# Appendix I Preliminary Water Quality Management Plan

# Appendices

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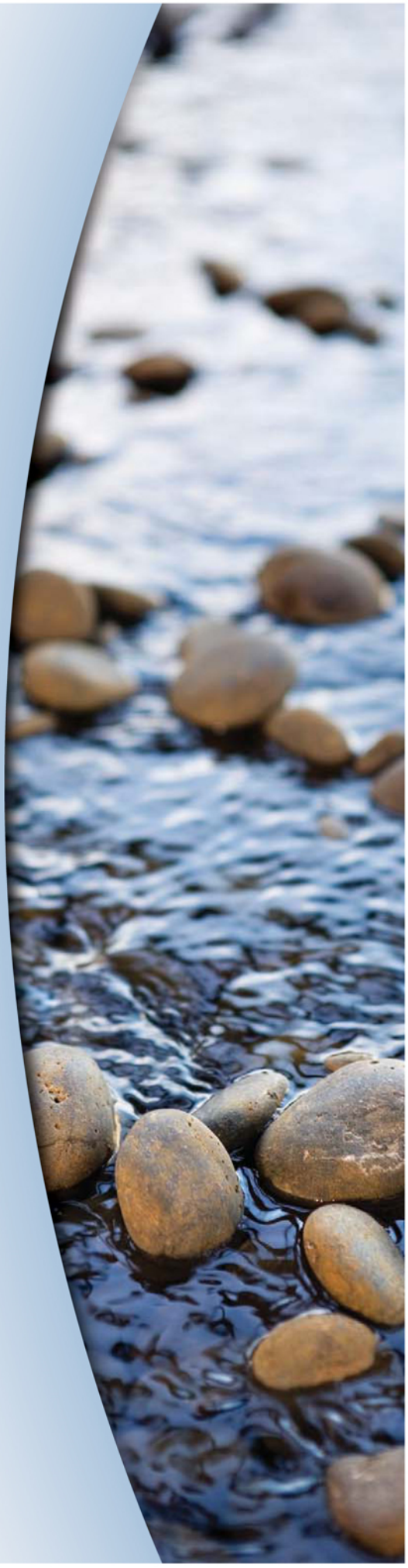

PRELIMINARY
WATER QUALITY MANAGEMENT PLAN (WQMP)

# OCMA Museum House

Newport Beach, California

Prepared For

*OCMA Urban Housing, LLC*
*18201 Von Karman Ave, Suite 900*
*Irvine, CA 92612*
*949.660.7272*

Prepared By

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**Project Manager:**
**Oriana Slasor, PE**

**Date Prepared: November 3, 2015**
**Date Revised: March 10, 2016**
**Job Number: 622.013.01**

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PRELIMINARY
WATER QUALITY MANAGEMENT PLAN (PWQMP)
# OCMA Museum House

*March 10, 2016*

622.013.01

PRELIMINARY
WATER QUALITY MANAGEMENT PLAN (PWQMP)
OCMA Museum House

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OCMA Museum House

March 10, 2016

622.013.01

# PRELIMINARY
# WATER QUALITY MANAGEMENT PLAN (WQMP)

## OCMA MUSEUM HOUSE

850 San Clemente Road, Newport Beach, County of Orange

VTTM 17970
APN: 442-261-05


6/3/16

Prepared for:

OCMA URBAN HOUSING, LLC
18201 Von Karman Ave, Suite 900
Irvine, CA 92612
949.660.7272

Prepared by:

FUSCOE ENGINEERING, INC.
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Oriana Slasor, PE

Date Prepared: November 3, 2015
Resubmitted: March 10, 2016

| PROJECT OWNER'S CERTIFICATION | | | |
|---|---|---|---|
| **Permit/Application No.:** | Pending | **Grading Permit No.:** | Pending |
| **Tract/Parcel Map and Lot(s)No.:** | VTTM 17970 | **Building Permit No.:** | Pending |
| **Address of Project Site and APN:** | 850 San Clemente Drive, Newport Beach, CA 92660<br>APN: 442-261-05 | | |

This Water Quality Management Plan (WQMP) has been prepared for OCMA URBAN HOUSING, LLC by FUSCOE ENGINEERING, INC. The WQMP is intended to comply with the requirements of the County of Orange NPDES Stormwater Program requiring the preparation of the plan.

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

| OWNER: OCMA Urban Housing, LLC | | | |
|---|---|---|---|
| **Name:** | Greg Vilkin | | |
| **Title:** | President | | |
| **Company:** | OCMA Urban Housing, LLC | | |
| **Address:** | 18201 Von Karman Ave, Suite 900, Irvine, CA 92612 | | |
| **Email:** | steven.oh@related.com | | |
| **Telephone #:** | 949.660.7272 | | |
| I understand my responsibility to implement the provisions of this WQMP including the ongoing operation and maintenance of the best management practices (BMPs) described herein. | | | |
| **Owner Signature:** | | **Date:** | 7/21/16 |

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## APPENDICES



## EXHIBITS & BMP DETAILS (INCLUDED IN SECTION VI)

- Vicinity Map
- Site Plan
- WQMP Exhibit
- Typical Cross Sections

## EDUCATIONAL MATERIALS (INCLUDED IN APPENDIX C)

- The Ocean Begins at Your Front Door
- Household Tips
- Proper Disposal of Household Hazardous Waste
- Recycle at Your Local Used Oil Collection Center (Central County)
- Responsible Pest Control
- Tips for Landscaping and Gardening
- Tips for Pet Care
- Tips for Pool Maintenance
- Tips for Residential Pool, Landscape and Hardscape Drains
- DF-1 Drainage System Operation & Maintenance
- R-4 Home & Garden Care Activities
- R-5 Disposal of Pet Waste
- R-6 Disposal of Green Waste
- R-7 Household Hazardous Waste
- R-8 Water Conservation
- SD-10 Site Design & Landscape Planning
- SD-12 Efficient Irrigation
- SD-13 Storm Drain Signage

# SECTION I DISCRETIONARY PERMITS AND WATER QUALITY CONDITIONS

| PROJECT INFORMATION | | | |
|---|---|---|---|
| **Permit/Application No.:** | Pending | **Grading or Building Permit No.:** | Pending |
| **Address of Project Site (or Tract Map and Lot Number if no address) and APN:** | 850 San Clemente Drive, Newport Beach, CA 92660<br>APN: 442-261-05 | | |
| **WATER QUALITY CONDITIONS OF APPROVAL OR ISSUANCE** | | | |
| **Discretionary Permit(s):** | Pending | | |
| **Water Quality Conditions of Approval or Issuance applied to this project:**<br>**(Please list verbatim.)** | <u>City of Newport Beach Standard Condition:</u><br>▪ The City of Newport Beach requires all new development and significant redevelopment projects to prepare and submit a Water Quality Management Plan (WQMP) to the City for review and approval. Prior to issuance of grading or building permits, the project applicant shall have an approved final Project WQMP.<br>▪ Prior to the issuance of the grading permit, the applicant shall prepare a Water Quality Management Plan (WQMP) specifically identifying the Best Management Practices (BMP's) that will be used on site to control predictable pollutant runoff. The plan shall identify the types of structural and non-structural measures to be used. The plan shall comply with the Orange County Drainage Area Management Plan (DAMP). Particular attention should be addressed to the appendix section "Best Management Practices for New Development." The WQMP shall clearly show the locations of structural BMP's, and assignment of long term maintenance responsibilities (which shall also be included in the Maintenance Agreement). The plan shall be prepared to the format of the DAMP title "Water Quality Management Plan Outline" and be subject to the approval of the City. | | |
| **CONCEPTUAL WQMP** | | | |
| **Was a Conceptual Water Quality Management Plan previously approved for this project?** | N/A | | |

| WATERSHED-BASED PLAN CONDITIONS | | |
|---|---|---|
| **Applicable conditions from watershed - based plans including WIHMPs and TMDLs:** | Upper Newport Bay:<br>▪ Metals<br>▪ Nutrients<br>▪ Pathogens<br>▪ Pesticides<br>▪ Siltation | Lower Newport Bay:<br>▪ Metals<br>▪ Nutrients<br>▪ Pathogens<br>▪ Pesticides<br>▪ Priority Organics<br>▪ Siltation |

# SECTION II PROJECT DESCRIPTION

## II.1 PROJECT DESCRIPTION

The proposed OCMA Museum House project site encompasses approximately 2 acres in the City of Newport Beach. The project site is bounded by San Clemente Drive to the south, Santa Barbara Drive to the west and Santa Cruz Drive to the east. The intersection of Jamboree Road and San Joaquin Hills Road is approximately 1,300 feet north of the project site. A Vicinity Map is included in Section VI.

Under existing conditions, the project site is currently the Orange County Museum of Art. Adjacent land uses include other commercial land uses and a residential property to the south across San Clemente Drive.

The table below summarizes the proposed project.

| DESCRIPTION OF PROPOSED PROJECT | | | | |
|---|---|---|---|---|
| **Development Category (Model WQMP, Table 7.11-2; or 7.11-3):** | Category 8.<br>All significant redevelopment projects, where significant redevelopment is defined as the addition or replacement of 5,000 or more square feet of impervious surface on an already developed site. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of the facility, or emergency redevelopment activity required to protect public health and safety.<br>Since the proposed project includes the replacement of more than 5,000 square feet of impervious surfaces on an already developed site, the project is considered a "Priority Project" in accordance with the Model WQMP and OC DAMP. | | | |
| **Project Area ($ft^2$):** | 87,120 $ft^2$ (2.00 acres) | | | |
| **# of Dwelling Units:** | 100 | | | |
| **SIC Code:** | N/A Residential | | | |
| **Narrative Project Description:** | The proposed OCMA Museum House project will include 100 condominium units along with proposed amenities. Recreation centers, such as pools, fitness, spa facility, and other amenities along with common-area landscaping are included in the proposed development. | | | |
| **Project Area:** | **Pervious Area** | **Pervious Area Percentage** | **Impervious Area** | **Impervious Area Percentage** |
| **Pre-Project Conditions:** | 0.30 ac | 15% | 1.70 ac | 85% |
| **Post-Project Conditions:** | 0.52 ac | 26% | 1.48 ac | 74% |

| DESCRIPTION OF PROPOSED PROJECT | |
|---|---|
| **Drainage Patterns/ Connections:** | Existing runoff flows towards the north west and south west portions of the site. Most of the site drainage is conveyed via existing ribbon gutters within the parking lot, and is ultimately collected by an existing 21-foot catch basin, located on the adjacent private property on 888 San Clemente Drive, to the west of the project. The 18" catch basin outlet pipe conveys the storm flows into an existing private storm drain system within the 888 San Clemente Drive property, and then to an existing 30" storm drain in Bombero Drive, then to an existing 36" public storm drain in Santa Barbara Drive. Based on preliminary hydrologic analysis, it appears that the existing catch basin and storm drain have been designed and sized to accommodate the OCMA property drainage.<br><br>Proposed runoff will flow in a southwesterly direction towards the entrance of the proposed project. All other runoff will be intercepted by proposed storm drain lines and enter into proprietary systems for water quality treatment via biofiltration or will be considered self-treating. Runoff will then flow offsite into an existing 18" private RCP line and into the existing 30" storm drain in Bombero Drive, then to an existing 36" public storm drain in Santa Barbara Drive. Flows will ultimately discharge to the Upper Newport Bay. |

## PROJECT FEATURES

**Building Summary:**

The proposed project will include 100 condominium units as summarized in the table below.

| Level | Unit Type | | | | |
|---|---|---|---|---|---|
| | Type A 2BR/2BA | Type B 2BR/2BA | Type C 2 BR/2.5 BA | Type D 2 BR/2.5 BA | Type E 3BR/3.5 BA |
| 1 | Common area | | | | |
| 2 | 1 | 1 | | | |
| 3 | Amenity Level | | | | |
| 4 | 1 | 1 | 1 | 1 | 1 |
| 5 | 1 | 1 | 1 | 1 | 1 |
| 6 | 1 | 1 | 1 | 1 | 1 |
| 7 | 1 | 1 | 1 | 1 | 1 |
| 8 | 1 | 1 | 1 | 1 | 1 |
| 9 | 1 | 1 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 |
| 11 | 1 | 1 | 1 | 1 | 1 |
| 12 | 1 | 1 | 1 | 1 | 1 |
| 13 | 1 | 1 | 1 | 1 | 1 |
| 14 | 1 | 1 | 1 | 1 | 1 |
| 15 | 1 | 1 | 1 | 1 | 1 |
| 16 | 1 | 1 | 1 | 1 | 1 |
| 17 | 1 | 1 | 1 | 1 | 1 |
| 18 | 1 | 1 | 1 | 1 | |
| 19 | 1 | 1 | 1 | 1 | |
| 20 | 1 | 1 | 1 | 1 | |
| 21 | 1 | 1 | 1 | | |
| 22 | 1 | 1 | 1 | | |
| 23 | 1 | 1 | 1 | | |
| 24 | 1 | 1 | 1 | | |
| 25 | 1 | 1 | | | |
| 26 | 1 | 1 | | | |
| Subtotal | 24 | 24 | 21 | 17 | 14 |
| Grand total | 100 units | | | | |

**Amenities:**

Recreation centers, such as pools, fitness, spa facility, and other amenities along with common-area landscaping are included in the proposed development. More details of amenity footprints will be provided in the Final WQMP.

**Landscaped Areas:**

Approximately 22,651 square feet of the project area will be landscaped. Landscaped areas are scattered throughout the proposed project area with landscaped sitting areas on the north and south ends of the property.

**Parking Facilities:**

Parking will be provided in the subterranean parking garage. There will also be uncovered visitor parking at the street level of the proposed project. Final parking counts will be provided in the final WQMP.

| PROJECT FEATURES | |
|---|---|
| **Other Project Features:** | The property will include trash enclosures that will be located in the subterranean parking garage. The trash enclosures will be walled on 3 sides with an access gate comprising the remaining side, and it will be covered. The site will not have any loading docks, outdoor storage areas, vehicle/ community car wash racks, vehicle/equipment wash areas, or commercial kitchens/food preparation areas. |
| **Outdoor Activities:** | Outdoor areas throughout the site will be used for recreational and open space purposes. The recreation areas will include a pool, spa, and open lawn areas. All other outdoor areas will be used for walkways, common areas and landscaping, and other recreational purposes. |
| **Materials Stored:** | Materials used and stored on site will include those associated with residential land uses, such as normal cleaning supplies, pool maintenance materials, and maintenance supplies. Trash will be managed by the Owner/HOA. |
| **Wastes Generated:** | The project is not anticipated to generate any wastes other than landscape clippings, typical trash, debris and refuse from the homeowners. Outdoor trash receptacles will be provided throughout the common areas of the site for the tenants to dispose of their refuse in a proper manner, and property maintenance will provide trash and waste material removal to maintain a trash-free property. Trash will be managed by the individual homeowners. All wastes shall be collected and properly disposed of off-site. |

## II.2 POTENTIAL STORM WATER POLLUTANTS

The table below, derived from Table 2 of the Countywide Model WQMP Technical Guidance Document (May 2011), summarizes the categories of land use or project features of concern and the general pollutant categories associated with them.

| ANTICIPATED & POTENTIAL POLLUTANTS GENERATED BY LAND USE TYPE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Priority Project Categories and/or Project Features** | **General Pollutant Categories** | | | | | | | |
| | **Suspended Solid/ Sediments** | **Nutrients** | **Heavy Metals** | **Pathogens (Bacteria/ Virus)** | **Pesticides** | **Oil & Grease** | **Toxic Organic Compounds** | **Trash & Debris** |
| **Detached Residential Development** | E | E | N | E | E | E | N | E |
| **Attached Residential Development** | E | E | N | E | E | E[(2)] | N | E |
| **Commercial/Industrial Development** | E[(1)] | E[(1)] | E[(5)] | E[(3)] | E[(1)] | E | E | E |
| **Automotive Repair Shops** | N | N | E | N | N | E | E | E |

| ANTICIPATED & POTENTIAL POLLUTANTS GENERATED BY LAND USE TYPE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Priority Project Categories and/or Project Features | General Pollutant Categories | | | | | | | |
| | Suspended Solid/ Sediments | Nutrients | Heavy Metals | Pathogens (Bacteria/ Virus) | Pesticides | Oil & Grease | Toxic Organic Compounds | Trash & Debris |
| Restaurants | E(1)(2) | E(1) | E(2) | E | E(1) | E | N | E |
| Hillside Development >5,000 ft² | E | E | N | E | E | E | N | E |
| Parking Lots | E | E(1) | E | E(4) | E(1) | E | E | E |
| Streets, Highways, & Freeways | E | E(1) | E | E(4) | E(1) | E | E | E |
| Retail Gasoline Outlets | N | N | E | N | N | E | E | E |

*Notes:*
E = expected to be of concern N = not expected to be of concern
(1) Expected pollutant if landscaping exists on-site, otherwise not expected.
(2) Expected pollutant if the project includes uncovered parking areas, otherwise not expected.
(3) Expected pollutant if land use involves food or animal waste products, otherwise not expected.
(4) Bacterial indicators are routinely detected in pavement runoff.
(5) Expected if outdoor storage or metal roofs, otherwise not expected.
Source: County of Orange. (2011, May 19). Technical Guidance Document for the Preparation of Conceptual/ Preliminary and/or Project Water Quality Management Plans (WQMPs). Table 2.1.

**Priority Project Categories and/or Features:** Attached residential development.

| POLLUTANTS OF CONCERN | | |
|---|---|---|
| Pollutant | E = Expected to be of concern<br>N =Not Expected to be of concern | Additional Information and Comments |
| Suspended Solid/ Sediment | E | 303(d) listed impairment/TMDL |
| Nutrients | E | 303(d) listed impairment/TMDL |
| Heavy Metals | N | 303(d) listed impairment/TMDL |
| Pathogens (Bacteria/Virus) | E | 303(d) listed impairment/TMDL |
| Pesticides | E | 303(d) listed impairment/TMDL |
| Oil & Grease | E | |

| POLLUTANTS OF CONCERN | | |
|---|---|---|
| **Pollutant** | **E = Expected to be of concern<br>N =Not Expected to be of concern** | **Additional Information and Comments** |
| **Toxic Organic Compounds** | N | |
| **Trash & Debris** | E | |

## II.3 HYDROLOGIC CONDITIONS OF CONCERN

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

In the North Orange County permit area, HCOCs are considered to exist if any streams located downstream from the project are determined to be potentially susceptible to hydromodification impacts and either of the following conditions exists:

- Post-development runoff volume for the 2-yr, 24-hr storm exceeds the pre-development runoff volume for the 2-yr, 24-hr storm by more than 5 percent

*or*

- Time of concentration (Tc) of post-development runoff for the 2-yr, 24-hr storm event exceeds the time of concentration of the pre-development condition for the 2-yr, 24-hr storm event by more than 5 percent.

If these conditions do not exist or streams are not potentially susceptible to hydromodification impacts, an HCOC does not exist and hydromodification does not need to be considered further. In the North Orange County permit area, downstream channels are considered not susceptible to hydromodification, and therefore do not have the potential for a HCOC, if all downstream conveyance channels that will receive runoff from the project are engineered, hardened, and regularly maintained to ensure design flow capacity, and no sensitive habitat areas will be affected.

Is the proposed project potentially susceptible to hydromodification impacts?

☐ **Yes** ☒ **No (show map)**

According to Figure XVI-3b of the Model WQMP Technical Guidance Document (May 2011), the project site is **not** located in an area susceptible to hydromodification impacts. Therefore, the project does not have the potential for a HCOC. A copy of Figure XVI-3b is included in Appendix A.

## II.4 POST DEVELOPMENT DRAINAGE CHARACTERISTICS

Proposed runoff will flow in a southwesterly direction towards the entrance of the proposed project. All other runoff will be intercepted by proposed storm drain lines and enter into proprietary systems for water quality treatment via biofiltration or will be considered self-treating. Runoff will then flow offsite into an existing 18" private RCP line and into the existing 30" storm drain in Bombero Drive, then to an existing 36" public storm drain in Santa Barbara Drive. Flows will ultimately discharge to the Upper Newport Bay.

## II.5 PROPERTY OWNERSHIP/MANAGEMENT

| PROPERTY OWNERSHIP/MANAGEMENT | |
|---|---|
| **Public Streets:** | City of Newport Beach |
| **Private Streets:** | OCMA Museum House/HOA |
| **Landscaped Areas:** | OCMA Museum House/HOA |
| **Easements:** | City of Newport Beach |
| **Buildings:** | OCMA Museum House/HOA |
| **Structural BMPs:** | OCMA Museum House/HOA |

A Home Owners Association (HOA) will be formed upon project completion. The HOA will be responsible for inspecting and maintaining all BMPs prescribed for OCMA Museum House. Until a HOA is formally established, OCMA Museum House shall assume all BMP maintenance and inspection responsibilities for the proposed project. Inspection and maintenance responsibilities are outlined in Section V of this report.

# SECTION III SITE DESCRIPTION

## III.1 PHYSICAL SETTING

| | |
|---|---|
| **Planning Area/ Community Name:** | OCMA Museum House |
| **Address:** | 850 San Clemente Drive, Newport Beach, CA 92660 |
| **Project Area Description:** | The project site is bounded by San Clemente Drive to the south, Santa Barbara Drive to the west and Santa Cruz Drive to the east. The intersection of Jamboree Road and San Joaquin Hills Road is approximately 1,300 feet north of the project site. |
| **Land Use:** | PI |
| **Zoning:** | PC 19 (San Joaquin Plaza) |
| **Acreage:** | 2.00 ac |
| **Predominant Soil Type:** | Soil Type B |
| **Impervious Conditions:** | Existing Impervious: 85% (15% Pervious)<br>Proposed Impervious: 74% (26% Pervious) |

## III.2 SITE CHARACTERISTICS

| | |
|---|---|
| **Precipitation Zone:** | 0.7" |
| **Topography:** | The topography of the site varies, with slopes ranging from about 1 percent to approximately 4 percent. |
| **Existing Drainage Patterns/ Connections:** | Existing runoff flows towards the north west and south west portions of the site. Most of the site drainage is conveyed via existing ribbon gutters within the parking lot, and is ultimately collected by an existing 21-foot catch basin, located on the adjacent private property on 888 San Clemente Drive, to the west of the project. The 18" catch basin outlet pipe conveys the storm flows into an existing private storm drain system within the 888 San Clemente Drive property, and then to an existing 30" storm drain in Bombero Drive, then to an existing 36" public storm drain in Santa Barbara Drive. Based on preliminary hydrologic analysis, it appears that the existing catch basin and storm drain have been designed and sized to accommodate the OCMA property drainage. |

| | |
|---|---|
| **Proposed Drainage Patterns/ Connections:** | Proposed runoff will flow in a southwesterly direction towards the entrance of the proposed project. Runoff will be intercepted by proposed storm drain lines and enter into proprietary systems for water quality treatment via biofiltration or will be considered self-treating. Runoff will then flow offsite into an existing 18" private RCP line and into the existing 30" storm drain in Bombero Drive, then to an existing 36" public storm drain in Santa Barbara Drive. Flows will ultimately discharge to the Upper Newport Bay. |
| **Soil Type, Geology, and Infiltration Properties:** | A site specific soils analysis has not yet been conducted for the OCMA Museum House project site. However, soils are assumed to be similar to an adjacent site of the San Joaquin Apartments that conducted a soils report in June, 2013 (NMG Geotechnical, Inc.)[1]. A site specific soils investigation report will be provided in the final WQMP.<br>The report at the adjacent site found that soils generally consist of marine terrace deposits that are underlain by tertiary-age bedrock unit of the Monterey Formation. Artificial fill overlies these native deposits, between 2 and 15 ft in thickness. Fill materials were found to consist of reddish brown, yellowish brown and gray silty sands and clean sands with scattered bedrock fragments. The marine terrace deposits below the fill consist primarily of yellowish brown, reddish brown and grayish brown clean fine to medium sands with local zones of silty fine to medium sands. Bedrock of the Miocene-age Monterey Formation underlies the site at depths of 5 to 28.5 feet below existing ground surface. The bedrock consists of olive gray interbedded fine sandstone, siltstone and claystone. |
| **Hydrogeologic (Groundwater) Conditions:** | The groundwater table at the San Joaquin Apartments site was not encountered during the geotechnical investigation. However, perched groundwater was encountered at depths of 12.5 to 28 feet below existing grade. The perched groundwater was found along the terrace-bedrock contact and extends a few feet (4 to 6 feet) into the weathered/fractured bedrock below the contact. |

[1] NMG Geotechnical, 2013: "Geotechnical Investigation and Review of Proposed Apartment Development at San Joaquin Plaza, City of Newport Beach, CA"

| | |
|---|---|
| **Geotechnical Conditions (relevant to infiltration):** | The excavation for the subterranean parking structure at the project site including over excavation for geotechnical purposes ranges from approximately 18-25 below the proposed final ground surface and extends into the terrace deposits. Although it is not anticipated the structure will encounter the perched groundwater, the risk of instability associated with seepage and instability associated with infiltration into these types of deposits may result in mounding of the perched groundwater encountered between the terrace deposits and bedrock layers.<br>Per the 2011 Model WQMP and Technical Guidance Document, infiltration BMPs are required to maintain a minimum separation of 10 ft from the bottom of the facility to the depth of seasonally-high mounded groundwater surface, as well as placed at least 10-15 ft away from the building to avoid conflicts with the structure's foundation. Due to the large footprint of the structure, and the depth excavated, these conditions cannot be met on-site. Based on these risks of geotechnical hazards, infiltration BMPs are considered infeasible for the site. Refer to Section IV.3.2 for further discussion on infiltration feasibility, and Appendix F for supporting documentation. |
| **Off-Site Drainage:** | The project site does not receive off-site run-on. |
| **Utility and Infrastructure Information:** | Dry and wet utilities will be incorporated into the proposed project and will tie into larger existing facilities within the existing development. |

## III.3 WATERSHED DESCRIPTION

| | | |
|---|---|---|
| **Receiving Waters:** | Upper Newport Bay, Lower Newport Bay | |
| **303(d) Listed Impairments:** | Upper Newport Bay:<br>▪ Chlordane<br>▪ Copper<br>▪ DDT<br>▪ Indicator Bacteria<br>▪ metals<br>▪ nutrients<br>▪ PCBs<br>▪ Pesticides<br>▪ Sediment Toxicity<br>▪ Sedimentation/ Siltation | Lower Newport Bay:<br>▪ Chlordane<br>▪ Copper<br>▪ DDT<br>▪ Indicator Bacteria<br>▪ Nutrients<br>▪ PCBs<br>▪ Pesticides<br>▪ Sediment Toxicity |
| **Applicable TMDLs:** | Upper Newport Bay:<br>▪ Metals<br>▪ Nutrients<br>▪ Pathogens<br>▪ Pesticides<br>▪ Siltation | Lower Newport Bay:<br>▪ Metals<br>▪ Nutrients<br>▪ Pathogens<br>▪ Pesticides<br>▪ Priority Organics<br>▪ Siltation |

| | |
|---|---|
| **Pollutants of Concern for the Project:** | Per Section II.2:<br>▪ Suspended Solids/Sediment<br>▪ Nutrients<br>▪ Pathogens (Bacteria/Virus)<br>▪ Pesticides<br>▪ Trash & Debris |
| **Hydrologic Conditions of Concern (HCOCs):** | None. Refer to Section II.3 for details. |
| **Environmentally Sensitive and Special Biological Significant Areas:** | There are no Environmentally Sensitive Areas (ESAs) or Areas of Special Biological Significance (ASBS) within the project site or within the project's vicinity. |

# SECTION IV BEST MANAGEMENT PRACTICES (BMPs)

## IV.1 PROJECT PERFORMANCE CRITERIA

Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implementing LID on regional or sub-regional basis?

☐ Yes ☒ No

| PROJECT PERFORMANCE CRITERIA | |
|---|---|
| Hydromodification Control Performance Criteria:<br>(Model WQMP Section 7.II-2.4.2.2) | If a hydrologic condition of concern (HCOC) exists, priority projects shall implement onsite or regional hydromodification controls such that:<br>▪ Post-development runoff volume for the two-year frequency storm does not exceed that of the predevelopment condition by more than five percent, and<br>▪ Time of concentration of post-development runoff for the two-year storm event is not less than that for the predevelopment condition by more than five percent.<br>Where the Project WQMP documents that excess runoff volume from the two-year runoff event cannot feasibly be retained and where in-stream controls cannot be used to otherwise mitigate HCOCs, the project shall implement on-site or regional hydromodification controls to:<br>▪ Retain the excess volume from the two-year runoff event to the MEP, and<br>▪ Implement on-site or regional hydromodification controls such that the post-development runoff two-year peak flow rate is no greater than 110 percent of the predevelopment runoff two-year peak flow rate. |
| LID Performance Criteria:<br>(Model WQMP Section 7.II-2.4.3) | Infiltrate, harvest and use, evapotranspire, or biotreat/biofilter, the 85$^{th}$ percentile, 24-hour storm event (Design Capture Volume).<br>LID BMPs must be designed to retain, on-site, (infiltrate, harvest and use, or evapotranspire) storm water runoff up to 80 percent average annual capture efficiency. |
| Treatment Control BMP Performance Criteria:<br>(Model WQMP Section 7.II-3.2.2) | If it is not feasible to meet LID performance criteria through retention and/or biotreatment provided on-site or at a sub-regional/regional scale, then treatment control BMPs shall be provided on-site or offsite prior to discharge to waters of the US. Sizing of treatment control BMP(s) shall be based on either the unmet volume after claiming applicable water quality credits, if appropriate. |

| PROJECT PERFORMANCE CRITERIA | |
|---|---|
| **LID Design Storm Capture Volume:** | DCV = C × d × A × 43560 sf/ac × 1/12 in/ft<br><br>Where:<br><br>DCV = design storm capture volume, cu-ft<br>C = runoff coefficient = (0.75 × imp + 0.15)<br>Imp = impervious fraction of drainage area (ranges from 0 to 1)<br>d = storm depth (inches)<br>A = tributary area (acres)<br><br>Imp = 74%<br>d = 0.7 inches<br>A = 2.00 acres<br><br>*DCV* = *(0.75 x* 0.74 *+0.15) x* 0.7 *inches x* 2.00 *ac x 43560 sf/ac x 1/12 in/ft*<br>= 3,583 ft$^3$<br><br>*Refer to Section IV.2.2 for specific Drainage Manage Area (DMA) breakdown and Appendix A for detailed calculations (Worksheet B).* |

## IV.2 SITE DESIGN AND DRAINAGE PLAN

The following section describes the site design BMPs used in this project and the methods used to incorporate them. Careful consideration of site design is a critical first step in storm water pollution prevention from new developments and redevelopments.

### IV.2.1 Site Design BMPs

*Minimize Impervious Area*

Impervious surfaces have been minimized by incorporating landscaped areas throughout the site surrounding the proposed building. Landscaping will be provided throughout the site within the common areas as well as around the perimeter of the building.

*Maximize Natural Infiltration Capacity*

Infiltration is not recommended for the project site due to proximity to perched groundwater at an adjacent apartment site. Refer to Section IV.3.2 for details.

*Preserve Existing Drainage Patterns and Time of Concentration*

Runoff from the site will continue to flow similar to existing conditions. Low-flows and first-flush runoff will drain to proprietary biotreatment systems for water quality treatment via bio-filtration.

*Disconnect Impervious Areas*

Landscaping will be provided adjacent to sidewalks and between the proposed buildings. Low-flows and first-flush runoff will drain to proprietary biotreatment systems for water quality treatment via bio-filtration. Refer to Section IV.3.4 for further details.

*Protect Existing Vegetation and Sensitive Areas, and Revegetate Disturbed Areas*

There are no existing vegetated or sensitive areas to preserve on the project site. All disturbed areas will either be paved or landscaped.

*Xeriscape Landscaping*

Xeriscape landscaping is not proposed for the project. However, native and/or tolerant landscaping will be incorporated into the site design consistent with City guidelines.

## IV.2.2 Drainage Management Areas

In accordance with the MS4 permit and the 2011 Model WQMP, the project site has been divided into Drainage Management Areas (DMAs) to be utilized for defining drainage areas and sizing LID and other treatment control BMPs. DMAs have been delineated based on the proposed site grading patterns, drainage patterns, storm drain and catch basin locations.

The design capture volumes (DCV) and treatment flow rates ($Q_{Design}$) for each DMA are summarized in the table below. These have been derived utilizing the "Simple Method" in accordance with the TGD Section III.1.1. Actual BMP sizing requirements, including 80 percent capture design volumes, flow rates, depths, and other design details for the specific BMPs proposed are provided in Section IV.3.4 below. Locations of DMAs and associated LID and treatment BMPs are identified on the exhibits in Section VI. Additional calculations and TGD Worksheets are provided in Appendix A.

| DRAINAGE MANAGEMENT AREAS (DMAs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DMA/ Drainage Area ID[1] | Tributary Drainage Area ($ft^2$) | Tributary Drainage Area (ac) | % Imp. | Design Storm Depth[2] (in) | Estimated Tc (min) | Rainfall Intensity[3] (in/hr) | Simple Method DCV[4] ($ft^3$) | $Q_{Design}$ [5] (cfs) |
| DMA 1 | 29,621 | 0.68 | 78% | 0.7 | 5 | 0.26 | 1,319 | 0.159 |
| DMA 2 | 2,614 | 0.06 | 0% | 0.7 | 5 | 0.26 | 23 | 0.002 |
| DMA 3 | 2,178 | 0.05 | 100% | 0.7 | 5 | 0.26 | 108 | 0.013 |
| DMA 4 | 2,614 | 0.06 | 0% | 0.7 | 5 | 0.26 | 23 | 0.002 |
| DMA 5 | 50,094 | 1.15 | 78% | 0.7 | 5 | 0.26 | 2,110 | 0.191 |
| Total Site | 87,121 | 2.00 | 74% | 0.7 | 5 | 0.26 | 3,583 | 0.367 |

| DRAINAGE MANAGEMENT AREAS (DMAs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DMA/ Drainage Area ID[1] | Tributary Drainage Area ($ft^2$) | Tributary Drainage Area (ac) | % Imp. | Design Storm Depth[2] (in) | Estimated Tc (min) | Rainfall Intensity[3] (in/hr) | Simple Method DCV[4] ($ft^3$) | $Q_{Design}$ [5] (cfs) |

*Notes:*
1. Refer to exhibits in Section VI for locations of each DMA.
2. Per Figure XVI-1 of the Technical Guidance Document, dated May 19, 2011. See also Appendix A.
3. Per Figure III.4 of the Technical Guidance Document, dated May 19, 2011. See also Appendix A.
4. Per Section III.1.1 of the Technical Guidance Document.
5. Per Section III.3.3 and Worksheet D of the Technical Guidance Document.

## IV.3 LID BMP SELECTION AND PROJECT CONFORMANCE ANALYSIS

Low Impact Development (LID) BMPs are required in addition to site design measures and source controls to reduce pollutants in storm water discharges. LID BMPs are engineered facilities that are designed to retain or biotreat runoff on the project site. The 4th Term MS4 Storm Water Permit (Order R8-2009-0030) requires the evaluation and use of LID features using the following hierarchy of treatment: infiltration, evapotranspiration, harvest/reuse, and biotreatment. The following sections summarize the LID BMPs proposed for the project in accordance with the permit hierarchy and performance criteria outlined in Section IV.1.

### IV.3.1 Hydrologic Source Controls (HSCs)

Hydrologic source controls (HSCs) can be considered to be a hybrid between site design practices and LID BMPs. HSCs are distinguished from site design BMPs in that they do not reduce the tributary area or reduce the imperviousness of a drainage area; rather they reduce the runoff volume that would result from a drainage area with a given imperviousness compared to what would result if HSCs were not used.

| HYDROLOGIC SOURCE CONTROLS | | |
|---|---|---|
| ID | Name | Included? |
| HSC-1 | Localized on-lot infiltration | ☐ |
| HSC-2 | Impervious area dispersion (e.g. roof top disconnection) | ☐ |
| HSC-3 | Street trees (canopy interception) | ☐ |
| HSC-4 | Residential rain barrels (not actively managed) | ☐ |
| HSC-5 | Green roofs/Brown roofs | ☐ |
| HSC-6 | Blue roofs | ☐ |
| -- | Impervious area reduction (e.g. permeable pavers, site design) | ☒ |

The project will utilize hydrologic source controls within the large landscaped areas around the perimeter of the project site. These areas consist of 100% landscaping, and therefore can be considered "Self-Retaining", and function similar to Green Roofs (HSC-5) by retaining runoff in the plants and soil pore space making it available for subsequent evapotranspiration. These areas do not receive any runoff from impervious surfaces. As a result, these areas can be removed from the downstream BMP sizing.

| HYDROLOGIC SOURCE CONTROL BMP SUMMARY | | | | | |
|---|---|---|---|---|---|
| Drainage Area ID | HSC Type | Drainage Area | % impervious | % Capture by HSC (1) | Sufficient? |
| DMA 2 | Impervious Area Reduction; Site Design; HSC-5 | 0.06 | 0% | 100% | Yes |
| DMA 4 | | 0.06 | 0% | 100% | Yes |

*Notes:*
1. Per Table III.1 of the Technical Guidance Document, dated May 19, 2011.

## IV.3.2 Infiltration BMPs

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

| INFILTRATION | | |
|---|---|---|
| ID | Name | Included? |
| INF-3 INF-4 | Bioretention Without Underdrains | ☐ |
| | Rain Gardens | ☐ |
| | Porous Landscaping | ☐ |
| | Infiltration Planters | ☐ |
| | Retention Swales | ☐ |
| INF-2 | Infiltration Trenches | ☐ |
| INF-1 | Infiltration Basins | ☐ |
| INF-5 | Drywells | ☐ |
| INF-7 | Subsurface Infiltration Galleries | ☐ |
| -- | French Drains | ☐ |
| INF-6 | Permeable Asphalt | ☐ |

| INFILTRATION | | |
|---|---|---|
| **ID** | **Name** | **Included?** |
| | Permeable Concrete | ☐ |
| | Permeable Concrete Pavers | ☐ |
| | Other: | ☐ |

As discussed previously in Section III.2, the excavation for the building and perimeter retaining walls is anticipated to be approximately 18-25 below the proposed final ground surface and extends into the terrace deposits. Although it is not anticipated the structure will encounter the perched groundwater found at the adjacent San Joaquin Apartments site, the risk of instability associated with seepage and instability associated with infiltration into these types of deposits may result in mounding of the perched groundwater encountered between the terrace deposits and bedrock layers.

Per the 2011 Model WQMP and Technical Guidance Document, infiltration BMPs are required to maintain a minimum separation of 10 ft from the bottom of the facility to the depth of seasonally-high mounded groundwater surface, as well as placed at least 10-15 ft away from the building to avoid conflicts with the structure's foundation. Due to the extent of the structure, the bottom of any infiltration BMPs, such as underground infiltration galleries and drywells, will likely extend below the bottom of the structure to avoid conflicts with the foundation, which may cause excessive mounding in the perched groundwater encountered 32-37 feet below existing grade, and the minimum separation requirements would not be met.

Based on the geotechnical conditions of the San Joaquin Apartments which are immediately adjacent to the OCMA Museum House project site, the excavated depth of the proposed building structure, and presence of perched groundwater between the marine terrace deposits and bedrock, infiltration of runoff on-site is considered infeasible in accordance with the Model WQMP and TGD. Further details will be included in the Final WQMP.

### IV.3.3 Evapotranspiration & Rainwater Harvesting BMPs

Evapotranspiration BMPs are a class of retention BMPs that discharges stored volume predominately to ET, though some infiltration may occur. ET includes both evaporation and transpiration, and ET BMPs may incorporate one or more of these processes. BMPs must be designed to achieve the maximum feasible ET, where required to demonstrate that the maximum amount of water has been retained on-site. Since ET is not the sole process in these BMPs, specific design and sizing criteria have not been developed for ET-based BMPs.

| EVAPOTRANSPIRATION | | |
|---|---|---|
| **ID** | **Name** | **Included?** |
| -- | HSCs, *see Section IV.3.1* | ☒ |
| -- | Surface-based infiltration BMPs | ☐ |

| EVAPOTRANSPIRATION | | |
|---|---|---|
| **ID** | **Name** | **Included?** |
| -- | Biotreatment BMPs, see *Section VI.3.4* | ☒ |
| | Other: | ☐ |

HSCs and Biofiltration BMPs are proposed which utilize evapotranspiration as physical process for runoff volume reduction. Bioretention BMPs are described further in Section IV.3.4.

Harvest and use (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.

| HARVEST & REUSE / RAINWATER HARVESTING | | |
|---|---|---|
| **ID** | **Name** | **Included?** |
| HU-1 | Above-ground cisterns and basins | ☐ |
| HU-2 | Underground detention | ☐ |
| -- | Other: | ☐ |

In order to quantify harvested water demand for the common areas of the project, the Modified Estimated Applied Water Use (EAWU) method was used, consistent with Appendix X of the Model WQMP's Technical Guidance Document (TGD), dated May 19, 2011.

The Modified EAWU method is modified from the OC Irrigation Code (County Ordinance No. 09-010) to account for the wet season demand and storm events (assuming that no irrigation would be applied for approximately 30% of the days in the wet season).

The equation used to calculate the Modified EAWU is:

$$Modified\ EAWU = \frac{(ETo_{wet} \times K_L \times LA \times 0.015)}{IE}$$

Where:

$Modified\ EAWU$ = estimated daily average water use during wet season
$ETo_{wet}$ = average reference ET from November through April (inches per month) per Table X.2 of the TGD
$K_L$ = landscape coefficient (Table X.4 of the TGD)
$LA$ = landscape area irrigated with harvested water (square feet)

$IE$ = irrigation efficiency (assumed at 90%)

*Note: In the equation, the coefficient (0.015) accounts for unit conversions and shut down of irrigation during and for three days following a significant precipitation event.*

For a system to be considered "feasible", the system must be designed with a storage volume equal to the DCV from the tributary area and achieve more than 40% capture. The system must also be able to drawdown in 30 days to meet the 40% capture value. In addition, Table X.6 of the Technical Guidance Document sets forth the demand thresholds for minimum partial capture.

| TABLE X.6: HARVESTED WATER DEMAND THRESHOLDS FOR MINIMUM PARTIAL CAPTURE | |
|---|---|
| **Design Capture Storm Depth, inches** | **Wet Season Demand Required for Minimum Partial Capture, gpd per impervious acre** |
| 0.60 | 490 |
| 0.65 | 530 |
| 0.70 | 570 |
| 0.75 | 610 |
| 0.80 | 650 |
| 0.85 | 690 |
| 0.90 | 730 |
| 0.95 | 770 |
| 1.00 | 810 |

The following table summarizes the estimated applied water use for the common area landscaping of the project. Detailed calculations are provided in Appendix A. The "blend" scenario represents an accurate depiction of the proposed landscaping. Of the proposed area of landscaping around the perimeter of the project site, there is a combination of low-use planting/succulent areas and high-water use plants.

| ESTIMATED APPLIED WATER USE (EAWU) FOR COMMON AREA LANDSCAPING | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Landscape Type** | **Total Area (ac)** | **% Impervious** | **Impervious Tributary (ac)** | **Irrigated LS Area (ac)** | **$ETo_{Wet}$ [1] (in/mo)** | **$K_L$ [2]** | **Modified EAWU (gpd)** | **Modified EAWU per impervious acre (gpd/ac)** | **Minimum Capture Threshold [3] (gpd/ac)** |
| Blend | 2.00 | 74% | 1.48 | 0.52 | 3 | 0.55 | 623 | 421 | 570 |
| **Design Capture Volume (gal)** | | | | 26,799 | **Drawdown (days)** | | | | 43 |

| ESTIMATED APPLIED WATER USE (EAWU) FOR COMMON AREA LANDSCAPING | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Landscape Type | Total Area (ac) | % Impervious | Impervious Tributary (ac) | Irrigated LS Area (ac) | $ETo_{Wet}$ [1] (in/mo) | $K_L$ [2] | Modified EAWU (gpd) | Modified EAWU per impervious acre (gpd/ac) | Minimum Capture Threshold [3] (gpd/ac) |

*Notes:*
1 Per Table X.2 for Santa Ana Region (similar climate type), Model WQMP Technical Guidance Document, dated May 19, 2011.
2 Per Table X.4 of the Model WQMP Technical Guidance Document, dated May 19, 2011.
3 Per Table X.6 of Model WQMP Technical Guidance Document, dated May 19, 2011.

As shown above, the project site does not have sufficient water demand during the wet season to support harvest and reuse. The project does not meet the minimum capture threshold of 570 gallons per day/acre with its Modified EAWU or estimated daily average water usage during the wet season. Therefore the DCV will not be fully utilized and emptied for the next storm event. Drawdown of the DCV is anticipated to take approximately 43 days by the landscape's water demand usage, which is greater than the maximum drawdown time of 30 days.

## IV.3.4 Biotreatment BMPs

Biotreatment BMPs are a broad class of LID BMPs that reduce storm water volume to the maximum extent practicable, treat storm water using a suite of treatment mechanisms characteristic of biologically active systems, and discharge water to the downstream storm drain system or directly to receiving waters. Treatment mechanisms include media filtration (though biologically-active media), vegetative filtration (straining, sedimentation, interception, and stabilization of particles resulting from shallow flow through vegetation), general sorption processes (i.e., absorption, adsorption, ion-exchange, precipitation, surface complexation), biologically-mediated transformations, and other processes to address both suspended and dissolved constituents. Examples of biotreatment BMPs include bioretention with underdrains, vegetated swales, constructed wetlands, and proprietary biotreatment systems.

| BIOTREATMENT | | |
|---|---|---|
| ID | Name | Included? |
| BIO-1 | Bioretention with underdrains | ☐ |
| | Storm Water planter boxes with underdrains | ☐ |
| | Rain gardens with underdrains | ☐ |
| BIO-5 | Constructed wetlands | ☐ |
| BIO-2 | Vegetated swales | ☐ |
| BIO-3 | Vegetated filter strips | ☐ |
| BIO-7 | Proprietary vegetated biotreatment systems | ☒ |
| BIO-4 | Wet extended detention basin | ☐ |

| BIOTREATMENT | | |
|---|---|---|
| **ID** | **Name** | **Included?** |
| BIO-6 | Dry extended detention basins | ☐ |
| -- | Other: | ☐ |

Since both infiltration and harvest and reuse are considered infeasible, biofiltration BMPs will be utilized on-site for water quality treatment. The project will implement three proprietary biotreatment systems and storm water planters for water quality treatment to treat all pollutants of concern to a medium to high level of effectiveness. These systems were selected based on their ability to treat the project's pollutants of concerns to a medium or high effectiveness, in accordance with Table 4.2 of the Technical Guidance Document.

*Proprietary Biotreatment: Modular Wetland Systems*

The systems will include the Modular Wetlands Systems developed by Bio Clean Environmental Services, Inc. There are several advantages of the Modular Wetland System over traditional bioretention planters including the following reasons:

- Modular Wetlands are the only proprietary biotreatment device approved through the Washington State University TAPE (Technology Assessment Protocol – Ecology) program for basic storm water treatment and enhanced treatment including sediment, nutrients and heavy metals. TAPE approval is based on a series of independent field studies using strict sampling criteria to validate vendor's claims. TAPE approval is considered one of the most stringent and most reliable in the Country.
- Modular Wetlands have a pre-treatment chamber that is specifically designed to capture fine sediments and particulates through a series of BioMediaGREEN sponges which prohibit the fines and particulates from entering the bioretention chamber and accelerating potential clogging of the bioretention soil. The City of Huntington Beach has installed a Modular Wetland for a residential neighborhood and has monitored the maintenance and functionality of the system for several years. Contact: Mark Birchfield, City of Huntington Beach (714375-5041;MBirchfield@surfcity-hb.org)
- Modular Wetland systems are specifically designed for higher flow through treatment rates which reduce the potential for nutrient and copper leaching under more stagnant conditions (a common occurrence with planters that are left unmaintained).

Modular Wetlands by Modular Wetlands Systems, Inc. are proprietary biotreatment systems that utilize multi-stage treatment processes including screening media filtration, settling, and biofiltration. The pre-treatment chamber contains the first three stages of treatment, and includes a catch basin inlet filter to capture trash, debris, gross solids and sediments, a settling chamber for separating out larger solids, and a media filter cartridge for capturing fine TSS, metals, nutrients, and bacteria. Runoff then flows through the wetland chamber where treatment is achieved through a variety of physical, chemical, and biological processes. As storm water passes down through the planting soil, pollutants are filtered, adsorbed, biodegraded and sequestered by the soil and plants, functioning similar to

bioretention systems. The discharge chamber at the end of the unit collects treated flows and discharges back into the storm drain system.

These systems were selected based on their ability to treat the project's pollutants of concerns to a medium or high effectiveness, in accordance with the Model WQMP and TGD requirements. The table below summarizes the overall treatment effectiveness for Modular Wetlands, derived from Table 4.2 of the Technical Guidance Document and testing data provided by the manufacturer. Additional details for the Modular Wetland units included in Section VI of this WQMP.

| POLLUTANTS OF CONCERN AND PERFORMANCE RATINGS | | |
|---|---|---|
| Pollutant of Concern [1] | Treatment Effectiveness | |
| | Bioretention Systems/ Stormwater Planters[2] | Modular Wetlands Proprietary Bioretention Units [3] |
| Oil & Grease | High | High |
| Trash & Debris | High | High |
| Oxygen Demanding Substances | N/A | N/A |
| Toxic Organic Compounds | Medium | N/A[4] |
| Suspended Solids/Sediments | High | High |
| Nutrients | Low | Medium-High |
| Metals | High | High |
| Pathogens/Bacteria | Medium | Medium-High |
| Pesticides | N/A | N/A |

*Notes:*
1 See Section II.2 for a complete list of expected pollutants for the Project
2 Per Table 4.2 of the Model WQMP's companion Technical Guidance Document dated December 20, 2013.
3 Based on Washington State University Technology Assessment Protocol – Ecology (TAPE) third-party independent field tests for a high-flow biotreatment system with raised under drain (Modular Wetland System-Linear). Refer to manufacturer documentation (attached) for specific removal efficiencies and source references.
4 Field and Lab Testing demonstrates 75-83% removal rates of Chemical Oxygen Demand (COD), a measure of the amount of organic pollutants commonly found in surface water. COD removals of this range would fall within the Medium-High effectiveness category.

*Biotreatment BMP Sizing & Design*

In accordance with the Model WQMP and TGD, the biotreatment BMPs will be sized to treat runoff from the Design Capture Storm (85th percentile, 24-hour). Locations and tributary drainage areas (DMAs) are shown on the exhibits included in Section VI. BMP details and typical cross sections are also included in Section VI. Detailed calculations and associated TGD Worksheets are included in Appendix A. Operation and maintenance details are included in Section V and Appendix B (O&M Plan).

There are three proprietary biotreatment Modular Wetland Systems (MWS) proposed at the project site. DMA 3 will have one MWS-L-4-4 unit located towards the south west end of the project site

within DMA 4. DMA 1 and DMA 5 will have two MWS-L-4-15 units located towards the southern end of the property. Detailed calculations are summarized in the table below and provided in Appendix A.

| PROPRIETARY BIOTREATMENT (BIO-7): MODULAR WETLAND SYSTEM DESIGN SUMMARY | | | | | | |
|---|---|---|---|---|---|---|
| DMA ID[1] | Total Drainage Area[1] (ac) | % Imp. | Design Capture Volume ($ft^3$) | $Q_{Design}$[3] (cfs) | MWS Vault Size/Model[4] | Total Q Treated[5] (cfs) |
| DMA 1 & DMA 5 | 1.83 | 78% | 3,429 | 0.320 | Two (2) MWS-L-4-15-V (2 units totaling to 0.350 cfs treatment capacity) | 0.350 |
| DMA 3 | 0.05 | 100% | 108 | 0.052 | MWS-L-4-4 | 0.013 |

Notes:
1) Refer to WQMP Exhibit in Section VI for locations of BMPs and drainage areas.
2) Per Section III.3.3 and Worksheet D of the Technical Guidance Document, dated December 20, 2013. Detailed calculations and worksheets are included in Appendix A.
3) Unit details and specifications are included in Section VI.
4) Treatment capacities of each unit are based on wetland media design loading rate (controlled by downstream orifice) and perimeter surface area of wetland media provided. Individual unit sizing calculations provided by the manufacturer are included on each cut sheet/detail included in Section VI.
5) Flows up the 2-year storm event will be discharged from the detention system at a regulated rate of 0.2 cfs or less.
6) Units are NAVD 88 Elevations in feet
7) Three off-site MWS-L-8-16 units are located on the San Joaquin Apartments site. The three units have a total treatment capacity of 1.38 cfs to treat San Joaquin Apartments flows totaling to 1.349 cfs. There is sufficient treatment capacity (0.031 cfs) of the three MWS-L-8-16 units to treat an additional 0.002 cfs from the OCMA Museum House project site.

### IV.3.5 Hydromodification Control BMPs

Not applicable. Refer to Section II.3 for further information.

### IV.3.6 Regional/Sub-Regional LID BMPs

Not applicable. LID BMPs (biofiltration) will be utilized for water quality treatment on-site in accordance with the MS4 Permit hierarchy identified at the beginning of this Section.

### IV.3.7 Treatment Control BMPs

Treatment control BMPs can only be considered if the project conformance analysis indicates that it is not feasible to retain the full design capture volume with LID BMPs.

| TREATMENT CONTROL BMPs | | |
|---|---|---|
| ID | Name | Included? |
| TRT-1 | Sand Filters | ☐ |
| TRT-2 | Cartridge Media Filter | ☐ |

| TREATMENT CONTROL BMPs | | |
|---|---|---|
| ID | Name | Included? |
| PRE-1 | Hydrodynamic Separation Device | ☐ |
| PRE-2 | Catch Basin Insert | ☐ |
| | Other: | ☐ |

Not applicable. LID BMPs (biofiltration) will be utilized for water quality treatment on-site in accordance with the MS4 Permit hierarchy identified at the beginning of this Section.

## IV.3.8 Non-Structural Source Control BMPs

The table below indicates all BMPs to be incorporated in the project. For those designated as not applicable (N/A), a brief explanation why is provided.

| NON-STRUCTURAL SOURCE CONTROL BMPs | | | | |
|---|---|---|---|---|
| ID | Name | Included? | Not Applicable? | If Not Applicable, Provide Brief Reason |
| N1 | Education for Property Owners, Tenants and Occupants | ☒ | ☐ | |
| N2 | Activity Restrictions | ☒ | ☐ | |
| N3 | Common Area Landscape Management | ☒ | ☐ | |
| N4 | BMP Maintenance | ☒ | ☐ | |
| N5 | Title 22 CCR Compliance (How development will comply) | ☐ | ☒ | Not applicable – residential development. |
| N6 | Local Water Quality Permit Compliance | ☐ | ☒ | Not applicable – residential development. |
| N7 | Spill Contingency Plan | ☐ | ☒ | Not applicable – residential development. |
| N8 | Underground Storage Tank Compliance | ☐ | ☒ | No underground storage tanks are proposed. |
| N9 | Hazardous Materials Disclosure Compliance | ☐ | ☒ | Hazardous materials will not be stored on-site. |
| N10 | Uniform Fire Code Implementation | ☐ | ☒ | Not applicable – residential development. |
| N11 | Common Area Litter Control | ☒ | ☐ | |
| N12 | Employee Training | ☒ | ☐ | |

| NON-STRUCTURAL SOURCE CONTROL BMPs | | | | |
|---|---|---|---|---|
| ID | Name | Included? | Not Applicable? | If Not Applicable, Provide Brief Reason |
| N13 | Housekeeping of Loading Docks | ☐ | ☒ | No loading docks are proposed. |
| N14 | Common Area Catch Basin Inspection | ☒ | ☐ | |
| N15 | Street Sweeping Private Streets and Parking Lots | ☒ | ☐ | |
| N16 | Retail Gasoline Outlets | ☐ | ☒ | No retail gasoline outlets are proposed. |

*N1, Education for Property Owners, Tenants and Occupants*

Educational materials will be provided to tenants, including brochures and restrictions to reduce pollutants from reaching the storm drain system. Examples include tips for pet care, household tips, and proper household hazardous waste disposal. Tenants will be provided with these materials by the property management prior to occupancy, and periodically thereafter. Refer to Section VII for a list of materials available and attached to this WQMP. Additional materials are available through the County of Orange Storm water Program website (http://ocwatersheds.com/PublicEd/) and the California Storm water Quality Association's (CASQA) BMP Handbooks (http://www.cabmphandbooks.com/).

*N2, Activity Restrictions*

The HOA shall develop ongoing activity restrictions that include those that have the potential to create adverse impacts on water quality. Activities include, but are not limited to: handling and disposal of contaminants, fertilizer and pesticide application restrictions, litter control and pick-up, and vehicle or equipment repair and maintenance in non-designated areas, as well as any other activities that may potentially contribute to water pollution.

*N3, Common Area Landscape Management*

Management programs will be designed and implemented by the HOA to maintain all the common areas within the project site. These programs will cover how to reduce the potential pollutant sources of fertilizer and pesticide uses, utilization of water-efficient landscaping practices and proper disposal of landscape wastes by the owner/developer and/or contractors.

*N4, BMP Maintenance*

The HOA will be responsible for the implementation and maintenance of each applicable non-structural BMP, as well as scheduling inspections and maintenance of all applicable structural BMP facilities through its staff, landscape contractor, and/or any other necessary maintenance contractors. Details on BMP maintenance are provided in Section V of this WQMP, and the O&M Plan is included in Appendix D.

*N11, Common Area Litter Control*

The HOA will be responsible for performing trash pickup and sweeping of littered common areas on a weekly basis or whenever necessary. Responsibilities will also include noting improper disposal materials by the public and reporting such violations for investigation.

*N12, Employee Training*

All employees of the HOA and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not be limited to, spill cleanup procedures, proper waste disposal, housekeeping practices, etc.

*N14, Common Area Catch Basin Inspection*

All on-site catch basin inlets and drainage facilities shall be inspected and maintained by the HOA at least once a year, prior to the rainy season, no later than October 1st of each year.

*N15, Street Sweeping Private Streets and Parking Lots*

The HOA shall be responsible for sweeping all on-site drive aisles and parking areas within the project on a quarterly basis.

## IV.3.9 Structural Source Control BMPs

The table below indicates all BMPs to be incorporated in the project. For those designated as not applicable (N/A), a brief explanation why is provided.

| STRUCTURAL SOURCE CONTROL BMPs | | | | |
|---|---|---|---|---|
| ID | Name | Included? | Not Applicable? | If Not Applicable, Provide Brief Reason |
| S1<br>SD-13 | Provide storm drain system stenciling and signage | ☒ | ☐ | |
| S2<br>SD-34 | Design and construct outdoor material storage areas to reduce pollution introduction | ☐ | ☒ | No outdoor storage areas are proposed. |
| S3<br>SD-32 | Design and construct trash and waste storage areas to reduce pollution introduction | ☐ | ☒ | Not applicable. No outdoor trash storage areas are proposed. Trash will be collected within the subterranean parking structure. |
| S4<br>SD-12 | Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control | ☒ | ☐ | |

| STRUCTURAL SOURCE CONTROL BMPs | | | | |
|---|---|---|---|---|
| ID | Name | Included? | Not Applicable? | If Not Applicable, Provide Brief Reason |
| S5 | Protect slopes and channels and provide energy dissipation | ☐ | ☒ | No slopes or channels on the project site. |
| S6 SD-31 | Properly Design: Dock areas | ☐ | ☒ | No loading docks are proposed. |
| S7 SD-31 | Properly Design: Maintenance bays | ☐ | ☒ | No maintenance bays are proposed. |
| S8 SD-33 | Properly Design: Vehicle wash areas | ☐ | ☒ | No vehicle wash areas are proposed. |
| S9 SD-36 | Properly Design: Outdoor processing areas | ☐ | ☒ | No outdoor processing areas are proposed. |
| S10 | Properly Design: Equipment wash areas | ☐ | ☒ | No equipment wash areas are proposed. |
| S11 SD-30 | Properly Design: Fueling areas | ☐ | ☒ | No fueling areas are proposed. |
| S12 SD-10 | Properly Design: Hillside landscaping | ☐ | ☒ | There are no major slopes on the project site. |
| S13 | Properly Design: Wash water control for food preparation areas | ☐ | ☒ | No food preparation areas/ commercial kitchens are proposed. |
| S14 | Properly Design: Community car wash racks | ☐ | ☒ | No community car wash racks are proposed. |

*S1/SD-13, Provide storm drain system stenciling and signage*

The phrase "NO DUMPING! DRAINS TO OCEAN", or an equally effective phrase approved by the City, will be stenciled on all major storm drain inlets within the project site to alert the public to the destination of pollutants discharged into storm water. Stencils shall be in place prior to release of certificate of occupancy. Stencils shall be inspected for legibility on an annual basis and re-stenciled as necessary.

*S4/SD-12, Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control*

The HOA will be responsible for the installation and maintenance of all common landscape areas utilizing similar planting materials with similar water requirements to reduce excess irrigation runoff. The HOA will be responsible for implementing all efficient irrigation systems for common area landscaping including, but not limited to, provisions for water sensors and programmable irrigation cycles. This includes smart timers, rain sensors, and moisture shut-off valves. The irrigation systems shall be in conformance with water efficiency guidelines. Systems shall be tested twice per year, and water used during testing/flushing shall not be discharged to the storm drain system.

## IV.4 ALTERNATIVE COMPLIANCE PLAN

### IV.4.1 Water Quality Credits

Local jurisdictions may develop a water quality credit program that applies to certain types of development projects after they first evaluate the feasibility of meeting LID requirements on-site. If it is not feasible to meet the requirements for on-site LID, project proponents for specific project types can apply credits that would reduce project obligations for selecting and sizing other treatment BMPs or participating in other alternative programs.

| WATER QUALITY CREDITS | |
|---|---|
| **Credit** | **Applicable?** |
| Redevelopment projects that reduce the overall impervious footprint of the project site. | ☐ |
| Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface water quality if not redeveloped. | ☐ |
| Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance) | ☐ |
| Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution). | ☐ |
| Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned | ☐ |
| Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping). | ☐ |
| Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses. | ☐ |
| Developments in a city center area. | ☐ |
| Developments in historic districts or historic preservation areas. | ☐ |
| Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories. | ☐ |

| WATER QUALITY CREDITS | |
|---|---|
| **Credit** | **Applicable?** |
| In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas. | ☐ |

Not applicable. Water quality credits will not be applied for the project. LID BMPs will be utilized for water quality treatment on-site in accordance with the MS4 Permit hierarchy identified at the beginning of this Section.

## IV.4.2 Alternative Compliance Plan Information

Not applicable. LID BMPs (biofiltration) will be utilized for water quality treatment on-site in accordance with the MS4 Permit hierarchy identified at the beginning of this Section.

# SECTION V INSPECTION/MAINTENANCE RESPONSIBILITY FOR BMPs

It has been determined that OCMA Housing, LLC shall assume all BMP inspection and maintenance responsibilities for the OCMA Museum House project.

| | |
|---|---|
| **Contact Name:** | Steven Oh |
| **Title:** | Vice President |
| **Company:** | OCMA Urban Housing, LLC |
| **Address:** | 18201 Von Karman Ave, Suite 900, Irvine, CA 92612 |
| **Phone:** | 949.660.7272 |
| **Fax:** | |
| **Email:** | steven.oh@related.com |

Should the maintenance responsibility be transferred at any time during the operational life of OCMA Museum House, such as when an HOA or POA is formed for a project, a formal notice of transfer shall be submitted to the City of Newport Beach at the time responsibility of the property subject to this WQMP is transferred. The transfer of responsibility shall be incorporated into this WQMP as an amendment.

The HOA shall verify BMP implementation and ongoing maintenance through inspection, self-certification, survey, or other equally effective measure. The certification shall verify that, at a minimum, the inspection and maintenance of all structural BMPs including inspection and performance of any required maintenance in the late summer / early fall, prior to the start of the rainy season. A form that may be used to record implementation, maintenance, and inspection of BMPs is included in Appendix D.

The City of Newport Beach may conduct verifications to assure that implementation and appropriate maintenance of structural and non-structural BMPs prescribed within this WQMP is taking place at the project site. The HOA shall retain operations, inspections and maintenance records of these BMPs and they will be made available to the City or County upon request. All records must be maintained for at least five (5) years after the recorded inspection date for the lifetime of the project.

Long-term funding for BMP maintenance shall be funded through fees paid into the HOA. Brookfield Homes, which will set up the HOA shall oversee that adequate funding for BMP maintenance is included within the HOA fee structure including annual maintenance fees and long-term maintenance reserve funds.

The Operations and Maintenance (O&M) Plan can be found in Appendix D.

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | | |
|---|---|---|---|---|
| | BMP | Inspection/Maintenance Activities | Minimum Frequency | Responsible Party |
| **BIOTREATMENT BMPs** | | | | |
| BIO-7 | Proprietary Biotreatment: Modular Wetlands | The Modular Wetland units shall be maintained in accordance with manufacturer's specifications. The system shall be inspected at a minimum of once every six months, prior to the start of the rainy season (October 1) each year, and after major storm events. Typical maintenance includes removing trash & debris from the catch basin screening filter (by hand), removal of sediment and solids in the settlement chamber (vacuum truck), replacement of the BioMediaGREEN™ filter cartridge, and replacement of the BioMediaGREEN™ drain down filter (if equipped). In addition, plants within the wetland chamber will require trimming as needed in conjunction with routine landscape maintenance activities. No fertilizer shall be used in this chamber. Wetland chamber should be inspected during rain events to verify flow through the system. If little to no flow is observed from the lower valve or orifice plate, the wetland media may require replacement. If prior treatment stages are properly maintained, the life of the wetland media can be up to 20 years. | 2x per year | OCMA Museum House/HOA |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | | |
|---|---|---|---|---|
| | BMP | Inspection/Maintenance Activities | Minimum Frequency | Responsible Party |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | | |
|---|---|---|---|---|
| | BMP | Inspection/Maintenance Activities | Minimum Frequency | Responsible Party |
| **NON-STRUCTURAL SOURCE CONTROL BMPs** | | | | |
| N1 | Education for Property Owners, Tenants and Occupants | Educational materials will be provided to tenants annually. Materials to be distributed are found in Appendix C. Tenants will be provided these materials by the Owner prior to occupancy and periodically thereafter. | Annually | OCMA Museum House/HOA |
| N2 | Activity Restrictions | The Owner will prescribe activity restrictions to protect surface water quality, through lease terms or other equally effective measure, for the property. Restrictions include, but are not limited to, prohibiting vehicle maintenance or vehicle washing. | Ongoing | OCMA Museum House/HOA |
| N3 | Common Area Landscape Management | Maintenance shall be consistent with City requirements. Fertilizer and/or pesticide usage shall be consistent with County Management Guidelines for Use of Fertilizers (OC DAMP Section 5.5) as well as local requirements. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting, and replacement of mulch shall be performed on an as-needed basis to prevent exposure of erodible surfaces. Trimmings, clippings, and other landscape wastes shall be properly disposed of in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and storm drain inlets. | Monthly | OCMA Museum House/HOA |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | | |
|---|---|---|---|---|
| | BMP | Inspection/Maintenance Activities | Minimum Frequency | Responsible Party |
| N4 | BMP Maintenance | Maintenance of structural BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP (Appendix D). Records of inspections and BMP maintenance shall be kept by the Owner and shall be available for review upon request. | Ongoing | OCMA Museum House/HOA |
| N5 | Title 22 CCR Compliance (How development will comply) | Not Applicable | | |
| N6 | Local Industrial Permit Compliance | Not Applicable | | |
| N7 | Spill Contingency Plan | Not Applicable | | |
| N8 | Underground Storage Tank Compliance | Not Applicable | | |
| N9 | Hazardous Materials Disclosure Compliance | Not Applicable | | |
| N10 | Uniform Fire Code Implementation | Not Applicable | | |
| N11 | Common Area Litter Control | Litter patrol, violations investigations, reporting and other litter control activities shall be performed on a weekly basis and in conjunction with routine maintenance activities. | Weekly | OCMA Museum House/HOA |
| N12 | Employee Training | Educate all new employees/ managers on storm water pollution prevention, particularly good housekeeping practices, prior to the start of the rainy season (October 1). Refresher courses shall be conducted on an as needed basis. | Annually | OCMA Museum House/HOA |
| N13 | Housekeeping of Loading Docks | Not Applicable | | |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | | |
|---|---|---|---|---|
| | **BMP** | **Inspection/Maintenance Activities** | **Minimum Frequency** | **Responsible Party** |
| N14 | Common Area Catch Basin Inspection | Catch basin inlets and other drainage facilities shall be inspected after each storm event and once per year. Inlets and other facilities shall be cleaned prior to the rainy season, by October 1 each year. | Annually | OCMA Museum House/HOA |
| N15 | Street Sweeping Private Streets and Parking Lots | Drive aisles & parking areas must be swept at least quarterly (every 3 months), including prior to the start of the rainy season (October 1). | Quarterly | OCMA Museum House/HOA |
| N16 | Retail Gasoline Outlets | Not Applicable | | |
| **STRUCTURAL SOURCE CONTROL BMPs** | | | | |
| S1 SD-13 | Provide storm drain system stenciling and signage | Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1 each year. Those determined to be illegible will be re-stenciled as soon as possible. | Annually | OCMA Museum House/HOA |
| S2 SD-34 | Design and construct outdoor material storage areas to reduce pollution introduction | Not Applicable | | |
| S3 SD-32 | Design and construct trash and waste storage areas to reduce pollution introduction | Not Applicable | | |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | | |
|---|---|---|---|---|
| | BMP | Inspection/Maintenance Activities | Minimum Frequency | Responsible Party |
| S4 SD-12 | Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control | In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, and day or night time temperatures. System testing shall occur twice per year. Water from testing/flushing shall be collected and properly disposed to the sewer system and shall not discharge to the storm drain system. | 2x per year | OCMA Museum House/HOA |
| S5 | Protect slopes and channels and provide energy dissipation | To be performed in conjunction with maintenance activities. Maintain vegetative cover and/or mulch to eliminate exposed soils. Any eroded surfaces to be repaired immediately. Inspections to be performed twice each year (spring and fall) and after major storm events to check for signs of erosion, gullies, and sloughing. | Monthly | OCMA Museum House/HOA |
| S6 SD-31 | Properly Design: Dock areas | Not Applicable | | |
| S7 SD-31 | Properly Design: Maintenance bays | Not Applicable | | |
| S8 SD-33 | Properly Design: Vehicle wash areas | Not Applicable | | |
| S9 SD-36 | Properly Design: Outdoor processing areas | Not Applicable | | |
| S10 | Properly Design: Equipment wash areas | Not Applicable | | |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | | |
|---|---|---|---|---|
| | BMP | Inspection/Maintenance Activities | Minimum Frequency | Responsible Party |
| S11 SD-30 | Properly Design: Fueling areas | Not Applicable | | |
| S12 SD-10 | Properly Design: Hillside landscaping | Not Applicable | | |
| S13 | Properly Design: Wash water control for food preparation areas | Not Applicable | | |
| S14 | Properly Design: Community car wash racks | Not Applicable | | |

Any waste generated from maintenance activities will be disposed of properly. Wash water and other waste from maintenance activities is not to be discharged or disposed of into the storm drain system. Clippings from landscape maintenance (i.e. prunings) will be collected and disposed of properly off-site, and will not be washed into the streets, local area drains/conveyances, or catch basin inlets.

# SECTION VI SITE PLAN AND DRAINAGE PLAN

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

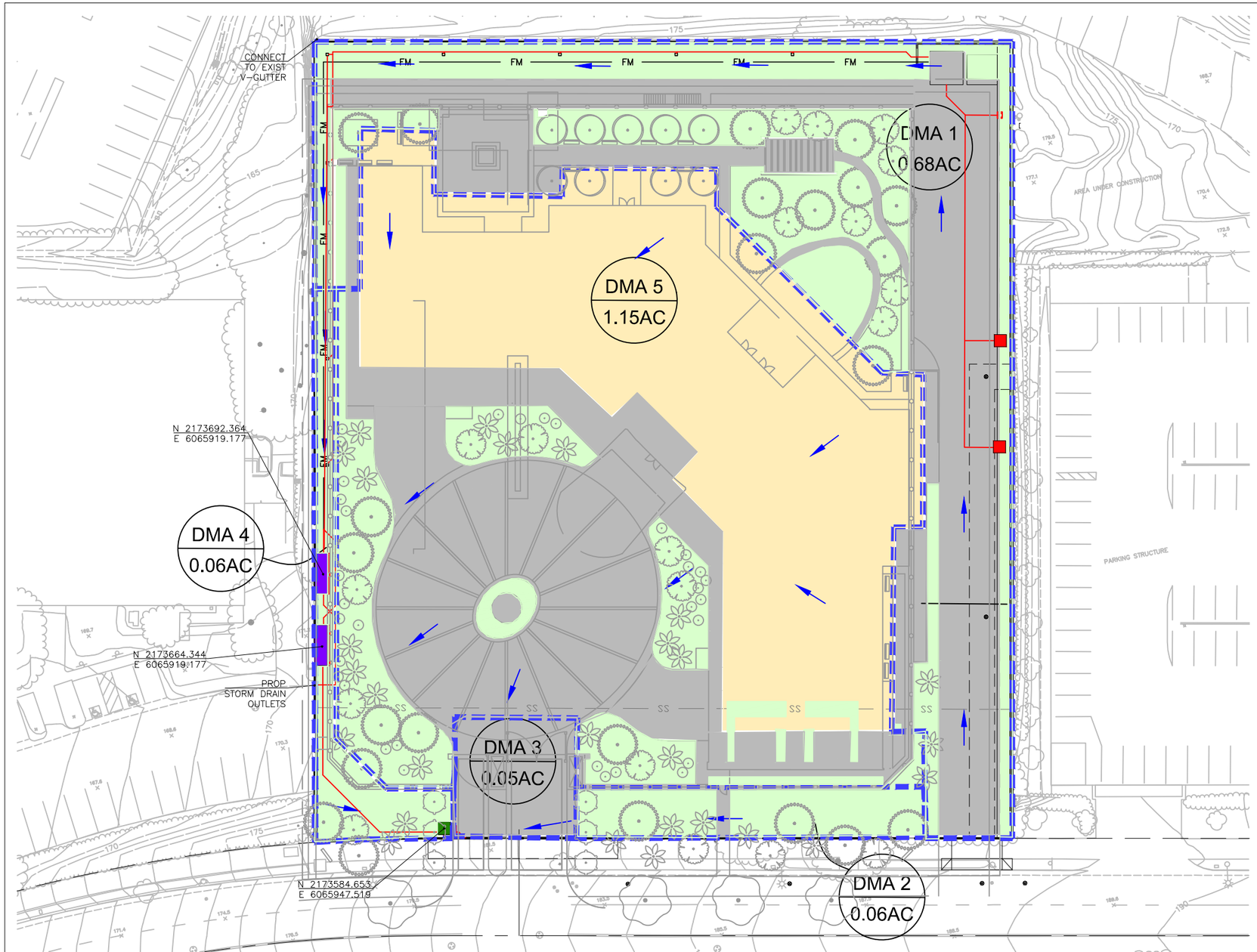
## EXHIBITS

- Vicinity Map
- Site Plan
- WQMP Exhibit
- Typical Cross Sections

## BMP DETAILS & FACT SHEETS

- Modular Wetland System

# VICINITY MAP




## LEGEND

- PROPERTY LINE
- PROPOSED STORM DRAIN
- BMP DRAINAGE AREA BOUNDARY
- PROPOSED COMMON AREA LANDSCAPING
- PROPOSED BUILDING
- STREET SWEEPING PRIVATE STREETS & PARKING LOTS
- CATCH BASIN STENCILING & MAINTENANCE
- PROPOSED MODULAR WETLAND SYSTEM (MWS-L-4-15)
- PROPOSED MODULAR WETLAND SYSTEM (MWS-L-4-4)
- DIRECTION OF FLOW

40' 0' 20' 40'

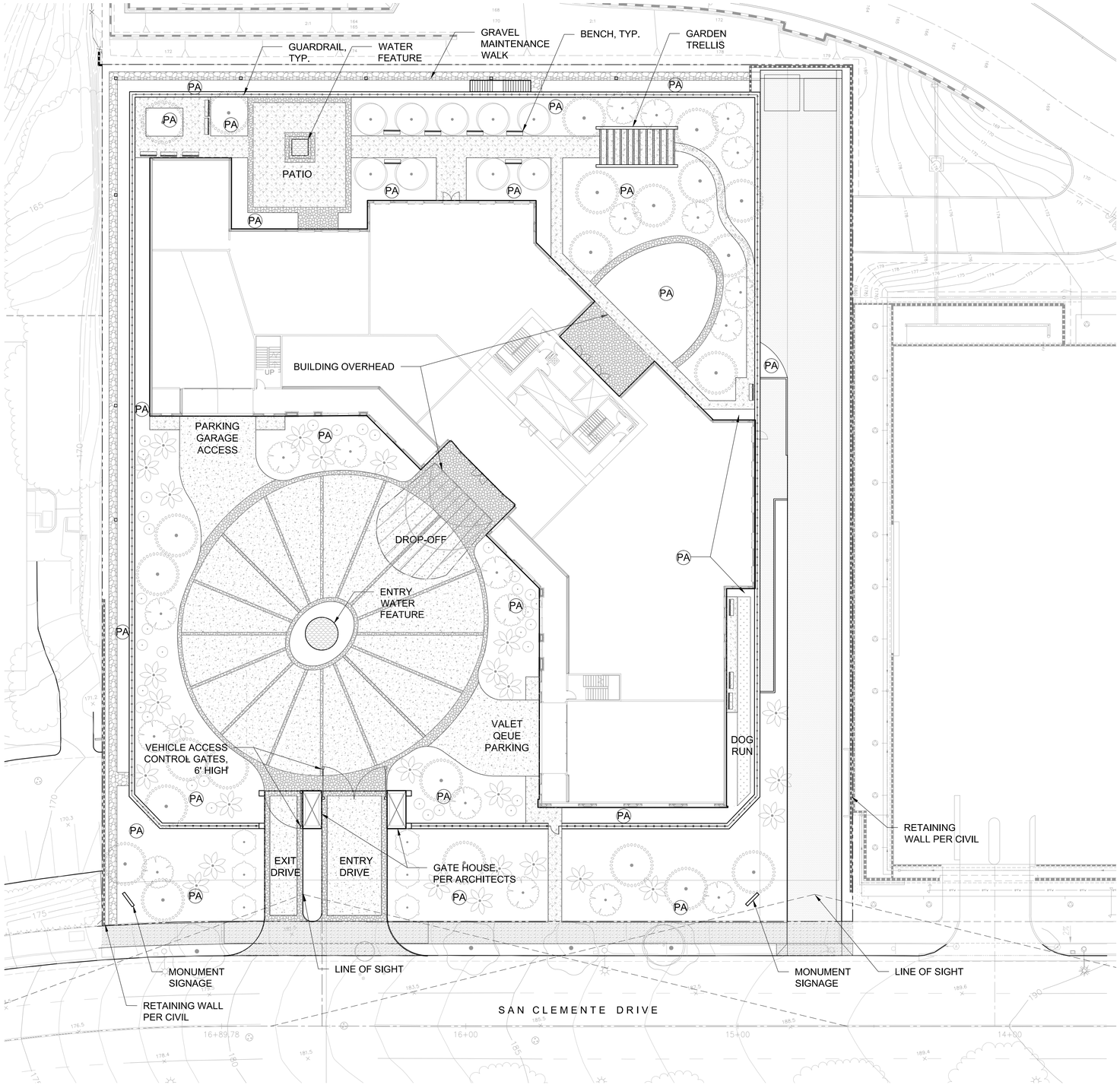
SCALE: 1" = 40'

FUSCOE ENGINEERING
16795 Von Karman, Suite 100
Irvine, California 92606
tel 949.474.1960 • fax 949.474.5315
www.fuscoe.com

Exhibit Date: 3/10/2016

# WATER QUALITY MANAGEMENT PLAN
## OCMA MUSEUM HOUSE
## NEWPORT BEACH, CA

F:\PROJECTS\622\013\EXHIBITS\622-13XH - WQMP.DWG (03-09-16 6:09:25PM) Plotted by: Susan Williams




## LEGEND

- CONCRETE DRIVEWAY NATURAL GRAY
- INTEGRALLY COLORED DECORATIVE CONCRETE TYPE 1 - VEHICLE RATED
- INTEGRALLY COLORED DECORATIVE CONCRETE TYPE 2 - GARDEN WALK
- STONE ACCENT PAVERS
- NEW CONCRETE SIDEWALK AND DRIVEWAY APRON IN RIGHT OF WAY
- GRAVEL MAINTENANCE PATH, 3/8" CRUSHED GRAVEL
- WATER FEATURE
- SYNTHETIC TURF DOG RUN
- PERIMETER FENCE, 6'-0" HIGH MAX.
- ORNAMENTAL GUARDRAIL, 42" HIGH FENCE
- PERIMETER FENCE 6'-0" HIGH
- GARDEN TRELLIS 16'-0" HIGH, IPE WOOD WITH PLASTER COLUMNS
- MONUMENTAL SIGNAGE (SEE NOTE BELOW)
- PA PLANTING AREA

## NOTES

1. ENTRY MONUMENT SIGNAGE: ALL PROPOSED SIGNAGE SHALL COMPLY WITH CITY STANDARD 110-L AND MUNICIPAL CODE 20.30.130, TYP.
2. REFER TO CIVIL SHEET 2-01 FOR ALL SITE WALL HEIGHTS AND MATERIALS

0' 20' 40' 80' 160' 1" = 20'-0"

L1.0

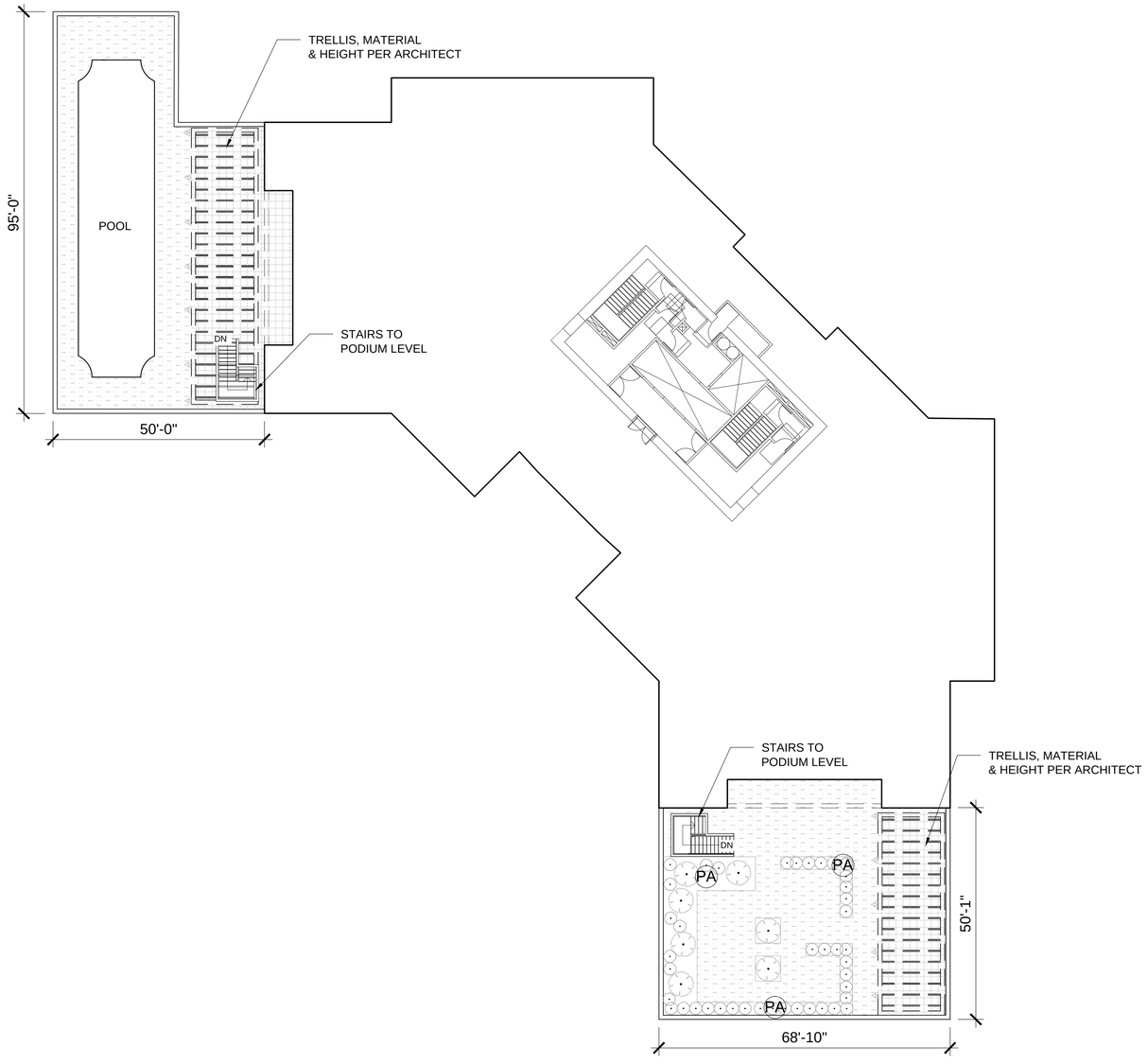
RAMSA
ROBERT A.M. STERN ARCHITECTS

PBCo

**OCMA**
**850 San Clemente Drive**
***Newport Beach, CA***
***Note: Conceptual Design Package Subject To Change***

HARDSCAPE PLAN - GROUND FLOOR

RELATED




## LEGEND

- ON STRUCTURE PAVERS TYPE 1
- ON STRUCTURE PAVERS TYPE 2
- PA — PLANTING AREA

1 LEVEL 2 ROOF TERRACES

0' 16' 32' 64' 188' 1" = 16'-0"

N

L1.1

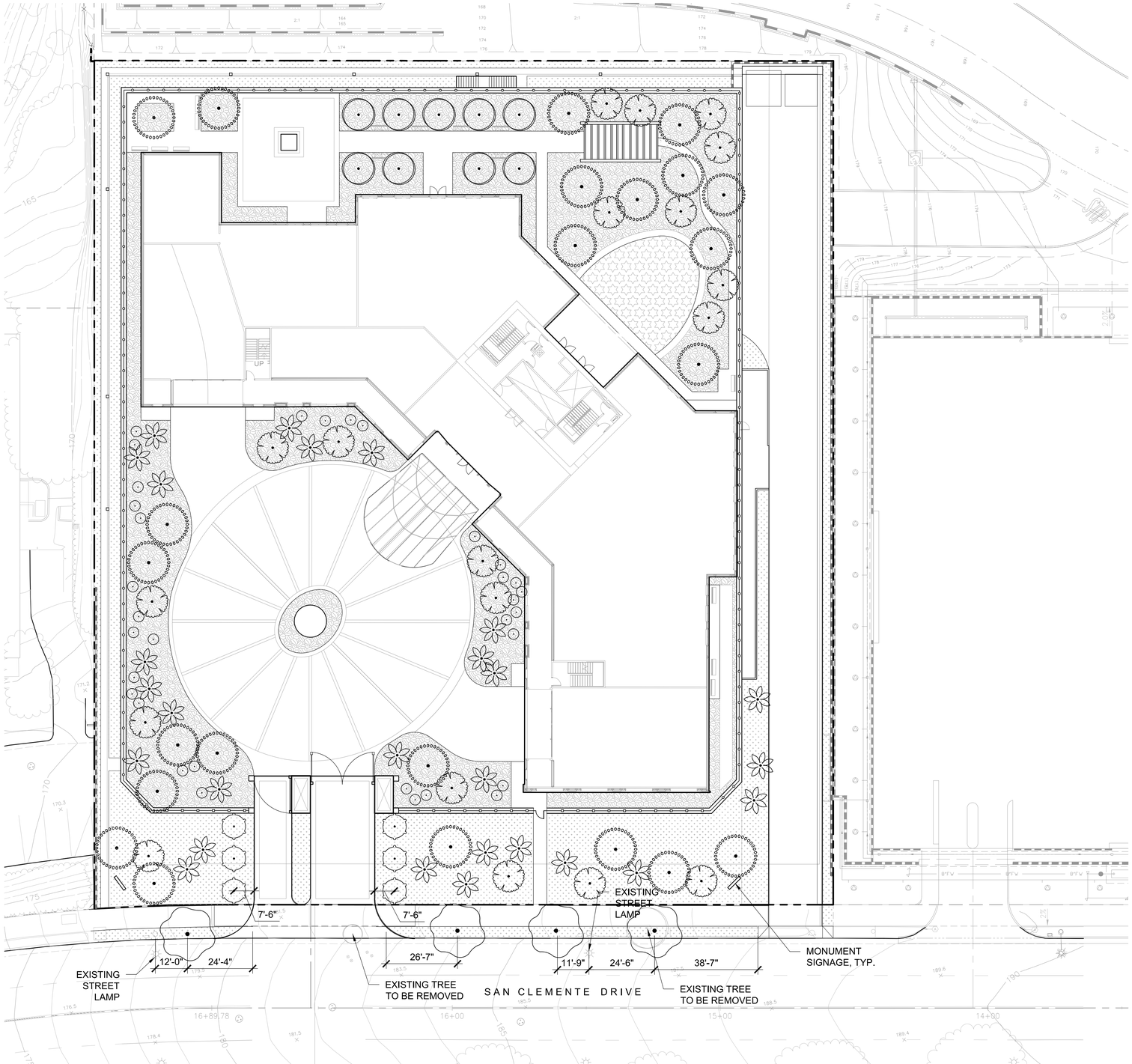
RAMSA
ROBERT A.M. STERN ARCHITECTS

PBCo

**OCMA**
**850 San Clemente Drive**
*Newport Beach, CA*
*Note: Conceptual Design Package Subject To Change*

HARDSCAPE PLAN - ROOF GARDENS

RELATED




# PLANT SCHEDULE

| TREES | BOTANICAL NAME | COMMON NAME |
|---|---|---|
| | PALM TREE: | |
| | Butia capitata | Pindo Palm |
| | Brahea armata | Blue Hesper Palm |
| | Chamaerops humilis | Mediterranean Fan Palm |
| | CITRUS VARIETES | Lemon, Orange, Grapefruit |
| | ORNAMENTAL TREE: | |
| | Olea europaea | Olive |
| | Laurus nobilis | Sweet Bay |
| | Arbutus marina | Marina Strawberry Tree |
| | ORNAMENTAL EVERGREEN TREE: | |
| | Cupressus sempervirens | Italian Cypress |
| | EVERGREEN CANOPY TREE: | |
| | Pinus pinea | Italian Stone Pine |
| | Pinus radiata | Monterey Pine |
| | STREET TREE: (SEE NOTES BELOW) | |
| | Ficus rubiginosa | Rusty Leaf Fig |
| | HEDGE: | |
| | Ligustrum texanum | Texas Privet |
| | Ficus nitida | Indian Laurel Fig |
| | Prunus caroliniana compacta | Cherry Laurel |
| GROUND-LEVEL GARDENS SHRUB MIX | Agave attenuata 'Kara's Stripes' | Agave |
| | Coprosma repens 'Marble Queen' | Marble Queen Mirror Plant |
| | Dietes bicolor | Fortnight Lily |
| 11,700 sf | Dymondia margaretae | Dymondia |
| | Lavandula dentata ' Goodwin Creek Gray' | Goodwin Creek Gray Lavender |
| | Pennisetum x 'Fairy Tails' | Fountain Grass |
| | Pittosporum crassifolium 'Nana' | Karo Pittosporum |
| | Rosmarinus officinalis ' Huntington Carpet | Huntington Carpet Rosemary |
| STREETSCAPE AND BUFFER SHRUB MIX | Arctostaphylos uva-ursi 'Point Reyes' | Kinnikinnick |
| | Asparagus densiflorus | Asparagus fern |
| | Carex pansa | Sanddune Sedge |
| 13,200 sf | Ceanothus griseus horizontalis ' Yankee Point' | California Lilac |
| | Echium candicans | Pride of Madeira |
| | Muhlenbergia rigens | Deer Grass |
| | Salvia x 'Bee's Bliss' | Sage |
| | Westringia fruticosa 'Morning Light' | Morning Light Coast Rosemary |
| MARATHON II SOD | | |
| 1,200 sf | | |

## NOTES

1. LANDSCAPE DESIGN IS TO COMPLY WITH WATER EFFICIENT LANDSCAPE ORDINANCE (MBMC 14.17)
2. ALL STREET TREES SHALL BE 36" BOX SIZE. FINAL LOCATIONS PER MUNICIPAL OPERATIONS DEPARTMENT.
3. ENTRY MONUMENT SIGNAGE: ALL PROPOSED SIGNAGE SHALL COMPLY WITH CITY STANDARD 110-L AND MUNICIPAL CODE 20.30.130, TYP.

0' 20' 40' 80' 160' 1" = 20'-0"

L2.0

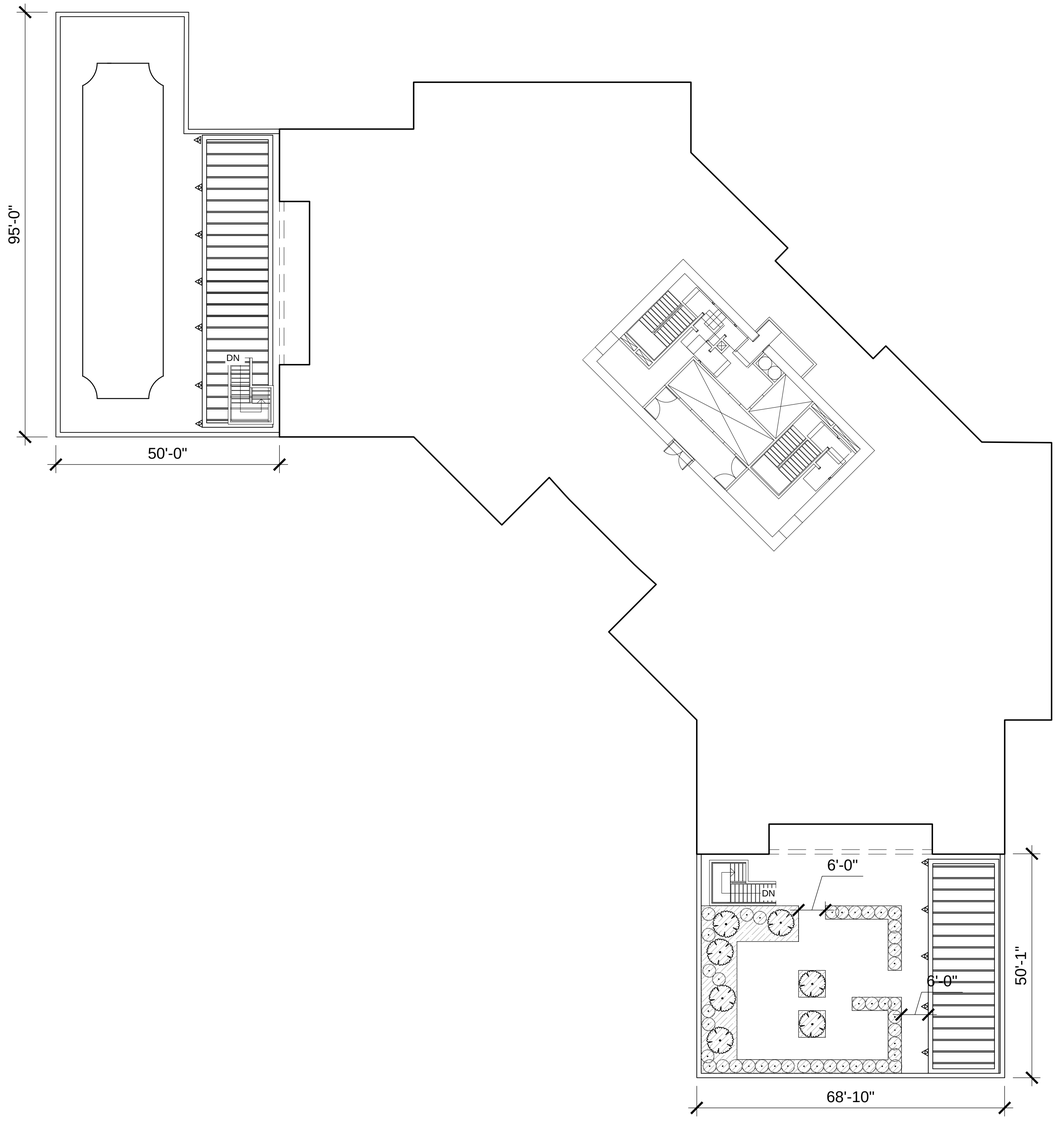
RAMSA
ROBERT A.M. STERN ARCHITECTS

PBCo

**OCMA**
**850 San Clemente Drive**
***Newport Beach, CA***
***Note: Conceptual Design Package Subject To Change***

PLANTING PLAN - GROUND FLOOR

RELATED




1 LEVEL 2 ROOF TERRACES

## PLANT SCHEDULE

| TREES | BOTANICAL NAME | COMMON NAME |
|---|---|---|
| | ORNAMENTAL TREE: | |
| | Olea europaea | Olive |
| | Laurus nobilis | Sweet Bay |
| | Arbutus marina | Marina Strawberry Tree |
| | HEDGE: | |
| | Ligustrum texanum | Texas Privet |
| | Ficus nitida | Indian Laurel Fig |
| | Prunus caroliniana compacta | Cherry Laurel |
| | VINE: | |
| | Bougainvillea | N.C.N. |
| | Solandra maxima | Cup-of-Gold-Wine |

| ROOF GARDENS SHRUB MIX | BOTANICAL NAME | COMMON NAME |
|---|---|---|
| 700 sf | Ajuga reptans 'Atropurpurea' | Bronze Ajuga |
| | Anigozanthos flavidus 'Bush Ranger' | Kangaroo Paw |
| | Coprosma repens 'Marble Queen' | Marble Queen Mirror Plant |
| | Correa alba | White Correa |
| | Dietes bicolor | Fortnight Lily |
| | Gaura lindheimeri | White Gaura |
| | Helleborus foetidus | Bearsfoot Hellebore |
| | Lavandula dentata 'Goodwin Creek Gray' | Goodwin Creek Gray Lavender |
| | Ophiopogon planiscapus 'Nigrescens' | Black Mondo Grass |
| | Pittosporum crassifolium 'Nana' | Karo Pittosporum |
| | Rosmarinus officinalis 'Huntington Carpet' | Huntington Carpet Rosemary |

## NOTES

1. LANDSCAPE DESIGN IS TO COMPLY WITH WATER EFFICIENT LANDSCAPE ORDINANCE (MBMC 14.17)

0' 16' 32' 64' 128' 1/16"' = 1'-0"

L2.1

RAMSA
ROBERT A.M. STERN ARCHITECTS

PBCo

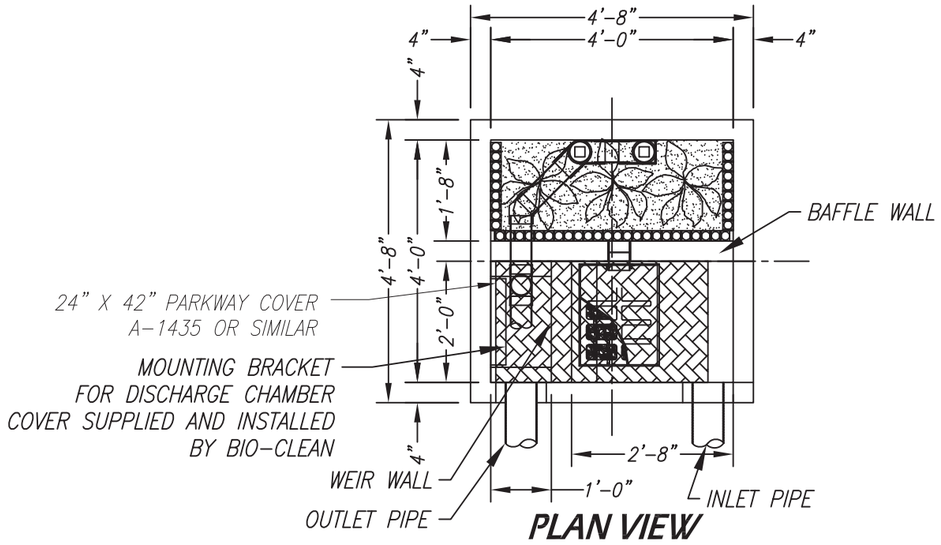
**OCMA**
**850 San Clemente Drive**
***Newport Beach, CA***
***Note: Conceptual Design Package Subject To Change***

PLANTING PLAN - ROOF GARDENS

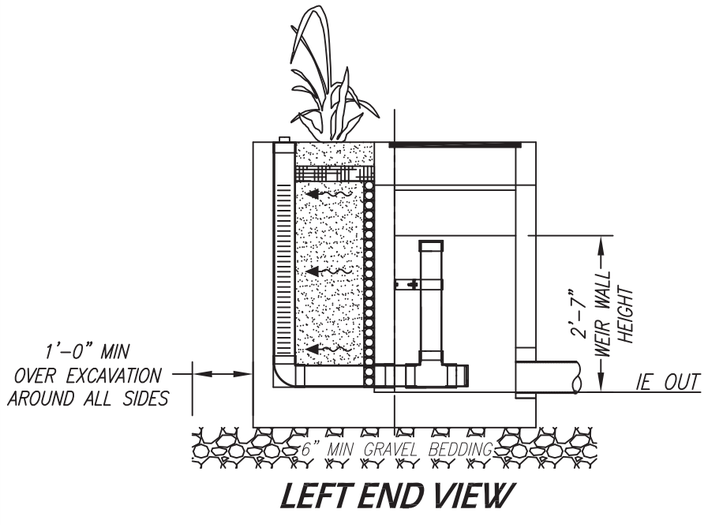
RELATED

# MODULAR WETLAND SYSTEMS - LINEAR 4-4 VAULT TYPE

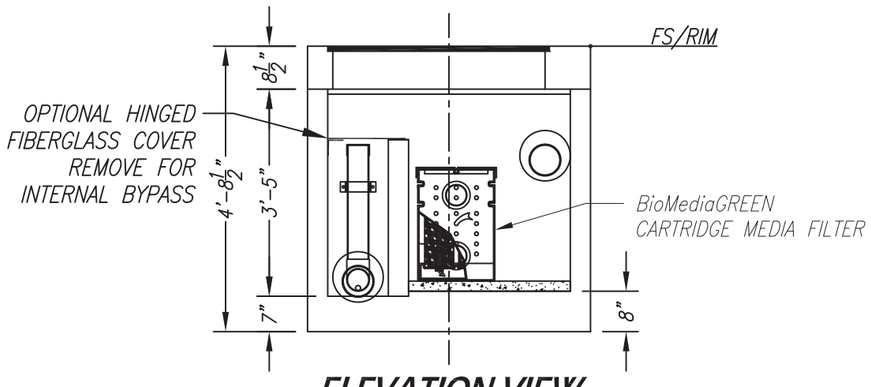
| FLOW RATES |
|---|
| PEAK TREATMENT FLOW RATE = 0.051 CFS OR 22.80 GPM |
| PEAK BYPASS FLOW RATE = OPTIONAL |
| **SPECIFICATIONS** |
| INSTALL AT SURFACE |
| O.D. DIMENSIONS = 4.7' X 4.7' X 4.7' |
| TOP OF CURB TO INVERT OUT = 4.13' |
| SEDIMENT STORAGE CAPACITY = 1000 LBS OR 23.5 CF |



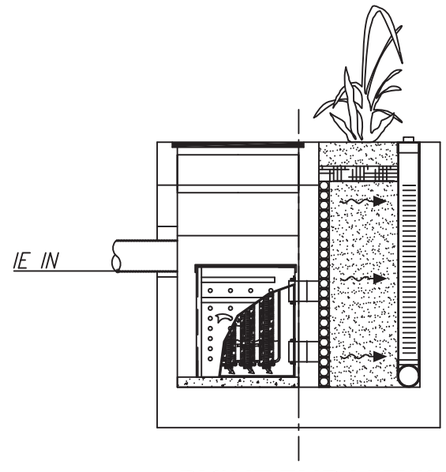

**PLAN VIEW**




**LEFT END VIEW**




**ELEVATION VIEW**




**RIGHT END VIEW**

| BIOFILTRATION CHAMBER SURFACE AREA CALCS |
|---|
| SIDES = 2 |
| 1.5' L x 3.4' H = 5.1 SF |
| SIDE SURFACE AREA = 10.2 SF |
| ENDS = 1 |
| 3.7' L x 3.4' H = 12.6 SF |
| END SURFACE AREA = 12.6 SF |
| TOTAL WETLAND MEDIA SURFACE AREA **= 22.80 SF** |
| WETLAND MEDIA LOADING RATE 22.80 GPM / 22.80 SF **= 1.00 GPM/SF** |
| **PRETREATMENT FILTER SURFACE AREA CALCS** |
| TOTAL PRETREATMENT SURFACE AREA **= 20 SF** |
| PRETREATMENT FILTER LOADING RATE 22.80 GPM / 20.00 SF **= 1.14 GPM/SF** |

## LEGEND

- WETLAND MEDIA
- PLANT/ROOT MOISTURE RETENTION LAYER
- MANHOLE / ACCESS HATCH

## INSTALLATION NOTES:

1. INSTALL UNIT ON LEVEL BED OF GRAVEL OF AT LEAST 6" IN DEPTH WITH 1' MINIMUM OF OVER EXCAVATION AROUND ENTIRE MWS UNIT.
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH fc=5,000 PSI.
3. REINFORCING: ASTM A-615, GRADE 60.
4. RATED FOR PARKWAY LOADING 300 PSF.
5. JOINT SEALANT: BUTYL RUBBER SS-S-00210


MODULAR WETLAND SYSTEMS INC.
P.O. BOX 869
OCEANSIDE, CA 92049
www.ModularWetlands.com




| | NAME | DATE |
|---|---|---|
| DRAWN | John Hayden | 4/24/13 |
| EDITED | | |
| | | |

COMMENTS:

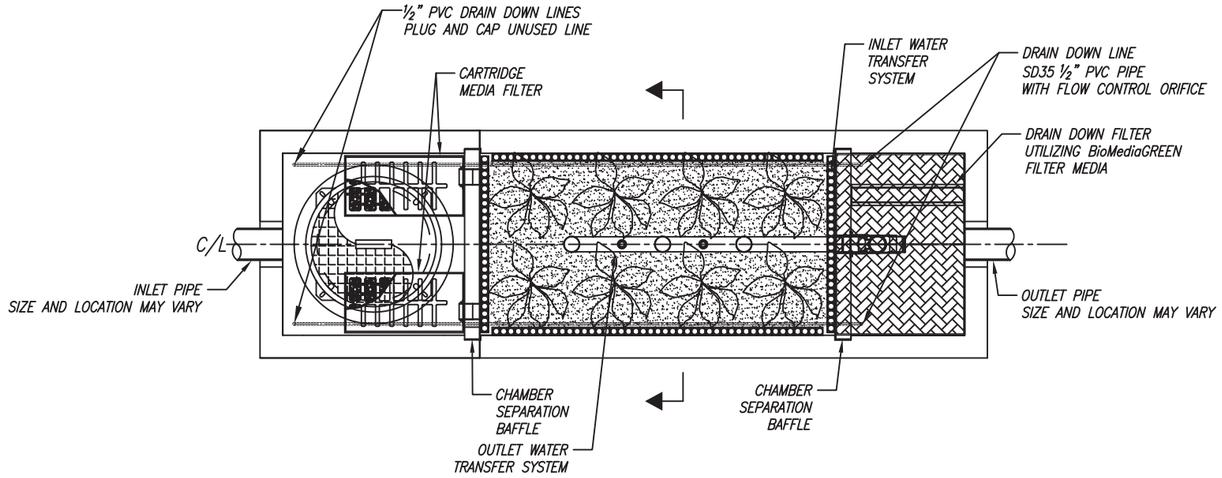
TITLE: MWS LINEAR VAULT TYPE

| SIZE | DWG. NO. | REV |
|---|---|---|
| | MWS-L-4-4-V | |

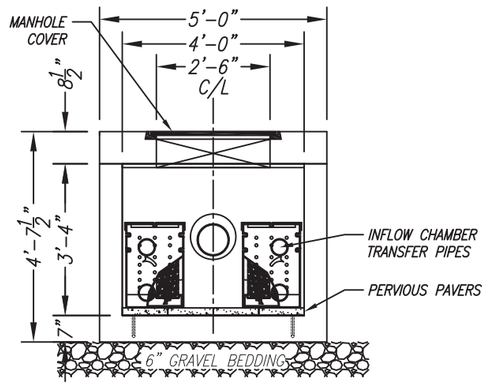
SCALE NTS | UNITS = INCHES | SHEET 1 OF 1

# MODULAR WETLAND SYSTEMS - LINEAR 2.0
# 15' VAULT TYPE

| FLOW RATES |
|---|
| PEAK TREATMENT FLOW RATE = .175 CFS OR 78.5 GPM |
| PEAK BYPASS FLOW RATE = N/A |
| **SPECIFICATIONS** |
| INSTALL AT SURFACE |
| O.D. DIMENSIONS = 16' X 5' X 4.7' |
| TOP OF VAULT TO INVERT OUT = 4.13' |
| SEDIMENT STORAGE CAPACITY = 1000 LBS OR 23.5 CF |



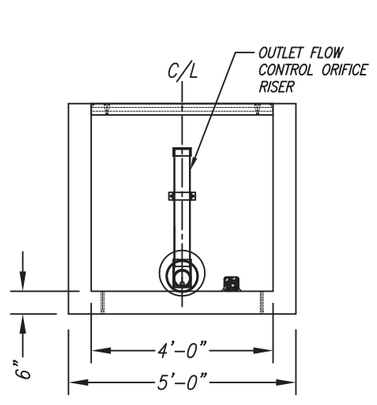

| BIOFILTRATION CHAMBER SURFACE AREA CALCS |
|---|
| SIDES = 2 |
| 7.5' L x 3.4' H = 25.5 SF |
| SIDE SURFACE AREA = 51.0 SF |
| ENDS = 2 |
| 3.7' L x 3.4' H = 12.6 SF |
| END SURFACE AREA = 25.2 SF |
| TOTAL WETLAND MEDIA SURFACE AREA **= 76.2 SF** |
| WETLAND MEDIA LOADING RATE 78.5 GPM / 76.2 SF **= 1.0 GPM/SF** |
| **PRETREATMENT FILTER SURFACE AREA CALCS** |
| SIDES = 2 |
| 0.50' L x 1.67' H = 0.84 SF |
| SIDE SURFACE AREA = 1.68 SF |
| ENDS = 2 |
| 0.25' L x 1.67' H = 0.42 SF |
| END SURFACE AREA = 0.84 SF |
| TOTAL PRETREATMENT SURFACE AREA 2.52 SF x 28 FILTERS **= 70.56 SF** |
| PRETREATMENT FILTER LOADING RATE 78.5 GPM / 70.56 SF **= 1.11 GPM/SF** |



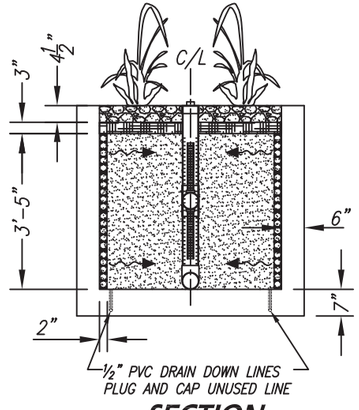

**LEFT END VIEW**
***PRETREATMENT CHAMBER***




**ELEVATION VIEW**




**RIGHT END VIEW**
***DISCHARGE CHAMBER***




**SECTION**
***BIOFILTRATION CHAMBER***

## LEGEND

- 2" DRAIN CELL PERIMETER INLET WATER TRANSFER SYSTEM
- WETLAND MEDIA
- PLANT/ROOT MOISTURE RETENTION LAYER
- MANHOLE / ACCESS HATCH

### INSTALLATION NOTES:

1. INSTALL UNIT ON LEVEL BED OF GRAVEL OF AT LEAST 6" IN DEPTH.
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH fc=5,000 PSI.
3. REINFORCING: ASTM A-615, GRADE 60.
4. RATED FOR PARKWAY LOADING 300 PSF.
5. JOINT SEALANT: BUTYL RUBBER SS-S-00210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| | NAME | DATE |
|---|---|---|
| DRAWN | Luis | 1/25/13 |
| EDITED | | |
| | | |

COMMENTS:

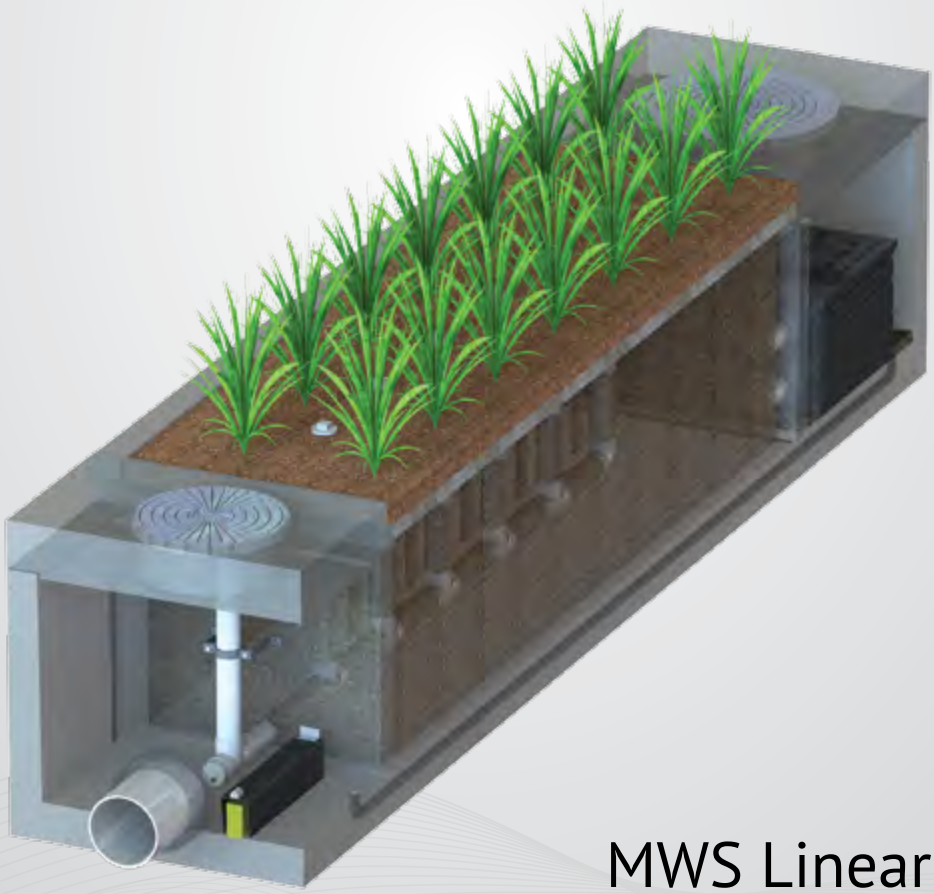
TITLE: MWS LINEAR 2.0 VAULT TYPE

| SIZE | DWG. NO. | REV |
|---|---|---|
| | MWS-L-4-15-V | |

SCALE 1:40 | UNITS = INCHES | SHEET 1 OF 1

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

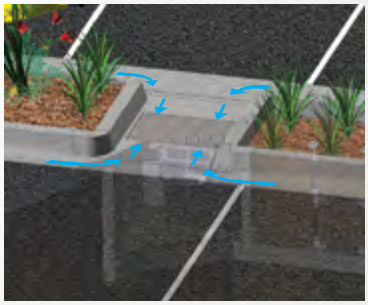
- Agriculture
- Reuse
- Low Impact Development
- Waste Water

# 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.

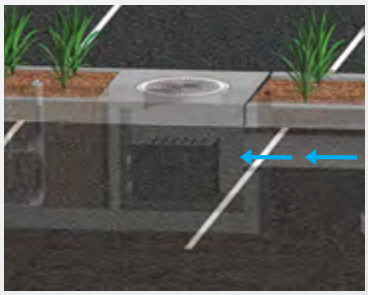
## Curb Type

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

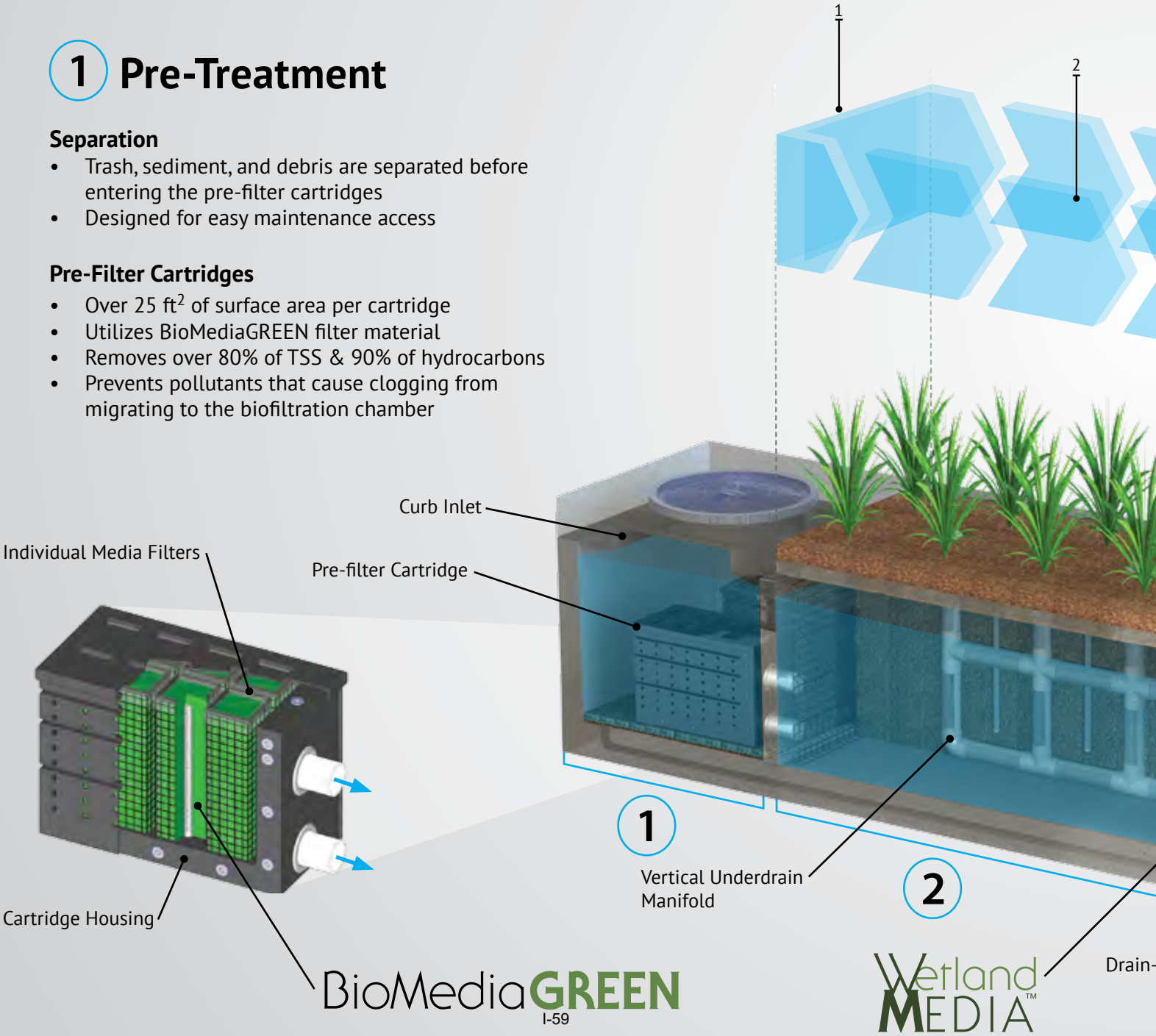
## 1 Pre-Treatment

**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



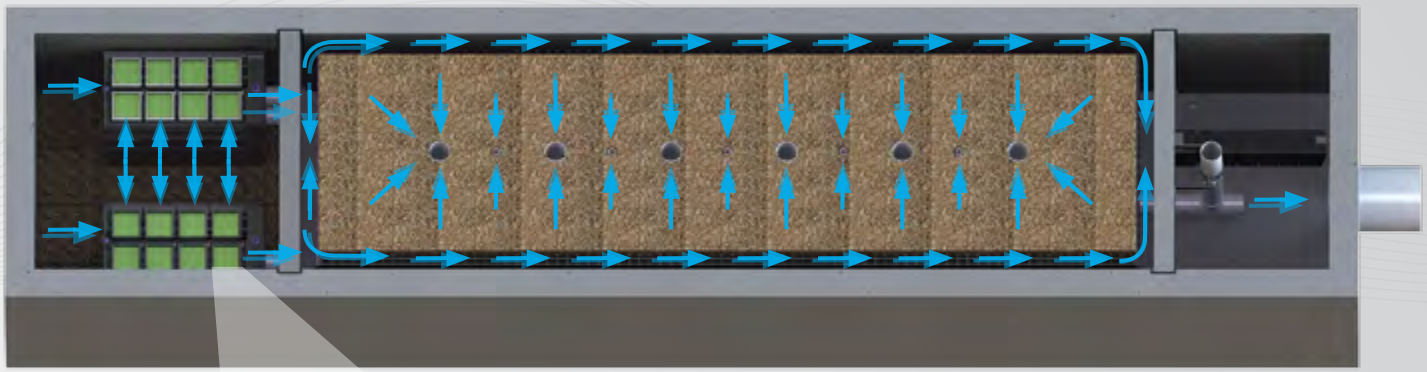


Fig. 2 - Top View

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

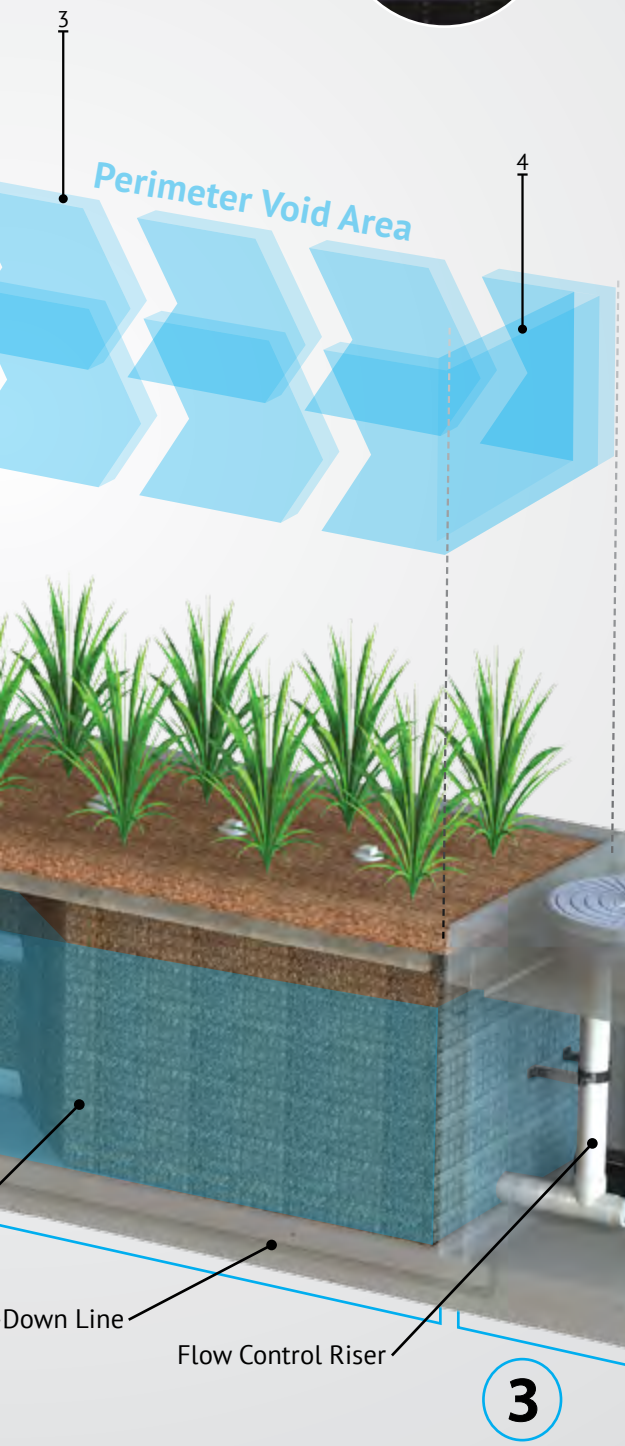



Fig. 1

## 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

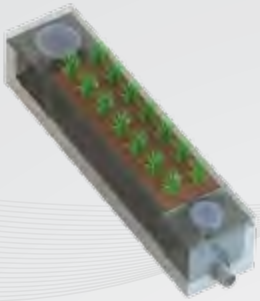
### Drain-Down Filter

- 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.

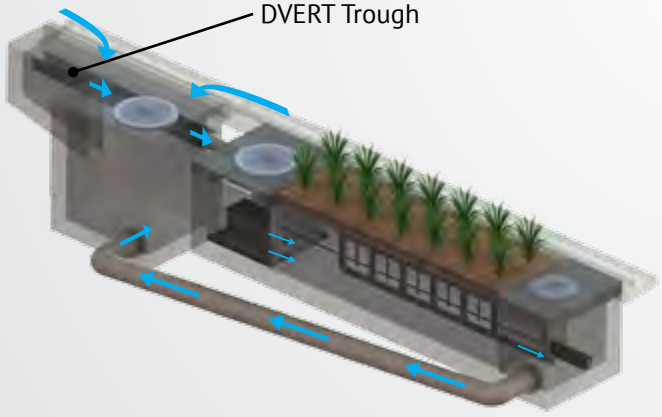
## External Diversion Weir Structure

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

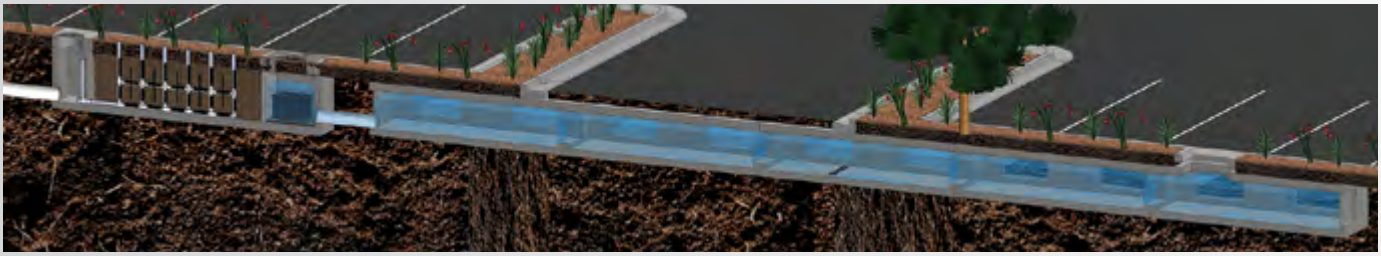
The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line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

BIO-7: Proprietary Biotreatment

Proprietary biotreatment devices are devices that are manufactured to mimic natural systems such as bioretention areas by incorporating plants, soil, and microbes engineered to provide treatment at higher flow rates or volumes and with smaller footprints than their natural counterparts. Incoming flows are typically filtered through a planting media (mulch, compost, soil, plants, microbes, etc.) and either infiltrated or collected by an underdrain and delivered to the storm water conveyance system. Tree box filters are an increasingly common type of proprietary biotreatment device that are installed at curb level and filled with a bioretention type soil. For low to moderate flows they operate similarly to bioretention systems and are bypassed during high flows. Tree box filters are highly adaptable solutions that can be used in all types of development and in all types of soils but are especially applicable to dense urban parking lots, street, and roadways.

*Also known as:*

- *Catch basin planter box*
- *Bioretention vault*
- *Tree box filter*

Proprietary biotreatment
*Source: http://www.americastusa.com /index.php/filterra/*

### *Feasibility Screening Considerations*

- Proprietary biotreatment devices that are unlined may cause incidental infiltration. Therefore, an evaluation of site conditions should be conducted to evaluate whether the BMP should include an impermeable liner to avoid infiltration into the subsurface.

### *Opportunity Criteria*

- Drainage areas of 0.25 to 1.0 acres.
- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Proprietary biotreatment facilities may also be applied in parking lot islands, traffic circles, road shoulders, and road medians.
- Must not adversely affect the level of flood protection provided by the drainage system.

### *OC-Specific Design Criteria and Considerations*

☐ Frequent maintenance and the use of screens and grates to keep trash out may decrease the likelihood of clogging and prevent obstruction and bypass of incoming flows.

☐ Consult proprietors for specific criteria concerning the design and performance.

☐ Proprietary biotreatment may include specific media to address pollutants of concern. However, for proprietary device to be considered a biotreatment device the media must be capable of supporting rigorous growth of vegetation.

☐ Proprietary systems must be acceptable to the reviewing agency. Reviewing agencies shall have the discretion to request performance information. Reviewing agencies shall have the discretion to deny the use of a proprietary BMP on the grounds of performance, maintenance considerations, or other relevant factors.

☐ In right of way areas, plant selection should not impair traffic lines of site. Local jurisdictions may also limit plant selection in keeping with landscaping themes.

### *Computing Sizing Criteria for Proprietary Biotreatment Device*

- Proprietary biotreatment devices can be volume based or flow-based BMPs.
- Volume-based proprietary devices should be sized using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** or the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs described in **Appendix III.3.2**.
- The required design flowrate for flow-based proprietary devices should be computed using the Capture Efficiency Method for Flow-based BMPs described in **Appendix III.3.3)**.

### *Additional References for Design Guidance*

- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: **http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850**
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 9: **http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf**
- Santa Barbara BMP Guidance Manual, Chapter 6: **http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual_071008_Final.pdf**

# SECTION VII EDUCATIONAL MATERIALS

The educational materials included in this WQMP are provided to inform people involved in future uses, activities, or ownership of the site about the potential pitfalls associated with careless storm water management. "The Ocean Begins at Your Front Door" provides users with information about storm water that is/will be generated on site, what happens when water enters a storm drain, and its ultimate fate, discharging into the ocean. Also included are activities guidelines to educate anyone who is or will be associated with activities that have a potential to impact storm water runoff quality, and provide a menu of BMPs to effectively reduce the generation of storm water runoff pollutants from a variety of activities. The educational materials that may be used for the proposed project are included in Appendix C of this WQMP and are listed below.

| EDUCATION MATERIALS | | | |
|---|---|---|---|
| **Residential Materials (http://www.ocwatersheds.com)** | **Check If Attached** | **Business Materials (http://www.ocwatersheds.com)** | **Check If Attached** |
| The Ocean Begins at Your Front Door | ☒ | Tips for the Automotive Industry | ☐ |
| Tips for Car Wash Fund-raisers | ☐ | Tips for Using Concrete and Mortar | ☐ |
| Tips for the Home Mechanic | ☐ | Tips for the Food Service Industry | ☐ |
| Homeowners Guide for Sustainable Water Use | ☐ | Proper Maintenance Practices for Your Business | ☐ |
| Household Tips | ☒ | **Other Materials (http://www.ocwatersheds.com) (http://www.cabmphandbooks.com)** | **Check If Attached** |
| Proper Disposal of Household Hazardous Waste | ☒ | | |
| Recycle at Your Local Used Oil Collection Center (North County) | ☐ | DF-1 Drainage System Operation & Maintenance | ☒ |
| Recycle at Your Local Used Oil Collection Center (Central County) | ☒ | R-1 Automobile Repair & Maintenance | ☐ |
| Recycle at Your Local Used Oil Collection Center (South County) | ☐ | R-2 Automobile Washing | ☐ |
| Tips for Maintaining Septic Tank Systems | ☐ | R-3 Automobile Parking | ☐ |
| Responsible Pest Control | ☒ | R-4 Home & Garden Care Activities | ☒ |
| Sewer Spill | ☐ | R-5 Disposal of Pet Waste | ☒ |
| Tips for the Home Improvement Projects | ☐ | R-6 Disposal of Green Waste | ☒ |
| Tips for Horse Care | ☐ | R-7 Household Hazardous Waste | ☒ |
| Tips for Landscaping and Gardening | ☒ | R-8 Water Conservation | ☒ |
| Tips for Pet Care | ☒ | SD-10 Site Design & Landscape Planning | ☒ |
| Tips for Pool Maintenance | ☒ | SD-11 Roof Runoff Controls | ☐ |
| Tips for Residential Pool, Landscape and Hardscape Drains | ☒ | SD-12 Efficient Irrigation | ☒ |
| Tips for Projects Using Paint | ☐ | SD-13 Storm Drain Signage | ☒ |
| Tips for Protecting Your Watershed | ☐ | SD-31 Maintenance Bays & Docs | ☐ |
| Other: Children's Brochure | ☐ | SD-32 Trash Storage Areas | ☐ |

# APPENDICES

# APPENDIX A

# SUPPORTING CALCULATIONS

SUBJECT TO FURTHER REVISION

## LEGEND

City Boundaries

**Hydrologic Soil Groups**

- A Soils
- B Soils
- C Soils
- D Soils

Source:
Soils: Natural Resources Conservation Service (NRCS)
Soil Survey - soil_ca678, Orange County & Western Riverside
Date of publication: 2006-02-08
http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

Project Location

0 2.5 5 10 Kilometers

0 1.8 3.6 7.2 Miles

P: \ 9526E \ 6-GIS \ Mxds \ Reports \ InfiltrationFeasability_20110215 \ 9526E_FigureXVI-2a_HydroSoils_20110215.mxd

TITLE
NRCS HYDROLOGIC SOILS GROUPS

ORANGE COUNTY INFILTRATION STUDY

JOB
ORANGE CO. CA

| | |
|---|---|
| SCALE | 1" = 1.8 miles |
| DESIGNED | TH |
| DRAWING | TH |
| CHECKED | BMP |
| DATE | 02/09/11 |
| JOB NO. | 9526-E |

PACE
Advanced Water Engineering

FIGURE
XVI-2a

## Susceptibility

Potential Areas of Erosion, Habitat, & Physical Structure Susceptibility

## Channel Type

- Earth (Unstable)
- Earth (Stabilized)
- Stabilized

## Tidel Influence

- <= Mean High Water Line (4.28')

## Water Body

- Basin
- Dam
- Lake
- Reservoir

## Other Lands

- Airport/Military

AnaheimBay-HuntingtonHarbor Watershed

Santa Ana River Watershed

Santa Ana River Watershed

South Orange County

El Modena-Irvine Retarding Basin

Lower Peters Canyon Retarding Basin

Eastfoot Retarding Basin

Orchard Estates Retention Basin

Hicks Canyon Retarding Basin

Rattlesnake Reservoir

East Hicks Canyon Retarding Basin

Siphon Reservoir

Bee Canyon Retarding Basin

Round Canyon Retarding Basin

Trabuco Retarding Basin

Marshburn Retarding Basin

Agua Chinon Retarding Basin

North Lake

South Lake

Basin Number 2

Basin Number 1

Sand Canyon Reservoir

Laguna Reservoir

Village Pond Park

Bonita Canyon Reservoir

San Joaquin Reservoir

Big Canyon Reservoir

Harbor View Dam

John Wayne Airport

Project Location

I-71

Feet

0 9,000 18,000

TITLE: SUSCEPTIBILITY ANALYIS NEWPORT BAY-NEWPORT COASTAL STREAMS

JOB: ORANGE CO. WATERSHED MASTER PLANNING ORANGE COUNTY CA

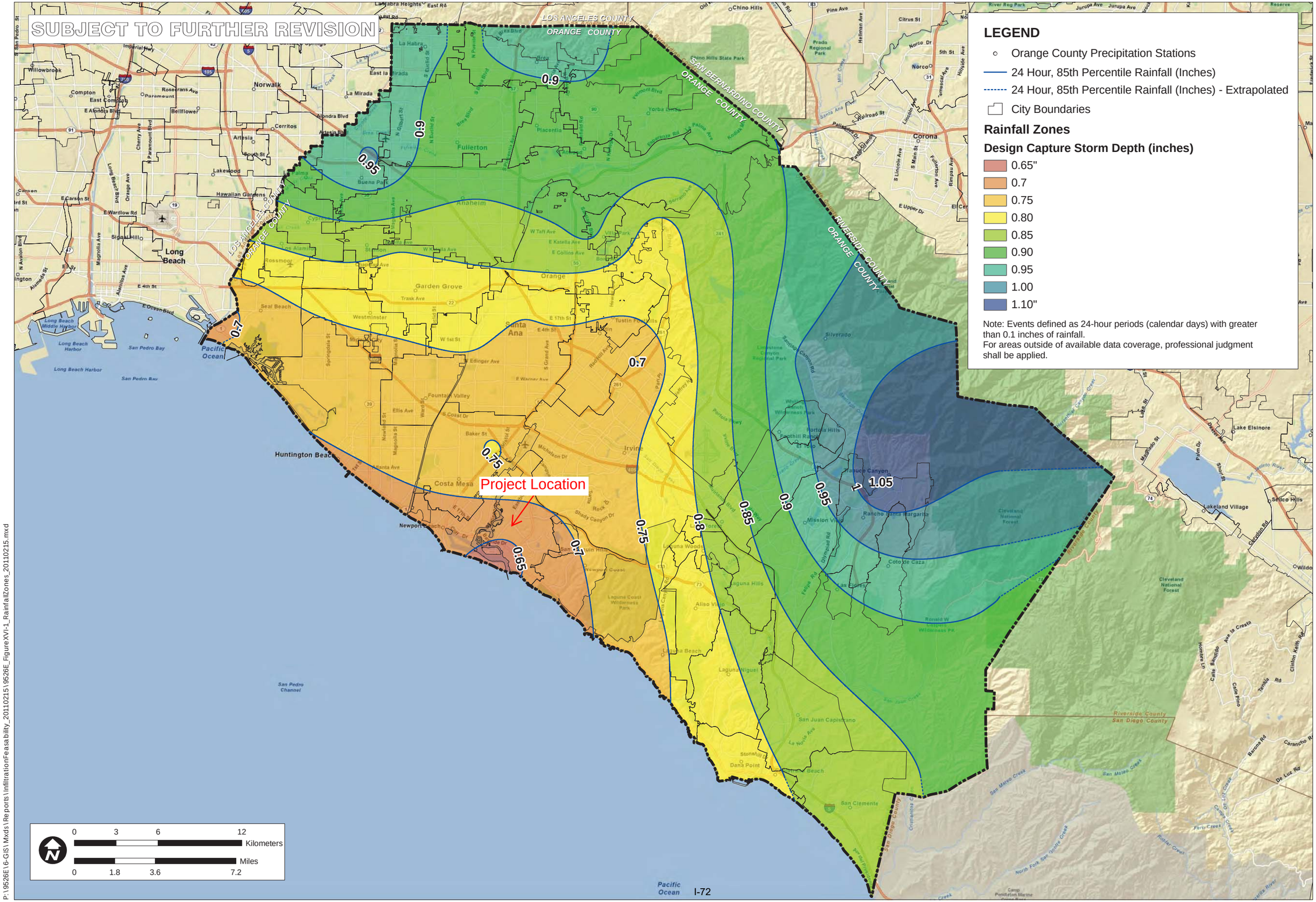
| SCALE | 1" = 12000' |
|---|---|
| DESIGNED | TH |
| DRAWING | TH |
| CHECKED | BMP |
| DATE | 04/30/10 |
| JOB NO. | 9526-E |

PACE Advanced Water Engineering

FIGURE 4

P:\9526E\16-GIS\Mxds\SuceptabilityMaps_20100505\9526E_NewportBaySuscetibility_20100430.mxd

SUBJECT TO FURTHER REVISION




## LEGEND

- Orange County Precipitation Stations
- 24 Hour, 85th Percentile Rainfall (Inches)
- 24 Hour, 85th Percentile Rainfall (Inches) - Extrapolated
- City Boundaries

### Rainfall Zones

**Design Capture Storm Depth (inches)**

- 0.65"
- 0.7
- 0.75
- 0.80
- 0.85
- 0.90
- 0.95
- 1.00
- 1.10"

Note: Events defined as 24-hour periods (calendar days) with greater than 0.1 inches of rainfall.
For areas outside of available data coverage, professional judgment shall be applied.

0 3 6 12 Kilometers

0 1.8 3.6 7.2 Miles

TITLE: RAINFALL ZONES

JOB: ORANGE COUNTY TECHNICAL GUIDANCE DOCUMENT — ORANGE CO., CA

| SCALE | DESIGNED | DRAWING | CHECKED | DATE | JOB NO. |
|---|---|---|---|---|---|
| 1" = 1.8 miles | TH | TH | BMP | 04/22/10 | 9526-E |

PACE Advanced Water Engineering

FIGURE XVI-1

P:\9526E\6-GIS\Mxds\Reports\InfiltrationFeasability_20110215\9526E_FigureXVI-1_RainfallZones_20110215.mxd

## Worksheet B: Simple Design Capture Volume Sizing Method

Project: OCMA Museum House

Date: March 10, 2016

| | | | Total Site | DMA 1 | DMA 2 | DMA 3 | DMA 4 | DMA 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ***Step 1: Determine the design capture storm depth used for calculating volume*** | | | | | | | | | | |
| 1 | Enter design capture storm depth from Figure III.1, *d* (inches) | d= | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | | inches |
| 2 | Enter the effect of provided HSCs, $d_{HSC}$ (inches) (Worksheet A) | $d_{HSC}$= | 0 | 0 | 0 | 0 | 0 | 0 | | inches |
| 3 | Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2) | $d_{remainder}$= | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | | inches |
| ***Step 2: Calculate the DCV*** | | | | | | | | | | |
| 1 | Enter Project area tributary to BMP (s), *A* (acres) | A= | 2.0000 | 0.6800 | 0.0600 | 0.0500 | 0.0600 | 1.1500 | | acres |
| 2 | Enter Project Imperviousness, *imp* (unitless) | imp= | 78.0% | 0.0% | 100.0% | 0.0% | 0.0% | 78.0% | | % |
| 3 | Calculate runoff coefficient, *C= (0.75 x imp) + 0.15* | C= | 0.7050 | 0.1500 | 0.6015 | 0.1500 | 0.6285 | 0.1500 | | |
| 4 | Calculate runoff volume, $V_{design} = (C \times d_{remainder} \times A \times 43560 \times (1/12))$ | $V_{design}$= | 3,583 | 22.5 | 395.9 | 21.0 | 134.1 | 30.9 | | cu-ft |
| ***Step 3: Design BMPs to ensure full retention of the DCV*** | | | | | | | | | | |
| ***Step 3a: Determine design infiltration rate*** | | | | | | | | | | |
| 1 | Enter measured infiltration rate, $K_{measured}$ (in/hr) (Appendix VII) | $K_{measured}$= | *Infiltration not feasible.* | | | | | | | in/hr |
| 2 | Enter combined safety factor from Worksheet H, $S_{final}$ (unitless) | $S_{final}$= | | | | | | | | |
| 3 | Calculate design infiltration rate, $K_{design} = K_{measured} / S_{final}$ | $K_{design}$= | | | | | | | | in/hr |
| **Step 3b: Determine minimum BMP footprint** | | | | | | | | | | |
| 4 | Enter drawdown time, *T* (max 48 hours) | T= | *See Worksheet D for Proprietary Biotreatment Calcuations.* | | | | | | | hours |
| 5 | Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$ | $D_{max}$= | | | | | | | | feet |
| 6 | Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$ | $A_{min}$= | | | | | | | | sq-ft |

## Worksheet D: Capture Efficiency Method for Flow-Based BMPs

Project: OCMA Museum House

Date: March 10, 2016

| | | | DMA 1 | DMA 5 | DMA 3 | | |
|---|---|---|---|---|---|---|---|
| ***Step 1: Determine the design capture storm depth used for calculating volume*** | | | | | | | |
| 1 | Enter the time of concentration, $T_c$ (min) (See Appendix IV.2) | $T_c$= | 5.0 | 5.0 | 5.0 | | min |
| 2 | Using Figure III.4, determine the design intensity at which the estimated time of concentration ($T_c$) achieves 80% capture efficiency, $I_1$ | $I_1$= | 0.260 | 0.260 | 0.260 | | in/hr |
| 3 | Enter the effect depth of provided HSCs upstream, $d_{HSC}$ (inches) (Worksheet A) | $d_{HSC}$= | 0 | 0 | 0 | | inches |
| 4 | Enter capture efficiency corresponding to $d_{HSC}$, $Y_2$ (Worksheet A) | $Y_2$= | 0% | 0% | 0% | | % |
| 5 | Using Figure III.4, determine the design intensity at which the time of concentration ($T_c$) achieves the upstream capture efficiency ($Y_2$), $I_2$ | $I_2$= | 0 | 0 | 0 | | in/hr |
| 6 | Determine the design intensity that must be provided by BMP, $I_{design} = I_1 - I_2$ | $I_{design}$= | 0.260 | 0.260 | 0.260 | | in/hr |
| ***Step 2: Calculate the design flowrate*** | | | | | | | |
| 1 | Enter Project area tributary to BMP(s), *A* (acres) | A= | 0.680 | 1.150 | 0.050 | | acres |
| 2 | Enter Project Imperviousness, *imp* (unitless) | imp= | 78.0% | 78.0% | 100.0% | | % |
| 3 | Calculate runoff coefficient, $C = (0.75 \times imp) + 0.15$ | C= | 0.735 | 0.735 | 0.980 | | |
| 4 | Calculate design flowrate, $Q_{design} = (C \times i_{design} \times A)$ | $Q_{design}$= | 0.130 | 0.220 | 0.013 | | cfs |
| ***Supporting Calculations*** | | | | | | | |
| Describe System: | | | | | | | |
| *prietary BioTreatment (BIO-7): Modular Wetland Systems (MWS)* | | | | | | | |
| | | *Unit Size / Model =* | *Flows will be treated by three (3) off-site MWS-L-8-16 units at the San Joaquin Apartments site* | *Flows will be treated by three (3) off-site MWS-L-8-16 units at the San Joaquin Apartments site* | *MWS-L-4-4* | *(2) MWS-L-4-15* | |
| | | *Unit Size / Model Treatment Capacity =* | | | *0.052* | *0.350* | cfs |
| | | *Number of Units Needed =* | | | *1* | *1* | |
| | | *Total Bio-treatment Provided =* | | | *0.052* | *0.350* | cfs |
| Provide time of concentration assumptions: | | | | | | | |
| | | | | | | | min |

# APPENDIX B

# NOTICE OF TRANSFER OF RESPONSIBILITY

# NOTICE OF TRANSFER OF RESPONSIBILITY

# WATER QUALITY MANAGEMENT PLAN

OCMA Museum House
VTTM 17970; APN: 442-261-05

Submission of this Notice Of Transfer of Responsibility constitutes notice to the City of Newport Beach that responsibility for the Water Quality Management Plan ("WQMP") for the subject property identified below, and implementation of that plan, is being transferred from the Previous Owner (and his/her agent) of the site (or a portion thereof) to the New Owner, as further described below.

I. Previous Owner/ Previous Responsible Party Information

| Company/ Individual Name: | | Contact Person: | |
|---|---|---|---|
| Street Address: | | Title: | |
| City: | State: | ZIP: | Phone: |

II. Information about Site Transferred

| Name of Project (if applicable): | |
|---|---|
| Title of WQMP Applicable to site: | |
| Street Address of Site (if applicable): | |
| Planning Area (PA) and/ or Tract Number(s) for Site: | Lot Numbers (if Site is a portion of a tract): |
| Date WQMP Prepared (and revised if applicable): | |

III. New Owner/ New Responsible Party Information

| Company/ Individual Name: | | Contact Person: | |
|---|---|---|---|
| Street Address: | | Title: | |
| City: | State: | ZIP: | Phone: |

IV. Ownership Transfer Information

| General Description of Site Transferred to New Owner: | General Description of Portion of Project/ Parcel Subject to WQMP Retained by Owner (if any): |
|---|---|

| |
|---|
| Lot/ Tract Numbers of Site Transferred to New Owner: |
| Remaining Lot/ Tract Numbers Subject to WQMP Still Held by Owner (if any): |
| Date of Ownership Transfer: |

Note: When the Previous Owner is transferring a Site that is a portion of a larger project/ parcel addressed by the WQMP, as opposed to the entire project/parcel addressed by the WQMP, the General Description of the Site transferred and the remainder of the project/ parcel no transferred shall be set forth as maps attached to this notice. These maps shall show those portions of a project/ parcel addressed by the WQMP that are transferred to the New Owner (the Transferred Site), those portions retained by the Previous Owner, and those portions previously transferred by Previous Owner. Those portions retained by Previous Owner shall be labeled as "Previously Transferred".

V. Purpose of Notice of Transfer

The purposes of this Notice of Transfer of Responsibility are: 1) to track transfer of responsibility for implementation and amendment of the WQMP when property to which the WQMP is transferred from the Previous Owner to the New Owner, and 2) to facilitate notification to a transferee of property subject to a WQMP that such New Order is now the Responsible Party of record for the WQMP for those portions of the site that it owns.

VI. Certifications

A. Previous Owner

I certify under penalty of law that I am no longer the owner of the Transferred Site as described in Section II above. I have provided the New Owner with a copy of the WQMP applicable to the Transferred Site that the New Owner is acquiring from the Previous Owner.

| | |
|---|---|
| Printed Name of Previous Owner Representative: | Title: |
| Signature of Previous Owner Representative: | Date: |

B. New Owner

I certify under penalty of law that I am the owner of the Transferred Site, as described in Section II above, that I have been provided a copy of the WQMP, and that I have informed myself and understand the New Owner's responsibilities related to the WQMP, its implementation, and Best Management Practices associated with it. I understand that by signing this notice, the New Owner is accepting all ongoing responsibilities for implementation and amendment of the WQMP for the Transferred Site, which the New Owner has acquired from the Previous Owner.

| | |
|---|---|
| Printed Name of New Owner Representative: | Title: |
| Signature: | Date: |

# APPENDIX C

# EDUCATIONAL MATERIALS

# The Ocean Begins at Your Front Door

Orange County Stormwater Program

*Even if you live miles from the Pacific Ocean, you may be unknowingly polluting it.*

*Dumping one quart of motor oil into a storm drain can contaminate 250,000 gallons of water.*

## *Did You Know?*

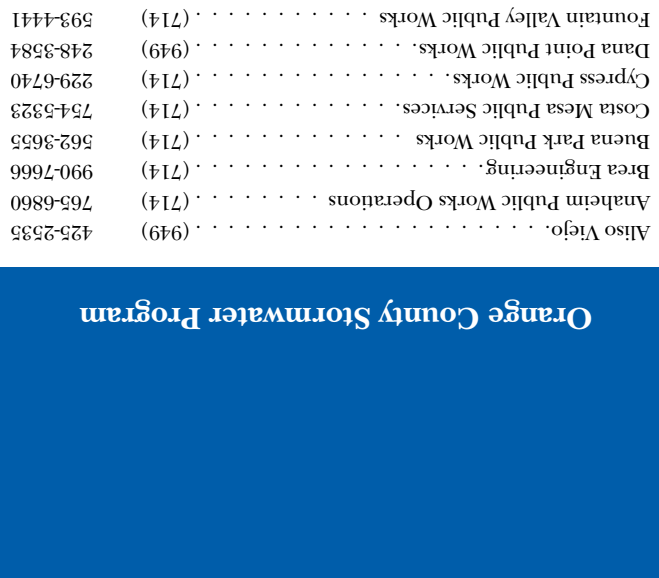
- Most people believe that the largest source of water pollution in urban areas comes from specific sources such as factories and sewage treatment plants. In fact, the largest source of water pollution comes from city streets, neighborhoods, construction sites and parking lots. This type of pollution is sometimes called "non-point source" pollution.
- There are two types of non-point source pollution: stormwater and urban runoff pollution.
- Stormwater runoff results from rainfall. When rainstorms cause large volumes of water to rinse the urban landscape, picking up pollutants along the way.
- Urban runoff can happen any time of the year when excessive water use from irrigation, vehicle washing and other sources carries trash, lawn clippings and other urban pollutants into storm drains.

## *Where Does It Go?*

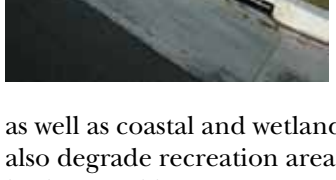
- Anything we use outside homes, vehicles and businesses – like motor oil, paint, pesticides, fertilizers and cleaners – can be blown or washed into storm drains.
- A little water from a garden hose or rain can also send materials into storm drains.
- Storm drains are separate from our sanitary sewer systems; unlike water in sanitary sewers (from sinks or toilets), water in storm drains is not treated before entering our waterways.

## *Sources of Non-Point Source Pollution*

- Automotive leaks and spills.
- Improper disposal of used oil and other engine fluids.
- Metals found in vehicle exhaust, weathered paint, rust, metal plating and tires.
- Pesticides and fertilizers from lawns, gardens and farms.
- Improper disposal of cleaners, paint and paint removers.
- Soil erosion and dust debris from landscape and construction activities.
- Litter, lawn clippings, animal waste, and other organic matter.
- Oil stains on parking lots and paved surfaces.



## *The Effect on the Ocean*



Non-point source pollution can have a serious impact on water quality in Orange County. Pollutants from the storm drain system can harm marine life as well as coastal and wetland habitats. They can also degrade recreation areas such as beaches, harbors and bays.

Stormwater quality management programs have been developed throughout Orange County to educate and encourage the public to protect water quality, monitor runoff in the storm drain system, investigate illegal dumping and maintain storm drains.

Support from Orange County residents and businesses is needed to improve water quality and reduce urban runoff pollution. Proper use and disposal of materials will help stop pollution before it reaches the storm drain and the ocean.

# *For More Information*

**Earth 911** - Community-Specific Environmental Information 1-800-cleanup or visit www.1800cleanup.org

**Health Care Agency's Ocean and Bay Water Closure and Posting Hotline**
(714) 433-6400 or visit www.ocbeachinfo.com

**Integrated Waste Management Dept. of Orange County** (714) 834-6752 or visit www.oclandfills.com for information on household hazardous waste collection centers, recycling centers and solid waste collection

**O.C. Agriculture Commissioner**
(714) 447-7100 or visit www.ocagcomm.com

**Stormwater Best Management Practice Handbook**
Visit www.cabmphandbooks.com

**UC Master Gardener Hotline**
(714) 708-1646 or visit www.uccemg.com

The Orange County Stormwater Program has created and moderates an electronic mailing list to facilitate communications, take questions and exchange ideas among its users about issues and topics related to stormwater and urban runoff and the implementation of program elements. To join the list, please send an email to ocstormwaterinfo-join@list.ocwatersheds.com

**California Environmental Protection Agency**
www.calepa.ca.gov

- **Air Resources Board**
  www.arb.ca.gov
- **Department of Pesticide Regulation**
  www.cdpr.ca.gov
- **Department of Toxic Substances Control**
  www.dtsc.ca.gov
- **Integrated Waste Management Board**
  www.ciwmb.ca.gov
- **Office of Environmental Health Hazard Assessment**
  www.oehha.ca.gov
- **State Water Resources Control Board**
  www.waterboards.ca.gov

**Earth 911** - Community-Specific Environmental Information 1-800-cleanup or visit www.1800cleanup.org

**Health Care Agency's Ocean and Bay Water Closure and Posting Hotline**
(714) 433-6400 or visit www.ocbeachinfo.com

**Integrated Waste Management Dept. of Orange County** (714) 834-6752 or visit www.oclandfills.com for information on household hazardous waste collection centers, recycling centers and solid waste collection

**O.C. Agriculture Commissioner**
(714) 447-7100 or visit www.ocagcomm.com

**Stormwater Best Management Practice Handbook**
Visit www.cabmphandbooks.com

**UC Master Gardener Hotline**
(714) 708-1646 or visit www.uccemg.com

The Orange County Stormwater Program has created and moderates an electronic mailing list to facilitate communications, take questions and exchange ideas among its users about issues and topics related to stormwater and urban runoff and the implementation of program elements. To join the list, please send an email to ocstormwaterinfo-join@list.ocwatersheds.com

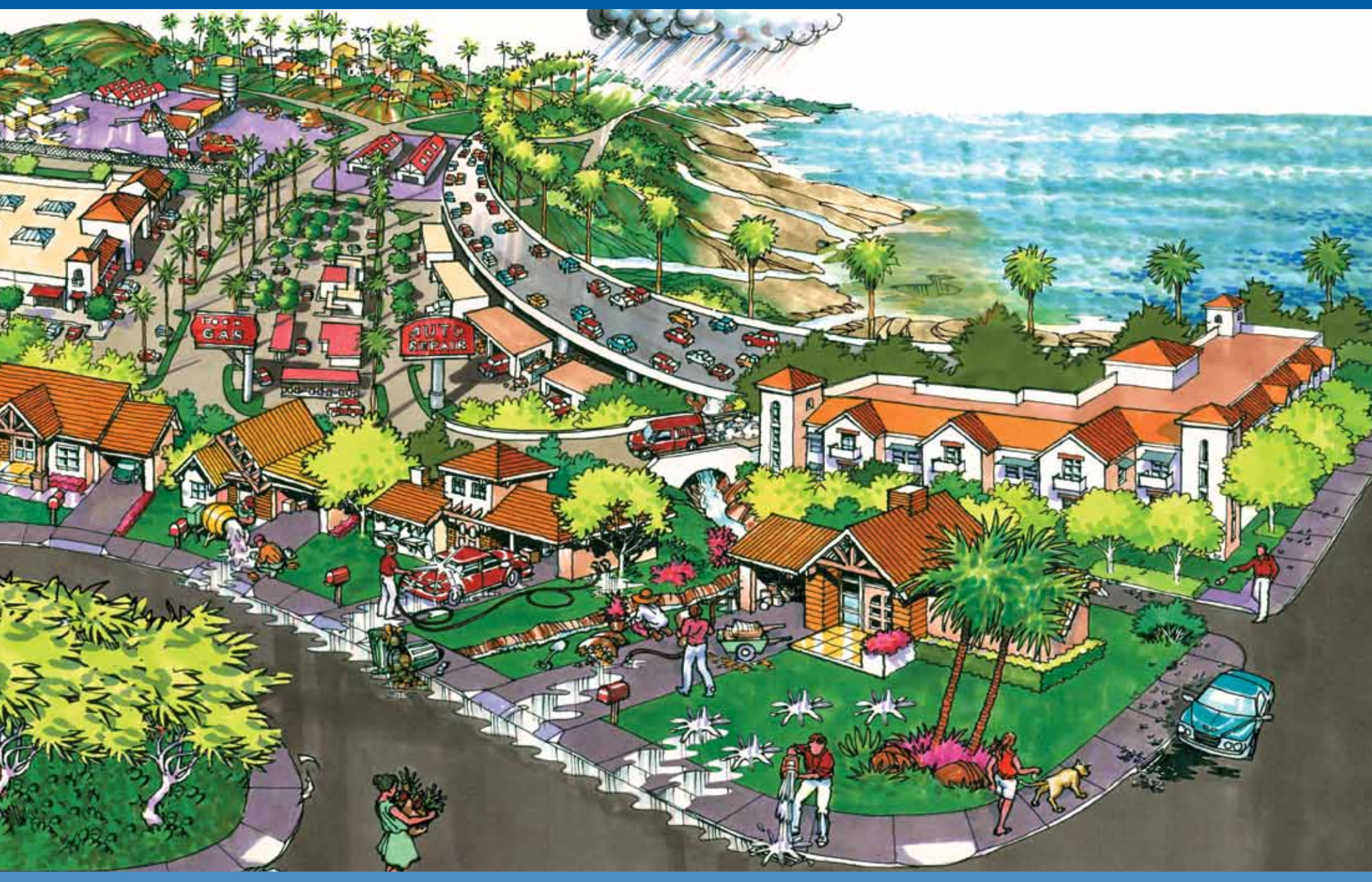
| | | |
|---|---|---|
| Aliso Viejo | (949) | 425-2535 |
| Anaheim Public Works Operations | (714) | 765-6860 |
| Brea Engineering | (714) | 990-7666 |
| Buena Park Public Works | (714) | 562-3655 |
| Costa Mesa Public Services | (714) | 754-5323 |
| Cypress Public Works | (714) | 229-6740 |
| Dana Point Public Works | (949) | 248-3584 |
| Fountain Valley Public Works | (714) | 593-4441 |
| Fullerton Engineering Dept. | (714) | 738-6853 |
| Garden Grove Public Works | (714) | 741-5956 |
| Huntington Beach Public Works | (714) | 536-5431 |
| Irvine Public Works | (949) | 724-6315 |
| La Habra Public Services | (562) | 905-9792 |
| La Palma Public Works | (714) | 690-3310 |
| Laguna Beach Water Quality | (949) | 497-0378 |
| Laguna Hills Public Services | (949) | 707-2650 |
| Laguna Niguel Public Works | (949) | 362-4337 |
| Laguna Woods Public Works | (949) | 639-0500 |
| Lake Forest Public Works | (949) | 461-3480 |
| Los Alamitos Community Dev. | (562) | 431-3538 |
| Mission Viejo Public Works | (949) | 470-3056 |
| Newport Beach, Code & Water Quality Enforcement | (949) | 644-3215 |
| Orange Public Works | (714) | 532-6480 |
| Placentia Public Works | (714) | 993-8245 |
| Rancho Santa Margarita | (949) | 635-1800 |
| San Clemente Environmental Programs | (949) | 361-6143 |
| San Juan Capistrano Engineering | (949) | 234-4413 |
| Santa Ana Public Works | (714) | 647-3380 |
| Seal Beach Engineering | (562) | 431-2527 x317 |
| Stanton Public Works | (714) | 379-9222 x204 |
| Tustin Public Works/Engineering | (714) | 573-3150 |
| Villa Park Engineering | (714) | 998-1500 |
| Westminster Public Works/Engineering | (714) | 898-3311 x446 |
| Yorba Linda Engineering | (714) | 961-7138 |
| Orange County Stormwater Program | (877) | 897-7455 |
| Orange County 24-Hour Water Pollution Problem Reporting Hotline 1-877-89-SPILL (1-877-897-7455) | | |

On-line Water Pollution Problem Reporting Form
www.ocwatersheds.com





# The Ocean Begins at Your Front Door




*Never allow pollutants to enter the street, gutter or storm drain!*

Follow these simple steps to help reduce water pollution:

## *Household Activities*

- Do not rinse spills with water. Use dry cleanup methods such as applying cat litter or another absorbent material, sweep and dispose of in the trash. Take items such as used or excess batteries, oven cleaners, automotive fluids, painting products and cathode ray tubes, like TVs and computer monitors, to a Household Hazardous Waste Collection Center (HHWCC).
- For a HHWCC near you call (714) 834-6752 or visit www.oclandfills.com.
- Do not hose down your driveway, sidewalk or patio to the street, gutter or storm drain. Sweep up debris and dispose of it in the trash.

## *Automotive*

- Take your vehicle to a commercial car wash whenever possible. If you wash your vehicle at home, choose soaps, cleaners, or detergents labeled non-toxic, phosphate- free or biodegradable. Vegetable and citrus-based products are typically safest for the environment.
- Do not allow washwater from vehicle washing to drain into the street, gutter or storm drain. Excess washwater should be disposed of in the sanitary sewer (through a sink or toilet) or onto an absorbent surface like your lawn.
- Monitor your vehicles for leaks and place a pan under leaks. Keep your vehicles well maintained to stop and prevent leaks.
- Never pour oil or antifreeze in the street, gutter or storm drain. Recycle these substances at a service station, a waste oil collection center or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.1800cleanup.org.

## *Pool Maintenance*

- Pool and spa water must be dechlorinated and free of excess acid, alkali or color to be allowed in the street, gutter or storm drain.
- When it is not raining, drain dechlorinated pool and spa water directly into the sanitary sewer.
- Some cities may have ordinances that do not allow pool water to be disposed of in the storm drain. Check with your city.

## *Landscape and Gardening*

- Do not over-water. Water your lawn and garden by hand to control the amount of water you use or set irrigation systems to reflect seasonal water needs. If water flows off your yard onto your driveway or sidewalk, your system is over-watering. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of waste by composting, hauling it to a permitted landfill, or as green waste through your city's recycling program.
- Follow directions on pesticides and fertilizer, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Take unwanted pesticides to a HHWCC to be recycled. For locations and hours of HHWCC, call (714) 834-6752 or visit www.oclandfills.com.

## *Trash*

- Place trash and litter that cannot be recycled in securely covered trash cans.
- Whenever possible, buy recycled products.
- Remember: Reduce, Reuse, Recycle.

## *Pet Care*

- Always pick up after your pet. Flush waste down the toilet or dispose of it in the trash. Pet waste, if left outdoors, can wash into the street, gutter or storm drain.
- If possible, bathe your pets indoors. If you must bathe your pet outside, wash it on your lawn or another absorbent/permeable surface to keep the washwater from entering the street, gutter or storm drain.
- Follow directions for use of pet care products and dispose of any unused products at a HHWCC.

## *Common Pollutants*

***Home Maintenance***
- Detergents, cleaners and solvents
- Oil and latex paint
- Swimming pool chemicals
- Outdoor trash and litter

***Lawn and Garden***
- Pet and animal waste
- Pesticides
- Clippings, leaves and soil
- Fertilizer

***Automobile***
- Oil and grease
- Radiator fluids and antifreeze
- Cleaning chemicals
- Brake pad dust

*Do your part to prevent water pollution in our creeks, rivers, bays and ocean.*

Clean beaches and healthy creeks, rivers, bays, and ocean are important to Orange County. However, many common household activities can lead to water pollution if you're not careful.

*Remember the Water in Your Storm Drain is Not Treated BEFORE It Enters Our Waterways*

Litter, oil, chemicals and other substances that are left on your yard or driveway can be blown or washed into storm drains that flow to the ocean. Over-watering your lawn and washing your car can also flush materials into the storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated.

You would never pour soap, fertilizers or oil into the ocean, so don't let them enter streets, gutters or storm drains. Follow the easy tips in this brochure to help prevent water pollution.

For more information, please call the **Orange County Stormwater Program** at **1-877-89-SPILL** (1-877-897-7455) or visit **www.ocwatersheds.com**

To report a spill, call the **Orange County 24-Hour Water Pollution Problem Reporting Hotline 1-877-89-SPILL** (1-877-897-7455).

**For emergencies, dial 911.**

The tips contained in this brochure provide useful information to help prevent water pollution while performing everyday household activities. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

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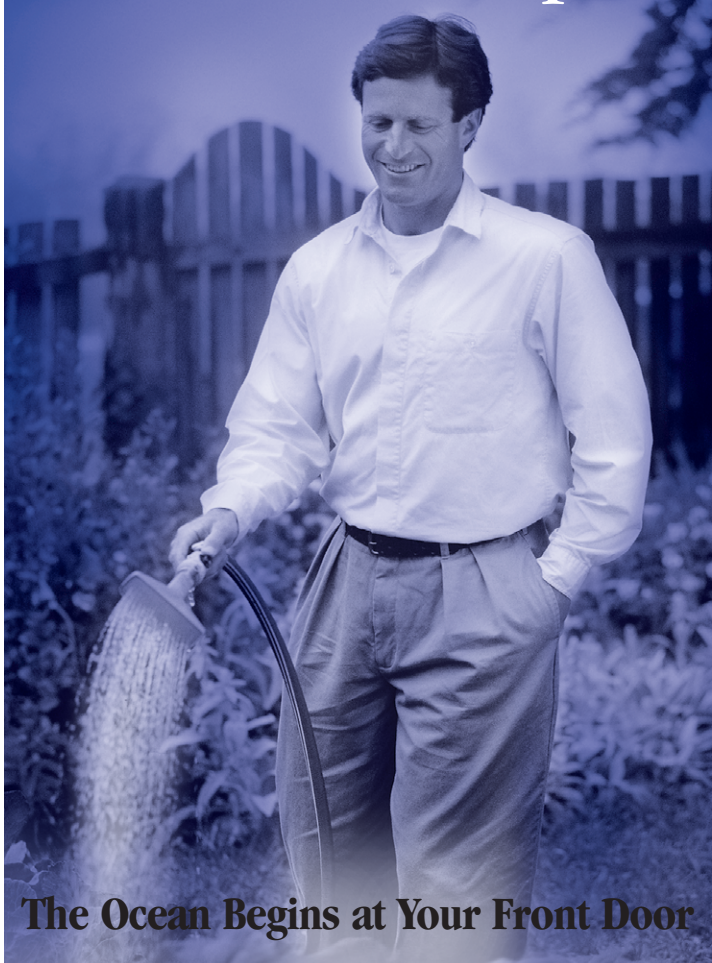
RECYCLE USED OIL



# Help Prevent Ocean Pollution:

# Household Tips



**The Ocean Begins at Your Front Door**

PROJECT Pollution PREVENTION

# Pollution Prevention

## *Household Activities*

- **Do not rinse spills with water!** Sweep outdoor spills and dispose of in the trash. For wet spills like oil, apply cat litter or another absorbent material, then sweep and bring to a household hazardous waste collection center (HHWCC).
- Securely cover trash cans.
- Take household hazardous waste to a household hazardous waste collection center.
- Store household hazardous waste in closed, labeled containers inside or under a cover.
- Do not hose down your driveway, sidewalk or patio. Sweep up debris and dispose of in trash.
- Always pick up after your pet. Flush waste down the toilet or dispose of in the trash.
- Bathe pets indoors or have them professionally groomed.

## *Household Hazardous Wastes include:*

- ▲ **Batteries**
- ▲ **Paint thinners, paint strippers and removers**
- ▲ **Adhesives**
- ▲ **Drain openers**
- ▲ **Oven cleaners**
- ▲ **Wood and metal cleaners and polishes**
- ▲ **Herbicides and pesticides**
- ▲ **Fungicides/wood preservatives**
- ▲ **Automotive fluids and products**
- ▲ **Grease and rust solvents**
- ▲ **Thermometers and other products containing mercury**
- ▲ **Fluorescent lamps**
- ▲ **Cathode ray tubes, e.g. TVs, computer monitors**
- ▲ **Pool and spa chemicals**

## *Gardening Activities*

- Follow directions on pesticides and fertilizers, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Water your lawn and garden by hand to control the amount of water you use. Set irrigation systems to reflect seasonal water needs. If water flows off your yard and onto your driveway or sidewalk, your system is over-watering.
- Mulch clippings or leave them on the lawn. If necessary, dispose in a green waste container.
- Cultivate your garden often to control weeds.

## *Washing and Maintaining Your Car*

- Take your car to a commercial car wash whenever possible.
- Choose soaps, cleaners, or detergents labeled "non-toxic," "phosphate free" or "biodegradable." Vegetable and citrus-based products are typically safest for the environment, **but even these should not be allowed into the storm drain.**
- Shake floor mats into a trash can or vacuum to clean.
- Do not use acid-based wheel cleaners and "hose off" engine degreasers at home. They can be used at a commercial facility, which can properly process the washwater.
- **Do not dump washwater onto your driveway, sidewalk, street, gutter or storm drain.** Excess washwater should be disposed of in the sanitary sewers (through a sink, or toilet) or onto an absorbent surface like your lawn.
- Use a nozzle to turn off water when not actively washing down automobile.
- Monitor vehicles for leaks and place pans under leaks. Keep your car well maintained to stop and prevent leaks.
- Use cat litter or other absorbents and sweep to remove any materials deposited by vehicles. Contain sweepings and dispose of at a HHWCC.
- Perform automobile repair and maintenance under a covered area and use drip pans or plastic sheeting to keep spills and waste material from reaching storm drains.
- **Never pour oil or antifreeze in the street, gutter or storm drains.** Recycle these substances at a service station, HHWCC, or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.ciwmb.ca.gov/UsedOil.

*For locations and hours of Household Hazardous Waste Collection Centers in Anaheim, Huntington Beach, Irvine and San Juan Capistrano, call (714)834-6752 or visit www.oclandfills.com.*

***Do your part to prevent water pollution in our creeks, rivers, bays and ocean.***

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, not properly disposing of household hazardous waste can lead to water pollution. Batteries, electronics, paint, oil, gardening chemicals, cleaners and other hazardous materials cannot be thrown in the trash. They also must never be poured or thrown into yards, sidewalks, driveways, gutters or streets. Rain or other water could wash the materials into the storm drain and eventually into our waterways and the ocean. In addition, hazardous waste must not be poured in the sanitary sewers (sinks and toilets).

***NEVER DISPOSE OF HOUSEHOLD HAZARDOUS WASTE IN THE TRASH, STREET, GUTTER, STORM DRAIN OR SEWER.***

For more information,
please call the
**Orange County Stormwater Program**
at **1-877-89-SPILL** (1-877-897-7455)
or visit
**www.ocwatersheds.com**

**To Report Illegal Dumping of Household Hazardous Waste call 1-800-69-TOXIC**

To report a spill,
call the
**Orange County 24-Hour Water Pollution Problem Reporting Hotline**
**1-877-89-SPILL** (1-877-897-7455).

**For emergencies, dial 911.**

RECYCLE USED OIL

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Help Prevent Ocean Pollution:

# Proper Disposal of Household Hazardous Waste

**The Ocean Begins at Your Front Door**

PROJECT Pollution PREVENTION

**ORANGE COUNTY**

# Pollution Prevention

Leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients are considered to be "household hazardous waste" or "HHW." HHW can be found throughout your home, including the bathroom, kitchen, laundry room and garage.

*WHEN POSSIBLE, USE NON-HAZARDOUS OR LESS-HAZARDOUS PRODUCTS.*

Disposal of HHW down the drain, on the ground, into storm drains, or in the trash is illegal and unsafe.

Proper disposal of HHW is actually easy. Simply drop them off at a Household Hazardous Waste Collection Center (HHWCC) for free disposal and recycling. Many materials including anti-freeze, latex-based paint, motor oil and batteries can be recycled. Some centers have a "Stop & Swap" program that lets you take partially used home, garden, and automobile products free of charge. There are four HHWCCs in Orange County:

**Anaheim**:.....1071 N. Blue Gum St
**Huntington Beach**:.....17121 Nichols St
**Irvine**:..... 6411 Oak Canyon
**San Juan Capistrano**:... 32250 La Pata Ave

Centers are open Tuesday-Saturday, 9 a.m.-3 p.m. Centers are closed on rainy days and major holidays. For more information, call **(714) 834-6752** or visit **www.oclandfills.com.**

## *Common household hazardous wastes*

- Batteries
- Paint and paint products
- Adhesives
- Drain openers
- Household cleaning products
- Wood and metal cleaners and polishes
- Pesticides
- Fungicides/wood preservatives
- Automotive products (antifreeze, motor oil, fluids)
- Grease and rust solvents
- Fluorescent lamps
- Mercury (thermometers & thermostats)
- All forms of electronic waste including computers and microwaves
- Pool & spa chemicals
- Cleaners
- Medications
- Propane (camping & BBQ)
- Mercury-containing lamps
- Television & monitors (CRTs, flatscreens)

## *Tips for household hazardous waste*

- Never dispose of HHW in the trash, street, gutter, storm drain or sewer.
- Keep these materials in closed, labeled containers and store materials indoors or under a cover.
- When possible, use non-hazardous products.
- Reuse products whenever possible or share with family and friends.
- Purchase only as much of a product as you'll need. Empty containers may be disposed of in the trash.
- HHW can be harmful to humans, pets and the environment. Report emergencies to 911.

***Did you know that just one quart of oil can pollute 250,000 gallons of water?***

A clean ocean and healthy creeks, rivers, bays and beaches are important to Orange County. However, not properly disposing of used oil can lead to water pollution. If you pour or drain oil onto driveways, sidewalks or streets, it can be washed into the storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering the ocean. Help prevent water pollution by taking your used oil to a used oil collection center.

Included in this brochure is a list of locations that will accept up to five gallons of used motor oil at no cost. Many also accept used oil filters. Please contact the facility before delivering your used oil. This listing of companies is for your reference and does not constitute a recommendation or endorsement of the company.

Please note that used oil filters may not be disposed of with regular household trash. They must be taken to a household hazardous waste collection or recycling center in Anaheim, Huntington Beach, Irvine or San Juan Capistrano. For information about these centers, visit www.oclandfills.com.

Please do not mix your oil with other substances!

For more information, please call the Orange County Stormwater Program at 1-877-89-SPILL (1-877-897-7455) or visit www.watersheds.com.

For information about the proper disposal of household hazardous waste, call the Household Waste Hotline at (714) 834-6752 or visit www.oclandfills.com.

RECYCLE USED OIL

For additional information about the nearest oil recycling center, call the Used Oil Program at 1-800-CLEANUP or visit www.cleanup.org.



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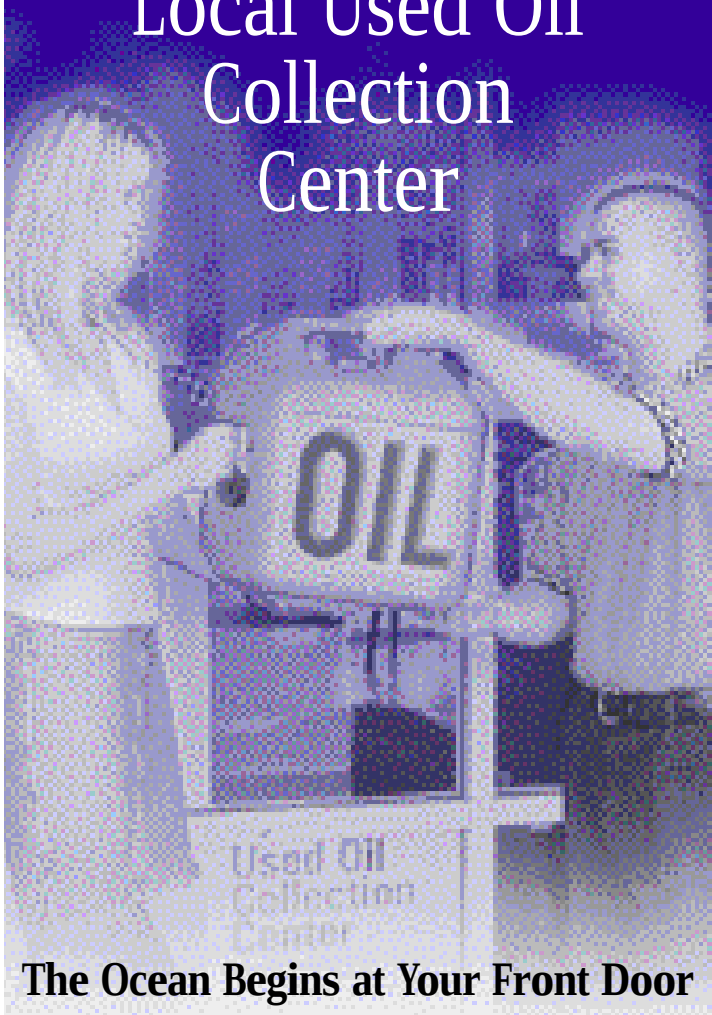
Help Prevent Ocean Pollution:

# Recycle at Your Local Used Oil Collection Center




**The Ocean Begins at Your Front Door**

PROJECT Pollution PREVENTION

CENTRAL COUNTY

# Used Oil Collection Centers

## Balboa

**Hill's Boat Service**
814 E Bay Ave., Balboa, CA 92661
(949)675-0740( )
CIWMB#: 30-C-03538

## Balboa Island

**Island Marine Fuel**
406 S Bay Front, Balboa Island, CA 92662
(949)673-1103( )
CIWMB#: 30-C-03728

## Corona Del Mar

**Corona Del Mar 76**
2201 E. Pacific Coast Hwy., Corona Del Mar, CA 92625
(949)673-3320( )
CIWMB#: 30-C-06620

**Corona Del Mar Chevron**
2546 E. Coast Hwy., Corona Del Mar, CA 92625
(949)495-0774(14)
CIWMB#: 30-C-06424

**Mobil (Harbor View)**
2500 San Joaquin Hills Rd., Corona Del Mar, CA 92625
(949)640-4759( )
CIWMB#: 30-C-03363

## Costa Mesa

**AutoZone #5520**
744 W. 19th St., Costa Mesa, CA 92627
(901)495-7159( )
CIWMB#: 30-C-05992

**Big O Tires #5571**
3181 Harbor Blvd., Costa Mesa, CA 92626
(949)443-4155( )
CIWMB#: 30-C-04676

**Big O Tires #694**
322 E. 17th St., Costa Mesa, CA 92627
(949)642-4131( )
CIWMB#: 30-C-05811

**Coast General Performance**
2855 Harbor Blvd., Costa Mesa, CA 92626
(714)540-5710( )
CIWMB#: 30-C-05916

**Connell Chevrolet**
2828 Harbor Blvd., Costa Mesa, CA 92626
(714)546-1200( )
CIWMB#: 30-C-06286

**EZ Lube Inc #15**
3599 Harbor Blvd., Costa Mesa, CA 92626
(714)966-1647( )
CIWMB#: 30-C-03137

**EZ Lube Inc #46**
400 E 17th St., Costa Mesa, CA 92627
(714)556-1312( )
CIWMB#: 30-C-05779

**EZ Lube Inc. #44**
2248 Harbor Blvd., Costa Mesa, CA 92627
(714)556-1312( )
CIWMB#: 30-C-05737

**Firestone Store #71T7**
475 E 17th St., Costa Mesa, CA 92627
(949)646-2444( )
CIWMB#: 30-C-02120

**Jiffy Lube #1969**
300 E 17th St., Costa Mesa, CA 92627
(949)548-2505( )
CIWMB#: 30-C-05553

**Jiffy Lube #1970**
2175 Newport Blvd., Costa Mesa, CA 92627
(949)548-4150( )
CIWMB#: 30-C-05554

**Jiffy Lube #607**
2255 Fairview Rd., Costa Mesa, CA 92627
(949)650-5823( )
CIWMB#: 30-C-05551

**Jiffy Lube #861**
375 Bristol St., Costa Mesa, CA 92626
(714)557-5823( )
CIWMB#: 30-C-05552

**Kragen Auto Parts #0725**
1739 Superior Ave., Costa Mesa, CA 92627
(949)642-3384( )
CIWMB#: 30-C-02624

**Kragen Auto Parts #0796**
1175 Baker Blvd., Unit E, Costa Mesa, CA 92626
(714)662-2005( )
CIWMB#: 30-C-02664

**Nabers Cadillac**
2600 Harbor Blvd., Costa Mesa, CA 92626
(714)444-5200( )
CIWMB#: 30-C-05051

**Oil Stop Inc.**
Oil Stop Inc. Costa Mesa, CA 92626
(714)434-8350( )
CIWMB#: 30-C-06293

**Pep Boys #660**
2946 Bristol St., Costa Mesa, CA 92626
(714)549-1533( )
CIWMB#: 30-C-03416

**Plaza Chevron Service Center**
3048 Bristol Costa Mesa, CA 92626
(714)545-4257( )
CIWMB#: 30-C-01123

**Scher Tire Inc #15 dba Goodyear Tire**
1596 Newport Blvd., Costa Mesa, CA 92627
(949)548-9384( )
CIWMB#: 30-C-03034

## Fountain Valley

**Firestone Store #7147**
17975 Magnolia Ave., Fountain Valley, CA 92708
(714)842-3341( )
CIWMB#: 30-C-01219

**Golden Shell**
8520 Warner Ave., Fountain Valley, CA 92708
(714)842-7150( )
CIWMB#: 30-P-05002

**Kragen Auto Parts #0734**
9880 Warner Ave., Fountain Valley, CA 92708
(714)964-6427( )
CIWMB#: 30-C-02609

**Kragen Auto Parts #1505**
16147 Harbor Blvd., Fountain Valley, CA 92708
(714)531-8525( )
CIWMB#: 30-C-04125

**Oil Can Henry's**
9525 Warner Ave., Fountain Valley, CA 92708
(714)473-7705( )
CIWMB#: 30-C-05843

**Purrfect Auto Service #10**
16780 Harbor Blvd., Fountain Valley, CA 92708
(714)839-3899( )
CIWMB#: 30-C-01380

## Huntington Beach

**AutoZone #5528**
6800 Warner Ave., Huntington Beach, CA 92647
(714)891-8211( )
CIWMB#: 30-C-04777

**Bella Terra Car Wash**
16061 Beach Blvd., Huntington Beach, CA 92647
(714)847-4924( )
CIWMB#: 30-C-06195

**Big O Tires #553**
19411 Beach Blvd., Huntington Beach, CA 92648
(714)536-7571( )
CIWMB#: 30-C-00970

**Econo Lube N' Tune #26**
19961 Beach Blvd., Huntington Beach, CA 92648
(714)536-6519( )
CIWMB#: 30-C-06117

**Expertec Automotive**
7680 Talbert Ave Suite A & B, Huntington Beach, CA 92648
(714)848-9222( )
CIWMB#: 30-C-05914

**EZ Lube Inc #16**
7361 Edinger Ave., Huntington Beach, CA 92647
(714)899-3600( )
CIWMB#: 30-C-03289

**EZ Lube Inc. #79**
9862 Adams St., Huntington Beach, CA 92647
(714)556-1312( )
CIWMB#: 30-C-06547

**Firestone Store #71T5**
16171 Beach Blvd., Huntington Beach, CA 92647
(714)847-6081( )
CIWMB#: 30-C-02118

**Huntington Beach Car Wash**
18971 Beach Blvd., Huntington Beach, CA 92648
(714)847-4924( )
CIWMB#: 30-C-05303

**Jiffy Lube #1857**
8971 Warner Ave., Huntington Beach, CA 92647
(714)596-7213( )
CIWMB#: 30-C-05053

**Kragen Auto Parts #1468**
10072 Adams Ave., Huntington Beach, CA 92646
(714)593-6156( )
CIWMB#: 30-C-04284

**Kragen Auto Parts #1511**
7171 Warner Ave., Huntington Beach, CA 92647
(714)842-4531( )
CIWMB#: 30-C-04129

**Kragen Auto Parts #1633**
18888 Beach Blvd., Huntington Beach, CA 92648
(714)965-2353( )
CIWMB#: 30-C-02645

**Oilmax 10 Minute Lube/Wash**
9862 Adams Ave., Huntington Beach, CA 92646
(714)964-7110( )
CIWMB#: 30-C-03219

**Pep Boys #799**
19122 Brookhurst St., Huntington Beach, CA 92646
(714)964-0777( )
CIWMB#: 30-C-03439

**Quik Change Lube & Oil**
5841 Warner Ave., Huntington Beach, CA 92649
(714)840-2331( )
CIWMB#: 30-C-03208

**R Kids Tire and Service #6**
5062 Warner Ave., Huntington Beach, CA 92647
(714)846-1189( )
CIWMB#: 30-C-05691

**Saturn of Huntington Beach**
18801 Beach Blvd., Huntington Beach, CA 92648
(714)841-5428( )
CIWMB#: 30-C-05221

**USA Express Tire & Service Inc**
7232 Edinger Ave., Huntington Beach, CA 92647
(714)842-0717( )
CIWMB#: 30-C-04429

**Zito's Auto Care**
19002 Magnolia St., Huntington Beach, CA 92646
(714)968-8788( )
CIWMB#: 30-C-03251

## Irvine

**Firestone Store #71W4**
51 Auto Center Dr., Irvine, CA 92618
(949)829-8710( )
CIWMB#: 30-C-03689

**Irvine City Auto Parts**
14427 Culver Dr., Irvine, CA 92604
(949)551-5588( )
CIWMB#: 30-C-02186

**Jiffy Lube #1856 Irvine Spectrum**
8777 Irvine Center Dr., Irvine, CA 92618
(949)753-0485( )
CIWMB#: 30-C-06094

**Jiffy Lube #1988**
3080 Main St., Irvine, CA 92614
(714)961-5491(27 )
CIWMB#: 30-C-04450

**Kragen Auto Parts #4174**
15315 Culver Dr., Ste.#170, Irvine, CA 92604
(602)631-7115( )
CIWMB#: 30-C-06417

## Newport Beach

**Jiffy Lube #2811**
1520 W Coast Hwy., Newport Beach, CA 92663
(949)764-9255( )
CIWMB#: 30-C-05629

**Newport Landing Fuel Dock**
503 E Edgewater Newport Beach, CA 92661
(949)673-7878( )
CIWMB#: 30-C-03628

## Orange

**AutoZone #5942**
1330 N. Glassell Orange, CA 92867
(714)538-4551( )
CIWMB#: 30-C-04553

**Big O Tires #570**
1825 E Katella Ave., Orange, CA 92867
(714)538-0016( )
CIWMB#: 30-C-00974

**David Wilsons Ford of Orange**
1350 W Katella Ave., Orange, CA 92867
(714)633-6731( )
CIWMB#: 30-C-02341

**EZ Lube #74**
3232 Chapman Ave. #E, Orange, CA 92869
(714)556-1312(106)
CIWMB#: 30-C-06627

**Firestone Store #7185**
1690 N Tustin Ave., Orange, CA 92867
(714)282-8144( )
CIWMB#: 30-C-0122

**Jiffy Lube #1457**
433 W. Katella Ave., Orange, CA 92867
(714)720-5757( )
CIWMB#: 30-C-06280

**Kragen Auto Parts #1764**
910 Tustin St., Orange, CA 92867
(714)771-3000( )
CIWMB#: 30-C-02625

**Managed Mobile, Inc.**
1030 N Batavia St., #B, Orange, CA 92867
(714)400-0250( )
CIWMB#: 30-C-05776

**Pep Boys #806**
215 E Katella Ave., Orange, CA 92867
(714)997-1540( )
CIWMB#: 30-C-01759

**Santiago Hills Car Care**
8544 East Chapman Ave., Orange, CA 92869
(714)919-1060( )
CIWMB#: 30-C-05622

**Scher Tire #33**
1821 E. Katella Ave., Orange, CA 92867
(909)343-3100( )
CIWMB#: 30-C-06324

**Tabassi Shell Service Station**
830 E Katella Ave., Orange, CA 92867
(714)771-6990( )
CIWMB#: 30-C-00552

**The Tune-up Center**
193 S Main St., Orange, CA 92868
(714)633-1876( )
CIWMB#: 30-C-02091

**Tony's Fuel and Towing**
1650 W La Veta Ave., Orange, CA 92868
(714)953-7676( )
CIWMB#: 30-C-00868

**Truck Lubrication Company**
143 S. Pixley Orange, CA 92868
(714)997-7730( )
CIWMB#: 30-C-06001

## Santa Ana

**All Phase Environmental**
910 E. Fourth St., Santa Ana, CA 92701
(714)731-5995( )
CIWMB#: 30-C-06116

**Archie's Tire & Towing**
4518 Westminster Ave., Santa Ana, CA 92703
(714)636-4518( )
CIWMB#: 30-C-02058

**AutoZone #3320**
2007 S. Main St., Santa Ana, CA 92707
(901)495-7217( )
CIWMB#: 30-C-06508

**AutoZone #5232**
430 W 17th Santa Ana, CA 92706
(714)547-7003( )
CIWMB#: 30-C-04609

**AutoZone #5538**
1101 S Bristol Santa Ana, CA 92704
(714)241-0335( )
CIWMB#: 30-C-00829

**Big O Tires**
1211 W. Warner Ave., Santa Ana, CA 92707
(714)540-8646( )
CIWMB#: 30-C-04679

**Big O Tires #712**
1302 E. 17th St., Santa Ana, CA 92705
(714)541-6811( )
CIWMB#: 30-C-05813

**Firestone Store #7175**
3733 S Bristol Santa Ana, CA 92704
(714)549-4015( )
CIWMB#: 30-C-01223

**Firestone Store #71TA**
101 S Main St., Santa Ana, CA 92701
(714)542-8857( )
CIWMB#: 30-C-02123

**Firestone Store #71W6**
2005 N Tustin Ave., Ste A, Santa Ana, CA 92705
(714)541-7977( )
CIWMB#: 30-C-03688

**Guaranty Chevrolet Motors Inc.**
711 E 17th St., Santa Ana, CA 92701
(714)973-1711(277 )
CIWMB#: 30-C-06506

**Jiffy Lube #1303**
2025 N. Tustin Santa Ana, CA 92701
(714)720-5757( )
CIWMB#: 30-C-06283

**John's Mobil**
1465 S Main St., Santa Ana, CA 92707
(714)835-3266( )
CIWMB#: 30-C-00578

**Kragen Auto Parts #0736**
1302 E 17th St., Santa Ana, CA 92705
(714)953-6061( )
CIWMB#: 30-C-02610

**Kragen Auto Parts #1253**
1400 W Edinger Ave., Santa Ana, CA 92704
(714)754-1432( )
CIWMB#: 30-C-02627

**Kragen Auto Parts #1376**
521 W 17th St., Santa Ana, CA 92706
(714)543-4492( )
CIWMB#: 30-C-03901

**Kragen Auto Parts #1516**
2337 S Bristol Ave., Santa Ana, CA 92704
(714)557-0787( )
CIWMB#: 30-C-04106

**Kragen Auto Parts #1648**
1015 S Main St., Santa Ana, CA 92701
(714)568-1570( )
CIWMB#: 30-C-05664

**Pep Boys #609**
120 E 1st St., Santa Ana, CA 92701
(714)547-7477( )
CIWMB#: 30-C-01738

**Pep Boys #802**
1107 S Harbor Blvd., Santa Ana, CA 92704
(714)775-0828( )
CIWMB#: 30-C-01739

**Purrfect Auto Service**
2519 S Main St., Santa Ana, CA 92707
(714)549-7900( )
CIWMB#: 30-C-02085

**Saturn of Santa Ana**
1350 Auto Mall Dr., Santa Ana, CA 92705
(714)648-2444( )
CIWMB#: 30-C-05222

**Scher Tire #28**
1805 N Grand Ave., Santa Ana, CA 92705
(714)558-8644( )
CIWMB#: 30-C-03225

## Tustin

**Big O Tires #555**
131 E 1st St., Tustin, CA 92780
(714)544-9431( )
CIWMB#: 30-C-00972

**EZ Lube #42**
12972 Newport Ave., Tustin, CA 92780
(714)556-1312( )
CIWMB#: 30-C-06408

**Jiffy Lube #1406**
3087 Edinger Ave., Tustin, CA 92780
(949)651-8814( )
CIWMB#: 30-C-03778

**Kragen Auto Parts #1533**
502 B E 1st St., Tustin, CA 92780
(714)544-9249( )
CIWMB#: 30-C-04128

**Scher Tire Inc #17 dba Goodyear Tire**
14511 Redhill Ave., Tustin, CA 92780
(714)832-6011( )
CIWMB#: 30-C-03035

## Villa Park

**Phil's Villa Park 76**
17771 Santiago Blvd., Villa Park, CA 92861
(714)637-0854( )
CIWMB#: 30-C-06579



*This information was provided by the County of Orange Integrated Waste Management Department and the California Integrated Waste Management Board (CIWMB).*

**Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities such as pest control can lead to water pollution if you're not careful. Pesticide treatments must be planned and applied properly to ensure that pesticides do not enter the street, gutter or storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.**

**You would never dump pesticides into the ocean, so don't let it enter the storm drains. Pesticides can cause significant damage to our environment if used improperly. If you are thinking of using a pesticide to control a pest, there are some important things to consider.**

For more information,
please call
University of California Cooperative
Extension Master Gardeners at
(714) 708-1646
or visit these Web sites:
www.uccemg.org
www.ipm.ucdavis.edu

For instructions on collecting a specimen sample visit the Orange County Agriculture Commissioner's website at:
http://www.ocagcomm.com/ser_lab.asp

To report a spill, call the
**Orange County 24-Hour Water Pollution Problem Reporting Hotline at 1-877-89-SPILL (1-877-897-7455).**

**For emergencies, dial 911.**

Information From:
Cheryl Wilen, Area IPM Advisor; Darren Haver, Watershed Management Advisor; Mary Louise Flint, IPM Education and Publication Director; Pamela M. Geisel, Environmental Horticulture Advisor; Carolyn L. Unruh, University of California Cooperative Extension staff writer. Photos courtesy of the UC Statewide IPM Program and Darren Haver.

Funding for this brochure has been provided in full or in part through an agreement with the State Water Resources Control Board (SWRCB) pursuant to the Costa-Machado Water Act of 2000 (Prop. 13).

1-87
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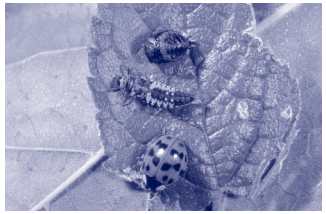
Help Prevent Ocean Pollution:

# Responsible Pest Control

# Tips for Pest Control

## *Key Steps to Follow:*

### *Step 1:* Correctly identify the pest (insect, weed, rodent, or disease) and verify that it is actually causing the problem.



Three life stages of the common lady beetle, a beneficial insect.

This is important because beneficial insects are often mistaken for pests and sprayed with pesticides needlessly.

Consult with a Certified Nursery Professional at a local nursery or garden center or send a sample of the pest to the Orange County Agricultural Commissioner's Office.

Determine if the pest is still present – even though you see damage, the pest may have left.

### *Step 2:* Determine how many pests are present and causing damage.

Small pest populations may be controlled more safely using non-pesticide techniques. These include removing food sources, washing off leaves with a strong stream of water, blocking entry into the home using caulking and replacing problem plants with ones less susceptible to pests.

Integrated Pest Management (IPM) usually combines several least toxic pest control methods for long-term prevention and management of pest problems without harming you, your family, or the environment.

UC CE University of California Cooperative Extension

### *Step 3:* If a pesticide must be used, choose the least toxic chemical.

Obtain information on the least toxic pesticides that are effective at controlling the target pest from the UC Statewide Integrated Pest Management (IPM) Program's Web site at www.ipm.ucdavis.edu.

Seek out the assistance of a Certified Nursery Professional at a local nursery or garden center when selecting a pesticide. Purchase the smallest amount of pesticide available.

Apply the pesticide to the pest during its most vulnerable life stage. This information can be found on the pesticide label.

### *Step 4:* Wear appropriate protective clothing.

Follow pesticide labels regarding specific types of protective equipment you should wear. Protective clothing should always be washed separately from other clothing.

### *Step 5:* Continuously monitor external conditions when applying pesticides such as weather, irrigation, and the presence of children and animals.

Never apply pesticides when rain is predicted within the next 48 hours. Also, do not water after applying pesticides unless the directions say it is necessary.

Apply pesticides when the air is still; breezy conditions may cause the spray or dust to drift away from your targeted area.

In case of an emergency call 911 and/or the regional poison control number at (714) 634-5988 or (800) 544-4404 (CA only).

For general questions you may also visit www.calpoison.org.

### *Step 6:* In the event of accidental spills, sweep up or use an absorbent agent to remove any excess pesticides. Avoid the use of water.

Be prepared. Have a broom, dust pan, or dry absorbent material, such as cat litter, newspapers or paper towels, ready to assist in cleaning up spills.

Contain and clean up the spill right away. Place contaminated materials in a doubled plastic bag. All materials used to clean up the spill should be properly disposed of according to your local Household Hazardous Waste Disposal site.

### *Step 7:* Properly store and dispose of unused pesticides.

Purchase Ready-To-Use (RTU) products to avoid storing large concentrated quantities of pesticides.

Store unused chemicals in a locked cabinet.

Unused pesticide chemicals may be disposed of at a Household Hazardous Waste Collection Center.

Empty pesticide containers should be triple rinsed prior to disposing of them in the trash.

**Household Hazardous Waste Collection Center**
**(714) 834-6752**
**www.oclandfills.com**

PROJECT Pollution PREVENTION

For more information,
please call the
**Orange County Stormwater Program**
at **1-877-89-SPILL** (1-877-897-7455)
or visit
**www.ocwatersheds.com**

To report a spill,
call the
**Orange County 24-Hour**
**Water Pollution Problem**
**Reporting Hotline**
at **1-877-89-SPILL** (1-877-897-7455).

**For emergencies, dial 911.**

The tips contained in this brochure provide useful information to help prevent water pollution. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

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Help Prevent Ocean Pollution:

# Tips for Residential Pool, Landscape and Hardscape Drains

**The Ocean Begins at Your Front Door**

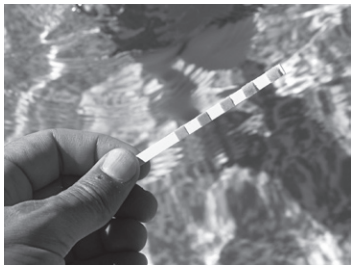
PROJECT Pollution PREVENTION

# Tips for Residential Pool, Landscape and Hardscape Drains

## Pool Maintenance

All pool water discharged to the curb, gutter or permitted pool drain from your property must meet the following water quality criteria:

- The residual chlorine does not exceed 0.1 mg/L (parts per million).
- The pH is between 6.5 and 8.5.
- The water is free of any unusual coloration.
- There is no discharge of filter media or acid cleaning wastes.



Some cities have ordinances that do not allow pool water to be discharged to the storm drain. Check with your city.

## Landscape and Hardscape Drains

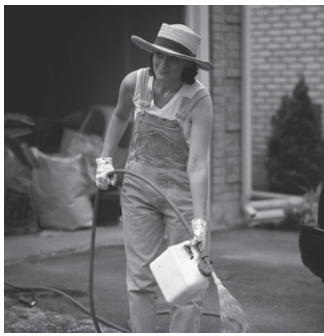
The following recommendations will help reduce or prevent pollutants from your landscape and hardscape drains from entering the street, gutter or storm drain. Unlike water that enters the sewer (from sinks and toilets), water that enters a landscape or hardscape drain is not treated before entering our creeks, rivers, bays and ocean.

## Household Activities

- Do not rinse spills of materials or chemicals to any drain.
- Use dry cleanup methods such as applying cat litter or another absorbent material, then sweep it up and dispose of it in the trash. If the material is hazardous, dispose of it at a Household Hazardous Waste Collection Center (HHWCC). For locations, call **(714) 834-6752** or visit **www.oclandfills.com**.
- Do not hose down your driveways, sidewalks or patios to your landscape or hardscape drain. Sweep up debris and dispose of it in the trash.
- Always pick up after your pet. Flush waste down the toilet or dispose of it in the trash.
- Do not store items such as cleaners, batteries, automotive fluids, paint products, TVs, or computer monitors uncovered outdoors. Take them to a HHWCC for disposal.

## Yard Maintenance

- Do not overwater. Water by hand or set automated irrigation systems to reflect seasonal water needs.
- Follow directions on pesticides and fertilizers (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Cultivate your garden often to control weeds and reduce the need to use chemicals.



## Vehicle Maintenance

- Never pour oil or antifreeze down your landscape or hardscape drain. Recycle these substances at a service station, a waste collection center or used oil recycling center. For locations, contact the Used Oil Program at **1-800-CLEANUP** or visit **www.CLEANUP.org**.
- Whenever possible, take your vehicle to a commercial car wash.
- If you do wash your vehicle at home, do not allow the washwater to go down your landscape or hardscape drain. Instead, dispose of it in the sanitary sewer (a sink or toilet) or onto an absorbent surface such as your lawn.
- Use a spray nozzle that will shut off the water when not in use.

**Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Fertilizers, pesticides and other chemicals that are left on yards or driveways can be blown or washed into storm drains that flow to the ocean. Overwatering lawns can also send materials into storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.**

**You would never pour gardening products into the ocean, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution.**

For more information,
please call the
**Orange County Stormwater Program**
at **1-877-89-SPILL** (1-877-897-7455)
or visit
**www.ocwatersheds.com**

**UCCE Master Gardener Hotline:**
**(714) 708-1646**

To report a spill,
call the
**Orange County 24-Hour**
**Water Pollution Problem**
**Reporting Hotline**
**1-877-89-SPILL** (1-877-897-7455)**.**

**For emergencies, dial 911.**

The tips contained in this brochure provide useful information to help prevent water pollution while landscaping or gardening. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

1-91
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Help Prevent Ocean Pollution:

# Tips for Landscape & Gardening

# Tips for Landscape & Gardening

Never allow gardening products or polluted water to enter the street, gutter or storm drain.

## *General Landscaping Tips*

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.

- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.

- Plant native vegetation to reduce the amount of water, fertilizers, and pesticide applied to the landscape.

- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

## *Garden & Lawn Maintenance*

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro spray systems. Periodically inspect and fix leaks and misdirected sprinklers.

- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.

- Use slow-release fertilizers to minimize leaching, and use organic fertilizers.

- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.

- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.

- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains. Dispose of empty containers in the trash.

- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting. For more information, visit **www.ipm.ucdavis.edu**.

- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.

- Take unwanted pesticides to a Household Hazardous Waste Collection Center to be recycled. Locations are provided below.

**Household Hazardous Waste Collection Centers**

| | |
|---|---|
| **Anaheim:** | 1071 N. Blue Gum St. |
| **Huntington Beach:** | 17121 Nichols St. |
| **Irvine:** | 6411 Oak Canyon |
| **San Juan Capistrano:** | 32250 La Pata Ave. |

**For more information, call (714) 834-6752 or visit www.oclandfills.com**

**Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Pet waste and pet care products can be washed into the storm drains that flow to the ocean. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.**

**You would never put pet waste or pet care products into the ocean, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution.**

For more information,
please call the
**Orange County Stormwater Program**
at **1-877-89-SPILL** (1-877-897-7455)
or visit
**www.ocwatersheds.com**

To report a spill,
call the
**Orange County 24-Hour**
**Water Pollution Problem**
**Reporting Hotline**
**1-877-89-SPILL** (1-877-897-7455)**.**

**For emergencies, dial 911.**

The tips contained in this brochure provide useful information to help prevent water pollution while caring for your pet. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

1-93
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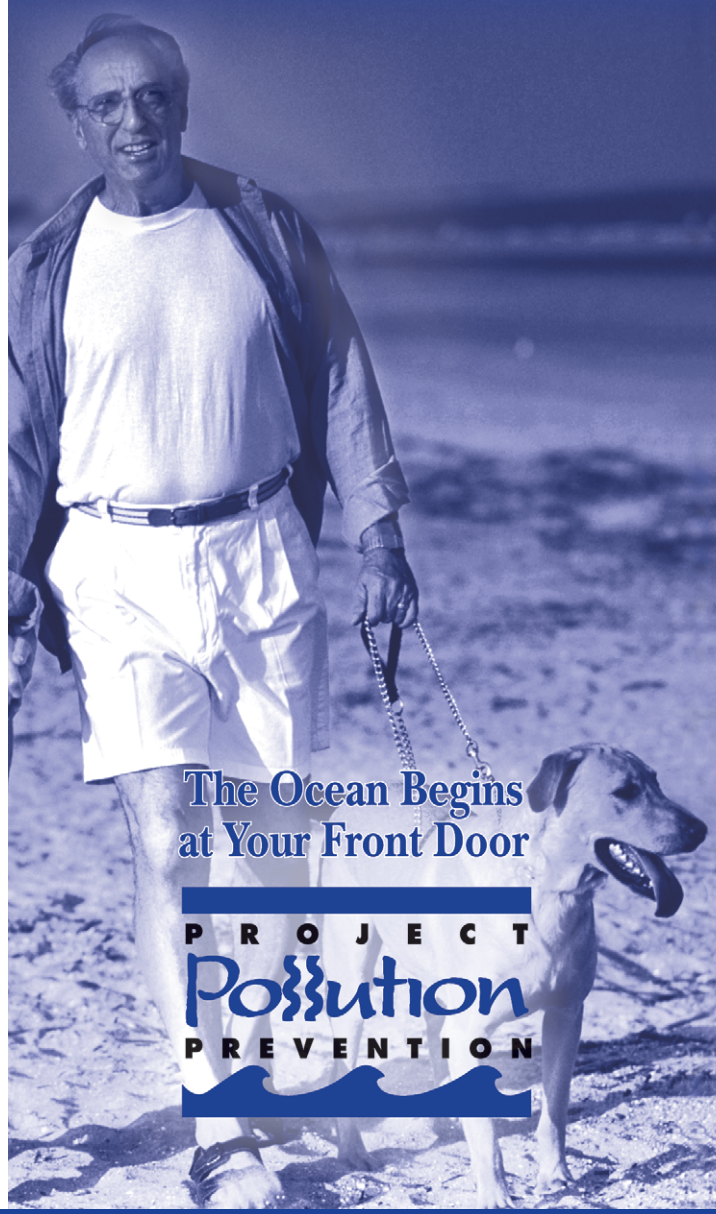
Help Prevent Ocean Pollution:

# Tips for Pet Care



# Tips for Pet Care

Never let any pet care products or washwater run off your yard and into the street, gutter or storm drain.

## *Washing Your Pets*

Even biodegradable soaps and shampoos can be harmful to marine life and the environment.

- If possible, bathe your pets indoors using less-toxic shampoos or have your pet professionally groomed. Follow instructions on the products and clean up spills.

- If you bathe your pet outside, wash it on your lawn or another absorbent/ permeable surface to keep the washwater from running into the street, gutter or storm drain.

## *Flea Control*

- Consider using oral or topical flea control products.

- If you use flea control products such as shampoos, sprays or collars, make sure to dispose of any unused products at a Household Hazardous Waste Collection Center. For location information, call **(714) 834-6752**.

## *Why You Should Pick Up After Your Pet*

It's the law! Every city has an ordinance requiring you to pick up after your pet. Besides being a nuisance, pet waste can lead to water pollution, even if you live inland. During rainfall, pet waste left outdoors can wash into storm drains. This waste flows directly into our waterways and the ocean where it can harm human health, marine life and the environment.


As it decomposes, pet waste demands a high level of oxygen from water. This decomposition can contribute to killing marine life by reducing the amount of dissolved oxygen available to them.

Have fun with your pets, but please be a responsible pet owner by taking care of them and the environment.

- Take a bag with you on walks to pick up after your pet.

- Dispose of the waste in the trash or in a toilet.

PROJECT Pollution PREVENTION

**Clean beaches and healthy creeks, rivers, bays, and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Swimming pools and spas are common in Orange County, but they must be maintained properly to guarantee that chemicals aren't allowed to enter the street, where they can flow into the storm drains and then into the waterways. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.**

**You would never dump pool chemicals into the ocean, so don't let it enter the storm drains. Follow these easy tips to help prevent water pollution.**

For more information,
please call the
**Orange County Stormwater Program**
at **1-877-89-SPILL** (1-877-897-7455)
or visit
**www.ocwatersheds.com**

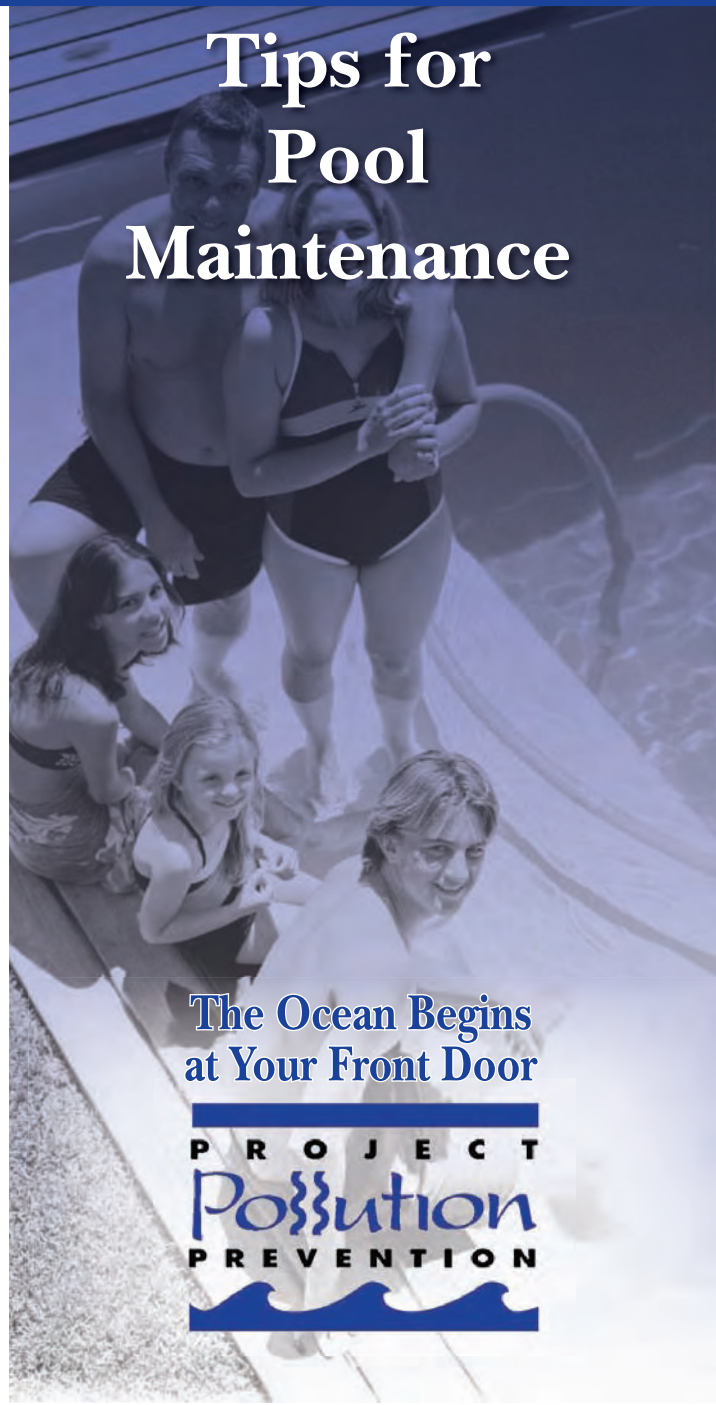
To report a spill,
call the
**Orange County 24-Hour**
**Water Pollution Reporting Hotline**
**1-877-89-SPILL** (1-877-897-7455).

**For emergencies, dial 911.**

The tips contained in this brochure provide useful information to help prevent water pollution while maintaining your pool. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

Help Prevent Ocean Pollution:

# Tips for Pool Maintenance



**The Ocean Begins at Your Front Door**

PROJECT Pollution PREVENTION

# Tips for Pool Maintenance

Many pools are plumbed to allow the pool to drain directly to the sanitary sewer. If yours is not, follow these instructions for disposing of pool and spa water.

## *Acceptable and Preferred Method of Disposal*

When you cannot dispose of pool water in the sanitary sewer, the release of dechlorinated swimming pool water is allowed if all of these tips are followed:

- The residual chlorine does not exceed 0.1 mg/l (parts per million).
- The pH is between 6.5 and 8.5.
- The water is free of any unusual coloration, dirt or algae.
- There is no discharge of filter media.
- There is no discharge of acid cleaning wastes.
- Some cities may have ordinances that do not allow pool water to be disposed into a storm drain. Check with your city.

## *How to Know if You're Following the Standards*

You can find out how much chlorine is in your water by using a pool testing kit. Excess chlorine can be removed by discontinuing the use of chlorine for a few days prior to discharge or by purchasing dechlorinating chemicals from a local pool supply company. Always make sure to follow the instructions that come with any products you use.

## *Doing Your Part*

By complying with these guidelines, you will make a significant contribution toward keeping pollutants out of Orange County's creeks, streams, rivers, bays and the ocean. This helps to protect organisms that are sensitive to pool chemicals, and helps to maintain the health of our environment.

PROJECT Pollution PREVENTION

# DF-1
## DRAINAGE FACILITY OPERATION AND MAINTENANCE

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and storm water that may contain certain pollutants. Consequently these pollutants may accumulate in the system and must be removed periodically. In addition, the systems must also be maintained to function properly hydraulically to avoid flooding. Maintaining the system may involve the following activities:

1. Inspection and Cleaning of Stormwater Conveyance Structures
2. Controlling Illicit Connections and Discharges
3. Controlling Illegal Dumping

This list of Model Maintenance Procedures can be utilized as an inspection checklist to determine where better compliance with Designated Minimum Best Management Practices (notated with checkmarks and capital letters) is needed, and to recommend Additional Best Management Practices (notated with bullet points and lower case letters) that may be applicable under certain circumstances, especially where there are certain Pollutant Constituents of Concern. BMPs applicable to certain constituents are notated as:

*Bacteria (BACT)* *Sediment (SED)* *Nutrients (NUT)* *Oil and Grease (O&G)* *Pesticides (PEST)*
*OtherToxic Compounds (TOX)* *Trash (TRASH)* *Hydrological Impacts (HYD)* *Any/All or General (ANY)*

Program/Facility Being Inspected: _____

Date: _____ Inspector Name: _____

When completed, the checklist should be attached to the General Inspection Form Cover Sheet and copies should be provided to the Supervisor of the Facility/Program being inspected.

**MAINTENANCE PROCEDURES:**

**1. Inspection and Cleaning of Drainage Facilities**

| Unsatisfactory | OK | General Guidelines |
|---|---|---|
| ☐ _____ | ☐ | T 1A. Annually inspect and clean drainage structures as needed. |
| ☐ _____ | ☐ | T 1B. Maintain appropriate records of cleaning and inspections. |
| ☐ _____ | ☐ | T 1C. Properly dispose of removed materials at a landfill or recycling facility. |
| ☐ _____ | ☐ | T 1D. Conduct intermittent supplemental visual inspections during the wet season to determine if there are problem inlets where sediment/trash or other pollutants accumulate, and provide for additional cleanouts as appropriate. |
| ☐ _____ | ☐ | T 1E. Prevent or clean up any discharges that may occur during the course of maintenance and cleaning procedures. |
| ☐ _____ | ☐ | T 1F. Verify that appropriate employees or subcontractors are trained in proper conductance of maintenance activities, including record keeping and disposal. |
| ☐ _____ | ☐ | T 1G. Annually inspect and clean v-ditches as needed, prior to the wet season. On shrub-covered slopes, vegetative debris may be placed on the downhill side of the ditch. Trash should be bagged and disposed at a landfill. |

| Unsatisfactory | OK |
|---|---|
| ☐ | ☐ |
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**General Guidelines (cont.)**

- 1a. Remove trash or debris as needed from open channels. It should be noted that major vegetative debris removal may require other regulatory permits prior to completing the work. (TRASH)
- 1b. Consider retrofitting energy dissipaters (e.g. riprap) below culvert outfalls to minimize potential for erosion. (SED)
- 1c. Repair any v-ditches that have cracked or displaced in a manner that accelerates erosion. (SED)
- 1d. If suspicious conditions appear to exist, test selected samples of the removed wastes for compliance with hazardous waste regulations prior to disposal. (TOX)
- 1e. Consider more frequent regular cleaning of selected drainage structures to help address ongoing specific impairments. (SED, BACT, NUT, TRASH)
- 1f. Consider structural retrofits to the MS4 to help address ongoing specific impairments (SED, BACT, NUT, TRASH, O&G)
- 1g. Consider cleaning out pipes at gradient breaks or other in-pipe debris accumulation points as identified/needed. (ANY, BACT, NUT, TRASH)

**Storm Drain Flushing**

- 1h. Flushing of storm drains or storm drain inlets should only be done when critically necessary and no other solution is practical. (SED, BACT, TRASH).
- 1i. If flushed, to the extent practical the material should be collected (vacuumed), treated with an appropriate filtering device to remove sand and debris and disposed of properly. (SED)

**Waste Management**

T 1H. Store wastes collected from cleaning activities of the drainage facilities in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.

- 1j. Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device to remove the sand and debris prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not permitted, water should be pumped or vacuumed to a tank and properly disposed of. Do not dewater near a storm drain or stream. (SED, TRASH)
- 1k. Provide for laboratory analysis of at least one randomly collected sediment (less the debris) sample per year from the storm drain inlet leaning program to ensure that it does not meet the EPA criteria for hazardous waste. If the sample is determined to be hazardous, the sediment must be disposed of as hazardous waste and the source should be investigated. (TOX).

## 2. Controlling Illicit Connections and Discharges

| Unsatisfactory | OK | General Guidelines |
|---|---|---|
| ☐ | ☐ | T 2A. Report prohibited discharges such as dumping, paint spills, abandoned oil containers, etc. observed during the course of normal daily activities so they can be investigated, contained, and cleaned up. |
| ☐ | ☐ | T 2B. Where field observations and/or monitoring data indicate significant problems, conduct field investigations to detect and eliminate existing illicit connections and improper disposal of pollutants into the storm drain (i.e. identify problem areas where discharges or illegal connections may occur and follow up stream to determine the source(s)). (Refer to Appendices A-10 and A-11.) |
| ☐ | ☐ | T 2C. Report all observed illicit connections and discharges to the 24-hour water pollution problem reporting hotline (714) 567-6363. |
| ☐ | ☐ | T 2D. Encourage public reporting of improper waste disposal by distributing public education materials and advertising the 24-hour water pollution problem reporting hotline. |
| | | **Storm Drain Stenciling ("No Dumping—Drains to Ocean")** |
| ☐ | ☐ | T 2E. Implement and maintain a storm drain stenciling program. |
| ☐ | ☐ | • 2a. Consider adding the hotline number to the storm drain stencils (BACT, TOX, TRASH). |

## 3. Controlling Illegal Dumping

| | | Field Investigation |
|---|---|---|
| ☐ | ☐ | T 3A. Report prohibited discharges such as dumpings observed during the course of normal daily activities so they can be investigated, contained and cleaned up. |
| ☐ | ☐ | T 3B. Conduct field investigations to detect and eliminate improper disposal of pollutants into the storm drain (i.e. identify problem areas where discharges or illegal connections may occur and follow up stream to determine the source(s)). |
| ☐ | ☐ | T 3C. Report all observed illegal dumping to the 24-hour water pollution problem reporting hotline (714) 567-6363. |
| ☐ | ☐ | T 3D. Encourage public reporting of improper waste disposal by distributing public education materials and advertising the 24-hour water pollution problem reporting hotline. |
| ☐ | ☐ | T 3E. If perpetrator can be identified, take appropriate enforcement action. |
| ☐ | ☐ | • 3a. Consider posting "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs could also indicate fines and penalties for illegal dumping. (ANY) |

| Unsatisfactory | OK | Training/Education/Outreach |
|---|---|---|
| ☐ _____ | ☐ | T 3F. Verify that appropriate employees and subcontractors are trained to recognize and report illegal dumping. |
| ☐ _____ | ☐ | T 3G. Encourage public reporting of illegal dumping by advertising the 24-hour water pollution problem reporting hotline (714) 567-6363. |
| ☐ _____ | ☐ | • 3b. Take extra steps to educate the public in neighborhoods where illegal dumping has occurred to inform them why illegal dumping is a problem, and that illegal dumping carries a significant financial penalty. (ANY) |

## LIMITATIONS:

Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.

# R-4
# HOME AND GARDEN CARE ACTIVITIES

| The activities outlined in this fact sheet target the following pollutants: | |
|---|---|
| Sediment | x |
| Nutrients | |
| Bacteria | x |
| Foaming Agents | x |
| Metals | x |
| Hydrocarbons | x |
| Hazardous Materials | x |
| Pesticides and Herbicides | |
| Other | x |

## HOME CARE

Many hazardous materials may be used in and around residences during routine maintenance activities (such as: oils, paints, cleaners, bleaches, pesticides, glues, solvents, and other products). Improper or excessive use of these products can increase the potential for pollutants to be transported to the storm drain by runoff. The pollution prevention activities outlined in this fact sheets are used to prevent the discharge of pollutants to the storm drain system.

Think before conducting home care activities. Remember - The ocean starts at your front door.

## Required Activities

- Clean out painting equipment in an area where the waste can be contained and properly disposed of (latex – sewer, oil based – household hazardous waste center).
- Rinse off cement mixers and cement laden tools in a contained washout area. Dispose of dried concrete waste in household trash.
- If safe, contain, clean up, and properly dispose all household hazardous waste spills. If an unsafe condition exists, call 911 to activate the proper response team.
- Household hazardous materials must be stored indoors or under cover, and in closed and labeled containers. Dispose of them at a household hazardous waste center.
- Household wash waters (e.g. washer machine effluent, mop water, etc.) must be disposed of in the sanitary sewer.
- Pool and spa water may be discharged to the storm drain if residual chlorine is less than 0.1 mg/L, the pH is between 6.5 and 8.5, and the water is free from any unusual coloration. (Call 714-834-6107 to obtain information on a pool drain permit). Pool filter media must be contained and disposed of properly.

## Recommended Activities

- Only purchase the types and amounts of materials needed.
- Share unused portions of products with neighbors or community programs (latex paint)

For additional information contact:
County of Orange, OC Watershed
Main: (714) 955-0600/ 24hr Water Pollution Discharge Hotline 1-877-89-SPILL
or visit our website at: www.ocwatersheds.com

## GARDEN CARE

Garden activities may contribute pollutants via soil erosion, green waste, fertilizer and pesticide use. Plant and garden care activities such as landscape maintenance, fertilization, and pesticide application have the potential to discharge significant quantities of pollutants to the storm drain system. Nonvegetated surfaces may allow for significant erosion leading to high sediment loads. Other pollutants such as pesticides may adsorb onto the soil particles and be transported off site. Excess fertilizer and pesticide pollutants from over application may be carried to the storm drain by dissolving in irrigation runoff or rainwater. Green wastes may also contain organic matter and may have adsorbed fertilizers and pesticides.

| The activities outlined in this fact sheet target the following pollutants: | |
|---|---|
| Sediment | x |
| Nutrients | x |
| Bacteria | x |
| Foaming Agents | |
| Metals | |
| Hydrocarbons | |
| Hazardous Materials | |
| Pesticides and Herbicides | x |
| Other | x |

Excessive irrigation is often the most significant factor in home and garden care activities. Pollutants may dissolve in irrigation water and then be transported to the storm drain, or particles and materials coated with fertilizers and pesticides may be suspended in the irrigation flow and carried to the storm drain. The pollution prevention activities outlined in this fact sheets are used to prevent the discharge of pollutants to the storm drain system.

Think before conducting garden care activities. Remember - The ocean starts at your front door.

### Required Activities

- Irrigation systems must be properly adjusted to reflect seasonal water needs.
- Minimize the use of pesticides and fertilizers. Read the labels and follow directions to avoid improper use. Do not apply chemicals if it is windy or about to rain.
- Properly clean up and dispose of spills of gardening chemicals, fertilizes, or soils. If possible, return the spilled material to the container for future use.
- Lawn and garden care products must be stored in closed labeled containers, in covered areas, or off-ground and under protective tarps.
- Household hazardous waste must be properly disposed at a household hazardous waste center.
- Cover nonvegetated surfaces to prevent erosion.

### Recommended Activities

- Utilize xeroscaping and use of drought and insect resistant landscaping.
- Cultivate garden often to control weeds
- Use integrated pest management (IPM). Planting pest repelling plants (e.g. Marigolds) or using pest eating insects (e.g. ladybugs) may reduce the need for pesticides.
- Do not leave food (human or pet) outside overnight
- Remove fruit and garden waste

# R-5
# DISPOSAL OF PET WASTES

Pet wastes left in the environment may introduce solids, bacteria, and nutrients to the storm drain. The type and quantity of waste will dictate the proper disposal method. Small quantities of waste are best disposed with regular trash or flushed down a toilet. Large quantities of wastes from herbivore animals may be composted for subsequent use or disposal to landfill.

| The activities outlined in this fact sheet target the following pollutants: | |
|---|---|
| Sediment | x |
| Nutrients | x |
| Bacteria | x |
| Foaming Agents | |
| Metals | |
| Hydrocarbons | |
| Hazardous Materials | |
| Pesticides and Herbicides | |
| Other | |

Pick up after your pet! It's as easy as 1-2-3. 1) Bring a bag. 2) Clean it up. 3) Dispose of it properly (toilet or trash). The pollution prevention activities outlined in this fact sheets are used to prevent the discharge of pollutants to the storm drain system.

Think before you dispose of any pet wastes. Remember - The ocean starts at your front door.

## Required Activities

- All pet wastes must be picked up and properly disposed of. Pet waste should be disposed of in the regular trash, flushed down a toilet, or composted as type and quantities dictate.

- Properly dispose of unused flea control products (shampoo, sprays, or collars).

- Manure produced by livestock in uncovered areas should be removed at least daily for composting, or storage in water-tight container prior to disposal. Never hose down to stream or storm drain. Composting or storage areas should be configured and maintained so as not to allow contact with runoff. Compost may be donated to greenhouses, nurseries, and botanical parks. Topsoil companies and composting centers may also accept composted manure.

- Line waste pits or trenches with an impermeable layer, such as thick plastic sheeting.

- When possible, allow wash water to infiltrate into the ground, or collect in an area that is routed to the sanitary sewer.

- Confine livestock in fenced in areas except during exercise and grazing times. Restrict animal access to creeks and streams, preferably by fencing.

For additional information contact:
County of Orange, OC Watershed
Main: (714) 955-0600/ 24hr Water Pollution Discharge Hotline 1-877-89-SPILL
or visit our website at: www.ocwatersheds.com

- Install gutters that will divert roof runoff away from livestock areas.

## Recommended Activities

- In order to properly dispose of pet waste, carry bags, pooper-scooper, or equivalent to safely pick up pet wastes while walking with pets.

- Bathe pets indoors and use less toxic shampoos. When possible, have pets professionally groomed.

- Properly inoculate your pet in order to maintain their health and reduce the possibility of pathogens in pet wastes.

- Maintain healthy and vigorous pastures with at least three inches of leafy material.

- Consider indoor feeding of livestock during heavy rainfall, to minimize manure exposed to potential runoff.

- Locate barns, corrals, and other high use areas on portions of property that either drain away from or are located distant form nearby creeks or storm drains.

# R-6
# DISPOSAL OF GREEN WASTES

| The activities outlined in this fact sheet target the following pollutants: | |
|---|---|
| Sediment | x |
| Nutrients | x |
| Bacteria | x |
| Foaming Agents | |
| Metals | |
| Hydrocarbons | |
| Hazardous Materials | x |
| Pesticides and Herbicides | x |
| Other | |

Green wastes entering the storm drain may clog the system creating flooding problems. Green wastes washed into receiving waters create an oxygen demand as they are decomposed, reducing the available oxygen for aquatic life. Pesticide and nutrient residues may be carried to the receiving water with the green wastes. The pollution prevention activities outlined in this fact sheets are used to prevent the discharge of pollutants to the storm drain system.

Think before disposing of any green wastes – Remember - The ocean starts at your front door.

## Required Activities

- Green wastes can not be disposed of in the street, gutter, public right-of-way, storm drain, or receiving water. Dispose of green wastes as a part of the household trash. If the quantities are too large, arrange a pick up with the local waste hauler.

- After conducting yard or garden activities sweep the area and properly dispose of the clippings and waste. Do not sweep or blow out into the street or gutter.

## Recommended Activities

- Utilize a commercial landscape company to conduct the landscape activities and waste disposal.

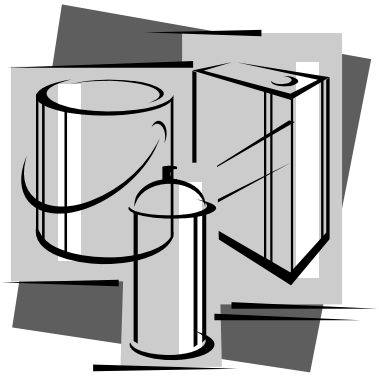
- Utilize native plants and drought tolerant species to reduce the water use and green waste produced.

- Use a lawn mower that has a mulcher so that the grass clippings remain on the lawn and do not have to be collected and disposed of.

- Compost materials in a designated area within the yard.

- Recycle lawn clippings and greenery waste through local programs if available.

For additional information contact:
County of Orange, OC Watershed
Main: (714) 955-0600/ 24hr Water Pollution Discharge Hotline 1-877-89-SPILL
or visit our website at: www.ocwatersheds.com



# R-7
# HOUSEHOLD HAZARDOUS WASTE

Household hazardous wastes (HHW) are defined as waste materials which are typically found in homes or similar sources, which exhibit characteristics such as: corrosivity, ignitability, reactivity, and/or toxicity, or are listed as hazardous materials by EPA.

| The activities outlined in this fact sheet target the following pollutants: | |
|---|---|
| Sediment | |
| Nutrients | |
| Bacteria | |
| Foaming Agents | x |
| Metals | x |
| Hydrocarbons | x |
| Hazardous Materials | x |
| Pesticides and Herbicides | x |
| Other | x |

List of most common HHW products:
- Drain openers
- Oven cleaners
- Wood and metal cleaners and polishes
- Automotive oil and fuel additives
- Grease and rust solvents
- Carburetor and fuel injection cleaners
- Starter fluids
- Batteries
- Paint Thinners
- Paint strippers and removers
- Adhesives
- Herbicides
- Pesticides
- Fungicides/wood preservatives

Many types of waste can be recycled, however options for each waste type are limited. Recycling is always preferable to disposal of unwanted materials. All gasoline, antifreeze, waste oil, and lead-acid batteries can be recycled. Latex and oil-based paint can be reused, as well as recycled. Materials that cannot be reused or recycled should be disposed of at a properly permitted landfill.

Think before disposing of any household hazardous waste. Remember - The ocean starts at your front door.

RECYCLE USED OIL

## Required Activities

- Dispose of HHW at a local collection facility. Call (714) 834-6752 for the household hazardous waste center closest to your area.
- Household hazardous materials must be stored indoors or under cover, and in closed and labeled containers.
- If safe, contain, clean up, and properly dispose all household hazardous waste spills. If an unsafe condition exists, call 911 to activate the proper response team.

## Recommended Activities

- Use non-hazardous or less-hazardous products.
- Participate in HHW reuse and recycling. Call (714) 834-6752 for the participating household hazardous waste centers.

*The California Integrated Waste Management Board has a Recycling Hotline (800) 553-2962, that provides information and recycling locations for used oil.*

For additional information contact:
County of Orange, OC Watershed
Main: (714) 955-0600/ 24hr Water Pollution Discharge Hotline 1-877-89-SPILL
or visit our website at: www.ocwatersheds.com

# R-8
# WATER CONSERVATION

| The activities outlined in this fact sheet target the following pollutants: | |
|---|---|
| Sediment | x |
| Nutrients | x |
| Bacteria | x |
| Foaming Agents | x |
| Metals | x |
| Hydrocarbons | x |
| Hazardous Materials | x |
| Pesticides and Herbicides | x |
| Other | x |

Excessive irrigation and/or the overuse of water is often the most significant factor in transporting pollutants to the storm drain system. Pollutants from a wide variety of sources including automobile repair and maintenance, automobile washing, automobile parking, home and garden care activities and pet care may dissolve in the water and be transported to the storm drain. In addition, particles and materials coated with fertilizers and pesticides may be suspended in the flow and be transported to the storm drain.

Hosing off outside areas to wash them down not only consumes large quantities of water, but also transports any pollutants, sediments, and waste to the storm drain system. The pollution prevention activities outlined in this fact sheets are used to prevent the discharge of pollutants to the storm drain system.

Think before using water. Remember - The ocean starts at your front door.

## Required Activities

- Irrigation systems must be properly adjusted to reflect seasonal water needs.
- Do not hose off outside surfaces to clean, sweep with a broom instead.

## Recommended Activities

- Fix any leaking faucets and eliminate unnecessary water sources.
- Use xeroscaping and drought tolerant landscaping to reduce the watering needs.
- Do not over watering lawns or gardens. Over watering wastes water and promotes diseases.
- Use a bucket to re-soak sponges/rags while washing automobiles and other items outdoors. Use hose only for rinsing.
- Wash automobiles at a commercial car wash employing water recycling.

For additional information contact:
County of Orange, OC Watershed
Main: (714) 955-0600/ 24hr Water Pollution Discharge Hotline 1-877-89-SPILL
or visit our website at: www.ocwatersheds.com

# Efficient Irrigation SD-12

**Design Objectives**

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

## Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

## Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

## Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

## Design Considerations

### *Designing New Installations*

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

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- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

***Redeveloping Existing Installations***

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

**Other Resources**

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

# Storm Drain Signage SD-13


**Design Objectives**

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

## Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

## Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

## Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

## Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

### *Designing New Installations*

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING

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– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

### *Redeveloping Existing Installations*

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

## Additional Information

### *Maintenance Considerations*

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

### *Placement*

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

## Supplemental Information

### *Examples*

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

## Other Resources

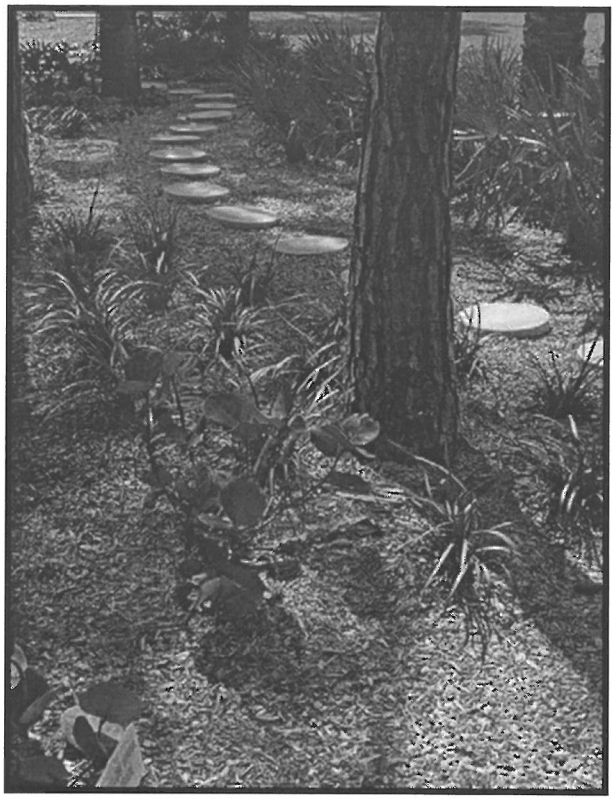
A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

# Site Design & Landscape Planning SD-10



**Design Objectives**

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- ☑ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

## Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

## Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

## Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

## Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

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***Designing New Installations***

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.
- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

*Conserve Natural Areas during Landscape Planning*

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- Promote natural vegetation by using parking lot islands and other landscaped areas.
- Preserve riparian areas and wetlands.

*Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit*

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.
- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and

regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

*Protection of Slopes and Channels during Landscape Design*

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

### *Redeveloping Existing Installations*

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

### Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

# APPENDIX D

# BMP MAINTENANCE SUPPLEMENT / O&M PLAN

# OPERATIONS AND MAINTENANCE (O&M) PLAN

Water Quality Management Plan

For

OCMA Museum House

850 San Clemente Road, Newport Beach, CA 92660

APN 442-261-05

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| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | |
|---|---|---|---|
| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
| **NON-STRUCTURAL SOURCE CONTROL BMPs** | | | |
| Yes | **N1. Education for Property Owners, Tenants and Occupants**<br>Educational materials will be provided to tenants, including brochures and restrictions to reduce pollutants from reaching the storm drain system. Examples include tips for pet care, household tips, and proper household hazardous waste disposal. Tenants will be provided with these materials by the property management prior to occupancy, and periodically thereafter. Refer to Section VII for a list of materials available and attached to this WQMP. Additional materials are available through the County of Orange Storm water Program website (http://ocwatersheds.com/PublicEd/) and the California Storm water Quality Association's (CASQA) BMP Handbooks (http://www.cabmphandbooks.com/). | Educational materials will be provided to tenants annually. Materials to be distributed are found in Appendix C. Tenants will be provided these materials by the Owner prior to occupancy and periodically thereafter.<br>Frequency: Annually | OCMA Museum House / HOA |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | |
|---|---|---|---|
| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
| | N2. Activity Restrictions<br>The HOA shall develop ongoing activity restrictions that include those that have the potential to create adverse impacts on water quality. Activities include, but are not limited to: handling and disposal of contaminants, fertilizer and pesticide application restrictions, litter control and pick-up, and vehicle or equipment repair and maintenance in non-designated areas, as well as any other activities that may potentially contribute to water pollution. | The Owner will prescribe activity restrictions to protect surface water quality, through lease terms or other equally effective measure, for the property. Restrictions include, but are not limited to, prohibiting vehicle maintenance or vehicle washing.<br>Frequency: Ongoing | OCMA Museum House / HOA |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | |
|---|---|---|---|
| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
| | N3. Common Area Landscape Management<br>Management programs will be designed and implemented by the HOA to maintain all the common areas within the project site. These programs will cover how to reduce the potential pollutant sources of fertilizer and pesticide uses, utilization of water-efficient landscaping practices and proper disposal of landscape wastes by the owner/developer and/or contractors. | Maintenance shall be consistent with City requirements. Fertilizer and/or pesticide usage shall be consistent with County Management Guidelines for Use of Fertilizers (OC DAMP Section 5.5) as well as local requirements. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting, and replacement of mulch shall be performed on an as-needed basis to prevent exposure of erodible surfaces. Trimmings, clippings, and other landscape wastes shall be properly disposed of in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and storm drain inlets.<br>Frequency: Monthly | OCMA Museum House / HOA |
| | N4. BMP Maintenance<br>The HOA will be responsible for the implementation and maintenance of each applicable non-structural BMP, as well as scheduling inspections and maintenance of all applicable structural BMP facilities through its staff, landscape contractor, and/or any other necessary maintenance contractors. Details on BMP maintenance are provided in Section V of this WQMP, and the O&M Plan is included in Appendix D. | Maintenance of structural BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP (Appendix D). Records of inspections and BMP maintenance shall be kept by the Owner and shall be available for review upon request.<br>Frequency: Ongoing | OCMA Museum House / HOA |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | |
|---|---|---|---|
| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
| No | N5. Title 22 CCR Compliance (How development will comply) | Not Applicable | |
| | N6. Local Industrial Permit Compliance | Not Applicable | |
| | N7. Spill Contingency Plan | Not Applicable | |
| | N8. Underground Storage Tank Compliance | Not Applicable | |
| | N9. Hazardous Materials Disclosure Compliance | Not Applicable | |
| | N10. Uniform Fire Code Implementation | Not Applicable | |
| | N11. Common Area Litter Control<br>The HOA will be responsible for performing trash pickup and sweeping of littered common areas on a weekly basis or whenever necessary. Responsibilities will also include noting improper disposal materials by the public and reporting such violations for investigation. | Litter patrol, violations investigations, reporting and other litter control activities shall be performed on a weekly basis and in conjunction with routine maintenance activities.<br>Frequency: Weekly | OCMA Museum House / HOA |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | |
|---|---|---|---|
| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
| | N12. Employee Training<br>All employees of the HOA and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not be limited to, spill cleanup procedures, proper waste disposal, housekeeping practices, etc. | Educate all new employees/ managers on storm water pollution prevention, particularly good housekeeping practices, prior to the start of the rainy season (October 1). Refresher courses shall be conducted on an as needed basis.<br>Frequency: Annually | OCMA Museum House / HOA |
| | N13. Housekeeping of Loading Docks | Not Applicable | |
| | N14. Common Area Catch Basin Inspection<br>All on-site catch basin inlets and drainage facilities shall be inspected and maintained by the HOA at least once a year, prior to the rainy season, no later than October 1st of each year. | Catch basin inlets and other drainage facilities shall be inspected after each storm event and once per year. Inlets and other facilities shall be cleaned prior to the rainy season, by October 1 each year.<br>Frequency: Annually | OCMA Museum House / HOA |
| | N15. Street Sweeping Private Streets and Parking Lots<br>The HOA shall be responsible for sweeping all on-site drive aisles and parking areas within the project on a quarterly basis. | Drive aisles & parking areas must be swept at least quarterly (every 3 months), including prior to the start of the rainy season (October 1).<br>Frequency: Quarterly | OCMA Museum House / HOA |
| | N16. Retail Gasoline Outlets | Not Applicable | |
| STRUCTURAL SOURCE CONTROL BMPs | | | |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | |
|---|---|---|---|
| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
| | S1. Provide storm drain system stenciling and signage<br>The phrase "NO DUMPING! DRAINS TO OCEAN", or an equally effective phrase approved by the City, will be stenciled on all major storm drain inlets within the project site to alert the public to the destination of pollutants discharged into storm water. Stencils shall be in place prior to release of certificate of occupancy. Stencils shall be inspected for legibility on an annual basis and re-stenciled as necessary. | Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1 each year. Those determined to be illegible will be re-stenciled as soon as possible.<br>Frequency: Annually | OCMA Museum House / HOA |
| | S2. Design and construct outdoor material storage areas to reduce pollution introduction | Not Applicable | |
| | S3. Design and construct trash and waste storage areas to reduce pollution introduction | Not Applicable | |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | |
|---|---|---|---|
| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
| | S4. Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control<br>The HOA will be responsible for the installation and maintenance of all common landscape areas utilizing similar planting materials with similar water requirements to reduce excess irrigation runoff. The HOA will be responsible for implementing all efficient irrigation systems for common area landscaping including, but not limited to, provisions for water sensors and programmable irrigation cycles. This includes smart timers, rain sensors, and moisture shut-off valves. The irrigation systems shall be in conformance with water efficiency guidelines. Systems shall be tested twice per year, and water used during testing/flushing shall not be discharged to the storm drain system. | In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, and day or night time temperatures. System testing shall occur twice per year. Water from testing/flushing shall be collected and properly disposed to the sewer system and shall not discharge to the storm drain system.<br>Frequency: 2x per year | OCMA Museum House / HOA |
| | S5. Protect slopes and channels and provide energy dissipation | Not Applicable | |
| | S6. Dock areas | Not Applicable | |
| | S7. Maintenance bays | Not Applicable | |
| | S8. Vehicle wash areas | Not Applicable | |
| | S9. Outdoor processing areas | Not Applicable | |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | | |
|---|---|---|---|
| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
| | S10. Equipment wash areas | Not Applicable | |
| | S11. Fueling areas | Not Applicable | |
| | S12. Hillside landscaping | Not Applicable | |
| | S13. Wash water control for food preparation areas | Not Applicable | |
| | S14. Community car wash racks | Not Applicable | |

| BMP INSPECTION & MAINTENANCE RESPONSIBILITY MATRIX | | |
|---|---|---|
| **BMP Name and BMP Implementation, Maintenance and Inspection Procedures** | **Implementation, Maintenance, and Inspection Frequency and Schedule** | **Person or Entity with Operation & Maintenance Responsibility** |
| **LOW IMPACT DEVELOPMENT BMPs** | | |
| **Biotreatment BMP # 1:** Proprietary Biotreatment: Modular Wetlands<br>Modular Wetlands by Modular Wetlands Systems, Inc. are proprietary biotreatment systems that utilize multi-stage treatment processes including screening media filtration, settling, and biofiltration. The pre-treatment chamber contains the first three stages of treatment, and includes a catch basin inlet filter to capture trash, debris, gross solids and sediments, a settling chamber for separating out larger solids, and a media filter cartridge for capturing fine TSS, metals, nutrients, and bacteria. Runoff then flows through the wetland chamber where treatment is achieved through a variety of physical, chemical, and biological processes. As storm water passes down through the planting soil, pollutants are filtered, adsorbed, biodegraded and sequestered by the soil and plants, functioning similar to bioretention systems. The discharge chamber at the end of the unit collects treated flows and discharges back into the storm drain system. | The Modular Wetland units shall be maintained in accordance with manufacturer's specifications. The system shall be inspected at a minimum of once every six months, prior to the start of the rainy season (October 1) each year, and after major storm events. Typical maintenance includes removing trash & debris from the catch basin screening filter (by hand), removal of sediment and solids in the settlement chamber (vacuum truck), replacement of the BioMediaGREEN™ filter cartridge, and replacement of the BioMediaGREEN™ drain down filter (if equipped). In addition, plants within the wetland chamber will require trimming as needed in conjunction with routine landscape maintenance activities. No fertilizer shall be used in this chamber. Wetland chamber should be inspected during rain events to verify flow through the system. If little to no flow is observed from the lower valve or orifice plate, the wetland media may require replacement. If prior treatment stages are properly maintained, the life of the wetland media can be up to 20 years.<br>Frequency: 2x per year | OCMA Museum House / HOA |

## Required Permits

Permits are not required for the implementation, operation, and maintenance of the BMPs.

## Forms to Record BMP Implementation, Maintenance, and Inspection

The form that will be used to record implementation, maintenance, and inspection of BMPs is attached.

## Recordkeeping

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

## Waste Management

Any waste generated from maintenance activities will be disposed of properly. Wash water and other waste from maintenance activities is not to be discharged or disposed of into the storm drain system. Clippings from landscape maintenance (i.e. prunings) will be collected and disposed of properly off-site, and will not be washed into the streets, local area drains/conveyances, or catch basin inlets.

# RECORD OF BMP IMPLEMENTATION, MAINTENANCE, AND INSPECTION

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

| BMP Name (As Shown in O&M Plan) | Brief Description of Implementation, Maintenance, and Inspection Activity Performed |
|---|---|
| | |
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# RECORD OF BMP IMPLEMENTATION, MAINTENANCE, AND INSPECTION

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

| BMP Name (As Shown in O&M Plan) | Brief Description of Implementation, Maintenance, and Inspection Activity Performed |
|---|---|
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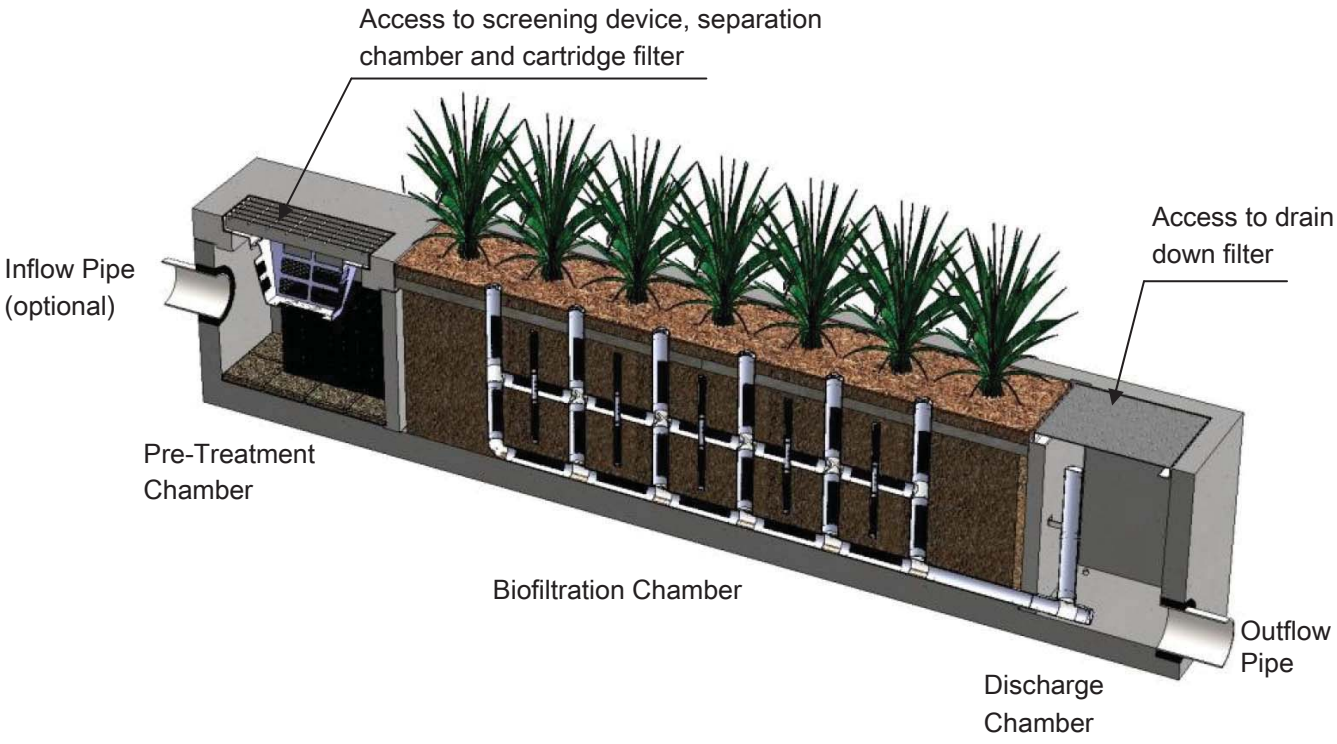
# Maintenance Guidelines for Modular Wetland System - Linear

## Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
  - (*5 minute average service time*).
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
  - (*10 minute average service time*).
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
  - (*10-15 minute per cartridge average service time*).
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
  - (*5 minute average service time*).
- Trim Vegetation – average maintenance interval is 6 to 12 months.
  - (*Service time varies*).

## System Diagram



# Maintenance Procedures

## Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

## Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

## Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

## Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.

# Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

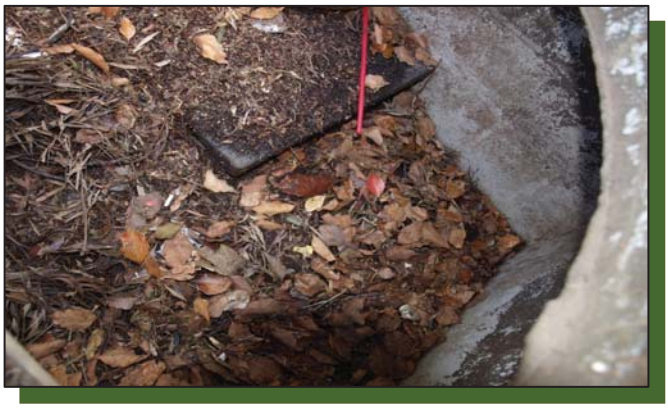
# Maintenance Procedure Illustration

## Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.

## Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.



## Cartridge Filters

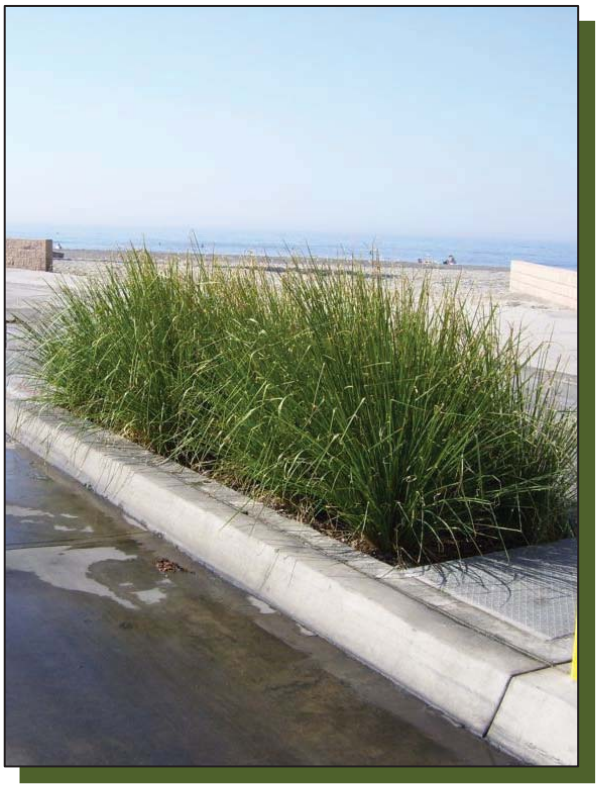
The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.


## Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.

## Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.



# Inspection Form

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

# Inspection Report
# Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

| For Office Use Only |
|---|
| (Reviewed By) |
| (Date) |
| Office personnel to complete section to the left. |

## Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

| **Structural Integrity:** | **Yes** | **No** | **Comments** |
|---|---|---|---|
| Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure? | | | |
| Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure? | | | |
| Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)? | | | |
| Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly? | | | |
| **Working Condition:** | | | |
| Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit? | | | |
| Is there standing water in inappropriate areas after a dry period? | | | |
| Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system? | | | |
| Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber. | | | Depth: |
| Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber? | | | Chamber: |
| Any signs of improper functioning in the discharge chamber? Note issues in comments section. | | | |
| **Other Inspection Items:** | | | |
| Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)? | | | |
| Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below. | | | |
| Is there a septic or foul odor coming from inside the system? | | | |

| **Waste:** | **Yes** | **No** |
|---|---|---|
| Sediment / Silt / Clay | | |
| Trash / Bags / Bottles | | |
| Green Waste / Leaves / Foliage | | |

| **Recommended Maintenance** | |
|---|---|
| No Cleaning Needed | |
| Schedule Maintenance as Planned | |
| Needs Immediate Maintenance | |

| **Plant Information** | |
|---|---|
| Damage to Plants | |
| Plant Replacement | |
| Plant Trimming | |

Additional Notes: _____



2972 San Luis Rey Road, Oceanside, CA 92058 P (760) 433-7640 F (760) 433-3176

# Maintenance Report


Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

# Cleaning and Maintenance Report
# Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

| For Office Use Only |
|---|
| (Reviewed By) |
| (Date) |
| Office personnel to complete section to the left. |

| Site Map # | GPS Coordinates of Insert | Manufacturer / Description / Sizing | Trash Accumulation | Foliage Accumulation | Sediment Accumulation | Total Debris Accumulation | Condition of Media 25/50/75/100 (will be changed @ 75%) | Operational Per Manufactures' Specifications (If not, why?) |
|---|---|---|---|---|---|---|---|---|
| | Lat:<br>Long: | MWS Catch Basins | | | | | | |
| | | MWS Sedimentation Basin | | | | | | |
| | | Media Filter Condition | | | | | | |
| | | Plant Condition | | | | | | |
| | | Drain Down Media Condition | | | | | | |
| | | Discharge Chamber Condition | | | | | | |
| | | Drain Down Pipe Condition | | | | | | |
| | | Inlet and Outlet Pipe Condition | | | | | | |

Comments:

2972 San Luis Rey Road, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

# APPENDIX E

# CONDITIONS OF APPROVAL (PENDING ISSUANCE)

# APPENDIX F

# INFILTRATION TEST RESULTS (PENDING SITE SPECIFIC STUDY)