placement of BMPs shall observe geotechnical recommendations with respect to geological hazards (e.g. landslides, liquefaction zones, erosion, etc.) and set-backs (e.g., foundations,

utilities, roadways, etc.)

- ☐ For facilities with tributary area less than 5 acres, minimum separation to mounded seasonally high groundwater of 5 feet shall be observed.
- ☐ For facilities with tributary area greater than 5 acres, minimum separation to mounded seasonally high groundwater of 10 feet shall be observed.
- ☐ Minimum pretreatment (settling forebay or separate BMP) should be provided upstream of the infiltration basin, and water bypassing pretreatment should not be directed to the infiltration basin.
- ☐ If a settling forebay is used, forebay should have a volume equal to 25% of facility volume and have a minimum length to width ratio of 2:1
- ☐ Infiltration basins should not be used for drainage areas with high sediment production potential unless preceded by full treatment control with a BMP effective for sediment removal.
- ☐ Side-slopes should be no steeper than 3H:1V.
- ☐ Design infiltration rate should be determined consistent with guidance contained in **Appendix VII**.
- ☐ Energy dissipators should be provided at inlet and outlet to prevent erosion.
- ☐ An overflow device must be provided if basin is on-line.
- ☐ A minimum freeboard of one foot should be provided above the overflow device (for an on-line basin) or the outlet (for an off-line basin).
- ☐ Infiltration basin bottom must be as flat as possible.
- ☐ Basin length to width ratio should be a minimum of 2:1 L:W.

Simple Sizing Method for Infiltration Basins

If the Simple DCV Sizing Method is used to size an infiltration basin, the user calculates the DCV and designs the BMP geometry required to draw down the DCV in 48 hours. The sizing steps are as follows:

Step 1: Determine Infiltration Basin DCV

Calculate the DCV using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1**.

Step 2: Determine the 48-hour Depth

The depth of water that can be drawn down in 48 hours can be calculated using the following equation:

$$d_{48} = K_{DESIGN} \times 4$$

Where:

d_{48} = basin 48-hour drawdown depth, ft

K_{DESIGN} = basin design infiltration rate, in/hr (See **Appendix VII**)

This is the maximum depth of the basin below the overflow device to achieve drawdown in 48 hours.

Step 3: Calculate the Required Infiltrating Area

The required infiltrating area (i.e. basin area at mid ponding depth) can be calculated using the following equation:

$$A = DCV / (d_P)$$

Where:

A = required basin infiltrating area, sq-ft (assumed to be the basin area at mid-ponding depth)

DCV = design capture volume, cu-ft (see Step 1)

d_P = ponding depth, ft (should be equal to or less than d_{48})

Capture Efficiency Method for Infiltration Basins

If BMP geometry has already been defined and deviates from the 48 hour drawdown time, the designer can use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) to determine the fraction of the DCV that must be provided to manage 80 percent of average annual runoff volume. This method accounts for drawdown time different than 48 hours.

Step 1: Determine the drawdown time associated with the selected basin geometry

$$DD = (d_P / K_{DESIGN}) \times 12$$

Where:

DD = time to completely drain infiltration basin ponding depth, hours

d_P = ponding depth below overflow device, ft

K_{DESIGN} = basin design infiltration rate, in/hr (See **Appendix VII**)

Step 2: Determine the Required Adjusted DCV for this Drawdown Time

Use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (**Appendix III.3.2**) to calculate the fraction of the DCV the basin must hold to achieve 80 percent capture of average annual stormwater runoff volume based on the basin drawdown time calculated above.

Step 3: Determine the Basin Infiltrating Area Needed

The required infiltrating area (i.e. basin bottom) can be calculated using the following equation:

$$A = DCV/ ((d_P)$$

Where:

A = required basin infiltrating area, sq-ft (assumed to be the basin area at mid-ponding depth)

DCV = design capture volume, adjusted for drawdown time, cu-ft (see Step 1)

d_P = ponding depth, ft

If the area required is greater than the selected basin area, adjust surface area or adjust ponding depth and recalculate required area until the required area is achieved.

Configuration for Use in a Treatment Train

- Infiltration basins may be preceeded in a treatment train by HSCs in the drainage area, which would reduce the required design volume of the basins.
- Infiltration basins must be preceeded by some form of pretreatment, which may be biotreatment or a treatment control BMP; if an approved biotreatment BMP is used as pretreatment, the overflow from the infiltration basin may be considered “biotreated” for the purposes of meeting the LID requirements.
- The overflow or bypass from an infiltration basin can be routed to a downstream biotreatment BMP and/or a treatment control BMP if additional control is required to achieve LID or treatment control requirements.

Additional References for Design Guidance

- CASQA BMP Handbook for New and Redevelopment:
  http://www.cabmphandbooks.com/Documents/Development/TC-11.pdf
- SMC LID Manual (pp 139):
  http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCalLID_Manual_FINAL_040910.pdf
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 6:
  http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf
- City of Portland Stormwater Management Manual (Basin, page 2-57)
  http://www.portlandonline.com/bes/index.cfm?c=47954&a=202883
- San Diego County LID Handbook Appendix 4 (Factsheet 2):
  http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf

BIO-2: Vegetated Swale

Also known as:

- *Bioswale*
- *Biofiltration swale*
- *Grass swale*

Vegetated Swale
Source: Geosyntec Consultants

Vegetated swale filters (vegetated swales) are open, shallow channels with low-lying vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. Vegetated swales provide pollutant removal through settling and filtration in the vegetation (usually grasses) lining the channels. In addition, they provide the opportunity for volume reduction through infiltration and ET, and reduce the flow velocity in addition to conveying storm water runoff. Where soil conditions allow, volume reduction in vegetated swales can be enhanced by adding a gravel drainage layer underneath the swale allowing additional flows to be retained and infiltrated. Where slopes are shallow and soil conditions limit or prohibit infiltration, an underdrain system or low flow channel for dry weather flows may be required to minimize ponding and convey treated and/or dry weather flows to an acceptable discharge point. An effective vegetated swale achieves uniform sheet flow through a densely vegetated area for a period of several minutes. The vegetation in the swale can vary depending on its location within the project area and is generally the choice of the designer, subject to the design criteria outlined in this section.

Feasibility Screening Considerations

- Swales may cause incidental infiltration; however, infiltration is not a mandatory mechanism for pollutant removal for swales and it may create hazards in some circumstances. Therefore, conditions should be evaluated to determine whether circumstances require an impermeable liner to avoid infiltration into the subsurface.

Opportunity Criteria

- Open areas are needed for vegetated swales, including, but not limited to, road shoulders, road medians, parks and athletic fields and can be constructed in residential or commercial areas.
- Site slope is less than 10 percent.
- Drainage area is ≤ 5 acres.
- Vegetated swales must not interfere with flood control functions of existing conveyance and detention structures.

OC-Specific Design Criteria and Considerations

☐ Swales should have a minimum bottom width of 2 feet and a maximum bottom width of 10 feet. Swale dividers should be used if the bottom width must exceed 10 feet to promote even distribution of flow across the swale. Local juridictions may require larger minimum widths based on maintenance requirements.

☐ The channel side slope should not exceed 2:1 (H:V) for a total swale depth of 1 foot or less. For deeper swales or mowed grass swales, the maximum channel side slope should be 3:1. Where space is constrained, swales may have vertical concrete or block walls provided that slope

stability, maintenance access and public safety considerations are met.

- ☐ The minimum swale length for biotreatment applications is 100 feet. The minimum residence time for flows in the swale is 10 minutes.
- ☐ If slope is less than 1.5%, underdrains should be provided for the length of the swale
- ☐ A gravel blanket or bedding is required around the underdrain pipe(s). At least 0.5 feet of washed aggregate must be placed below, to the top, and to the sides of the underdrain pipe(s).
- ☐ If an underdrain is included, an amended soil layer of 1 foot minimum thickness must be provided above the underdrain meeting the specifications of MISC-1: Planting/Storage Media.
- ☐ The maximum bed slope in flow direction should not exceed 6% (unles check dams are provided).
- ☐ The maximum flow velocity should not exceed 1.0 ft/sec for water quality treatment swales.
- ☐ For infrequently mowed swales, a maximum flow depth of 4 inches should be implemented. For frequently mowed turf swales, the maximum flow depth is 2 inches.
- ☐ The vegetation height should be maintained between 4 to 6 inches.
- ☐ Gradual meandering bends in the swale are desirable for aesthetic purposes and to promote slower flow and particulate settling.
- ☐ Blockages in the swale that result in uneven flow distribution and points of concentrated flow should be avoided. Blockages that should be avoided include trees, bushes, light pole piers, and utility vaults or pads.

Sizing Method for Vegetated Swales

The Design Capture Method for Flow-based BMPs should be used to determine the design flowrate for a vegetated swale. The user then selects the design flow depth and longitudinal slope and uses the sizing steps below to determine the length and width of the swale. The sizing steps are as follows:

Step 1: Determine Design Flowrate (Q)

Calculate the Design Flowrate (Q) using the Capture Efficiency Method for Flow-based BMPs (See **Appendix III.3.3**). Inputs include the time of concentration of the catchment (T_c) and the capture efficiency achieved upstream by HSCs or other BMPs.

Step 2: Estimate the Swale Bottom Width

For shallow flow depths, channel side slopes can be ignored and the bottom width can be calculated using a simplified form of Manning's formula:

$$b = (Q \times n_{WQ}) / (1.49 \times y^{1.67} \times s^{0.5})$$

Where:

b = estimated swale bottom width, ft

Q = design flowrate, cfs

n_{WQ} = Manning's roughness coefficient for shallow flow conditions, use 0.2 unless other information is available

y = design flow depth, ft (not to exceed 4 inches or 0.33 ft)

s = longitudinal slope in flow direction, ft/ft (not to exceed 0.06)

If b is between 2 and 10 feet, proceed to step 3.

If b is less than 2 feet, increase b to 2 feet and recalculate design flow depth using the following:

$y = ((Q \times n_{WQ}) / (1.49 \times b \times s^{0.5}))^{0.6}$

If b is greater than 10 feet, one of the following steps is necessary:

- Increase longitudinal slope to a maximum of 6% or 0.06, and recalculate b
- Increase design flow depth to a maximum of 4 inches or 0.33 ft, and recalculate b
- Install a divider lengthwise along swale bottom at least three-quarters of the swale length, beginning at the inlet. The swale width can be increased to 16 feet if a divider is provided.

Step 3: Determine Design Flow Velocity

Calculate the design flow velocity using the following equation:

$V_{WQ} = Q / A_{WQ}$

Where:

V_{WQ} = design flow velocity, fps

Q = design flowrate, cfs

$A_{WQ} = by + Zy^2$, cross sectional area of flow at design depth

Z = side slope length per unit height

If the design flow velocity exceeds 1 foot per second, design parameters in Step 2 should be adjusted (slope, bottom width, or design flow depth) until V_{WQ} is equal or less than 1 fps.

Step 4: Calculate Swale Length

Calculate the swale length needed to achieve a minimum hydraulic residence time of 10 minutes using the following equation:

$L = 60 \times t_{HR} \times V_{WQ}$

Where:

L = swale length, ft

t_{HR} = hydraulic residence time, min (minimum 10 minutes)

V_{WQ} = design flow velocity, fps

Step 5: If Needed, Adjust Swale Length to Site Constraints

Note that oftentimes swale length can be accomodated by providing a meandering swale. However, if swale length is too large for the site, the length can be adjusted as follows:

- Calculate the swale treatment top area (A_{top}), based on the swale length calculated in Step 4:

$A_{TOP} = (b_i + b_{SLOPE}) \times L_i$

Where:

A_{TOP} = top area (ft^2) at the design treatment depth

b_i = bottom width (ft), calculated in Step 2

b_{SLOPE} = the additional top width (ft) above the side slope for the design water depth (for 3:1 side slopes and a 4-inch water depth, b_{slope} = 2 feet)

L_i = initial length (ft) calculated in Step 4

- Use the swale top area and a reduced swale length (L_f) to increase the bottom width, using the following equation:

$L_F = A_{TOP} / (b_F + b_{SLOPE})$

Where:

L_F = reduced swale length (ft)

b_F = increased bottom width (ft)

- Recalculate V_{WQ} according to Step 3 using the revised cross-sectional area A_{WQ} based on the increased bottom width (b_F). Revise the design as necessary if the design flow velocity exceeds 1 foot per second.
- Recalculate to ensure that the 10 minute retention time is retained.

Configuration for Use in a Treatment Train

- Vegetated swales can be incorporated in a treatment train to provide enhanced water quality treatment and reductions in runoff volume and rate. For example, if a vegetated swale is placed upgradient of a dry extended detention (ED) basin, the rate and volume of water flowing to the dry ED basin can be reduced and the water quality enhanced. As another example, dry ED basins may be placed upstream a vegetated swale to reduce the size of the vegetated swale.
- Vegetated swales can be used as pretreatment for infiltration BMPs.
- If designed with an infiltration sump, vegetated "bioinfiltration" swales can provide retention and biotreatment capacity.

Additional References for Design Guidance

Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: **http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850**

Santa Barbara BMP Guidance Manual, Chapter 6: **http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual_071008_Final.pdf**

- County of San Diego Drainage Design Manual for design criteria, Section 5.5: **http://www.co.san-diego.ca.us/dpw/floodcontrol/floodcontrolpdf/drainage-designmanual05.pdf**

  County of Los Angeles Low Impact Development Standards Manual, Chapter 5: **http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf**

- Los Angeles County Stormwater BMP Design and Maintenance Manual: **http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf**

Attachment E

Operation and Maintenance Plan

OPERATIONS AND MAINTENANCE (O&M) PLAN

WATER QUALITY MANAGEMENT PLAN
FOR

THE PRESERVE AT SAN JUAN, LLC

CONCEPTUAL WATER QUALITY MANAGEMENT PLAN

FOR

TENTATIVE TRACT MAP NO. 17270

COUNTY OF ORANGE, CALIFORNIA

LEGAL DESCRIPTION:

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 20, TOWNSHIP 6 SOUTH, RANGE 5 WEST, SBM.

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
	Non-Structural Source Control BMPs		
Yes	N1. Education for Property Owners, Tenants and Occupants The Developer will insure that all homeowners will be given a copy of the recorded CC&R's which will contain a section outlining the environmental awareness education materials. The Developer shall establish requirements for the implementation of a community awareness program that informs home buyers of the impacts of dumping oil, paints, solvents or other potentially harmful chemicals into the storm drain; the proper use and management of fertilizers, pesticides and herbicides in home landscaping and gardening practices; the impacts of littering and improper watering. Environmental awareness education materials, including, but not limited to those included in Section VII of this WQMP, shall be provided to all members of the HOA and periodically thereafter by the HOA after the first sale of units.	Developer to provide educational materials to homeowners at sale of property. Thereafter, HOA to distribute materials to homeowners annually via HOA newsletter.	Owner/HOA
Yes	N2. Activity Restriction Within the Master CC&R's prepared by the Developer, language shall be included to identify surface water quality protection required by the HOA. Surface water quality activities shall also be conducted in conformance with the Water Quality Management Plan as it relates to the handling and disposal of contaminants.	Continuous enforcement via CC&R's.	Owner/HOA

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	N3. Common Area Landscape Management Maintenance shall be consistent with City requirements, plus fertilizer and/or pesticide usages shall be consistent with County guidelines for use of fertilizers and pesticides (OC DAMP Section 5.5). Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting and replacement of mulch shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets.	Weekly trimming and monthly inspection of all common landscape areas. Inspect for and replace dead/dying vegetation.	Owner/HOA
Yes	N4. BMP Maintenance As indicated in (N2) above, the CC&R's shall identify the HOA as being responsible for implementation of each applicable non-structural BMP as well as scheduling inspection and maintenance cleaning of all applicable structural BMP facilities the HOA, through its landscape maintenance contractor, will be responsible for inspection and maintenance activities in landscape areas. Debris and other water pollutants will be controlled, contained and disposed of in a proper manner by the maintenance contractor.	Ongoing, as prescribed per WQMP.	Owner/HOA
No	N5. Title 22 CCR Compliance Not applicable to residential projects.		

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
No	N6. Local Water Quality Permit Compliance Not applicable. No local water quality permits are required for the operation of the project.		
No	N7. Spill Contingency Plan Not applicable to residential projects.		
No	N8. Underground Storage Tank Compliance Not applicable. None onsite.		
No	N9. Hazardous Materials Disclosure Compliance Not applicable to residential projects.		
No	N10. Uniform Fire Code Implementation Not applicable to residential projects.		
Yes	N11. Common Area Litter Control Inspect the site (both roadway and adjacent areas) for trash, litter and other debris that may enter the storm drain system. These activities will become the responsibility of the HOA upon completion of the project. Responsibility shall include removing litter and debris, noting illegal dumping activities and reporting to the HOA, as appropriate, for investigation.	Ongoing patrols. Weekly (minimum) pick up and removal.	Owner/HOA

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	N12. Employee Training Post construction, an employee training/education program will be established as it would apply to future employees, contractors of the HOA, and the HOA volunteers to inform and train employees engaged in maintenance activities regarding the impact of dumping oil, paints, solvents or other potentially harmful chemicals into storm drain; the proper use of fertilizers and pesticides in landscaping maintenance practices; and the impacts of littering and improper water disposal. During construction, and until improvements are accepted by the HOA, or the County of Orange, whichever is applicable, the Developer will be responsible for these activities as they relate to the Developer's employees, subcontractors, and contractors. Thereafter, the HOA shall be responsible.	Training regarding the potential impacts of various maintenance activities on water quality. To be conducted upon hire and annually thereafter for HOA staff and all contractors and volunteers of the HOA.	Owner/HOA
No	N13. Housekeeping of Loading Docks Not applicable. No loading docks onsite.		
Yes	N14. Common Area Catch Basin Inspection Catch basin inlets, area drains, curb-and-gutter systems and other drainage systems shall be inspected prior to October 1st of each year and after large storm events. If necessary, drains shall be cleaned prior to any succeeding rain events. 80% of private facilities shall be inspected and cleaned annually, with 100% of private facilities inspected and maintained within a 2-year period.	Annually	Owner/HOA

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N15. Street Sweeping Private Streets and Parking Lots** Private alleys and public street shall be swept at minimum monthly, prior to the start of the rainy season (October 1st).	Annually	Owner/HOA
	Structural Source Control BMPs		
Yes	**S1. Provide Storm Drain System Stenciling and Signage** As a part of the final civil engineering drawings, it will be required by the Developer to stencil on all of the project's catch basins, where applicable in paved areas, the words, "No Dumping - Drains to Ocean." This will be done in a location that can be clearly seen by all and will be routinely inspected and re-stenciled, as required, until the HOA accepts maintenance responsibility for the catch basins. Thereafter, the responsible party shall routinely inspect and re-stencil the catch basins, as necessary.	Annually	Owner/HOA and County of Orange, as appropriate
No	**S2. Design Outdoor Hazardous Material Storage Areas to Reduce Pollutant Introduction** Not applicable. No outdoor storage of hazardous materials onsite.		
No	**S3. Design Trash Enclosures to Reduce Pollutant Introduction** Not applicable. None proposed.		

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	S4. Use Efficient Irrigation Systems and Landscape Design As a part of the design of all common area landscape irrigation, implementation of the Orange County Water Conservation Resolution (Ord. No. 3802) including, but not limited to, such provisions as water sensors, programmable irrigation times (for short cycles), etc., will be used. Such common areas will be maintained by the Developer until they are turned over to the HOA for ownership and maintenance.	Monthly inspection in conjunction with routine landscaping maintenance activities (mowing, trimming, etc.). Verify that plants continue to be grouped according to similar watering requirements. Inspect for dying or deceased vegetation and remove/replace accordingly. Inspect for leaks and broken sprinkler heads.	Owner/HOA
Yes	S5. Protect Slopes and Channels Lined concrete drains and down drains will be constructed on slope areas to convey runoff safely from top of slopes and to prevent storm and irrigation runoff from discharging in an uncontrolled manner, thereby causing erosion. Runoff from the slope areas will be conveyed to either the storm drain system or to outlet dissipation devices to prevent scouring and erosion. All slope areas will have at least 70% vegetative cover consisting of native and/or drought tolerant plant species with a deep root system. These areas will be inspected on a monthly basis for signs of erosion and plant health. These areas shall be maintained by the HOA.	Monthly inspection of slope areas for erosion and dying/deceased vegetation. Annually cleaning of slope and down drains for sediment and other debris that may obstruct flow.	Owner/HOA
No	S6. Loading Dock Areas Not applicable. No loading docks onsite.		

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
No	S7. Maintenance Bays and Docks Not applicable. No maintenance bays onsite.		
No	S8. Vehicle Wash Areas Not applicable. Not vehicle wash areas onsite.		
No	S9. Outdoor Processing Areas Not applicable. No outdoor processing onsite.		
No	S10. Equipment Wash Areas Not applicable. No equipment wash areas onsite.		
No	S11. Fueling Areas Not applicable. No fueling areas onsite.		
Yes	S12. Site Design and Landscape Planning (Hillside Landscaping) All hillside landscaping shall be landscaped with deep-rooted drought tolerant plant species that are consistent with the county's landscape ordinance and also approved for use by the County. The plants will be used to stabilize slope areas and prevent erosion. These areas shall be maintained by the HOA.	Monthly inspection of slope areas for erosion and dying/deceased vegetation.	Owner/HOA
No	S13. Wash Water Controls for Food Preparation Areas Not applicable. No restaurant facilities onsite.		
No	S14. Community Car Wash Racks Not applicable. No community car wash areas onsite.		

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Infiltration BMPs			
Yes	INF-1. Infiltration Basin Ensure that water infiltrates into the subsurface completely and that vegetation is carefully managed to prevent vectors. Inspect for erosion, standing water, trash, debris, excessive vegetation. Remove accumulated sediment and regrade when sediment volume exceeds 10% of basin.	Semi-Annually	Owner/HOA
Hydrologic Source Control BMPs			
Yes	HSC-2 Impervious Area Dispersion Conduct general inspection and maintenance weekly per routine landscaping maintenance activities. Trim, remove, replace mulch or vegetation as necessary. Inspect for standing water or saturated conditions. Conduct bi-annual landscaping health evaluations.	Weekly/Semi-Annually	Owner/HOA

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Biofiltration BMPs			
Yes	BIO-2 Vegetated Swales Maintenance includes, weeding, and debris removal on a weekly basis and mowing on a monthly basis to maintain designed vegetation height. Trimming, reseeding, replanting and replacement of dying/deceased vegetation shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets. Inspect at minimum twice per year for erosion and with routine maintenance for burrows and standing water.	Weekly, Monthly and Semi-Annually	Owner/HOA

Required Permits

There are no permits required for the maintenance of the project's BMPs.

Forms to Record BMP Implementation, Maintenance, and Inspection

See following page.

Recordkeeping

All records must be maintained for at least five (5) years and must be made available for review upon request.

Record of BMP Implementation, Maintenance, and Inspection

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed