CONCEPTUAL WATER QUALITY MANAGEMENT PLAN

"The Cove at El Niguel"
Tentative Tract Map No. 17721

Project Address:
Southwest of Crown Valley Parkway and Playa Blanca
City of Laguna Niguel, CA

Prepared For:
LAGUNA NIGUEL PROPERTIES INC.
27422 Portola Parkway, Suite 300
Foothill Ranch, CA 92610
(714) 272-9278

Prepared By:

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

WQMP Preparation/Revision Date:
August 24, 2021

W.O. 4173-17721

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"The Cove at El Niguel" – Tentative Tract Map No. 17721

Southwest of Crown Valley Parkway and Playa Blanca

City of Laguna Niguel, California

CONCEPTUAL WATER QUALITY MANAGEMENT PLAN (WQMP)

Project Name:

"THE COVE AT EL NIGUEL"

TENTATIVE TRACT MAP NO. 17721

SITE DEVELOPMENT PERMIT NO. SP 16-04

30667 CROWN VALLEY PARKWAY

Prepared for:

LAGUNA NIGUEL PROPERTIES INC.

27422 Portola Parkway, Suite 300

Foothill Ranch, CA 92610

(714) 272-9278

Prepared by:

Hunsaker and Associates Irvine, Inc.

Engineer: Doug Staley

Registration No. 38796

3 Hughes

Irvine, CA 92618

(949) 583-1010

Engineer's Seal

Prepared on:

August 24, 2021

Project Owner's Certification			
Permit/Application No.	SDP SP 16-04	Grading Permit No.	N/A
Tract/Parcel Map No.	TTM No. 17721	Building Permit No.	N/A
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract)			APN 656-231-02

This Water Quality Management Plan (WQMP) has been prepared for **Laguna Niguel Properties Inc.** by **Hunsaker & Associates Irvine, Inc**. The WQMP is intended to comply with the requirements of the local 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 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 (South Orange County). 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:			
Title			
Company	Laguna Niguel Properties Inc.		
Address	27422 Portola Parkway, Suite 300 Foothill Ranch, CA 92610		
Email			
Telephone #	(714) 272-9278		
Signature		Date	

Preparer (Engineer):			
Title	Doug Staley	PE Registration #	38796
Company	Hunsaker and Associates Irvine, Inc.		
Address	3 Hughes, Irvine, CA 92618		
Email	DougStaley@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. R9-2015-0001/NPDES No. CAS010266, of the San Diego Regional Water Quality Control Board.			
Preparer Signature		Date	
Place Stamp Here			

Contents

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Section 1 Discretionary Permit(s) and Water Quality Conditions

Project Infomation			
Permit/Application No.	TBD	Site Address or Tract/Parcel Map No.	S/W of Crown Valley Parkway and Playa Blanca, TTM 17721
Additional Information/ Comments:	This Conceptual WQMP is being submitted as part of the entitlement process for proposed TTM 17721.		
Water Quality Conditions			
Water Quality Conditions from prior approvals or applicable watershed-based plans	This WQMP has been prepared pursuant to the requirements of the County of Orange MS4 Permit (Order No. R9-2015-0001/NPDES No. CAS0108740, of the San Diego Regional Water Quality Control Board) and the City of Laguna Niguel Municipal Code (Title 6, Division 3, Article 5, Section 6-3-400—through 6-3-599) and the Local Implementation Plan (LIP) for Jurisdictional Runoff Management Program. Site-specific conditions of approval will be provided (Attachment C) once available from the City of Laguna Niguel. The project is located within the Aliso Creek Watershed Work Plan/Water Quality Improvement 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. Aliso Creek Mouth and Shoreline currently has an established TMDL for pathogens.		

Section 2 Project Description

2.1 General Description

<table>
<tr><th colspan="3">Description of Proposed Project</th></tr>
<tr><td>Site Location</td><td colspan="2">The project site is located just southwest of the intersection of Crown Valley Parkway and Playa Blanca, in the City of Laguna Niguel, California.
APN 656-231-02</td></tr>
<tr><td>Project Area (ft^2):
183,037 ft^2 (4.20 acres)</td><td>Number of Dwelling Units: 22</td><td>SIC Code: N/A for residential</td></tr>
<tr><td>Narrative Project Description:</td><td colspan="2">The proposed Project, "Tentative Tract Map 17721", consists of a 4.2 acre irregularly-shaped parcel of partially developed land that will be re-developed with 8-building structures to accommodate 22 multi-family residential units and infrastructure improvements, including project streets and parking spaces, storm drain system, curbs, sidewalks, gutters, common landscaping areas, wet and dry utilities, active recreation areas, landscape slopes, retaining walls and other related improvements. Entrance to the project site will be provided from existing Playa Blanca, off Crown Valley Parkway to the east.

A summary of the project site and uses is as follows:

Table 2-1 – Land Use Summary
<table><tr><th>Description</th><th>Lot 1 (Residential)</th><th>Lot A (Open Space)</th><th>Total</th></tr><tr><td>Gross Area (acres)</td><td>2.0</td><td>2.2</td><td>4.2</td></tr></table>
The proposed residential units will consist of multi-level units ranging from two (2) to three (3) bedrooms. Unit plan summary for the proposed units are currently under development and will be provided when available.

Designated parking will consist of 63 total spaces, which consist of 44 covered garage spaces (2 per each unit), 8 uncovered residential parking spaces and 11 uncovered guest parking spaces. Project parking shall be consistent with the City of Laguna Niguel parking requirements (63 spaces).

Proposed open space areas will consist of common open space areas located in designated areas throughout the site and within each unit's private yards. There areas shall be considered private, to be maintained by the Homeowners' Association (HOA) and unit owner, as appropriate.

Total landscaping/pervious areas for the proposed project include Lot A, open space areas within Lot 1, project slopes and common landscaping areas. Total onsite pervious area is approximately 3.12 acres, or 74.0% of the overall project site.

Paved areas and other impervious portions of the project site include the project's streets, curb, sidewalk and gutter improvements, the building footprint of each residential unit, private homeowner areas, slope drains and other paved surfaces. Total impervious area is approximately 1.08 acres, or 26.0% of the overall project site.</td></tr>
</table>

	Proposed community facilities include an active recreation area located at the northwestern portion of the project site, just west of the terminus of Playa Blanca. No delivery or storage areas are proposed for the project. 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, walking, commuting and other activities typical of residential developments. Typical residential related trash is anticipated to be produced daily from each of the residential units. Trash and recycle receptacles will be provided to store wastes and recyclables within the private areas of each residence. All wastes will be picked up for disposal on a weekly basis by the local contracting waste hauler. All improvements are shown in the WQMP Site Plan in Attachment D.

Project Area	Pervious		Impervious	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	3.45 acres	82.1%	0.75 acres	17.9%
Post-Project Conditions	2.97 acres	70.7%	1.23 acres	29.3%

2.2 Post Development Drainage Characteristics

In the post-development condition, runoff from project's residential development areas, designated as Drainage Management Areas (DMAs) 1 and 2, will be conveyed as sheet flow, gutter flow and area drain flow to project catch basins and the main storm drain line. Runoff is then conveyed to the project's discharge point at the southeastern corner of the site, prior to discharging to the existing storm drain line located approximately 50' to the south. All runoff is then discharged easterly to an open channel within El Niguel Golf Course and conveyed northerly to County Facility No. J03P01 to J03D01 (Siphon Creek Reservoir), which is tributary to Aliso Creek (County Facility No. J01).

To address hydromodification impacts and the project's storm water pollutants of concern for the project's development areas (DMAs 1 and 2), the project proposes the use of proprietary BMPs (Modular Wetland System) and an oversized storm drain system.

2.3 Property Ownership/Management

The property owner and developer, Laguna Niguel Properties Inc., shall assume all BMP maintenance and inspection responsibilities until ownership and responsibilities for the project site and related BMPs have been transferred to the HOA. Thereafter, the HOA shall be the mechanism responsible for ensuring long-term funding, inspection and maintenance for all onsite BMPs, as prescribed in this WQMP.

Section 3 Site & Watershed Characterization

3.1 Site Conditions

3.1.1 Existing Site Conditions

The pre-project site's current land use is vacant, with City zoning and General Plan designated as Attached Residential. Adjacent land use include multi-family residential to the south; open space/single family residential to the west; single family residential to the north and Crown Valley Parkway to the east.

The site consists of a hillside area that slopes to the southeast. The site has been partially improved with a storm drain system and paved streets. Overall, the site has significant topographic relief, sloping from generally from its highest point in the west at approximately 453 feet above mean sea level (MSL) to the lowest point in the southeast at approximately 362 feet above MSL.

Currently, the onsite storm drain system conveys onsite flows and run-on flows from upstream areas from the adjacent residential community to the west, in a southerly and southwesterly direction, across Crown Valley Parkway, prior to discharging to an existing, concrete lined, open channel within El Niguel Golf Course. Runoff is then conveyed northerly to County Facility No. J03P01 to J03D01 (Siphon Creek Reservoir), which is tributary to Aliso Creek (County Facility No. J01). See "Receiving Waters Exhibit" for the project in Attachment D.

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.

Table 3-1 – Existing Land Uses

Land Use Description	Total Area (acres)	Impervious Area (acres)	Pervious Area (acres)	Imperviousness (%)
Vacant, Open Space, Slopes	3.5	0.05	3.45	0.012
Streets	0.70	0.70	0	0.167
Total	4.2	0.75	3.45	0.179

3.1.2 Infiltration-Related Characteristics

3.1.2.1 Hydrogeologic Conditions

Per the TGD, the site is not located within an area known for hydrogeologic groundwater concerns.

3.1.2.2 Soil and Geologic Infiltration Characteristics

The subject site is located within the southwestern portion of the San Juan Capistrano 7.5-Minute Topographic Quadrangle Map and underlain by bedrock formations, surface deposit units and artificial fill.

Based on the County of Orange Technical Guidance Document for Preparation of WQMPs and NRCS Web Soil Survey, onsite soils consist primarily of Cropley clay, Bosanko clay and Botella clay loam, which are classified as a Hydrologic Soil Group "D" soil. The expansion potential of clays is high, with low infiltration potential.

3.1.2.3 Geotechnical Conditions

Due to the project residing within a past land slide area, slope gradient (hillside) and soil type (HSG D), infiltration BMPs are not proposed for the project.

3.1.2.4 Summary of Infiltration Opportunities and Constraints of Existing Site

Per the TGD Figure 7.9 – "Infiltration Constraints for Aliso Creek Watershed", the project resides in an area with two constraints for infiltration (physiographic features and Type D soils). Based on the project site's hillside location within a known landslide area and the presence of primarily Type "D" soils, the site is not considered feasible for infiltration.

3.2 Proposed Site Development Activities

The project consists of the development of 22 multi-family residential units and related improvements, including streets and parkways, wet and dry utilities, private storm drain improvements, common landscaping and open space areas, an active recreation area and other improvements to support residential use.

3.2.1 Overview of Site Development Activities

The proposed project would change the project site from vacant use to typical residential use consisting of residential activities, such as commuting, exercising, walking and other activities typical of residential developments. These uses, as well as proposed project infrastructure would connect onsite activities with existing developments located adjacent to the project.

3.2.2 Project Attributes Influencing Stormwater Management

Typical residential uses and activities are anticipated to produce wastes on a daily basis from each of the residential household. These materials include household wastes such as food wastes, recyclable materials (plastics, glass, etc.) and landscaping materials from private homeowner areas as well as HOA controlled slopes, common landscaping and open space areas. Non-recyclable and recyclable wastes will be stored within the private areas of each residence and brought to curb side for pick up. All wastes will be picked up for disposal on a weekly basis by the contracting waste hauler.

Other attributes that are anticipated to impact runoff include wastes generated from typical vehicle use (oil, coolant, etc.) as well as landscaping maintenance activities. These will be minimized via non-structural best management practices through homeowner education as well as restrictions on vehicle maintenance/repair activities onsite.

Aside from residential homes and supporting infrastructure facilities, no other facilities are proposed for the project.

As previously discussed in Section 3.1.1, the site receives run-on from upstream areas to the southwest and northwest. Run-on from these areas will be conveyed through the project site prior to discharging to El Niguel Golf Course to the east.

The project site does not contain any environmentally sensitive areas (ESAs) to preserve. Proposed land use for the project is as follows:

Table 3-2 – Proposed Land Uses					
Land Use Description		Total Area (acres)	Impervious Area (acres)	Pervious Area (acres)	Imperviousness of total (%)
Lot 1	*Residential Units, Streets, walkways, parkways*	1.40	1.08	0.32	0.257
	Open Space, Slopes, Common Landscaping	0.60	0	0.60	0
Lot A	*Open Space/Slopes*	2.2	0.15	2.05	0.036
Total		4.2	1.23	2.97	0.293

3.2.3 Effects on Infiltration and Harvest and Use Feasibility

The proposed project does not have the potential to influence infiltration opportunities onsite due to the existing condition of the project site. As discussed in Section 3.1.2.4, the project is located on a hillside within a known landslide area and onsite soils consisting primarily of Type D soils.

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 harvesting BMPs, as sources of reclaimed water are available. Based on Section F.2.8 of the TGD, if sufficient reclaimed water supply is available to meet the project's demand for use, then the decision to use reclaimed water or harvest and use rests on the project proponent. The project will employ the use of Biotreatment BMPs to address low flow (irrigation and other non-storm water runoff) and storm water runoff from project areas.

3.3 Receiving Waterbodies

The following table provides descriptions of the project's receiving waters and their impairment status. Refer to WQMP Section 2.2 for onsite drainage and connection to offsite/surrounding drainage.

Table 3-3 – Watershed Description	
Receiving Waters	Siphon Creek, Siphon Creek Reservoir, Aliso Creek (Mouth), Pacific Ocean (Aliso HSA)
303(d) Listed Impairments	Aliso Creek – Benthic Community Effects, Malathion, Nitrogen, Phosphorous, Selenium, Toxicity, Indicator Bacteria English Canyon Creek – Benthic Community Effects, Benzo[b]fluoranthene, Dieldrin, Phosphorus, Selenium, Total Nitrogen, Toxicity Aliso Creek (Mouth) – Indicator Bacteria, Toxicity Pacific Ocean (Aliso HSA) – Indicator Bacteria
Applicable TMDLs	Aliso Creek – Indicator Bacteria Aliso Creek (Mouth) – Indicator Bacteria Pacific Ocean Shoreline (Aliso HSA) – Indicator Bacteria

3.4 Stormwater Pollutants or Conditions of Concern

Table 2-4, Anticipated and Potential Pollutants Generated by Land Use Type, from the Technical Guidance Document (September 2017) lists the following Pollutants of Concern (POC's) associated with the proposed development:

Table 3-4 – Pollutants or Conditions of Concern				
Pollutant	Expected from Proposed Land Uses/Activities (Yes or No)	Receiving Waterbody Impaired (Yes or No)	Priority Pollutant from WQIP or other Water Quality Condition? (Yes or No)	Pollutant of Concern (Primary, Other, or No)
Suspended-Solids	Yes	No	No	Other
Nutrients	Yes	Yes	No	Primary
Heavy Metals	Yes	Yes	No	Primary
Bacteria/Virus/Pathogens	Yes	Yes	Yes	Primary
Pesticides	Yes	Yes	No	Primary
Oil and Grease	Yes	No	No	Other
Toxic Organic Compounds	Yes	Yes	No	Primary
Trash and Debris	Yes	No	Yes	Primary

Table 3-4 – Pollutants or Conditions of Concern				
Pollutant	Expected from Proposed Land Uses/Activities (Yes or No)	Receiving Waterbody Impaired (Yes or No)	Priority Pollutant from WQIP or other Water Quality Condition? (Yes or No)	Pollutant of Concern (Primary, Other, or No)
Dry Weather Runoff	Yes	No	Yes	Primary

3.5 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 2.3.5 of the 2017 TGD, 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.

Does a hydrologic condition of concern exist for this project?

☐ No – An HCOC does not exist for this receiving water because:

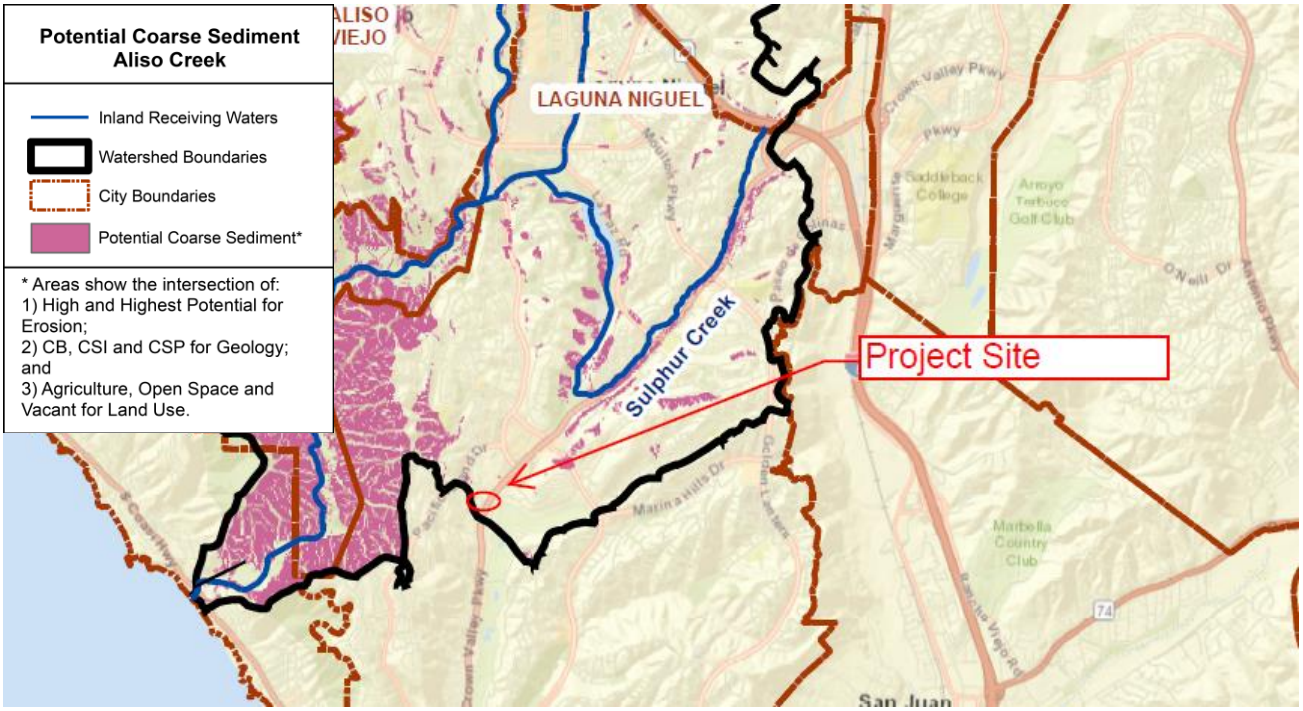
- ☐ Project discharges directly to a protected conveyance (bed and bank are concrete lined the entire way from the point(s) of discharge to a receiving lake, reservoir, embayment, or the Ocean
- ☐ Project discharges directly to storm drains which discharge directly to a reservoir, lake, embayment, ocean or protected conveyance (as described above)
- ☐ The project discharges to an area identified in the WMAA as exempt from hydromodification concerns

☒ Yes – An HCOC does exist for this receiving water because none of the above are applicable.

The project's hydromodification impacts and mitigation are discussed in Section 6.0 of this WQMP.

3.6 Critical Coarse Sediment Yield Areas

The project site is shown in Appendix K of the Water Quality Improvement Plan for South Orange County Watershed Management as not being located within a potential coarse sediment yield area.



Source: Appendix K, Figure 6 – Potential Coarse Sediment for Aliso Creek (SOC WMA WQIP, June 2018)

Section 4 Site Plan 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.

4.1 Drainage Management Area Delineation

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 limits of the project's DMA is provided in the WQMP Site Plan located in Attachment D. The DMA for the project was selected based on the site layout and suitable areas for BMP location. Due to the site's geotechnical concerns (unsuitable soil, landslide potential, presence of groundwater), retention of runoff was not feasible.

4.2 Overall 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 open space areas, common landscaping areas and private landscaping located within each homeowner lot to minimize the amount of impervious area.

Maximize Natural Infiltration Capacity – Due to the presence of clay-rich soils (Hydrologic Soil Group D) and slope stability concerns, infiltration is not recommended onsite.

Preserve Existing Drainage Patterns and Time of Concentration – In the proposed condition, runoff from the site will be conveyed similar to pre-project conditions, with hydromodification controls employed to maintain the site's pre-development runoff flow rates and volumes.

Disconnect Impervious Areas – Landscaping will be provided adjacent to common pavement areas and within private residential lot areas to break up the project's impervious areas.

Protect Existing Vegetation and Sensitive Areas – Project will preserve existing vegetation within open Space Lot A. Areas to be disturbed by construction will be paved or landscaped with native and/or drought tolerant plant species with a deep root system.

Revegetate Disturbed Areas – Native and/or drought tolerant landscaping will be incorporated into site design, consistent with City guidelines, in proposed landscaping areas.

Soil Stockpiling and Site Generated Organics – Where feasible, pre-project native soils from cut slope areas will be retained onsite and reused for final stabilization and revegetation. However, this may not be feasible since the project consists of a partially developed underlain by engineered fill.

Firescaping – Project landscaping will be selected based on each area's fire zone risk, including requirements for buffers/fuel modification.

Water Efficient Landscaping – Landscaping will be designed to consist of native species or drought tolerant, water conserving landscaping. Additionally, 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 nighttime temperatures based on system specifications and local climate patterns.

Slopes and Channel Buffers – The project's landscaped slopes shall be inspected for adequate vegetation cover, vegetation health and signs of erosion. Dead or dying vegetation shall be replaced as needed. Signs of erosion and concentrated flow areas shall be noted and repaired as needed. Down drains and V-ditches will be installed per city design guidelines based on slope length. Rip-rap installed at the project's discharge locations to natural areas shall be inspected for damage and signs of erosion to ensure that project's discharge is controlled and offsite erosion potential minimized.

4.3 DMA Characteristics and Site Design BMPs

The project's DMA characteristics and Site Design BMPs are provided in the following sections.

4.3.1 DMA 1

DMA Location:	Northern and Central portions of Lot 1
Total Area (AC):	0.86
Impervious Area (AC):	0.64
Pervious Area (AC):	0.22
DMA Outlet Location (or self-retaining):	MWS in center of Playa Blanca
Maximize Retention?:	No. Due to geotechnical concerns, runoff will not be retained.
Land Use & Pollutant Generation Activities:	Residential – Trash and debris from household uses, landscaping related materials, home maintenance Streets – Vehicle related fluids from daily vehicle use.
Site Design BMPs Summary:	Applicable site design BMPs include: minimize impervious area, preserve pre-project drainage patterns and time of concentration, disconnect impervious surface, revegetate disturbed areas, stockpiling natural materials, firescaping and water efficient landscaping.
Infiltration Feasibility Category:	No infiltration.
Potential Harvest Demand:	No reclaimed supply currently available. However, project to install system for future use.
Harvest and Use Requirement:	Not required.

4.3.2 DMA 2

DMA Location:	Southern portion of Lot 1.
Total Area (AC):	0.56
Impervious Area (AC):	0.42
Pervious Area (AC):	0.14
DMA Outlet Location (or self-retaining):	Eastern terminus of Private Drive "A"
Maximize Retention?:	No. Due to geotechnical concerns, runoff will not be retained.

Land Use & Pollutant Generation Activities:	Residential – Trash and debris from household uses, landscaping related materials, home maintenance Streets – Vehicle related fluids from daily vehicle use.
Site Design BMPs Summary:	Applicable site design BMPs include: minimize impervious area, preserve pre-project drainage patterns and time of concentration, disconnect impervious surface, revegetate disturbed areas, stockpiling natural materials, firescaping and water efficient landscaping.
Infiltration Feasibility Category:	No infiltration.
Potential Harvest Demand:	No reclaimed supply currently available. However, project to install system for future use.
Harvest and Use Requirement:	Not required.

4.3.8 DMA Summary

Summary of the project's DMA is provided in the following table:

Table 4-1 – Drainage Management Areas

DMA (Number/ Description)	Total Area (acres)	Imp. (%)	Infiltration Feasibility Category (Full, Partial, or No Infiltration)	Hydrologic Source Controls Used	C-value	D_{85} (in)	DCV_{Simple} (ft^3)	Tc (min)	I_{80} (in/hr)	Q_{design} (cfs)[1]
1	0.86	0.75	No Infiltration	TBD	0.7125	0.80	1779.4	6.4	0.255	0.234
2	0.56	0.75	No Infiltration	TBD	0.7125	0.80	1158.7	7.8	0.245	0.147
Total	*1.41*	--	--	--	--	--	*2917.4*	--	--	*0.378*

[1] *Includes scaling factor of 1.5 Q_{BMP}.*

4.4 Source Control BMPs

In accordance with the County DAMP and City of Laguna Niguel 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 City's LIP.

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

Table 4-2 – Non-Structural Source Control BMPs

Identifier	Name	Check One		Reason Source Control is Not Applicable
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☒	☐	

Table 4-2 – Non-Structural Source Control BMPs				
Identifier	Name	Check One		Reason Source Control is Not Applicable
		Included	Not Applicable	
N2	Activity Restrictions	☒	☐	
N3	Common Area Landscape Management	☒	☐	
N4	BMP Maintenance	☒	☐	
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	Proposed facility will not generate waste subject to Title 22 CCR compliance.
N6	Local Industrial Permit Compliance	☐	☒	Not applicable to residential.
N7	Spill Contingency Plan	☐	☒	Proposed facility 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 facility will not store or generate hazardous materials subject to agency requirements.
N10	Uniform Fire Code Implementation	☐	☒	Proposed facility does not propose to store toxic or highly toxic compressed gases.
N11	Common Area Litter Control	☒	☐	
N12	Employee Training	☐	☒	Not applicable for residential.
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	☐	☒	Project is for residential.

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 actions and the potential impacts to downstream water quality. Materials include those described in Section VII of this WQMP and any updates to educational materials.

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

Management programs will be designed and established by the developer. Upon project completion, the HOA will maintain all common areas within the project site. These programs will include how to mitigate the potential dangers of fertilizer and pesticide usage. Ongoing maintenance will be consistent with the City's Landscape Water Use Standards (Municipal Code Section 8.12).

N4 – BMP Maintenance

The Owner shall be responsible for implementation of each applicable non-structural, structural and LID BMPs as well as scheduling inspection and maintenance cleaning of all applicable structural BMP facilities. The Owner shall be responsible for inspection and maintenance activities in landscape areas (see WQMP Site Plan).

N11 – Common Area Litter Control

Weekly trash pickup and as necessary within all project areas and common landscape areas. Daily inspection of trash receptacles to ensure that lids are closed and pick up any excess trash on the ground, noting trash disposal violations by homeowners and reporting the violations to the Owner for investigation.

N14 – Common Area Catch Basin Inspection

100% 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 1st of each year. Drainage facilities include catch basins and inlets, detention vaults, storm drain lines, slope drains and the project's LID BMPs.

N15 – Street Sweeping Private Streets and Parking Lots

Per the TGD, private streets shall be swept at a minimum prior to the storm season, in early fall or late summer, and as needed.

Table 4-3 – Structural Source Control BMPs

Identifier	Name	Check One		Reason Source Control is Not Applicable
		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 facility.
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☐	☒	No community trash enclosures proposed.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	

Table 4-3 – Structural Source Control BMPs				
Identifier	Name	Check One		Reason Source Control is Not Applicable
		Included	Not Applicable	
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 facility.
S7	Maintenance bays	☐	☒	No maintenance bays proposed for facility.
S8	Vehicle wash areas	☐	☒	No vehicle washing anticipated for proposed facility.
S9	Outdoor processing areas	☐	☒	No outdoor processing of good required for facility.
S10	Equipment wash areas	☐	☒	No wash areas for site.
S11	Fueling areas	☐	☒	No fueling areas in project scope.
S12	Hillside landscaping	☒	☐	
S13	Wash water control for food preparation areas	☐	☒	No applicable to residential.
S14	Community car wash racks	☐	☒	None 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 and Provide Energy Dissipation

The project's landscaped slopes shall be inspected for adequate vegetation cover, vegetation health and signs of erosion. Dead or dying vegetation shall be replaced as needed. Signs of erosion and concentrated flow areas shall be noted and repaired as needed. Slope drains shall be cleaned of obstructions to ensure adequate capacity for runoff conveyance.

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 and City of Laguna Niguel requirements.

Section 5 Low Impact Development BMPs

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 primarily for full retention, partial retention and lastly, biotreatment.

5.1 LID BMPs in DMA 1 and DMA 2

The proposed project does not have the potential to influence infiltration opportunities onsite due to the existing condition of the project site. As discussed in Section 3.1.2.4 and 3.2.3, the project is located on a hillside within known landslide area (TGD Figure 7.9b and project Geotech Report) with onsite soils consisting primarily of Type D soils.

Additionally, the project does not propose the use of harvesting BMPs, as sources of reclaimed water are available for irrigation of the project's opens space areas. The project's previous design proposed the use of proprietary vegetated biofiltration BMPs (Modular Wetland System) to address project runoff. However, due to the following site constraints, the units will be placed underground and no longer include vegetation:

- DMA 1 – MWS unit at Playa Blanca
    - Pervious design with MWS located in parkway or under sidewalk or adjacent to slope would add additional retaining wall costs and lower portions of Playa Blanca cannot be treated due to grade depths and pipe flow depths.
    - In order to treat as much of the lower section of Playa Blanca (near intersection of Crown Valley Parkway), the MWS needs to be lowered and moved to the middle of Playa Blanca in order to get the catch basin closest to Crown Valley Parkway and the proposed storm drain pipe in "A" Drive to adequately drain.
    - Other location options do not support the low flow catch basin at lower part of Playa Blanca.
- DMA 2 – MWS unit at B Drive
    - Previously design located in landscaping area east of parking stall 2 is no longer feasible due to retaining wall locations.
    - Retaining walls along Crown Valley cannot exceed 3-ft each. Width of MWS unit does not fit due to top of slope, retaining wall footings, and location.
    - Unit type 4 x 17 does not fit on the northerly or easterly sides of parking stall 2.
    - Other possible option for MWS is to east of Unit 9 and top of slope but water would be in the way of design.

5.1.1 Hydrologic Source Controls for DMA 1 and 2

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.

Trees will be planted within the open space areas of the development site to provide canopy interception of rain, thereby reducing the site's runoff during rain event. However, the reduction benefits from these measures will not be determined as the project is in the conceptual phase. Proposed biotreatment BMPs will be designed to address the project's required runoff.

5.1.2 Structural LID BMP for DMA 1 and 2

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 proposes the use of a Modular Wetland Systems to address storm water pollutants. The system will be designed as a filter/treat and release system.

The selected BMPs have been designed per the TGD (Worksheet 9) and the SOC Model WQMP, which require that units treat 1.5 times the BMP design flow for the project.

5.2 Summary of LID BMPs

Summary of the selected BMPs is provided in the following table:

Table 5-1 – Biotreatment BMP Design Summary						
DMA	Tc (min)	I_{80} (in/hr)	Q_{design} (cfs)	1.5 x Q_{design} (cfs)	BMP Model/ Footprint	Treatment Capacity per unit (cfs)
1	6.4	0.255	0.154	0.234	MWS-L-4-19	0.237
2	7.8	0.245	0.098	0.147	MWS-L-4-15	0.175

Section 6 Hydromodification BMPs

6.1 Points of Compliance

The project has one point of compliance, (POC) as shown in the WQMP Site plan. The POC Is located at the southwest portion of the site, where runoff from the project and its tributary areas are discharged offsite.

6.2 Pre-Development (Natural) Conditions

The pre-project site is a partially improved site with graded slopes, partially improved streets and flat pad areas. Run-on from areas to the northwest and southwest are conveyed through the project site via an existing storm drain system. In the pre-project condition, the site only has one hydromodification drainage management area discharging to the POC, as flows from the proposed project and the upstream areas are not separated nor differentiated.

Table 6-1 – Summary of Existing Conditoins			
DMA[1]	Tributary Area (ac)	Imperviousness[2]	POC
DMA-1-EX	102.66	34.7%	1
Total	**102.66**	--	--

Notes: (1) DMA designation for hydromodification analysis is based on the tributary area to each hydromodification control BMP and therefore is not consistent with DMA designation for the project's treatment BMPs. Also note that there is only 1 DMA in existing condition and two DMAs in the developed condition, one for areas that bypass the site and the remaining for the project's development areas that require hydromodification BMPs.

6.3 Post-Development Conditions and Hydromodification BMPs

In the developed condition, runoff from the developed project site is intercepted by an onsite storm drain system, conveying flows from onsite development areas to an upsized storm drain pipe for detention. Run-on from the southwest is conveyed through the project site (bypass onsite flows) via the project's proposed storm drain system. Therefore, in the developed condition, run-on flows (existing/tributary flows) are differentiated from project flows, with the site having 2 hydromodification drainage management areas.

Table 2 shows a summary of the developed conditions DMAs along with the underground system receiving the runoff prior to discharging to POC.

Table 6-2 – Summary of Developed Conditoins			
DMA	BMP	Tributary Area (ac)	Imperviousness
DMA-1-DEV	Upsized Pipe	5.51	12.0%
DMA-2-DEV	Bypass system	97.15	37.3%
Total	--	**102.66**	--

An upsized storm drain pipe is located within Private Drive "A" and is responsible for handling hydromodification requirements for the project. This facility comprises of a 200 ft length and 4 ft diameter horizontal storm drain. A riser spillway structure with orifices and slots will be located at the downstream end of the basins to control the flows. The riser structure will act as a spillway such that peak flows can be safely discharged to the receiving storm drain system.

Table 6-3 – Hydromodification Control BMPs					
BMP Name	Tributary Area (ac)	BMP Description			
		BMP Area	Depth to main weir (ft)[1]	Weir length (ft)[2]	Total Depth (ft)[3]
Upsized Pipe	5.51	800 ft^2	4.0	4.0	4.0

Notes: (1) Depth to ponding beneath outlet structure's main weir.
(2) Overflow length

6.4 Measures for Avoidance of Critical Coarse Sediment Yield Areas

Per the TGD and related maps, there are no CCSY Areas within the project site. No further consideration of CCSYA's is needed.

6.5 Hydrologic Modeling and Hydromodification Compliance

Based on the project's Hydromodification Analysis from the South Orange County Hydrology Model, 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 (pre-development) by more than 10% of the time, from 10% of the 2-year runoff event up to the 10-year runoff event.

Table 6-2 – Hydromodification Analysis Summary			
Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Change (cfs)
2-year	44.116	44.236	+0.012
5-year	53.451	53.599	+0.148
10-year	66.903	66.934	+0.031

Section 7 Educational Materials Index

The following table provides a list of educational materials to be included in the Final WQMP.

Table 7-1 – Educational 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	☒	Compliance BMPs for Mobile Businesses	☐
Proper Disposal of Household Hazardous Waste	☒	**Other Material**	**Check If Attached**
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 Projects Using Paint	☒		☐

Attachment A Educational Materials

To be provided in the Final WQMP.

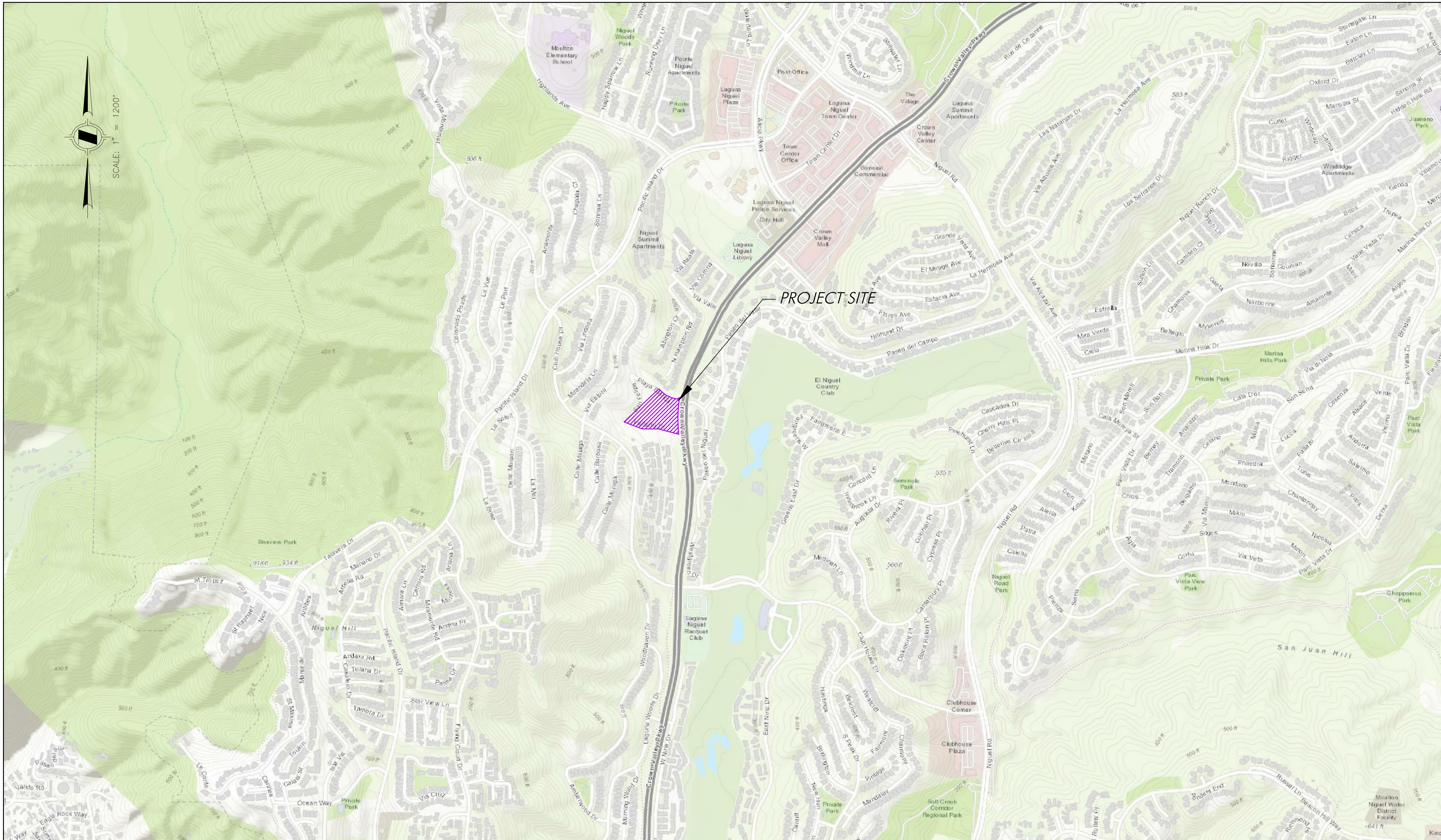
Attachment B Operations and Maintenance Plan

To be provided in the Final WQMP.

Attachment C Conditions of Approval

To be provided in the Final WQMP.

Attachment D Vicinity Map, Site Plan, Receiving Waters Exhibit, Supporting Exhibits



DRAWN BY: TIH	PREPARED BY:	PREPARED FOR:	"THE COVE AT EL NIGUEL" - TTM NO. 17721	CONCEPTUAL
DATE: 12/14/2020	HUNSAKER & ASSOCIATES IRVINE, INC.	LAGUNA NIGUEL PROPERTIES INC.	SOUTHWEST OF CROWN VALLEY PARKWAY AND PLAYA BLANCA	WQMP VICINITY MAP
W.O.: 4173-17721	PLANNING ■ ENGINEERING ■ SURVEYING Three Hughes, Irvine, CA 92618 ■ PH: (949) 583-1010 ■ FX: (949) 583-0759	27422 PORTOLA PARKWAY, SUITE 300 FOOTHILL RANCH, CA 92610 (714) 272-9278	LAGUNA NIGUEL, CALIFORNIA	

DATE: Dec. 14, 2020 01:32:42 PM FILE: F:\1102\Planning\SY_WQ\PWQMP\Exhibits\PWQMP_VIC TTM 17721.dwg

N

GRAPHIC SCALE
0 25 50
(IN FEET)
1 INCH = 25 FT.

NAP

LOT "A"
(2.2 ACRES)

PLAYA BLANCA

PRIVATE DRIVE "A"

PRIVATE DRIVE "B"

CROWN VALLEY PARKWAY

DMA1
0.86

DMA2
0.56

EXISTING SD TO BE REMOVED

EXISTING SD TO BE ABANDONED IN PLACE

PROPOSED MONUMENT SIGN

MIN. 2.0' LANDSCAPE WIDTH

LEGEND

- PROJECT LIMITS
- DRAINAGE MANAGEMENT AREA (DMA) LIMITS
- NAP — NOT A PART
- DMA / ACRE — DMA DESIGNATION AND ACREAGE
- SURFACE FLOW (ONSITE)
- SURFACE FLOW (OFFSITE)
- EXISTING DRAINAGE SYSTEM
- PROJECT STORM DRAIN SYSTEM
- UPSIZED STORM DRAIN FOR HYDROMODIFICATION CONTROL
- PROJECT CATCH BASIN WITH BMPS
  S1 STORM DRAIN SYSTEM SIGNAGE
  N14 COMMON AREA CATCH BASIN INSPECTION
- DECORATIVE PAVEMENT AND WALKWAY AREAS
- BUILDING FOOTPRINT
- PROJECT STREET AREA WITH BMP
  N15 STREET SWEEPING PRIVATE STREETS & PARKING LOTS
- PROJECT LANDSCAPING WITH BMPS
  S1 EFFICIENT IRRIGATION SYSTEM & LANDSCAPE PLANNING
  S12 HILLSIDE LANDSCAPING
  N3 COMMON AREA LANDSCAPE MANAGEMENT
- BMP BIO-7 PROPRIETARY BIOFILTRATION MODULAR WETLAND SYSTEM (MWS)
- DISCHARGE POINT / POINT OF COMPLIANCE (POC)

DMA SUMMARY

Table 5-1 – Biotreatment BMP Design Summary

DMA	Tc (min)	I_{80} (in/hr)	Q_{design} (cfs)	1.5 x Q_{design} (cfs)	BMP Model/ Footprint	Treatment Capacity per unit (cfs)
1	6.4	0.255	0.154	0.234	MWS-L-4-19	0.237
2	7.8	0.245	0.098	0.147	MWS-L-4-15	0.175

OPEN SPACE SUMMARY

DESIG.	AREA	ACRES
Ⓐ	COMMON OPEN SPACE AREA ONLY LEVEL AREAS	0.07
Ⓐ1	SLOPE COMMON OPEN SPACE AREA	0.30
Ⓑ	ACTIVE RECREATION AREA	0.17
Ⓒ	PRIVATE REAR YARD AREA (EACH DWELLING HAS PRIVATE REAR YARD AREA)	0.32
Ⓓ	SCENIC HIGHWAY AREA (INCLUDES AREA BEYOND SETBACK TO TOP OF SLOPE)	0.20
Ⓔ	ACTIVE RECREATION & SHARED MAINTENANCE ACCESS	0.15

CONCEPTUAL WATER QUALITY MANAGEMENT PLAN SITE PLAN

APPLICANT:
LAGUNA NIGUEL PROPERTIES INC.
27422 PORTOLA PARKWAY, SUITE 300
FOOTHILL RANCH, CA 92610
(714) 272-9278

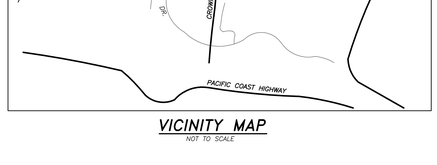
PREPARED BY:
HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

"THE COVE AT EL NIGUEL"
TENTATIVE TRACT MAP NO. 17721
SOUTHWEST OF CROWN VALLEY PKWY & PLAYA BLANCA
CITY OF LAGUNA NIGUEL, CALIFORNIA

DRAFTED BY: TIH | DATE: 08/24/2021 | W.O. NO: 4173-17721 | SHEET NO: 1 OF 1

DATE: Aug. 24, 2021 03:09:23 PM FILE: F:\1102\Planning\SY_WQ\PWQMP\Exhibits\PWQMP SP_TTM 17721.dwg


Receiving Waters Exhibit
"The Cove at El Niguel"
Wood Canyon
Walkway
Awma Rd
Aliso Creek
Alicia
Jaeger Dr
Dean St
Siphon Reservoir
La Paz
Moulton
Crown Valley
Project Flow
Kings Rd
Hugo Rd
Of The Golden Lantern
N
San Simeon
Preston Dr
Ana Maria Ln
La Vida Dr
Niguel
Las Naranjas Dr
Laguna Niguel
Siros
Marina Hills
Project Location
To outfall at Pacific Ocean



VICINITY MAP
NOT TO SCALE

LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q=xx.0cfs, Tc=x.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- FQ=xx.0cfs, Tc=x.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- EXISTING STORM DRAIN
- FLOW LINE WITH DIRECTION
- D — SOIL GROUP

SCALE: 1" = 100'

100 50 0 100 200
GRAPHIC SCALE 1"=100'

PREPARED FOR:
LAGUNA NIGUEL PROPERTIES INC
27422 PORTOLA PARKWAY
SUITE 300
FOOTHILL RANCH, CA 92610

PREPARED BY:
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EXHIBIT 1
OFF-SITE HYDROLOGY MAP FOR THE COVE AT EL NIGUEL-TTM 17721
30667 CROWN VALLEY PARKWAY
CITY OF LAGUNA NIGUEL

DATE: May. 13, 2021 09:55:06 AM FILE: F:\1102\Engineering\SY_Hydrology\Off Site Hydrology Study.dwg

HCHECK.DGN MAP FOR (TM 17721 - THE COVE AT EL NIGUEL)

REFER TO EXHIBIT 1 FOR OFF-SITE HYDROLOGY STUDY

VIA ESTORIL

CLUB HOUSE DRIVE

PROPERTY BOUNDARY

CROWN VALLEY PARKWAY

PLAYA BLANCA DR.

PASEO DEL NIGUEL

ABINGTON COURT

NORTH HAMPTON

EX. 36" RCP

EX. 27" RCP

EX. 39" RCP

EX. 42" RCP

EX. 48" RCP

EX. 30" RCP

EX. CATCH BASIN

Q_{10} =168.5cfs
Q_{100}=265.5cfs
t=15.8
Area=94.0 acres

A9 1.96

A8 0.75

A10 1.86

A11 1.46

A12 0.93

A13 0.21

A14 0.75

A15 0.71

A16 1.90

A17 1.02

A18 1.32

A19 1.09

A20 1.70

L=70'

L=230'

L=405'

L=265'

L=290'

L=160'

516.0 EL.

519.0 EL.

Q_{10} = 5.6cfs
Q_{100} = 8.9cfs
t=11.7
434.0 EL.

Q_{10} = 9.4cfs
Q_{100} =14.9cfs

ΣQ_{10} =176.3cfs
ΣQ_{100}=278.0cfs
t=15.8
409.5 EL.

Q_{10} = 1.6cfs
Q_{100}= 2.5cfs
t=10.9
458.5 EL.

Q_{10} = 1.5cfs
Q_{100}= 2.4cfs
t=11.8
460.0 EL.

Q_{10} = 6.6cfs
Q_{100}=10.4cfs
t=12.7
392.0 EL.

Q_{10} = 2.9cfs
Q_{100}= 4.6cfs
t=12.2
410.0 EL.

ΣQ_{10} =176.3cfs
ΣQ_{100}=278.2cfs
t=16.0
391.0 EL.

Q_{10} = 2.6cfs
Q_{100}= 4.0cfs

Q_{10} = 1.6cfs
Q_{100}= 2.5cfs

Q_{10} = 2.0cfs
Q_{100}= 3.1cfs

ΣQ_{10} =177.3cfs
ΣQ_{100}=280.6cfs
t=16.0
390.0 EL.

Q_{10} = 0.4cfs
Q_{100}= 0.6cfs

ΣQ_{10} =177.3cfs
ΣQ_{100}=280.6cfs
t=16.0
384.0 EL.

ΣQ_{10} = 8.5cfs
ΣQ_{100}=13.4cfs
t=13.0
382.0 EL.

ΣQ_{10} =185.1cfs
ΣQ_{100}=293.0cfs
t=16.1
381.0 EL.

Q_{10} = 2.3cfs
Q_{100} = 3.6cfs

ΣQ_{10} =186.5cfs
ΣQ_{100}=295.4cfs
t=16.1
377.0 EL.

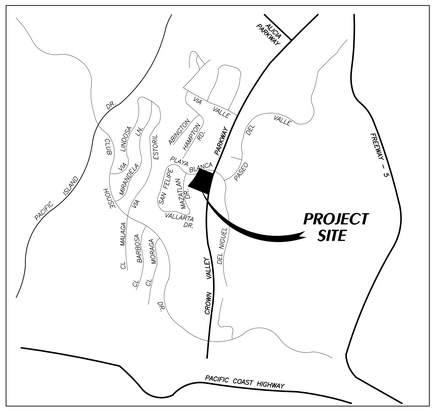
Q_{10} = 2.0cfs
Q_{100}= 3.2cfs

Q_{10} = 3.1cfs
Q_{100}= 4.8cfs

ΣQ_{10} =188.2cfs
ΣQ_{100}=298.2cfs
t=16.1
361.0 EL.

ΣQ_{10} =190.9cfs
ΣQ_{100}=302.6cfs
t=15.5
Total Area=109.7acres

10 11 12 13 14 15 16 17 20 21 22 23 24 25 26 27 28



VICINITY MAP
NOT TO SCALE

LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q=xxcfs / t=x.x — PEAK FLOW RATE / TIME OF CONCENTRATION
- ΣQ=xx.0cfs / t=x.x — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- EXISTING STORM DRAIN
- FLOW LINE WITH DIRECTION
- D — SOIL GROUP

SCALE: 1" = 40'

40 20 0 40 80

GRAPHIC SCALE 1"=40'

PREPARED FOR:

LAGUNA NIGUEL PROPERTIES INC
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SUITE 300
FOOTHILL RANCH, CA 92610

PREPARED BY:

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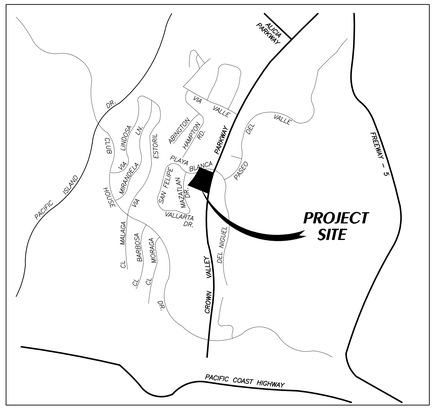
EXHIBIT 2
EXISTING CONDITION HYDROLOGY MAP
THE COVE AT EL NIGUEL-TTM 17721
30667 CROWN VALLEY PARKWAY
CITY OF LAGUNA NIGUEL

REFER TO EXHIBIT 1 FOR OFF-SITE HYDROLOGY STUDY



VICINITY MAP
NOT TO SCALE

LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- NODE NUMBER
- AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- PEAK FLOW RATE / TIME OF CONCENTRATION
- PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- EXISTING STORM DRAIN
- FLOW LINE WITH DIRECTION
- D — SOIL GROUP
- PROPOSED STORM DRAIN

SCALE: 1" = 40'

GRAPHIC SCALE 1"=40'

PREPARED FOR:
LAGUNA NIGUEL PROPERTIES INC
27422 PORTOLA PARKWAY
SUITE 300
FOOTHILL RANCH, CA 92610

PREPARED BY:

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

EXHIBIT 3
PROPOSED CONDITION HYDROLOGY MAP
THE COVE AT EL NIGUEL-TTM 17721
30667 CROWN VALLEY PARKWAY
CITY OF LAGUNA NIGUEL

Attachment E BMP Worksheets & Details

Worksheet 1: Infiltration Feasibility Categorization

Categorization of Infiltration Feasibility Condition	*Page 1 of 5*

Part 1: Physical Limitations of Infiltration

Based on the criteria for physical limitations of infiltration described in Section 4.2.2.2, what level of physical feasibility of infiltration is the maximum that the BMP location will support?

	Physical Infiltration Feasibility Category	Mark applicable category	Next step
1	Full Infiltration of the DCV		Continue to Part 2
	Biotreatment with Partial Infiltration		Continue to Part 3
	Biotreatment with No Infiltration	X	Select and Utilize Biotreatment without Infiltration

Provide summary of basis: Based on the project site's hillside location within slide area (per Geotech Report) and presence of predominantly Type "D" soils, infiltration BMPs are not considered feasible for the site. See project's geotechnical investigation provided in Attachment G for additional details.

Also note per the TGD Figure 7.9 – "Infiltration Constraints for Aliso Creek Watershed", the project resides in an area with two constraints for infiltration (physiographic features and Type D soils). Based on the project site's hillside location within a known landslide area and the presence of primarily Type "D" soils.

Categorization of Infiltration Feasibility Condition		*Page 2 of 5*	
Part 2: Risks Limiting Full Infiltration of the DCV *–Would infiltration of the full DCV introduce risks of undesirable consequences that cannot reasonably be mitigated?*		*Yes*	*No*
2	**Would infiltration of the DCV pose significant risk for groundwater related concerns?** Use criteria described in Section 4.2.2.3 and results from **Worksheet 2** (Appendix C) to describe groundwater-related infiltration feasibility criteria.		X
Provide basis: Infiltration of project runoff would not pose concerns as the project does not reside over plume areas nor has the potential for soluble pollutants that can reach groundwater.			
3	**Would infiltration of the full DCV pose significant risk of increasing risk of geotechnical hazards that cannot be mitigated to an acceptable level**? Use criteria described in Section 4.2.2.4.	X	
Provide basis: Project has steep slopes with clay soils. Additionally, project site is located within a slide mitigation area.			
4	Would infiltration of the DCV cause an increase in groundwater flow or decrease in surface runoff over predevelopment conditions that would cause **impairment to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?** Use criteria in Section 4.2.2.5		X
Provide basis: No ephemeral washes downstream.			

Categorization of Infiltration Feasibility Condition		*Page 3 of 5*	
Part 2 (continued): Risks Limiting Full Infiltration of the DCV –*Would infiltration of the full DCV introduce risks of undesirable consequences that cannot reasonably be mitigated?*		***Yes***	***No***
5	Is there substantial evidence that infiltration of the DCV would **result in a significant increase in I&I to the sanitary sewer** that cannot be sufficiently mitigated?		X
Provide basis: Based on TGD, project is not located within area that has potential for I&I.			
6	Would infiltration of the DCV **violate downstream water rights**?		X
Provide basis: No regional recharge areas downstream of project.			
Part 2 Result	If the answer to all questions 2-6 are "No", then the DMA is categorized as "Full Infiltration" for the purposes of LID BMP type selection. Describe finding. At the Preliminary/Conceptual WQMP phase, describe the additional design-phase testing required to confirm this determination and identify contingencies for final design. At the Final Project WQMP phase, identify any required construction-phase testing and identify the design contingencies that should result based on construction-phase testing. If the answer to any of questions 2-6 is "Yes" then the site cannot be categorized as "Full Infiltration". Continue to Part 3: Partial Infiltration Feasibility	Item 3 is Yes	

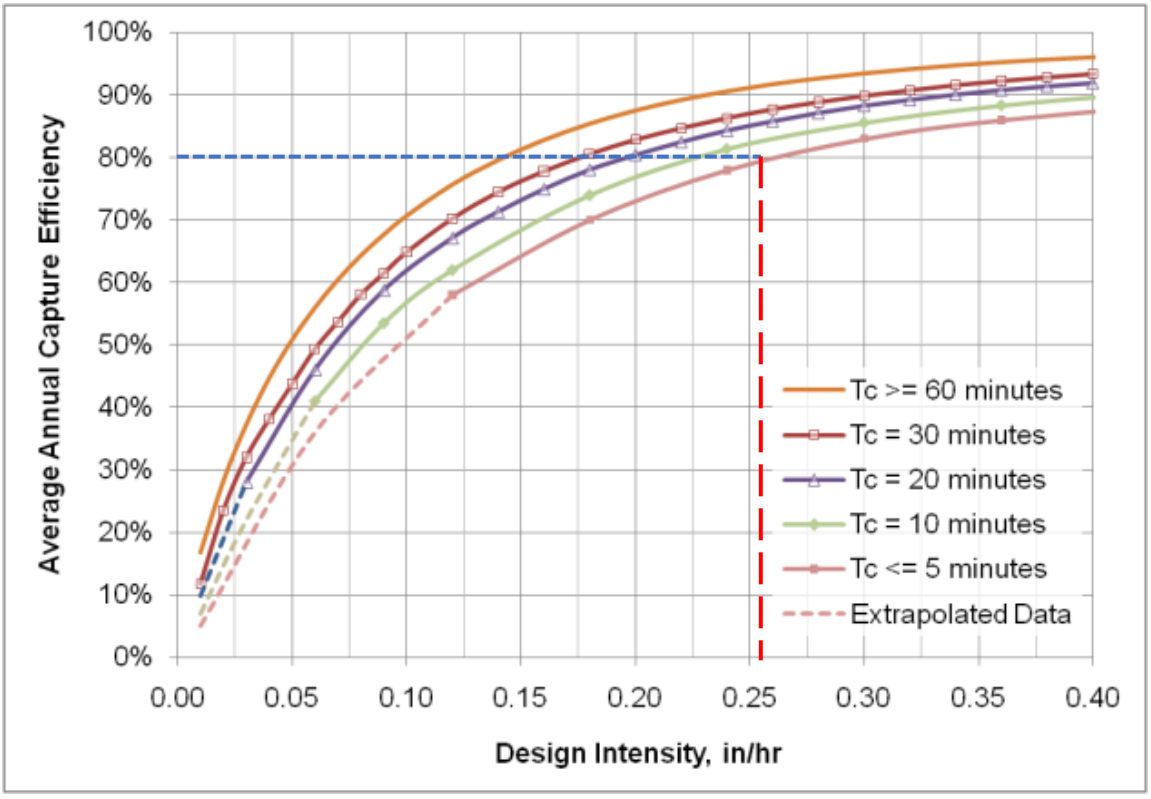
Categorization of Infiltration Feasibility Condition		*Page 4 of 5*	
Part 3: Partial Infiltration Feasibility Criteria *–Would infiltration of any appreciable volume of stormwater result in risks of undesirable consequences that cannot reasonably be mitigated?*		*Yes*	*No*
8	**Would use of biotreatment BMPs with partial infiltration pose significant risk for groundwater related concerns?** Refer to criteria in Section 4.2.2.3 and Worksheet 1 (Appendix C) for guidance on groundwater-related infiltration feasibility criteria.		X
Provide basis: No existing groundwater plumes onsite.			
9	**Would the use of biotreatment BMPs with partial infiltration pose elevated risks of geotechnical hazards that cannot be mitigated to an acceptable level?** Refer to Section 4.2.2.4.	X	
Provide basis: Project has steep slopes with clay soils and is located in a slide mitigation area.			
10	**Would the use of biotreatment BMPs with partial infiltration elevate risks or introduced conflicts related to groundwater balance, inflow and infiltration, or water rights?** Refer to Section 4.2.2.5. Note: this is uncommon and must be supported by site-specific analysis if it is used as a basis to reject biotreatment with partial infiltration.		X
Provide basis: Partial infiltration would not pose any downstream issues. However, due to the site's past history, partial infiltration is not recommended.			
Categorization of Infiltration Feasibility Condition		*Page 5 of 5*	
Part 3 Result	If the answer to all questions 8-10 are "No", then the DMA is categorized as "Biotreatment with Partial Infiltration" for the purposes of LID BMP type selection. If the answer to any of questions 8-10 is "Yes" then the site is categorized as "Biotreatment with No Infiltration" for the purposes of LID BMP type selection.	Item 9 is Yes	

Worksheet 9: Flow-Based Compact Biofiltration with Supplemental Retention Method –DMA1

Part 1: Determine the design storm intensity of the compact biofiltration BMP				
1	Enter the time of concentration, T_c (min) (See E.2.3) (account for upstream detention by increasing Tc to a maximum 60 minutes per Section E.3.5.2 if detention is provided)	T_c=	6.4	min
2	Using Figure E-7 or the figure included in the worksheet, determine the design intensity at which the estimated time of concentration (T_c) achieves 80% capture efficiency, I_1	I_1=	0.255	in/hr
3	Enter capture efficiency corresponding to upstream HSCs and/or upstream BMPs, Y_2. Attach associated calculations.	Y_2 =	0	%
4	Using Figure E-7, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_2), I_2	I_2=	0	in/hr
5	Determine the design intensity that must be provided by BMP to achieve 80 percent capture, $I_{design}= I_1-I_2$	$I_{design\_80\%}$=	0.255	in/hr
Part 2: Calculate the design flowrate of the compact biofiltration BMP (Section E.2.6)				
6a	Enter DMA area tributary to BMP (s), *A* (acres)	A=	0.86	acres
6b	Enter DMA Imperviousness, imp (unitless)	imp=	0.75	
6c	Calculate runoff coefficient, *c= (0.75 x imp) + 0.15*	c=	0.7125	
6d	Calculate flowrate to achieve 80 percent capture, $Q_{80\%}= (c \times I_{design} \times A)$	$Q_{80\%}$=	0.156	cfs
7	Calculate design flowrate, $Q_{design}= Q_{80\%} \times 150\%$	Q_{design}=	0.234	cfs
Part 3: Demonstrate that Supplemental Retention BMPs Conform to Volume Reduction Targets (Only DMAs Categorized as "Biotreatment with Partial Infiltration")				
8	Describe system, including features to maximize volume reduction (if applicable): Not applicable to project. Project is not able to retain any runoff.			
9	Summarize calculations to demonstrate that volume reduction targets are met, where feasible and applicable. Project is not able to retain any runoff onsite due to geotechnical concerns.			
Supporting Calculations				
Provide time of concentration assumptions: Tc determined to be 6.4 minutes resulting in I=0.255				

Worksheet 9: Flow-Based Compact Biofiltration with Supplemental Retention Method –DMA1

Graphical Operations



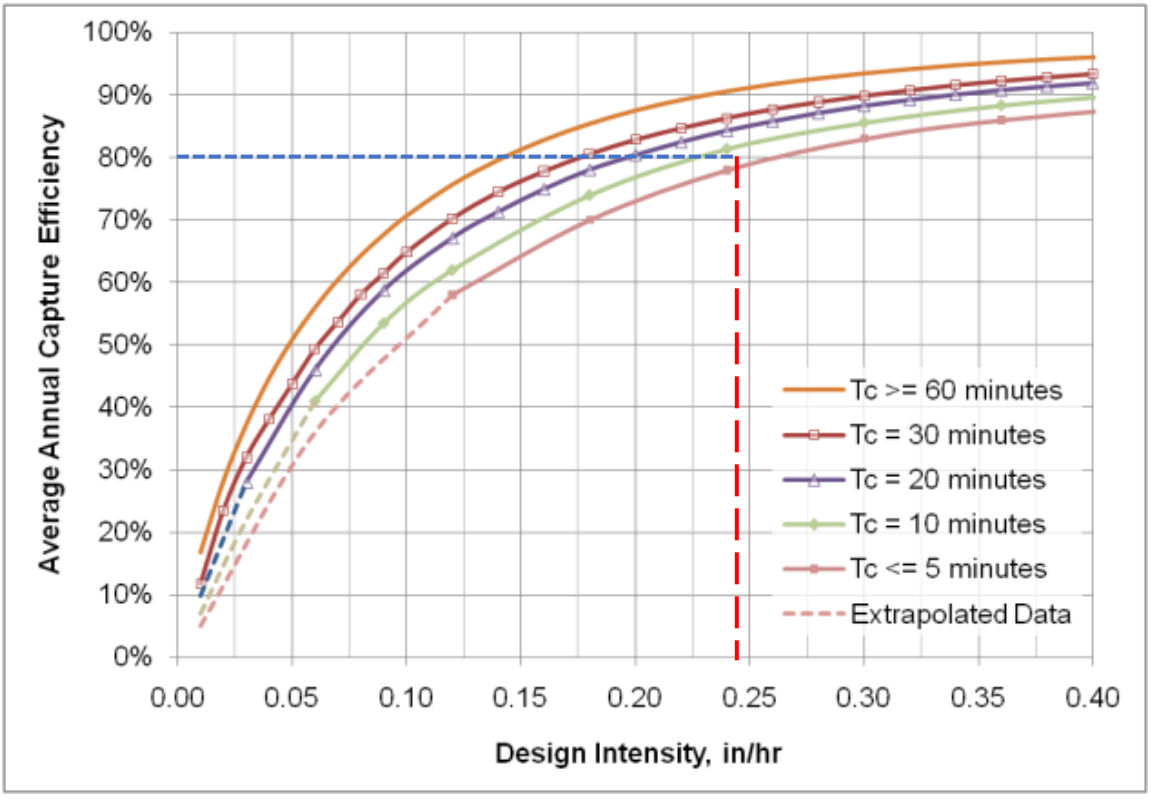
Provide supporting graphical operations in figure above.

Worksheet 9: Flow-Based Compact Biofiltration with Supplemental Retention Method –DMA2

Part 1: Determine the design storm intensity of the compact biofiltration BMP				
1	Enter the time of concentration, T_c (min) (See E.2.3) (account for upstream detention by increasing Tc to a maximum 60 minutes per Section E.3.5.2 if detention is provided)	T_c=	7.8	min
2	Using Figure E-7 or the figure included in the worksheet, determine the design intensity at which the estimated time of concentration (T_c) achieves 80% capture efficiency, I_1	I_1=	0.245	in/hr
3	Enter capture efficiency corresponding to upstream HSCs and/or upstream BMPs, Y_2. Attach associated calculations.	Y_2 =	0	%
4	Using Figure E-7, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_2), I_2	I_2=	0	in/hr
5	Determine the design intensity that must be provided by BMP to achieve 80 percent capture, $I_{design}= I_1-I_2$	$I_{design\_80\%}$=	0.245	in/hr
Part 2: Calculate the design flowrate of the compact biofiltration BMP (Section E.2.6)				
6a	Enter DMA area tributary to BMP (s), *A* (acres)	A=	0.56	acres
6b	Enter DMA Imperviousness, imp (unitless)	imp=	0.75	
6c	Calculate runoff coefficient, *c= (0.75 x imp) + 0.15*	c=	0.7125	
6d	Calculate flowrate to achieve 80 percent capture, $Q_{80\%}= (c \times I_{design} \times A)$	$Q_{80\%}$=	0.098	cfs
7	Calculate design flowrate, $Q_{design}= Q_{80\%} \times 150\%$	Q_{design}=	0.147	cfs
Part 3: Demonstrate that Supplemental Retention BMPs Conform to Volume Reduction Targets (Only DMAs Categorized as "Biotreatment with Partial Infiltration")				
8	Describe system, including features to maximize volume reduction (if applicable): Not applicable to project. Project is not able to retain any runoff.			
9	Summarize calculations to demonstrate that volume reduction targets are met, where feasible and applicable. Project is not able to retain any runoff onsite due to geotechnical concerns.			
Supporting Calculations				
Provide time of concentration assumptions: Tc determined to be 7.8 minutes, resulting in I=0.245				

Worksheet 9: Flow-Based Compact Biofiltration with Supplemental Retention Method –DMA2

Graphical Operations



Provide supporting graphical operations in figure above.

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_____________________________________________________________________________
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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                       Planning * Engineering * Surveying
                Three Hughes * Irvine, California 92618 * (949)583-1010

----------------------------------------------------------------------------
  FILE NAME: 17721P2.DAT
  TIME/DATE OF STUDY: 10:16 05/13/2021
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  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
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  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
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       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
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   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
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  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.748
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
```

DMA 2 - "B" DRIVE

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 D        0.56      0.20      0.200    57    7.84
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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
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  ELEVATION DATA: UPSTREAM(FEET) =    379.80  DOWNSTREAM(FEET) =    371.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.426
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.960
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 D        0.85      0.20      0.200    57    6.43
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.47
  TOTAL AREA(ACRES) =      0.85   PEAK FLOW RATE(CFS) =      1.47
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  TOTAL AREA(ACRES)     =        0.9  TC(MIN.) =      6.43
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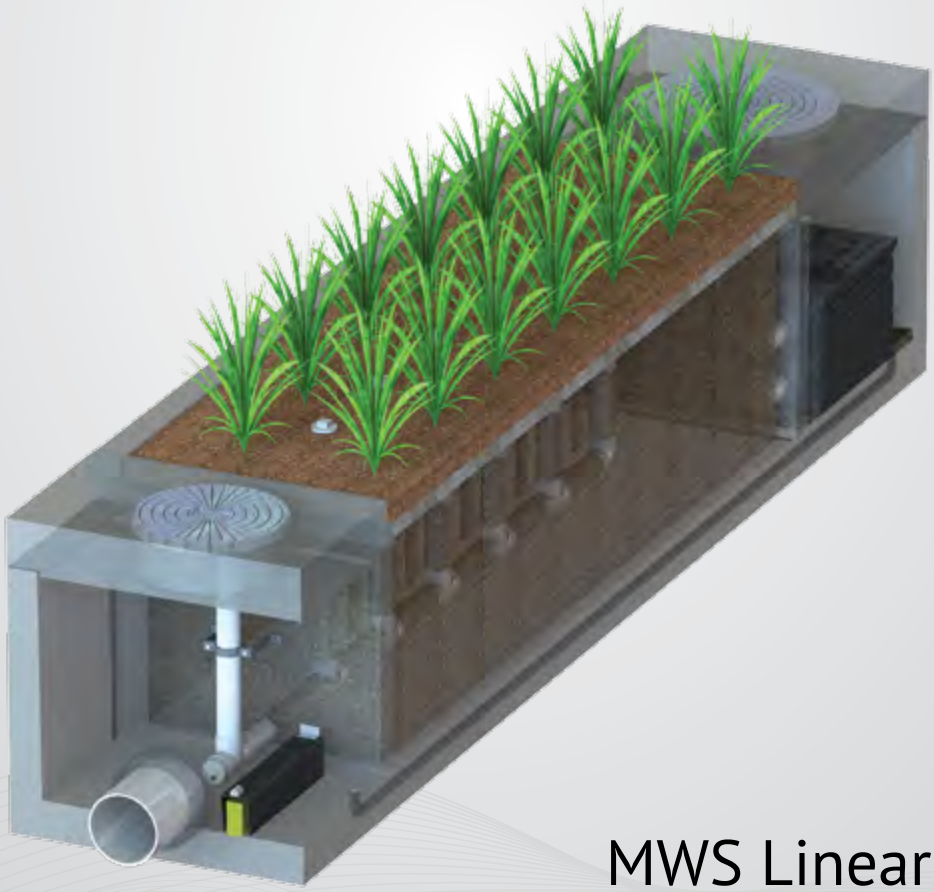
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =       1.47
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

DMA 1 - PLAYA BLANCA

MODULAR WETLANDS™

*Advanced **Stormwater** Biofiltration*



MWS Linear

Contents

The Urban Impact

For hundreds of years natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as our cities grow and develop, these natural wetlands have perished under countless roads, rooftops, and parking lots.

Plant A Wetland

Without natural wetlands our cities are deprived of water purification, flood control, and land stability. Modular Wetlands and the MWS Linear re-establish nature's presence and rejuvenate water ways in urban areas.

MWS Linear

The Modular Wetland System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint and higher treatment capacity. While most biofilters use little or no pre-treatment, the MWS Linear incorporates an advanced pre-treatment chamber that includes separation and pre-filter cartridges. In this chamber sediment and hydrocarbons are removed from runoff before it enters the biofiltration chamber, in turn reducing maintenance costs and improving performance.

Applications

The MWS Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.

Industrial

Many states enforce strict regulations for discharges from industrial sites. The MWS Linear has helped various sites meet difficult EPA mandated effluent limits for dissolved metals and other pollutants.

Residential

Low to high density developments can benefit from the versatile design of the MWS Linear. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.

Streets

Street applications can be challenging due to limited space. The MWS Linear is very adaptable, and offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.

Parking Lots

Parking lots are designed to maximize space and the MWS Linear's 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.

Commercial

Compared to bioretention systems, the MWS Linear can treat far more area in less space - meeting treatment and volume control requirements.

Mixed Use

The MWS Linear can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications are available on our website: www.ModularWetlands.com/Applications

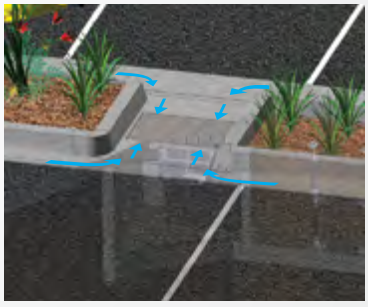
- Agriculture
- Reuse
- Low Impact Development
- Waste Water

Configurations

The MWS Linear is the preferred biofiltration system of Civil Engineers across the country due to its versatile design. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your stormdrain design.

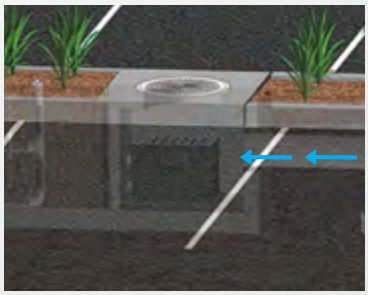
Curb Type

The *Curb Type* configuration accepts sheet flow through a curb opening and is commonly used along road ways and parking lots. It can be used in sump or flow by conditions. Length of curb opening varies based on model and size.



Grate Type

The *Grate Type* configuration offers the same features and benefits as the *Curb Type* but with a grated/drop inlet above the systems pre-treatment chamber. It has the added benefit of allowing for pedestrian access over the inlet. ADA compliant grates are available to assure easy and safe access. The *Grate Type* can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



Vault Type

The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pre-treatment chamber, meaning the MWS Linear can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/bioretention systems. Another benefit of the "pipe in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements.

Downspout Type

The *Downspout Type* is a variation of the *Vault Type* and is designed to accept a vertical downspout pipe from roof top and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

Advantages & Operation

The MWS Linear is the most efficient and versatile biofiltration system on the market, and the only system with horizontal flow which improves performance, reduces footprint, and minimizes maintenance. Figure-1 and Figure-2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.

Featured Advantages

- Horizontal Flow Biofiltration
- Greater Filter Surface Area
- Pre-Treatment Chamber
- Patented Perimeter Void Area
- Flow Control
- No Depressed Planter Area

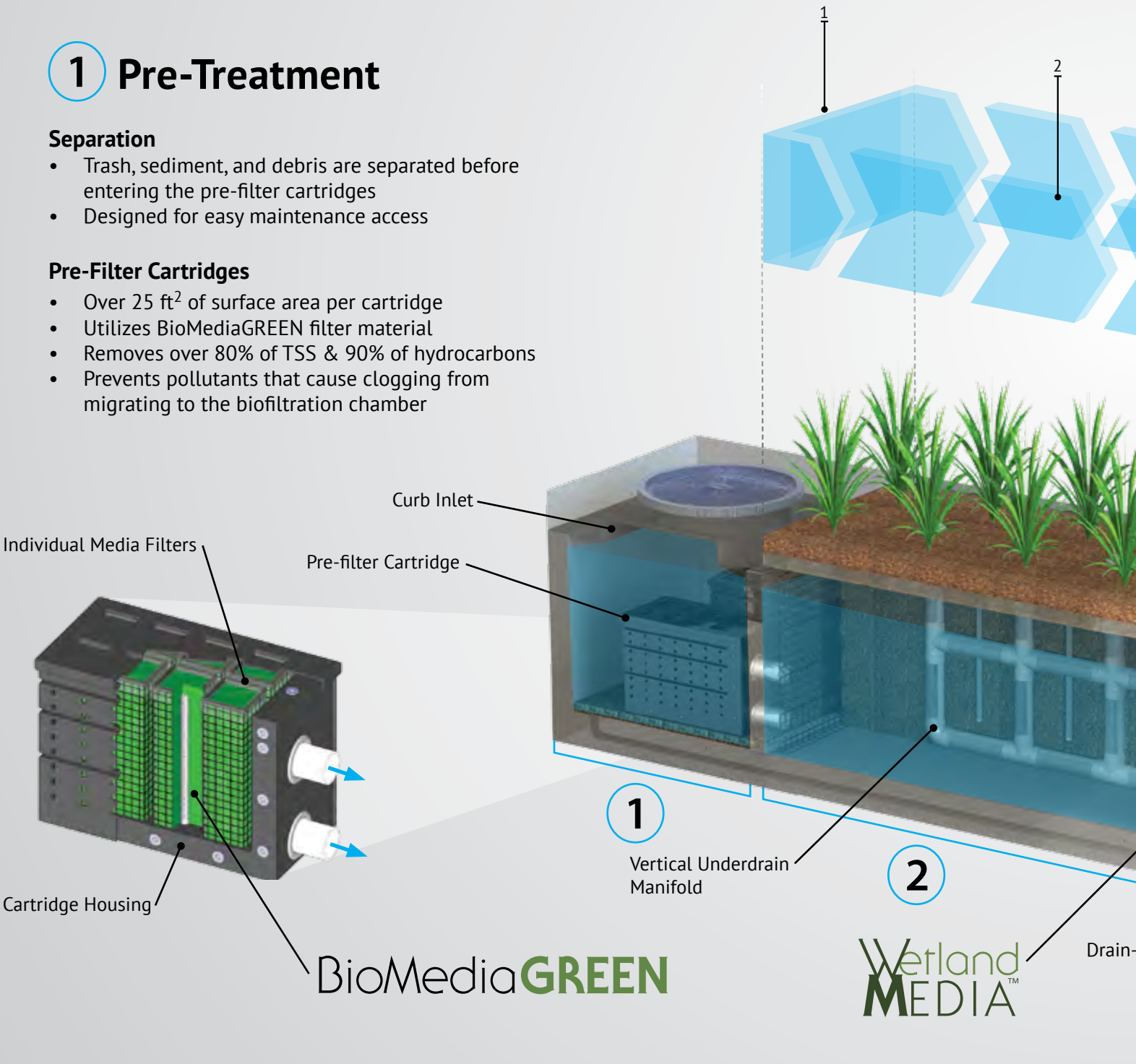
1 Pre-Treatment

Separation

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

Pre-Filter Cartridges

- Over 25 ft^2 of surface area per cartridge
- Utilizes BioMediaGREEN filter material
- Removes over 80% of TSS & 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber



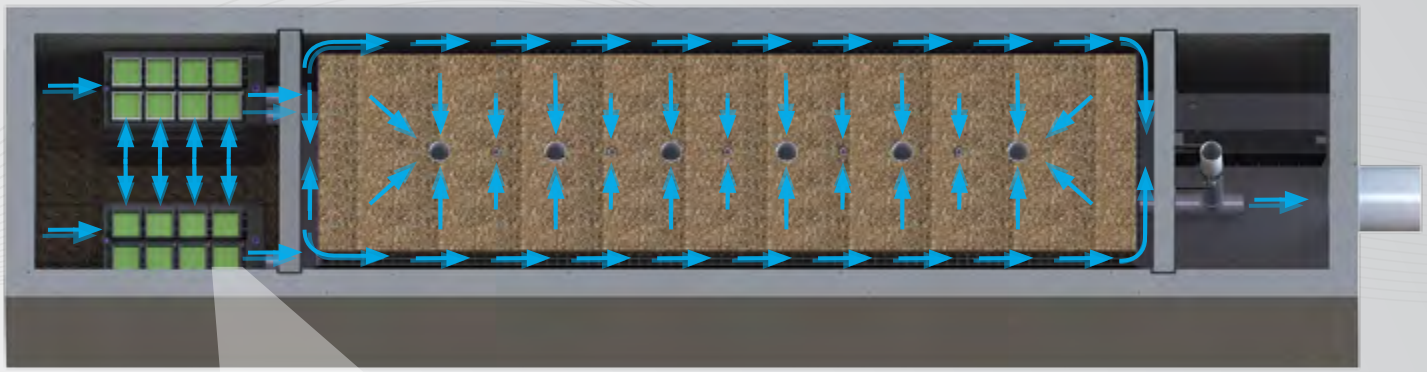


Fig. 2 - Top View

2x to 3x More Surface Area Than Traditional Downward Flow Bioretention Systems.

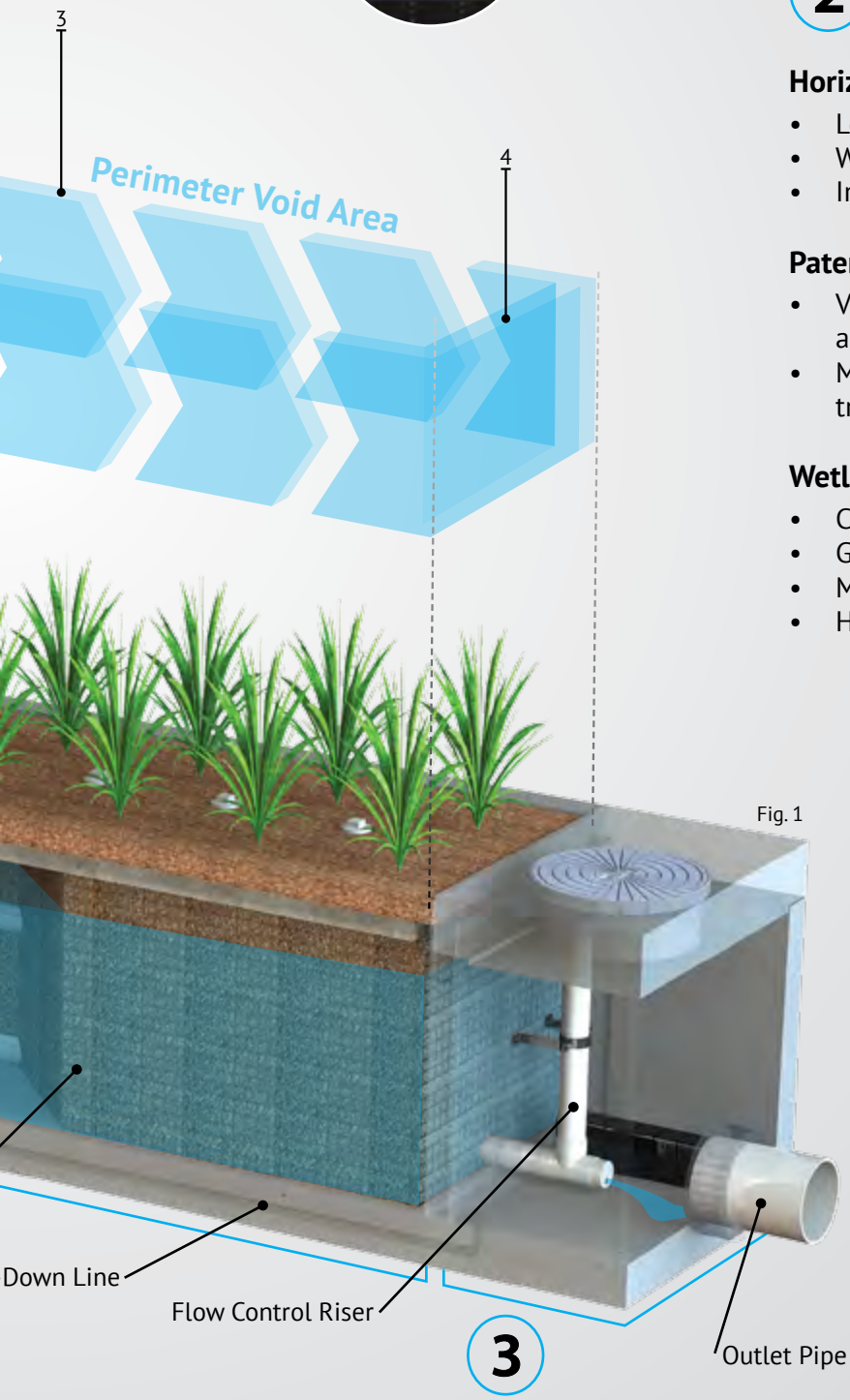


Fig. 1

2 Biofiltration

Horizontal Flow

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

Patented Perimeter Void Area

- Vertically extends void area between the walls and the WetlandMEDIA on all four sides.
- Maximizes surface area of the media for higher treatment capacity

WetlandMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and light weight

3 Discharge

Flow Control

- Orifice plate controls flow of water through WetlandMEDIA to a level lower than the media's capacity.
- Extends the life of the media and improves performance

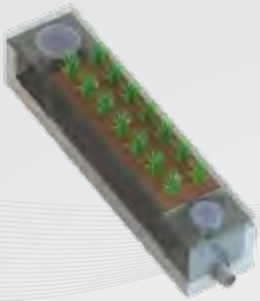
Drain-Down Filter

- The Drain-Down is an optional feature that completely drains the pre-treatment chamber
- Water that drains from the pre-treatment chamber between storm events will be treated

Orientations

Side-By-Side

The *Side-By-Side* orientation places the pre-treatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.



End-To-End

The *End-To-End* orientation places the pre-treatment and discharge chambers on opposite ends of the biofiltration chamber therefore minimizing the width of the system to 5 ft (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is bypass must be external.

Bypass

Internal Bypass Weir (Side-by-Side Only)

The *Side-By-Side* orientation places the pre-treatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pre-treatment chamber directly to the discharge chamber.

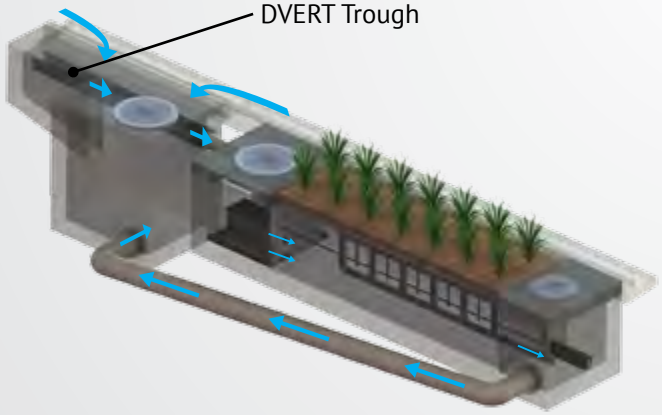
External Diversion Weir Structure

This traditional offline diversion method can be used with the MWS Linear in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the MWS Linear for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

Flow By Design

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the MWS Linear and into the standard inlet downstream.

DVERT Low Flow Diversion



This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the MWS Linear via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allows the MWS Linear to be installed anywhere space is available.

Performance

The MWS Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons and bacteria. Since 2007 the MWS Linear has been field tested on numerous sites across the country. With it's advanced pre-treatment chamber and innovative horizontal flow biofilter, the system is able to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. With the same biological processes found in natural wetlands, the MWS Linear harnesses natures ability to process, transform, and remove even the most harmful pollutants.

Approvals

The MWS Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation, and perhaps the world.

Washington State DOE Approved

The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft^2 loading rate. The highest performing BMP on the market for all main pollutant categories.

TSS	Total Phosphorus	Ortho Phosphorus	Nitrogen	Dissolved Zinc	Dissolved Copper	Total Zinc	Total Copper	Motor Oil
85%	64%	67%	45%	66%	38%	69%	50%	95%

DEQ Assignment

The Virginia Department of Environmental Quality assigned the MWS Linear, the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) Technical Criteria.

MASTEP Evaluation

The University of Massachusetts at Amherst – Water Resources Research Center, issued a technical evaluation report noting removal rates up to 84% TSS, 70% Total Phosphorus, 68.5% Total Zinc, and more.

Rhode Island DEM Approved

Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% Pathogens, 30% Total Phosphorus for discharges to freshwater systems, and 30% Total Nitrogen for discharges to saltwater or tidal systems.

Flow Based Sizing

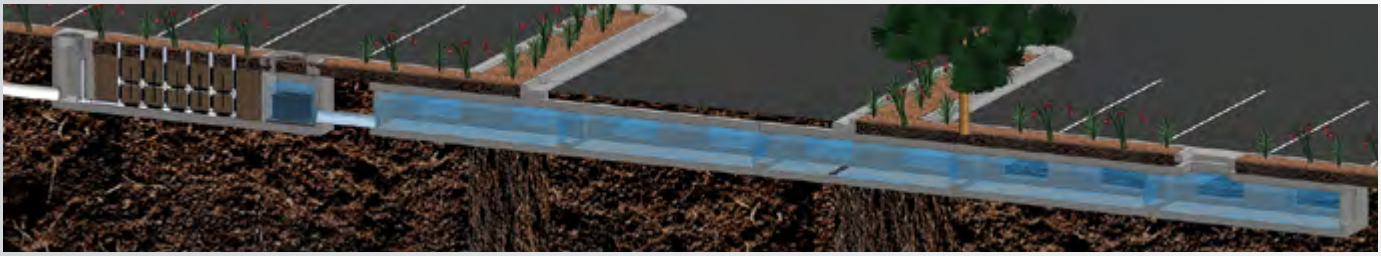
The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

Treatment Flow Sizing Table

Model #	Dimensions	WetlandMedia Surface Area	Treatment Flow Rate (cfs)
MWS-L-4-4	4' x 4'	23 ft^2	0.052
MWS-L-4-6	4' x 6'	32 ft^2	0.073
MWS-L-4-8	4' x 8'	50 ft^2	0.115
MWS-L-4-13	4' x 13'	63 ft^2	0.144
MWS-L-4-15	4' x 15'	76 ft^2	0.175
MWS-L-4-17	4' x 17'	90 ft^2	0.206
MWS-L-4-19	4' x 19'	103 ft^2	0.237
MWS-L-4-21	4' x 21'	117 ft^2	0.268
MWS-L-8-8	8' x 8'	100 ft^2	0.230
MWS-L-8-12	8' x 12'	151 ft^2	0.346
MWS-L-8-16	8' x 16'	201 ft^2	0.462

Volume Based Sizing

Many states require treatment of a water quality volume and do not offer the option of flow based design. The MWS Linear and its unique horizontal flow makes it the only biofilter that can be used in volume based design installed downstream of ponds, detention basins, and underground storage systems.



Treatment Volume Sizing Table

Model #	Treatment Capacity (cu. ft.) @ 24-Hour Drain Down	Treatment Capacity (cu. ft.) @ 48-Hour Drain Down
MWS-L-4-4	1140	2280
MWS-L-4-6	1600	3200
MWS-L-4-8	2518	5036
MWS-L-4-13	3131	6261
MWS-L-4-15	3811	7623
MWS-L-4-17	4492	8984
MWS-L-4-19	5172	10345
MWS-L-4-21	5853	11706
MWS-L-8-8	5036	10072
MWS-L-8-12	7554	15109
MWS-L-8-16	10073	20145

Installation

The MWS Linear is simple, easy to install, and has a space efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles pre-cast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians are available to supervise installations and provide technical support.

Maintenance

Reduce your maintenance costs, man hours, and materials with the MWS Linear. Unlike other biofiltration systems that provide no pre-treatment, the MWS Linear is a self-contained treatment train which incorporates simple and effective pre-treatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pre-treatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pre-treatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long term operation and there is absolutely no need to replace expensive biofiltration media.

Plant Selection

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the MWS Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the MWS Linear, giving the plants more "contact time" so that pollutants are more successfully decomposed, volatilized and incorporated into the biomass of The MWS Linear's micro/macro flora and fauna.

A wide range of plants are suitable for use in the MWS Linear, but selections vary by location and climate. View suitable plants by selecting the list relative to your project location's hardy zone.

Please visit www.ModularWetlands.com/Plants for more information and various plant lists.

Attachment F Hydromodification Analysis

SOHM

PROJECT REPORT

General Model Information

Project Name:	Tract 17721
Site Name:	The Cove at El Niguel
Site Address:	Crown Valley Parkway
City:	Laguna Niguel
Report Date:	12/18/2020
Gage:	Laguna Beach
Data Start:	10/01/1949
Data End:	09/30/2006
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2020/10/14

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	acre
D,Open Brush,Flat	52.53
D,Open Brush,Mod	14.46
Pervious Total	66.99

Impervious Land Use	acre
Impervious,Flat(0-5)	35.67
Impervious Total	35.67
Basin Total	102.66

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Tributary to Upsized Pipe

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
D,Open Brush,Mod	4.85
Pervious Total	4.85

Impervious Land Use	acre
Impervious,Flat(0-5)	0.66
Impervious Total	0.66
Basin Total	5.51

Element Flows To:

Surface	Interflow	Groundwater
Upsized PIpe	Upsized PIpe	

Areas Not Tributary to Detention

Bypass:	Yes
GroundWater:	No

Pervious Land Use	acre
D,Open Brush,Mod	7.12
D,Open Brush,Flat	53.83
Pervious Total	60.95

Impervious Land Use	acre
Impervious,Flat(0-5)	36.2
Impervious Total	36.2
Basin Total	97.15

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Upsized PIpe

Dimensions

Depth:	4 ft.	
Tank Type:	Circular	
Diameter:	4 ft.	
Length:	200 ft.	
Discharge Structure		
Riser Height:	4 ft.	
Riser Diameter:	48 in.	
Notch Type:	Rectangular	
Notch Width:	4.000 ft.	
Notch Height:	1.000 ft.	
Orifice 1 Diameter:	1 in.	Elevation:0 ft.
Orifice 2 Diameter:	2 in.	Elevation:2.001 ft.
Orifice 3 Diameter:	1 in.	Elevation:3 ft.

Element Flows To:

Outlet 1 Outlet 2

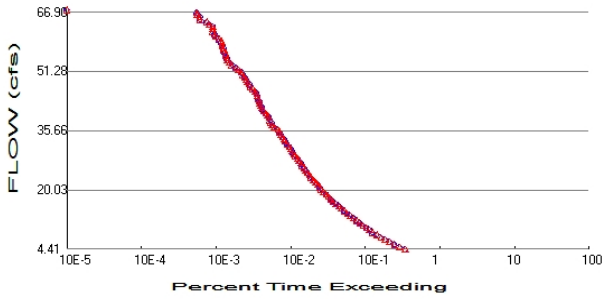
Tank Hydraulic Table

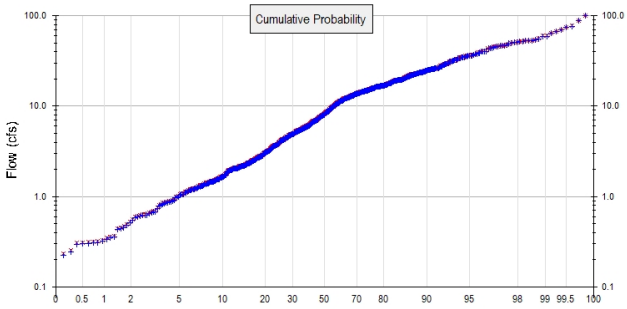
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.000	0.000	0.000	0.000
0.0444	0.003	0.000	0.005	0.000
0.0889	0.005	0.000	0.008	0.000
0.1333	0.006	0.000	0.009	0.000
0.1778	0.007	0.000	0.011	0.000
0.2222	0.008	0.001	0.012	0.000
0.2667	0.009	0.001	0.014	0.000
0.3111	0.009	0.002	0.015	0.000
0.3556	0.010	0.002	0.016	0.000
0.4000	0.011	0.003	0.017	0.000
0.4444	0.011	0.003	0.018	0.000
0.4889	0.012	0.004	0.019	0.000
0.5333	0.012	0.004	0.019	0.000
0.5778	0.012	0.005	0.020	0.000
0.6222	0.013	0.005	0.021	0.000
0.6667	0.013	0.006	0.022	0.000
0.7111	0.014	0.006	0.022	0.000
0.7556	0.014	0.007	0.023	0.000
0.8000	0.014	0.008	0.024	0.000
0.8444	0.015	0.008	0.024	0.000
0.8889	0.015	0.009	0.025	0.000
0.9333	0.015	0.010	0.026	0.000
0.9778	0.015	0.010	0.026	0.000
1.0222	0.016	0.011	0.027	0.000
1.0667	0.016	0.012	0.028	0.000
1.1111	0.016	0.013	0.028	0.000
1.1556	0.016	0.013	0.029	0.000
1.2000	0.016	0.014	0.029	0.000
1.2444	0.017	0.015	0.030	0.000
1.2889	0.017	0.016	0.030	0.000
1.3333	0.017	0.016	0.031	0.000
1.3778	0.017	0.017	0.031	0.000
1.4222	0.017	0.018	0.032	0.000

1.4667	0.017	0.019	0.032	0.000
1.5111	0.017	0.020	0.033	0.000
1.5556	0.017	0.020	0.033	0.000
1.6000	0.018	0.021	0.034	0.000
1.6444	0.018	0.022	0.034	0.000
1.6889	0.018	0.023	0.035	0.000
1.7333	0.018	0.024	0.035	0.000
1.7778	0.018	0.024	0.036	0.000
1.8222	0.018	0.025	0.036	0.000
1.8667	0.018	0.026	0.037	0.000
1.9111	0.018	0.027	0.037	0.000
1.9556	0.018	0.028	0.037	0.000
2.0000	0.018	0.028	0.038	0.000
2.0444	0.018	0.029	0.061	0.000
2.0889	0.018	0.030	0.071	0.000
2.1333	0.018	0.031	0.079	0.000
2.1778	0.018	0.032	0.085	0.000
2.2222	0.018	0.032	0.091	0.000
2.2667	0.018	0.033	0.096	0.000
2.3111	0.018	0.034	0.101	0.000
2.3556	0.018	0.035	0.106	0.000
2.4000	0.018	0.036	0.110	0.000
2.4444	0.017	0.036	0.114	0.000
2.4889	0.017	0.037	0.118	0.000
2.5333	0.017	0.038	0.122	0.000
2.5778	0.017	0.039	0.126	0.000
2.6222	0.017	0.040	0.129	0.000
2.6667	0.017	0.040	0.132	0.000
2.7111	0.017	0.041	0.136	0.000
2.7556	0.017	0.042	0.139	0.000
2.8000	0.016	0.043	0.142	0.000
2.8444	0.016	0.043	0.145	0.000
2.8889	0.016	0.044	0.148	0.000
2.9333	0.016	0.045	0.151	0.000
2.9778	0.016	0.046	0.154	0.000
3.0222	0.015	0.046	0.205	0.000
3.0667	0.015	0.047	0.395	0.000
3.1111	0.015	0.048	0.664	0.000
3.1556	0.015	0.048	0.992	0.000
3.2000	0.014	0.049	1.370	0.000
3.2444	0.014	0.050	1.793	0.000
3.2889	0.014	0.050	2.255	0.000
3.3333	0.013	0.051	2.753	0.000
3.3778	0.013	0.052	3.286	0.000
3.4222	0.012	0.052	3.851	0.000
3.4667	0.012	0.053	4.446	0.000
3.5111	0.012	0.053	5.070	0.000
3.5556	0.011	0.054	5.722	0.000
3.6000	0.011	0.054	6.400	0.000
3.6444	0.010	0.055	7.103	0.000
3.6889	0.009	0.055	7.831	0.000
3.7333	0.009	0.056	8.583	0.000
3.7778	0.008	0.056	9.358	0.000
3.8222	0.007	0.056	10.15	0.000
3.8667	0.006	0.057	10.97	0.000
3.9111	0.005	0.057	11.81	0.000
3.9556	0.003	0.057	12.67	0.000
4.0000	0.000	0.057	13.55	0.000

4.0444	0.000	0.000	13.95	0.000

Analysis Results
POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 66.99
Total Impervious Area: 35.67

Mitigated Landuse Totals for POC #1
Total Pervious Area: 65.8
Total Impervious Area: 36.86

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	44.115688
5 year	53.450914
10 year	66.903464
25 year	78.411997

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	44.2356
5 year	53.599051
10 year	66.93384
25 year	80.27014

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
4.4116	6695	6823	101	Pass
5.0428	5672	5768	101	Pass
5.6740	4825	4927	102	Pass
6.3053	4141	4219	101	Pass
6.9365	3606	3687	102	Pass
7.5677	3176	3228	101	Pass
8.1990	2804	2860	101	Pass
8.8302	2488	2524	101	Pass
9.4614	2256	2280	101	Pass
10.0927	2043	2075	101	Pass
10.7239	1833	1873	102	Pass
11.3551	1653	1687	102	Pass
11.9863	1505	1532	101	Pass
12.6176	1360	1380	101	Pass
13.2488	1231	1254	101	Pass
13.8800	1136	1145	100	Pass
14.5113	1020	1045	102	Pass
15.1425	945	958	101	Pass
15.7737	870	883	101	Pass
16.4050	801	805	100	Pass
17.0362	728	736	101	Pass
17.6674	675	683	101	Pass
18.2987	624	640	102	Pass
18.9299	590	596	101	Pass
19.5611	538	552	102	Pass
20.1924	509	508	99	Pass
20.8236	483	489	101	Pass
21.4548	451	458	101	Pass
22.0860	429	432	100	Pass
22.7173	400	403	100	Pass
23.3485	374	375	100	Pass
23.9797	349	355	101	Pass
24.6110	329	330	100	Pass
25.2422	313	312	99	Pass
25.8734	298	302	101	Pass
26.5047	281	286	101	Pass
27.1359	271	274	101	Pass
27.7671	254	257	101	Pass
28.3984	244	248	101	Pass
29.0296	230	231	100	Pass
29.6608	213	220	103	Pass
30.2921	206	207	100	Pass
30.9233	200	201	100	Pass
31.5545	188	190	101	Pass
32.1857	177	178	100	Pass
32.8170	166	167	100	Pass
33.4482	160	162	101	Pass
34.0794	152	156	102	Pass
34.7107	146	149	102	Pass
35.3419	140	141	100	Pass
35.9731	131	135	103	Pass
36.6044	118	121	102	Pass
37.2356	113	113	100	Pass

37.8668	111	109	98	Pass
38.4981	105	105	100	Pass
39.1293	101	103	101	Pass
39.7605	96	98	102	Pass
40.3918	89	92	103	Pass
41.0230	84	86	102	Pass
41.6542	82	82	100	Pass
42.2854	78	79	101	Pass
42.9167	77	77	100	Pass
43.5479	75	75	100	Pass
44.1791	72	74	102	Pass
44.8104	71	71	100	Pass
45.4416	69	70	101	Pass
46.0728	66	66	100	Pass
46.7041	61	62	101	Pass
47.3353	57	57	100	Pass
47.9665	55	55	100	Pass
48.5978	52	52	100	Pass
49.2290	50	51	102	Pass
49.8602	48	48	100	Pass
50.4915	46	45	97	Pass
51.1227	43	43	100	Pass
51.7539	39	40	102	Pass
52.3851	36	37	102	Pass
53.0164	33	32	96	Pass
53.6476	30	30	100	Pass
54.2788	28	28	100	Pass
54.9101	28	28	100	Pass
55.5413	27	27	100	Pass
56.1725	26	27	103	Pass
56.8038	25	25	100	Pass
57.4350	25	25	100	Pass
58.0662	24	24	100	Pass
58.6975	23	24	104	Pass
59.3287	22	24	109	Pass
59.9599	21	22	104	Pass
60.5912	19	20	105	Pass
61.2224	19	19	100	Pass
61.8536	18	18	100	Pass
62.4848	18	18	100	Pass
63.1161	18	18	100	Pass
63.7473	16	16	100	Pass
64.3785	15	15	100	Pass
65.0098	12	12	100	Pass
65.6410	12	12	100	Pass
66.2722	11	11	100	Pass
66.9035	11	11	100	Pass

Water Quality

POC 2

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

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2006 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   Tract 17721.wdm
MESSU       25   PreTract 17721.MES
            27   PreTract 17721.L61
            28   PreTract 17721.L62
            30   POCTract 177211.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      41
      PERLND      42
      IMPLND       1
      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           ***
   41     D,Open Brush,Flat       1    1    1    1   27    0
   42     D,Open Brush,Mod        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 ***
   41         0    0    1    0    0    0    0    0    0    0    0    0
   42         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  *********
   41         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   42         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 ***
   41         0    0    0    1    0    0    0    0    1    0    0
   42         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
   41              0       4.6      0.04       400      0.05       0.8     0.955
   42              0       4.3     0.035       350       0.1       0.8     0.955
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   41             40        35         4         2         0      0.03         0
   42             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 ***
   41              0       0.8      0.25         1       0.7         0
   42              0      0.65      0.25       0.8      0.45         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   41       0.4  0.4  0.4  0.5 0.55 0.55 0.55 0.55 0.55 0.55 0.45  0.4
   42       0.4  0.4  0.4  0.5 0.55 0.55 0.55 0.55 0.55 0.55 0.45  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   41      0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12
   42      0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12
  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
   41              0         0      0.08         0      0.92       0.3      0.01
   42              0         0     0.065         0      0.86       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  41                      52.53     COPY   501     12
PERLND  41                      52.53     COPY   501     13
PERLND  42                      14.46     COPY   501     12
PERLND  42                      14.46     COPY   501     13
IMPLND   1                      35.67     COPY   501     15

******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

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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1949 10 01        END    2006 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   Tract 17721.wdm
MESSU       25   MitTract 17721.MES
            27   MitTract 17721.L61
            28   MitTract 17721.L62
            30   POCTract 177211.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      42
      IMPLND       1
      PERLND      41
      RCHRES       1
      COPY         1
      COPY       501
      COPY       601
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Upsized PIpe               MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  601         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            ***
   42     D,Open Brush,Mod        1    1    1    1   27    0
   41     D,Open Brush,Flat       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 ***
   42         0    0    1    0    0    0    0    0    0    0    0    0
   41         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  *********
   42         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   41         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 ***
   42         0    0    0    1    0    0    0    0    1    0    0
   41         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
   42              0       4.3     0.035       350       0.1       0.8     0.955
   41              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
   42             40        35         4         2         0      0.03         0
   41             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 ***
   42              0      0.65      0.25       0.8      0.45         0
   41              0       0.8      0.25         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  ***
   42       0.4  0.4  0.4  0.5 0.55 0.55 0.55 0.55 0.55 0.55 0.45  0.4
   41       0.4  0.4  0.4  0.5 0.55 0.55 0.55 0.55 0.55 0.55 0.45  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   42      0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12
   41      0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12
  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
   42              0         0     0.065         0      0.86       0.3      0.01
   41              0         0      0.08         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#   ***
Tributary to Upsized Pipe***
PERLND  42                        4.85     RCHRES   1      2
PERLND  42                        4.85     RCHRES   1      3
IMPLND   1                        0.66     RCHRES   1      5
Areas Not Tributary to Detention***
PERLND  42                        7.12     COPY   501     12
PERLND  42                        7.12     COPY   601     12
PERLND  42                        7.12     COPY   501     13
PERLND  42                        7.12     COPY   601     13
PERLND  41                       53.83     COPY   501     12
PERLND  41                       53.83     COPY   601     12
PERLND  41                       53.83     COPY   501     13
PERLND  41                       53.83     COPY   601     13
IMPLND   1                        36.2     COPY   501     15
IMPLND   1                        36.2     COPY   601     15

******Routing******
PERLND  42                        4.85     COPY     1     12
IMPLND   1                        0.66     COPY     1     15
PERLND  42                        4.85     COPY     1     13
RCHRES   1                           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



<-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     Upsized PIpe            1    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  0  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      0.04       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  0.0  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    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.000000  0.000000  0.000000
  0.044444  0.003850  0.000114  0.005721
  0.088889  0.005414  0.000322  0.008091
  0.133333  0.006593  0.000590  0.009909
  0.177778  0.007570  0.000905  0.011442
  0.222222  0.008414  0.001261  0.012792
  0.266667  0.009162  0.001652  0.014013
  0.311111  0.009837  0.002074  0.015136
  0.355556  0.010453  0.002525  0.016181
  0.400000  0.011019  0.003003  0.017163
  0.444444  0.011543  0.003504  0.018091
  0.488889  0.012031  0.004028  0.018974
  0.533333  0.012486  0.004573  0.019818
  0.577778  0.012912  0.005138  0.020627
  0.622222  0.013313  0.005721  0.021406
  0.666667  0.013689  0.006321  0.022157
  0.711111  0.014043  0.006937  0.022884
  0.755556  0.014377  0.007569  0.023588
```

0.800000	0.014692	0.008215	0.024272
0.844444	0.014990	0.008874	0.024937
0.888889	0.015271	0.009547	0.025585
0.933333	0.015535	0.010232	0.026217
0.977778	0.015785	0.010928	0.026834
1.022222	0.016021	0.011635	0.027437
1.066667	0.016243	0.012352	0.028027
1.111111	0.016452	0.013078	0.028605
1.155556	0.016648	0.013814	0.029171
1.200000	0.016832	0.014558	0.029727
1.244444	0.017005	0.015310	0.030272
1.288889	0.017165	0.016069	0.030808
1.333333	0.017315	0.016835	0.031335
1.377778	0.017454	0.017608	0.031853
1.422222	0.017582	0.018387	0.032363
1.466667	0.017700	0.019171	0.032864
1.511111	0.017808	0.019960	0.033359
1.555556	0.017906	0.020754	0.033846
1.600000	0.017994	0.021552	0.034326
1.644444	0.018073	0.022353	0.034799
1.688889	0.018142	0.023158	0.035266
1.733333	0.018201	0.023966	0.035727
1.777778	0.018252	0.024776	0.036182
1.822222	0.018293	0.025588	0.036632
1.866667	0.018325	0.026402	0.037076
1.911111	0.018347	0.027216	0.037515
1.955556	0.018361	0.028032	0.037948
2.000000	0.018365	0.028848	0.038377
2.044444	0.018361	0.029665	0.061426
2.088889	0.018347	0.030480	0.071401
2.133333	0.018325	0.031295	0.079123
2.177778	0.018293	0.032109	0.085685
2.222222	0.018252	0.032921	0.091508
2.266667	0.018201	0.033731	0.096804
2.311111	0.018142	0.034539	0.101702
2.355556	0.018073	0.035344	0.106283
2.400000	0.017994	0.036145	0.110606
2.444444	0.017906	0.036943	0.114711
2.488889	0.017808	0.037737	0.118631
2.533333	0.017700	0.038526	0.122389
2.577778	0.017582	0.039310	0.126007
2.622222	0.017454	0.040089	0.129498
2.666667	0.017315	0.040861	0.132876
2.711111	0.017165	0.041628	0.136153
2.755556	0.017005	0.042387	0.139336
2.800000	0.016832	0.043139	0.142435
2.844444	0.016648	0.043883	0.145456
2.888889	0.016452	0.044619	0.148405
2.933333	0.016243	0.045345	0.151288
2.977778	0.016021	0.046062	0.154107
3.022222	0.015785	0.046769	0.205039
3.066667	0.015535	0.047465	0.395864
3.111111	0.015271	0.048150	0.664611
3.155556	0.014990	0.048822	0.992750
3.200000	0.014692	0.049482	1.370915
3.244444	0.014377	0.050128	1.793147
3.288889	0.014043	0.050760	2.255222
3.333333	0.013689	0.051376	2.753940
3.377778	0.013313	0.051976	3.286768
3.422222	0.012912	0.052559	3.851637
3.466667	0.012486	0.053124	4.446813
3.511111	0.012031	0.053669	5.070817
3.555556	0.011543	0.054193	5.722369
3.600000	0.011019	0.054694	6.400345
3.644444	0.010453	0.055171	7.103747
3.688889	0.009837	0.055622	7.831685
3.733333	0.009162	0.056045	8.583355
3.777778	0.008414	0.056436	9.358027
3.822222	0.007570	0.056791	10.15503
3.866667	0.006593	0.057107	10.97377

```
  3.911111  0.005414  0.057375  11.81366
  3.955556  0.003850  0.057582  12.67419
  4.000000  0.001000  0.057697  13.55488
  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

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   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
COPY   601 OUTPUT MEAN   1 1     48.4      WDM    901 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       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

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

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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Attachment G Geotechnical Report

Due to large size of document, the report is on file with the City and has been incorporated by reference:

American Geotechnical, Inc. January 8, 2021. *Geotechnical Review of Tentative Tract Map No. 17721, The Cove at El Niguel, 30667 Crown Valley Parkway, Laguna Niguel, California.*

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