Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING

# LOW IMPACT DEVELOPMENT (LID)

FOR

NELSON AVENUE INDUSTRIAL BUILDING
15010 AND 15100 NELSON AVENUE
CITY OF INDUSTRY, CA 91744
APNs: 8208-011-009 AND 8208-011-029

PREPARED FOR:

OVERTON MOORE PROPERTIES
19700 S. VERMONT AVENUE, SUITE 101
TORRANCE, CA 90502
PHONE: (310) 323-9100
CONTACT: TIMUR TECIMER

MARCH 2, 2022
JULY 26, 2022

JOB NO. 4022

PREPARED BY:

THIENES ENGINEERING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PHONE: (714) 521-4811
FAX: (714) 521-4173
CONTACT: FELIPE VAZQUEZ (felipe@thieneseng.com)

# LOW IMPACT DEVELOPMENT (LID)

# FOR

# "NELSON AVENUE INDUSTRIAL BUILDING"


PREPARED BY FELIPE VAZQUEZ
UNDER THE SUPERVISION OF:

07/26/2022

REINHARD STENZEL DATE
R.C.E. 56155
EXP. 12/31/2022

# Owner's Certification

This Low Impact Development (LID) has been prepared for **Overton Moore Properties** (Owner) by **Thienes Engineering, Inc** (Engineers).

The LID is intended to comply with the requirements of the City of Industry requiring the preparation of a LID. The undersigned is aware that Best Management Practices (BMPs) are enforceable pursuant to the City's Municipal Code **Chapter 13.16.090** for Stormwater Management. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to date conditions1 on the site consistent with the Los Angeles Regional Board's Basin Plan and the intent of the non-point source National Pollutant Discharge Elimination System (NPDES) Permit for Waste Discharge Requirements for the County of Los Angeles, Los Angeles County Flood Control District and the incorporated cities of Los Angeles County within the California Regional Water Quality Control Board, Los Angeles Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the LID. An appropriate number of approved-signed copies of this document shall be available on the subject site in perpetuity.

| **Owner Name: TIMUR TECIMER** | | |
|---|---|---|
| **Title** | Chief Executive Officer | |
| **Company** | Overton Moore Properties | |
| **Address** | 19700 S. Vermont Avenue, Suite 101, Torrance, CA 90502 | |
| **Email** | Ttecimer@omprop.com | |
| **Telephone #** | (310) 323-9100 | |
| **Signature** | **Date** | |

# TABLE OF CONTENTS

# APPENDICES

Appendix A Stormwater Quality Design Calculations
Appendix B LID Site Plan
Appendix C BMP Operation and Maintenance
Appendix D Maintenance and Covenant Agreement
Appendix E Educational Materials
Appendix F Infiltration Feasibility

# 1.0 Project Description

The project site is located at 15010 and 15100 Nelson Avenue in the City of Industry (Figure 1.1 - Vicinity Map), at APNs: 8208-011-009 and 8208-011-029 of Los Angeles County.

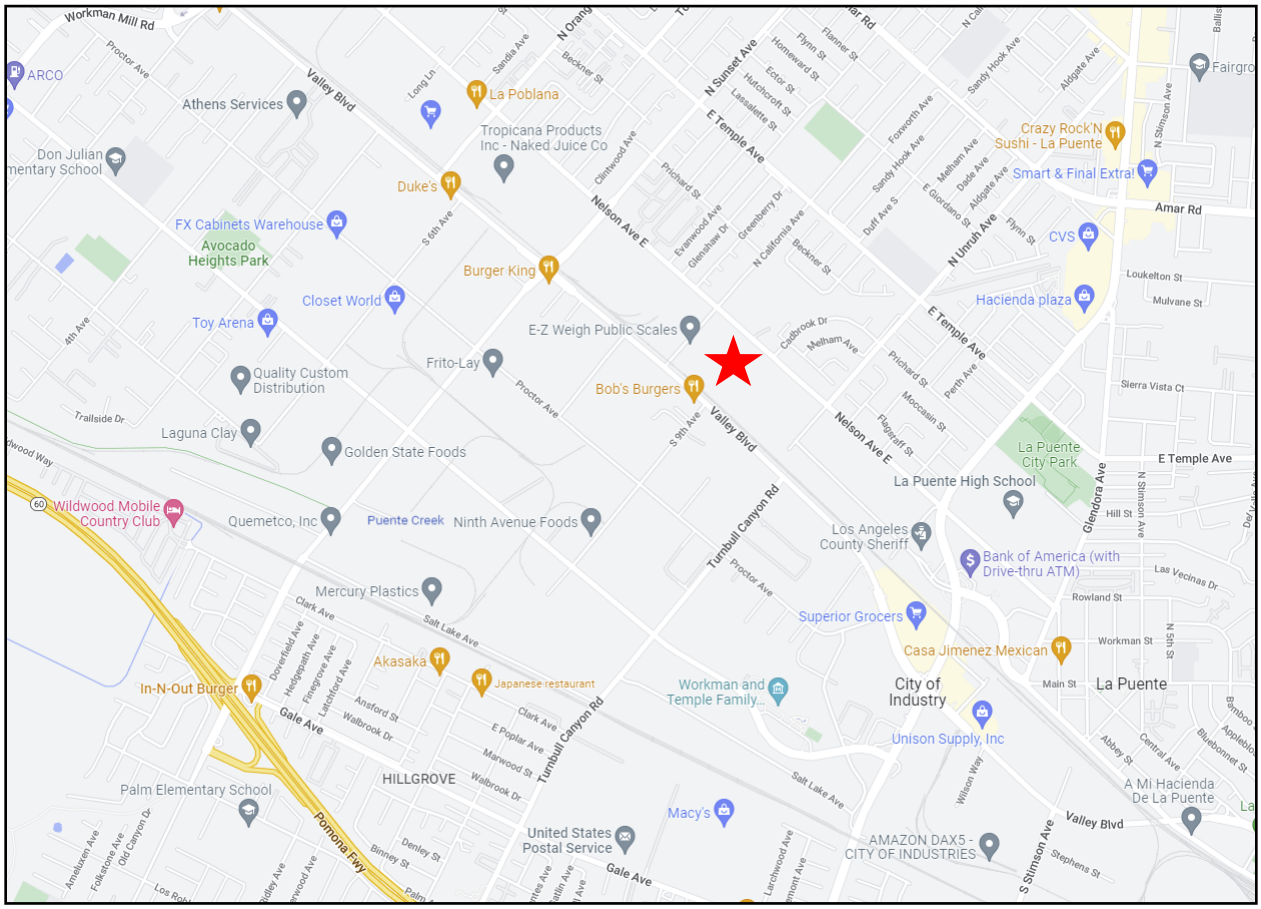



**Figure 1.1 - Vicinity Map (north ↑)**

The project site encompasses approximately 8.60 acres, of which 8.45 acres will receive LID treatment and the remainder 0.15 acres is primarily landscaping draining offsite without being routed to the LID BMP. Proposed improvements consist of one warehouse type building with a truck yard located along the north side of the building. Vehicular parking areas and landscaping areas will be located throughout the site.

The project will treat stormwater runoff generated by the project through the use of a WetlandMOD biofiltration system and an underground detention system sized to treat 1.5 times the Stormwater Quality Design volume (SWQDv). The 1,5x SWQDv is achieved by multiplying the volume produced by the 85$^{th}$ percentile rainfall depth by 1.5. Refer to Appendix A for references and calculations.

## 1.1 Existing Site Description

The site is currently developed with several existing buildings, vehicle parking and truck lots. The site generally drains southwesterly toward Puente Creek.

The northwesterly portion of the site sheet flows offsite to Nelson Avenue. The southwesterly truck area flows southwesterly to an existing catch basin along the westerly property line. Runoff is conveyed through an existing 18" PVC storm drain and discharges into Puente Creek. The southeasterly area flows southerly toward existing catch basins. Runoff from the neighboring easterly property will sheet flow on site and drain to the same existing catch basins.

## 1.2 Proposed Site Description

The site will continue to generally drain southwesterly toward the existing 18" PVC storm drain in the southwesterly corner of the site.

The landscaped area fronting Nelson Avenue (Area 1D) will continue to sheet flow offsite to Nelson Avenue.

Runoff from the proposed building and truckyard (Areas 1A and 2A) will be captured in catch basins located in the truckyard and confluence with the proposed on-site system. Flows will be conveyed westerly through the truck yard and into the westerly drive aisle. Flows from the westerly drive aisle (Area 3A) will drain to a catch basin located in the drive aisle and confluence in the proposed system. The easterly portion of the southerly drive (Area 4A) will drain to a catch basin located in the southerly drive aisle. A proposed on-site storm drain system will collect and convey runoff easterly around the proposed building and into the truck yard.

Runoff from the northwesterly vehicle parking area (Areas 1B and 2B) will drain to catch basins located in the parking area and confluence with the proposed onsite system. The storm drain system will continue southerly through the westerly drive aisle.

Runoff from the northeasterly offsite area (Area 1C) will be captured in catch basins located in the truckyard and confluence with the proposed on-site system. Flows will be conveyed westerly through the truck yard and into the westerly drive aisle. These flows will not be routed to the LID BMP for treatment.

The storm drain system will ultimately connect with the existing 18" PVC storm drain in the southwesterly corner of the site.

## 1.3 Geological Investigation

**Infiltration Study dated December 8, 2021, by Southern California Geotechnical**
A total of two (2) infiltration tests were performed at the subject site. The calculated infiltration rates at the infiltration locations range from 0.00 to 1.9 inches per hour. The high silty clay and sandy clay content of the on-site soils resulted in very low infiltration rates at the infiltration test locations. Based on the very low infiltration rates at the depths tested and the Los Angeles County minimum infiltration rate requirement, the on-site soils are generally not considered suitable for infiltration. Therefore, infiltration is not considered feasible for this site.

Refer to Appendix F for the abovementioned report.

# 2.0 Project Specific Requirements

The project is a redevelopment project that results in replacement of 5,000 square feet or more of impervious surface area. The project will alter more than 50 percent of the impervious surface thus the entire development site must meet the requirements of the LID Standards Manual (February 2014).

## 2.1 Peak Storm Water Runoff Discharge Rates / HCOC

*Post-development peak stormwater runoff discharge rates shall not exceed the estimated pre-development rate for developments where the increased peak stormwater discharge rate will result in increased potential for downstream erosion.*

The proposed project will not create any additional hydrologic conditions of concerns. Runoff from the property will continue to drain towards the San Jose Creek an engineered, hardened, and maintained channel. Discharge from the project will be in full compliance with agency requirements for connections and discharges to the MS4, including both quality and quantity requirements. See hydrology report for more details, a separate document.

## 2.2 Conserve Natural Areas

*During the subdivision design and approval process, the site layout must be consistent with the applicable General Plan and Local Area Plan policies and implement the following:*

- *Concentrate or cluster development on portions of the site while leaving the remaining land in a natural undisturbed condition;*
- *Limit clearing and grading of native vegetation at the site to the minimum amount needed to build lots, allow access, and provide fire protection;*
- *Maximize trees and other vegetation at the 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.*

The project site is currently developed with no natural areas to conserve.

## 2.3 Minimize Storm Water Pollutants of Concern

*Stormwater runoff from a site has the potential to contribute oil and grease, suspended solids, metals, gasoline, pesticides, and pathogens to the stormwater conveyance system. The development must be designed so as to minimize, to the maximum extent practicable, the introduction of pollutants of concern that may result in significant impacts, generated from site runoff of directly connected impervious areas (DCIA), to the stormwater conveyance system as approved by the building official. Pollutants of concern, consist of any pollutants that exhibit one or more of the following characteristics: current loadings or historic deposits of the*

*pollutant are impacting the beneficial uses of a receiving water, elevated levels of the pollutant are found in sediments of a receiving water and/or have the potential to bioaccumulate in organisms therein, or the detectable inputs of the pollutant are at concentrations or loads considered potentially toxic to humans and/or flora and fauna.*

*In meeting this specific requirement, "minimization of the pollutants of concern" will require the incorporation of a BMP or combination of BMPs best suited to maximize the reduction of pollutant loadings in that runoff to the Maximum Extent Practicable.*

Anticipated pollutants generated from the proposed development are:

- Heavy Metals
- Nutrients
- Pesticides
- Organic Compounds
- Sediments
- Trash & Debris
- Oxygen Demanding Substances
- Oil and Grease

The receiving waters and their impairments are:

- Puente Creek: Indicator Bacteria, Selenium
- San Jose Creek (Reach 1): Ammonia, Indicator Bacteria, pH, Total Dissolved Solids, Toxicity
- San Gabriel River (Reach 3): Indicator Bacteria
- San Gabriel River (Reach 2): Cyanide, Lead, Temperature (water)
- San Gabriel River (Reach 1): pH, Temperature (water)
- San Gabriel River Estuary: Copper, Dioxin, Indicator Bacteria, Nickel, Oxygen (dissolved)
- San Pedro Bay Near/Off Shore Zones: Chlordane, PCBs (Polychlorinatedbiphenyls), Total DDT, Toxicity
- Pacific Ocean: None

The pollutants of concern of the project site are:

- Heavy Metals
- Trash and debris

The proposed project will disconnect runoff from impervious areas by means of WetlandMOD biofiltration system and an underground detention system. Inlets are used to intercept "low flows" towards the biofiltration systems for treatment prior to discharging offsite.

## 2.4 Routine Non-Structural BMPs

| Routine Non-Structural BMPs | |
|---|---|
| **Name** | **Describe BMP Implementation OR, if not applicable, state reason** |
| Education of Property Owners, Tenants and Occupants on Stormwater BMPs | Property owner will familiarize him/herself with the educational materials in Appendix E and the contents of the LID. |
| Activity Restrictions | No outdoor work areas, processing, storage or wash area. Activities are restricted to only those for which a BMP has been implemented. |
| Landscape Management BMPs | Irrigation must be consistent with City's Water Conservation Ordinance. Fertilizer and pesticide usage will be consistent with County Management Guidelines for Use of Fertilizers and Pesticides. |
| BMP Maintenance | BMP maintenance, implementation schedules, and responsible parties are included in Appendix C. |
| Title 22 CCR Compliance | Not applicable. |
| Spill Contingency Plan | Owner/tenant will have a spill contingency plan based on individual site needs. |
| Underground Storage Tank Compliance | Not applicable. |
| Hazardous Materials Disclosure Compliance | Site will be in compliance with ordinances typically enforced by respective fire protection agency for the management of hazardous materials. Los Angeles County, health care agencies, and/or other appropriate agencies (i.e. Department of Toxics Substances Control is typically responsible for enforcing hazardous materials and hazardous waste handling and disposal regulations. |
| Uniform Fire Code Implementation | Site will be in compliance with article 80 of the Uniform Fire Code enforced by fire protection agency. Inspection and maintenance as necessary. |
| Litter/Debris Control Program | Contract with their landscape maintenance firm to provide this service during regularly schedule maintenance. |
| Employee Training | The owner will ensure that tenants are also familiar with onsite BMPs and necessary maintenance required of the tenants. Owner will check with City and County at least once a year to obtain new or updated educational materials and provide these materials to tenants. Employees shall be trained to clean up spills and participate in ongoing maintenance. This LID requires bi-annually employee training and new hires within 2 months. |
| Housekeeping of Loading Docks | Keep all fluids indoors. Clean up spills immediately and keep spills from entering storm drain system. No discharges of wastewater or cleanup water from maintenance of loading docks into the storm drain system. Area shall be inspected weekly for proper containment and practices with spills cleaned up immediately and disposed of properly. Areas under "dock high" doors shall be swept daily. |

| Routine Non-Structural BMPs | |
|---|---|
| **Name** | **Describe BMP Implementation OR, if not applicable, state reason** |
| Catch Basin Inspection Program | The owner/maintenance contractor will be responsible for cleaning the catch basins on-site on a regular basis prior to the storm season, no later than October 1st of each year. Catch basins and storm drain system will be cleaned at least twice a year and prior to October 1. |
| Vacuum Sweeping of Private Streets and Parking Lots | All landscape maintenance contractors will be required to sweep up all landscape cuttings, mowings and fertilizer materials off paved areas weekly and dispose of properly. Parking areas and drive ways will be swept monthly by sweeping contractor. |
| Retail Gasoline Outlets | Not applicable. |

## 2.5 Routine Structural BMPs

| Routine Structural BMPs | |
|---|---|
| **Name** | **Describe BMP Implementation OR, if not applicable, state reason** |
| Provide storm drain system stenciling and signage | All proposed and existing inlets to remain will be stenciled with prohibitive language and/or graphical icons to prevent dumping. Legibility of the stencils/markers will be maintained on a yearly basis, or as needed. |
| Design and construct outdoor material storage areas to reduce pollution introduction | Not applicable. There are no proposed outdoor material storage areas for this project. Any and all materials will be stored indoors. |
| Design and construct trash and waste storage areas to reduce pollution introduction | Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements diverted around the area, and screened or walled to prevent off-site transport of trash. |
| Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control | Irrigation systems shall include reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines. Timers will be used to avoid over watering and watering cycles and duration shall be adjusted seasonally by the landscape maintenance contractor. |
| Protect slopes and channels and provide energy dissipation | Not applicable. The proposed project site is located on a very flat terrain. There are no slopes, natural drainage systems, or channel crossings to protect. |
| Loading and Unloading Dock Areas | Keep all fluids indoors. Clean up spills immediately and keep spills from entering storm drain system. No discharges of wastewater or cleanup water from maintenance of loading docks into the storm drain system. Area shall be inspected weekly for proper containment and practices with spills cleaned up immediately and disposed of properly. Areas under “dock high” doors shall be swept daily. |
| Covered maintenance bays with spill containment plans | No maintenance bays onsite. |
| Vehicle wash areas with spill containment plans | No vehicle wash areas onsite. |
| Covered outdoor processing areas | No outdoor processing areas onsite. |
| Equipment wash areas with spill containment plans | No equipment wash areas onsite. |
| Fueling areas | No fueling areas onsite. |
| Hillside landscaping | No hillsides onsite. |
| Wash water control for food preparation areas | No food preparation onsite. |
| Community car wash racks | No community cars wash racks onsite. |

## 2.6 Site Design BMPs

| Site Design BMPs | |
|---|---|
| **Minimize impervious areas:** ☒Yes ☐No | Landscaping is proposed throughout the project site to the most extent practicable. Landscaping will help reduce the amount of runoff generated from the site. |
| **Maximize natural infiltration capacity:** ☐Yes ☒No | The project site will use biofiltration type BMPs due to poor infiltration at the site. |
| **Preserve existing drainage patterns and time of concentration:** ☒Yes ☐No | Post-development drainage patterns will mimic pre-development conditions. The proposed BMPs will also assist in increasing the time of concentration. |
| **Disconnect impervious areas:** ☒Yes ☐No | The WetlandMOD biofiltration system and an underground detention system will disconnect impervious areas before discharging offsite. |
| **Protect existing vegetation and sensitive areas:** ☐Yes ☒No | Not applicable, there is no sensitive areas to protect. Landscape will be provided throughout the site. |
| **Re-vegetate disturbed areas:** ☐Yes ☒No | Not applicable, development consists of a warehouse building. Most of the disturbed areas will be paved; however, all disturbed areas will drain through the WetlandMOD biofiltration system for treatment. Also, landscape will be provided throughout the site. |
| **Utilize vegetated drainage swales in place of underground piping or imperviously lined swales:** ☐Yes ☒No | Underground piping and imperviously lined swales could not be substituted with vegetated swales. |

## 2.7 Treatment Control BMPs

The proposed project is required to incorporate appropriate stormwater mitigation measures into the design plan for the entire site. The proposed project will treat and mitigate flows per LID guidelines via a WetlandMOD biofiltration system and an underground detention system.

## 2.8 Provide Proof of Ongoing BMP Maintenance

*Improper maintenance is one of the most common reasons why water quality controls will not function as designed or which may cause the system to fail entirely. It is important to consider who will be responsible for maintenance of a permanent BMP, and what equipment is required to perform the maintenance properly. If Structural or Treatment Control BMPs are required or included in project plans, the applicant must provide verification of maintenance provisions through such means as may be appropriate, including, but not limited to legal agreements, covenants, CEQA mitigation requirements and/or Conditional Use Permits.*

*The verification will include the developer's signed statement, as part of the project application, accepting responsibility for all Structural and Treatment Control BMP maintenance until the time the property is transferred and, where applicable, a signed agreement from the public entity*

*assuming responsibility for Structural or Treatment Control BMP maintenance. The transfer of property to a private or public owner must have conditions requiring the recipient to assume responsibility for maintenance of any Structural or Treatment Control BMP to be included in the sales or lease agreement for that property, and will be the owner's responsibility. The condition of transfer shall include a provision that the property owners conduct maintenance inspection of all Structural or Treatment Control BMPs at least once a year and retain proof of inspection. For residential properties where the Structural or Treatment Control BMPs are located within a common area, which will be maintained by a homeowner's association, language regarding the responsibility for maintenance must be included in the project's conditions, covenants and restrictions (CC&Rs). Printed educational materials will be required to accompany the first deed transfer to highlight the existence of the requirement and to provide information on what stormwater management facilities are present, signs that maintenance is needed, how the necessary maintenance can be performed, and assistance that the Permittee can provide. The transfer of this information shall also be required with any subsequent sale of the property.*

*Structural or Treatment Control BMPs located within a public area proposed for transfer will be the responsibility of the developer until accepted for transfer by the appropriate public agency. Structural or Treatment Control BMPs proposed for transfer must meet design standards adopted by the public entity for the BMP installed and should be approved by the appropriate public agency prior to its installation.*

The property owner/operator will maintain proof of ongoing maintenance at the site as recorded in the covenant and agreement (see Appendix D).

# 2.9 Provisions Applicable to Individual Priority Project Categories

# 2.9.A Single Family Hillside Home

The project site is not a single family hillside development.

### *2.9.A.1 Conserve Natural Areas*

The project site is not a single family hillside development.

### *2.9.A.2 Protect Slopes and Channels*

The project site is not a single family hillside development.

### *2.9.A.3 Provide Storm Drain System Stenciling and Signage*

The project site is not a single family hillside development.

### *2.9.A.4 Divert Roof Runoff to Vegetated Areas Before Discharge*

The project site is not a single family hillside development.

### *2.9.A.5 Direct Surface Flow to Vegetated Areas Before Discharge*

The project site is not a single family hillside development.

## 2.9.B 43,560 Square Feet Industrial/Commercial Developments

### *2.9.B.1 Properly Design Loading/Unloading Dock Areas*

*Loading/unloading dock areas have the potential for material spills to be quickly transported to the storm water conveyance system. To minimize this potential, the following design criteria are required:*

- *Cover loading dock areas or design drainage to minimize run-on and runoff of storm water.*
- *Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.*

The proposed project is designed so that pollutants from the impervious surfaces are disconnected prior to discharging offsite. Runoff from the parking lots is transported through WetlandMODs and underground detention for treatment.

### *2.9.B.2 Properly Design Repair/Maintenance Bays*

*Oil and grease, solvents, car battery acid, coolant and gasoline from the repair/maintenance bays can negatively impact storm water if allowed to come into contact with storm water runoff. Therefore, design plans for repair bays must include the following:*

- *Repair/maintenance bays must be indoors or designed in such a way that do not allow storm water run-on or contact with storm water runoff.*
- *Design a repair/maintenance bay drainage system to capture all washwater, leaks and spills. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.*

Not applicable, the proposed project will not construct any maintenance bays.

### *2.9.B.3 Properly Design Vehicle/Equipment Wash Areas*

*The activity of vehicle/equipment washing/steam cleaning has the potential to contribute metals, oil and grease, solvents, phosphates, and suspended solids to the stormwater conveyance system. Project plans are required to designate an area for washing/steam cleaning of vehicles and equipment. This area is required to be:*

- *Self-contained and/or covered, equipped with a clarifier, or other pretreatment facility, and properly connected to a sanitary sewer or to a permitted disposal facility.*

Not applicable, the proposed project will not construct any vehicle/equipment wash areas.

## 2.9.C Restaurants

### *2.9.C.1 Properly Design Equipment/Accessory Wash Areas*

*The activity of outdoor equipment/accessory washing/steam cleaning has the potential to contribute metals, oil and grease, solvents, phosphates, and suspended solids to the storm water conveyance system. Include in the project plans an area for the washing/steam cleaning of equipment and accessories. This area must be:*

- *Self-contained, equipped with a grease trap, and properly connected to a sanitary sewer.*
- *If the wash area is to be located outdoors, it must be covered, paved, have secondary containment, and be connected to the sanitary sewer.*

The proposed project is not a restaurant.

## 2.9.D Retail Gasoline Outlets

### *2.9.D.1 Properly Design Fueling Area*

*Fueling areas have the potential to contribute oil and grease, solvents, car battery acid, coolant and gasoline to the storm water conveyance system. The project plans must include the following BMPs:*

- *The fuel dispensing area must be covered with an overhanging roof structure or canopy. The canopy's minimum dimensions must be equal to or greater than the area within the grade break. The canopy must not drain onto the fuel dispensing area, and the canopy downspouts must be routed to prevent drainage across the fueling area.*
- *The fuel dispensing area must be paved with Portland cement concrete (or equivalent smooth impervious surface), and the use of asphalt concrete shall be prohibited.*
- *The fuel dispensing area must have a 2% to 4% slope to prevent ponding, and must be separated from the rest of the site by a grade break that prevents run-on of storm water to the extent practicable.*
- *At a minimum, the concrete fuel dispensing area must extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.*

The proposed project is not a retail gasoline outlet.

## 2.9.E Automotive Repair Shops

### *2.9.E.1 Properly Design Fueling Area*

*Fueling areas have the potential to contribute oil and grease, solvents, car battery acid, coolant and gasoline to the storm water conveyance system. The project plans must include the following BMPs:*

- *The fuel dispensing area must be covered with an overhanging roof structure or canopy. The canopy's minimum dimensions must be equal to or greater than the area within the grade break. The canopy must not drain onto the fuel dispensing area, and the canopy downspouts must be routed to prevent drainage across the fueling area.*
- *The fuel dispensing area must be paved with Portland cement concrete (or equivalent smooth impervious surface), and the use of asphalt concrete shall be prohibited.*
- *The fuel dispensing area must have a 2% to 4% slope to prevent ponding, and must be separated from the rest of the site by a grade break that prevents run-on of storm water to the extent practicable.*
- *At a minimum, the concrete fuel dispensing area must extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.*

Not applicable, no fuel dispensing areas proposed.

### *2.9.E.2 Properly Design Repair/Maintenance Bays*

*Oil and grease, solvents, car battery acid, coolant and gasoline from the repair/maintenance bays can negatively impact storm water if allowed to come into contact with storm water runoff. Therefore, design plans for repair bays must include the following:*

- *Repair/maintenance bays must be indoors or designed in such a way that doesn't allow storm water run-on or contact with storm water runoff.*
- *Design a repair/maintenance bay drainage system to capture all wash-water, leaks and spills.*
- *Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.*

Not applicable, the proposed project will not construct any maintenance bays.

### *2.9.E.3 Properly Design Vehicle/Equipment Wash Areas*

*The activity of vehicle/equipment washing/steam cleaning has the potential to contribute metals, oil and grease, solvents, phosphates, and suspended solids to the storm water conveyance system. Include in the project plans an area for washing/steam cleaning of vehicles and equipment. This area must be:*

- *Self-contained and/or covered, equipped with a clarifier, or other pretreatment facility, and properly connected to a sanitary sewer or to a permitted disposal facility.*

The proposed project is not an automotive repair shop.

### *2.9.E.4 Properly Design Loading/Unloading Dock Areas*

*Loading/unloading dock areas have the potential for material spills to be quickly transported to the storm water conveyance system. To minimize this potential, the following design criteria are required:*

- *Cover loading dock areas or design drainage to minimize run-on and runoff of storm water.*
- *Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.*

The proposed project is designed so that pollutants from the impervious surfaces are disconnected prior to discharging offsite. Runoff from the parking lots is transported through WetlandMODs and underground detention for treatment.

## 2.9.F Parking Lots

### *2.10.F.1 Properly Design Parking Area*

*Parking lots contain pollutants such as heavy metals, oil and grease, and polycyclic aromatic hydrocarbons that are deposited on parking lot surfaces by motor-vehicles. These pollutants are directly transported to surface waters. To minimize the offsite transport of pollutants, the following design criteria are required:*

- *Reduce impervious land coverage of parking areas.*
- *Infiltrate runoff before it reaches storm drain system.*
- *Treat runoff before it reaches storm drain system.*

The proposed project is designed so that pollutants from the impervious surfaces are disconnected prior to discharging offsite. Runoff from the parking lots is transported through WetlandMODs and underground detention for treatment.

### *2.10.F.2 Properly Design to Limit Oil Contamination and Perform Maintenance*

*Parking lots may accumulate oil, grease, and water insoluble hydrocarbons from vehicle drippings and engine system leaks.*

- *Treat to remove oil and petroleum hydrocarbons at parking lots that are heavily used (e.g. fast food outlets, lots with 25 or more parking spaces, sports event parking lots, shopping malls, grocery stores, discount warehouse stores).*
- *Ensure adequate operation and maintenance of treatment systems particularly sludge and oil removal, and system fouling and plugging prevention control.*

The project owner will ensure that grease and oil are contained. The parking lot will be swept on a monthly basis, minimum, and before any rain events. Absorbent materials will be used to collect any spilled oil, and disposed of properly, to ensure they do not contaminate stormwater. Filterra systems will be utilized to provide onsite treatment.

## 2.10 Waiver

*A Permittee may, through adoption of an ordinance or code incorporating the treatment requirements of the LID, provide for a waiver from the requirement if impracticability for a specific property can be established. A waiver of impracticability shall be granted only when all other Structural or Treatment Control BMPs have been considered and rejected as infeasible. Recognized situations of impracticability include, (i) extreme limitations of space for treatment on a redevelopment project, (ii) unfavorable or unstable soil conditions at a site to attempt infiltration, and (iii) risk of ground water contamination because a known unconfined aquifer lies beneath the land surface or an existing or potential underground source of drinking water is less than 10 feet from the soil surface. Any other justification for impracticability must be separately petitioned by the Permittee and submitted to the Regional Board for consideration. The Regional Board may consider approval of the waiver justification or may delegate the authority to approve a class of waiver justifications to the Regional Board Executive Officer. The supplementary waiver justification becomes recognized and effective only after approval by the Regional Board or the Regional Board Executive Officer. A waiver granted by a Permittee to any development or redevelopment project may be revoked by the Regional Board Executive Officer for cause and with proper notice upon petition.*

The proposed project does not require a waiver of impracticability from any LID conditions.

## 2.11 Mitigation Funding

*The Permittees may propose a management framework, for endorsement by the Regional Board Executive Officer, to support regional or sub-regional solutions to storm water pollution, where any of the following situations occur:*

- *A waiver for impracticability is granted;*
- *Legislative funds become available;*
- *Off-site mitigation is required because of loss of environmental habitat; or*
- *An approved watershed management plan or a regional storm water mitigation plan exists that incorporates an equivalent or improved strategy for storm water mitigation.*

No management framework for mitigation funding is necessary for the proposed project.

Funding will be the responsibility of the owner:

OVERTON MOORE PROPERTIES
19700 S. Vermont Avenue, Suite 101
TORRANCE, CA 90502

PHONE: (310) 323-9100
CONTACT: TIMUR TECIMER

## 2.12 Limitation on Use of Infiltration BMPs

*Three factors significantly influence the potential for storm water to contaminate ground water. They are (i) pollutant mobility, (ii) pollutant abundance in storm water, (iii) and soluble fraction of pollutant. The risk of contamination of groundwater may be reduced by pretreatment of storm water. A discussion of limitations and guidance for infiltration practices is contained in, Potential Groundwater Contamination from Intentional and Non-Intentional Stormwater Infiltration, Report No. EPA/600/R-94/051, USEPA (1994).*

*In addition, the distance of the groundwater table from the infiltration BMP may also be a factor determining the risk of contamination. A water table distance separation of ten feet depth in California presumptively poses negligible risk for storm water not associated with industrial activity or high vehicular traffic.*

*Infiltration BMPs are not recommended for areas of industrial activity or areas subject to high vehicular traffic (25,000 or greater average daily traffic (ADT) on main roadway or 15,000 or more ADT on any intersecting roadway) unless appropriate pretreatment is provided to ensure groundwater is protected and the infiltration BMP is not rendered ineffective by overload.*

There is a limitation on the use of infiltration BMPs as previously discussed in Section 1.3. Biofiltration type BMPs have been proposed instead due to the poor infiltration rates.

## 2.13 Alternative Certification for Storm Water Treatment Mitigation

*In lieu of conducting detailed BMP review to verify Structural or Treatment Control BMPs adequacy, a Permittee may elect to accept a signed certification from a Civil Engineer or a Licensed Architect registered in the State of California, that the plan meets the criteria established herein. The Permittee is encouraged to verify that certifying person(s) have been trained on BMP design for water quality, not more than two years prior to the signature date. Training conducted by an organization with storm water BMP design expertise (e.g., a University, American Society of Civil Engineers, American Society of Landscape Architects, American Public Works Association, or the California Water Environment Association) may be considered qualifying.*

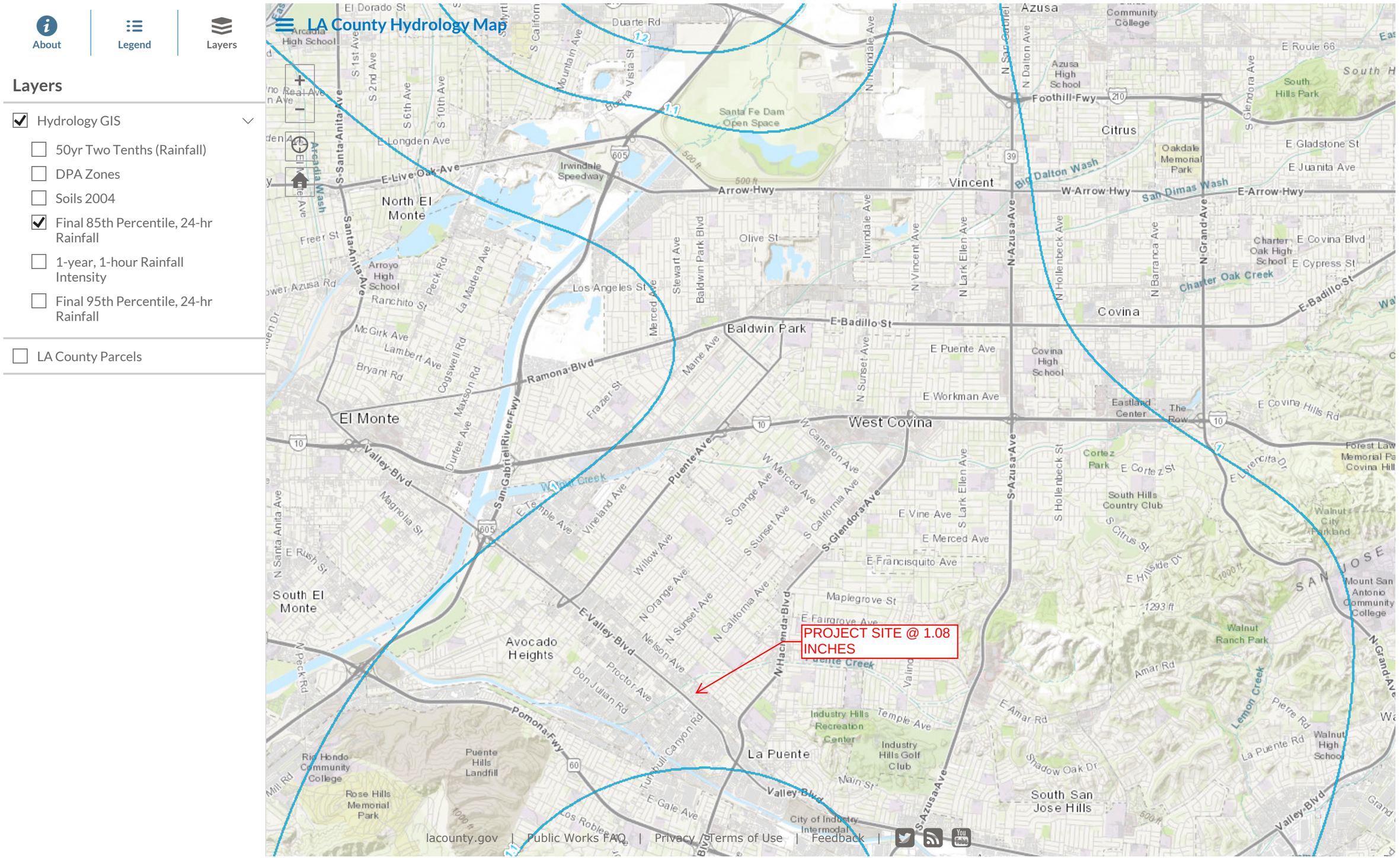
A California licensed civil engineer has provided a detailed BMP review of this report.

## 2.14 Resources and Reference

California Storm Water Best Management Practices Handbooks for Construction Activity (2015), Municipal (2003), and Industrial/Commercial (2014).

# APPENDIX A

# Stormwater Quality Design Calculations


About
Legend
Layers
LA County Hydrology Map
Layers
Hydrology GIS
50yr Two Tenths (Rainfall)
DPA Zones
Soils 2004
Final 85th Percentile, 24-hr Rainfall
1-year, 1-hour Rainfall Intensity
Final 95th Percentile, 24-hr Rainfall
LA County Parcels
PROJECT SITE @ 1.08 INCHES
lacounty.gov | Public Works FAQ | Privacy /Terms of Use | Feedback |


About
Legend
Layers
Layers
Hydrology GIS
50yr Two Tenths (Rainfall)
DPA Zones
Soils 2004
Final 85th Percentile, 24-hr Rainfall
1-year, 1-hour Rainfall Intensity
Final 95th Percentile, 24-hr Rainfall
LA County Parcels
LA County Hydrology Map
PROJECT SITE @ SOIL TYPES 006 AND 017 (HANFORD FINE SANDY LOAM AND YOLO CLAY LOAM, RESPECTIVELY)
006
017
003
013
308 ft
350 ft
E Valley Blvd
Puente Creek
Sunset Christian
Temple Academy Elementary School
Sparks Elementary School
Nelson Elementary School
La Puente High School
La Puente Park
Industry
lacounty.gov | Public Works FAQ | Privacy / Terms of Use | Feedback |

# Peak Flow Hydrologic Analysis

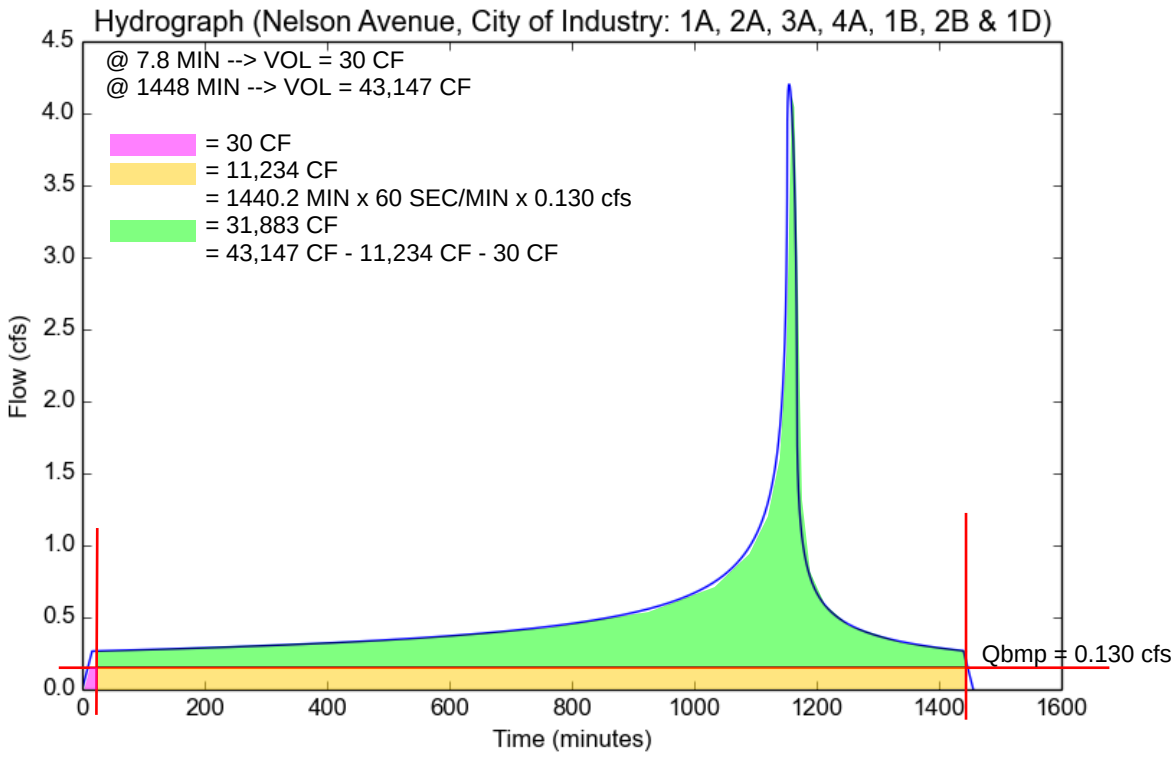
File location: O:/4000-4099/4022/SUSMP/2022-06-30 2nd Submittal/Appendices/Appendix A - SWQDv Calculations (PRINT IN COLOR)/HydroCalc/Nels
Version: HydroCalc 1.0.3

## Input Parameters

| | |
|---|---|
| Project Name | Nelson Avenue, City of Industry |
| Subarea ID | 1A, 2A, 3A, 4A, 1B, 2B & 1D |
| Area (ac) | 8.6 |
| Flow Path Length (ft) | 574.0 |
| Flow Path Slope (vft/hft) | 0.0214 |
| 85th Percentile Rainfall Depth (in) | 1.62 |
| Percent Impervious | 0.95 |
| Soil Type | 6 |
| Design Storm Frequency | 85th percentile storm |
| Fire Factor | 0 |
| LID | True |

## Output Results

| | |
|---|---|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.62 |
| Peak Intensity (in/hr) | 0.5595 |
| Undeveloped Runoff Coefficient (Cu) | 0.3654 |
| Developed Runoff Coefficient (Cd) | 0.8733 |
| Time of Concentration (min) | 16.0 |
| Clear Peak Flow Rate (cfs) | 4.2019 |
| Burned Peak Flow Rate (cfs) | 4.2019 |
| 24-Hr Clear Runoff Volume (ac-ft) | 0.9913 |
| 24-Hr Clear Runoff Volume (cu-ft) | 43179.0902 |



Inputs: Nelson Avenue, City of Industry

| Subarea ID | Area (ac) | Flow Path L | Flow Path S | 85th Percer | Percent Im | Soil Type | Design Stor | Fire Factor |
|---|---|---|---|---|---|---|---|---|
| 1A, 2A, 3A, | 8.6 | 574 | 0.0214 | 1.62 | 0.95 | 6 | 85th percer | 0 |

Outputs: Nelson Avenue, City of Industry

| Area (ac) | Modeled (8 | Time of Co | Clear Peak | 24-Hr Clear | Burned Pea | Peak Intens | Undevelop | Developed |
|---|---|---|---|---|---|---|---|---|
| 1A, 2A, 3A, | 1.62 | 16 | 4.201886 | 0.991256 | 4.201886 | 0.559497 | 0.36538 | 0.873269 |

Hydrograph: Nelson Avenue, City of Industry - 1A, 2A, 3A, 4A, 1B, 2B & 1D

| Time (min) | Incrementa | Incrementa | Intensity (i | Undevelop | Developed | Clear Peak | Incrementa | Cumulative |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.2 | 7.36E-05 | 0.000119 | 0 | 0 | 0 | 0.003318 | 0.01991 | 0.01991 |
| 0.4 | 0.000147 | 0.000239 | 0 | 0 | 0 | 0.006637 | 0.059729 | 0.079638 |
| 0.6 | 0.000221 | 0.000358 | 0 | 0 | 0 | 0.009955 | 0.099548 | 0.179186 |
| 0.8 | 0.000294 | 0.000477 | 0 | 0 | 0 | 0.013273 | 0.139367 | 0.318554 |
| 1 | 0.000368 | 0.000596 | 0 | 0 | 0 | 0.016591 | 0.179186 | 0.49774 |
| 1.2 | 0.000442 | 0.000716 | 0 | 0 | 0 | 0.01991 | 0.219006 | 0.716746 |
| 1.4 | 0.000515 | 0.000835 | 0 | 0 | 0 | 0.023228 | 0.258825 | 0.975571 |
| 1.6 | 0.000589 | 0.000954 | 0 | 0 | 0 | 0.026546 | 0.298644 | 1.274215 |
| 1.8 | 0.000663 | 0.001074 | 0 | 0 | 0 | 0.029864 | 0.338463 | 1.612678 |
| 2 | 0.000736 | 0.001193 | 0 | 0 | 0 | 0.033183 | 0.378283 | 1.990961 |
| 2.2 | 0.00081 | 0.001312 | 0 | 0 | 0 | 0.036501 | 0.418102 | 2.409062 |
| 2.4 | 0.000884 | 0.001432 | 0 | 0 | 0 | 0.039819 | 0.457921 | 2.866983 |
| 2.6 | 0.000957 | 0.001551 | 0 | 0 | 0 | 0.043137 | 0.49774 | 3.364724 |
| 2.8 | 0.001031 | 0.00167 | 0 | 0 | 0 | 0.046456 | 0.537559 | 3.902283 |
| 3 | 0.001105 | 0.00179 | 0 | 0 | 0 | 0.049774 | 0.577379 | 4.479662 |
| 3.2 | 0.001179 | 0.001909 | 0 | 0 | 0 | 0.053092 | 0.617198 | 5.096859 |
| 3.4 | 0.001252 | 0.002029 | 0 | 0 | 0 | 0.056411 | 0.657017 | 5.753876 |
| 3.6 | 0.001326 | 0.002148 | 0 | 0 | 0 | 0.059729 | 0.696836 | 6.450713 |
| 3.8 | 0.0014 | 0.002268 | 0 | 0 | 0 | 0.063047 | 0.736655 | 7.187368 |
| 4 | 0.001473 | 0.002387 | 0 | 0 | 0 | 0.066365 | 0.776475 | 7.963843 |
| 4.2 | 0.001547 | 0.002506 | 0 | 0 | 0 | 0.069684 | 0.816294 | 8.780137 |
| 4.4 | 0.001621 | 0.002626 | 0 | 0 | 0 | 0.073002 | 0.856113 | 9.63625 |
| 4.6 | 0.001695 | 0.002745 | 0 | 0 | 0 | 0.07632 | 0.895932 | 10.53218 |
| 4.8 | 0.001768 | 0.002865 | 0 | 0 | 0 | 0.079638 | 0.935752 | 11.46793 |
| 5 | 0.001842 | 0.002984 | 0 | 0 | 0 | 0.082957 | 0.975571 | 12.4435 |
| 5.2 | 0.001916 | 0.003104 | 0 | 0 | 0 | 0.086275 | 1.01539 | 13.45889 |
| 5.4 | 0.00199 | 0.003223 | 0 | 0 | 0 | 0.089593 | 1.055209 | 14.5141 |
| 5.6 | 0.002063 | 0.003343 | 0 | 0 | 0 | 0.092911 | 1.095028 | 15.60913 |
| 5.8 | 0.002137 | 0.003462 | 0 | 0 | 0 | 0.09623 | 1.134848 | 16.74398 |
| 6 | 0.002211 | 0.003582 | 0 | 0 | 0 | 0.099548 | 1.174667 | 17.91865 |
| 6.2 | 0.002285 | 0.003701 | 0 | 0 | 0 | 0.102866 | 1.214486 | 19.13313 |
| 6.4 | 0.002359 | 0.003821 | 0 | 0 | 0 | 0.106185 | 1.254305 | 20.38744 |
| 6.6 | 0.002432 | 0.003941 | 0 | 0 | 0 | 0.109503 | 1.294124 | 21.68156 |
| 6.8 | 0.002506 | 0.00406 | 0 | 0 | 0 | 0.112821 | 1.333944 | 23.01551 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 7 | 0.00258 | 0.00418 | 0 | 0 | 0 | 0.116139 | 1.373763 | 24.38927 |
| 7.2 | 0.002654 | 0.004299 | 0 | 0 | 0 | 0.119458 | 1.413582 | 25.80285 |
| 7.4 | 0.002728 | 0.004419 | 0 | 0 | 0 | 0.122776 | 1.453401 | 27.25625 |
| 7.6 | 0.002802 | 0.004539 | 0 | 0 | 0 | 0.126094 | 1.493221 | 28.74947 |
| 7.8 | 0.002875 | 0.004658 | 0 | 0 | 0 | 0.129412 | 1.53304 | 30.28251 |
| 8 | 0.002949 | 0.004778 | 0 | 0 | 0 | 0.132731 | 1.572859 | 31.85537 |
| 8.2 | 0.003023 | 0.004897 | 0 | 0 | 0 | 0.136049 | 1.612678 | 33.46805 |
| 8.4 | 0.003097 | 0.005017 | 0 | 0 | 0 | 0.139367 | 1.652497 | 35.12055 |
| 8.6 | 0.003171 | 0.005137 | 0 | 0 | 0 | 0.142686 | 1.692317 | 36.81286 |
| 8.8 | 0.003245 | 0.005256 | 0 | 0 | 0 | 0.146004 | 1.732136 | 38.545 |
| 9 | 0.003319 | 0.005376 | 0 | 0 | 0 | 0.149322 | 1.771955 | 40.31695 |
| 9.2 | 0.003392 | 0.005496 | 0 | 0 | 0 | 0.15264 | 1.811774 | 42.12873 |
| 9.4 | 0.003466 | 0.005616 | 0 | 0 | 0 | 0.155959 | 1.851593 | 43.98032 |
| 9.6 | 0.00354 | 0.005735 | 0 | 0 | 0 | 0.159277 | 1.891413 | 45.87173 |
| 9.8 | 0.003614 | 0.005855 | 0 | 0 | 0 | 0.162595 | 1.931232 | 47.80297 |
| 10 | 0.003688 | 0.005975 | 0 | 0 | 0 | 0.165913 | 1.971051 | 49.77402 |
| 10.2 | 0.003762 | 0.006094 | 0 | 0 | 0 | 0.169232 | 2.01087 | 51.78489 |
| 10.4 | 0.003836 | 0.006214 | 0 | 0 | 0 | 0.17255 | 2.05069 | 53.83558 |
| 10.6 | 0.00391 | 0.006334 | 0 | 0 | 0 | 0.175868 | 2.090509 | 55.92609 |
| 10.8 | 0.003984 | 0.006454 | 0 | 0 | 0 | 0.179186 | 2.130328 | 58.05641 |
| 11 | 0.004058 | 0.006574 | 0 | 0 | 0 | 0.182505 | 2.170147 | 60.22656 |
| 11.2 | 0.004132 | 0.006693 | 0 | 0 | 0 | 0.185823 | 2.209966 | 62.43653 |
| 11.4 | 0.004206 | 0.006813 | 0 | 0 | 0 | 0.189141 | 2.249786 | 64.68631 |
| 11.6 | 0.00428 | 0.006933 | 0 | 0 | 0 | 0.19246 | 2.289605 | 66.97592 |
| 11.8 | 0.004354 | 0.007053 | 0 | 0 | 0 | 0.195778 | 2.329424 | 69.30534 |
| 12 | 0.004428 | 0.007173 | 0 | 0 | 0 | 0.199096 | 2.369243 | 71.67459 |
| 12.2 | 0.004502 | 0.007292 | 0 | 0 | 0 | 0.202414 | 2.409062 | 74.08365 |
| 12.4 | 0.004575 | 0.007412 | 0 | 0 | 0 | 0.205733 | 2.448882 | 76.53253 |
| 12.6 | 0.004649 | 0.007532 | 0 | 0 | 0 | 0.209051 | 2.488701 | 79.02123 |
| 12.8 | 0.004723 | 0.007652 | 0 | 0 | 0 | 0.212369 | 2.52852 | 81.54975 |
| 13 | 0.004797 | 0.007772 | 0 | 0 | 0 | 0.215687 | 2.568339 | 84.11809 |
| 13.2 | 0.004871 | 0.007892 | 0 | 0 | 0 | 0.219006 | 2.608159 | 86.72625 |
| 13.4 | 0.004946 | 0.008012 | 0 | 0 | 0 | 0.222324 | 2.647978 | 89.37423 |
| 13.6 | 0.00502 | 0.008132 | 0 | 0 | 0 | 0.225642 | 2.687797 | 92.06202 |
| 13.8 | 0.005094 | 0.008252 | 0 | 0 | 0 | 0.22896 | 2.727616 | 94.78964 |
| 14 | 0.005168 | 0.008371 | 0 | 0 | 0 | 0.232279 | 2.767435 | 97.55707 |
| 14.2 | 0.005242 | 0.008491 | 0 | 0 | 0 | 0.235597 | 2.807255 | 100.3643 |
| 14.4 | 0.005316 | 0.008611 | 0 | 0 | 0 | 0.238915 | 2.847074 | 103.2114 |
| 14.6 | 0.00539 | 0.008731 | 0 | 0 | 0 | 0.242234 | 2.886893 | 106.0983 |
| 14.8 | 0.005464 | 0.008851 | 0 | 0 | 0 | 0.245552 | 2.926712 | 109.025 |
| 15 | 0.005538 | 0.008971 | 0 | 0 | 0 | 0.24887 | 2.966531 | 111.9915 |
| 15.2 | 0.005612 | 0.009091 | 0 | 0 | 0 | 0.252188 | 3.006351 | 114.9979 |
| 15.4 | 0.005686 | 0.009211 | 0 | 0 | 0 | 0.255507 | 3.04617 | 118.0441 |
| 15.6 | 0.00576 | 0.009331 | 0 | 0 | 0 | 0.258825 | 3.085989 | 121.13 |
| 15.8 | 0.005834 | 0.009451 | 0 | 0 | 0 | 0.262143 | 3.125808 | 124.2559 |
| 16 | 0.005908 | 0.009571 | 0.035893 | 0.1 | 0.86 | 0.265461 | 3.165628 | 127.4215 |
| 16.2 | 0.005982 | 0.009691 | 0.035896 | 0.1 | 0.86 | 0.265483 | 3.185668 | 130.6072 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1445.2 | 1 | 1.62 | 0.024365 | 0.1 | 0.86 | 0.180203 | 2.182644 | 43120.88 |
| 1445.4 | 1 | 1.62 | 0.02391 | 0.1 | 0.86 | 0.176836 | 2.142236 | 43123.02 |
| 1445.6 | 1 | 1.62 | 0.023455 | 0.1 | 0.86 | 0.173471 | 2.101841 | 43125.12 |
| 1445.8 | 1 | 1.62 | 0.023 | 0.1 | 0.86 | 0.170106 | 2.061461 | 43127.18 |
| 1446 | 1 | 1.62 | 0.022545 | 0.1 | 0.86 | 0.166743 | 2.021093 | 43129.21 |
| 1446.2 | 1 | 1.62 | 0.02209 | 0.1 | 0.86 | 0.163381 | 1.98074 | 43131.19 |
| 1446.4 | 1 | 1.62 | 0.021636 | 0.1 | 0.86 | 0.160019 | 1.9404 | 43133.13 |
| 1446.6 | 1 | 1.62 | 0.021182 | 0.1 | 0.86 | 0.15666 | 1.900074 | 43135.03 |
| 1446.8 | 1 | 1.62 | 0.020728 | 0.1 | 0.86 | 0.153301 | 1.859761 | 43136.89 |
| 1447 | 1 | 1.62 | 0.020274 | 0.1 | 0.86 | 0.149943 | 1.819462 | 43138.71 |
| 1447.2 | 1 | 1.62 | 0.01982 | 0.1 | 0.86 | 0.146586 | 1.779177 | 43140.49 |
| 1447.4 | 1 | 1.62 | 0.019366 | 0.1 | 0.86 | 0.143231 | 1.738905 | 43142.22 |
| 1447.6 | 1 | 1.62 | 0.018912 | 0.1 | 0.86 | 0.139877 | 1.698646 | 43143.92 |
| 1447.8 | 1 | 1.62 | 0.018459 | 0.1 | 0.86 | 0.136524 | 1.658402 | 43145.58 |
| 1448 | 1 | 1.62 | 0.018006 | 0.1 | 0.86 | 0.133172 | 1.61817 | 43147.2 |
| 1448.2 | 1 | 1.62 | 0.017553 | 0.1 | 0.86 | 0.129821 | 1.577953 | 43148.78 |
| 1448.4 | 1 | 1.62 | 0.0171 | 0.1 | 0.86 | 0.126471 | 1.537748 | 43150.32 |
| 1448.6 | 1 | 1.62 | 0.016647 | 0.1 | 0.86 | 0.123122 | 1.497558 | 43151.81 |
| 1448.8 | 1 | 1.62 | 0.016195 | 0.1 | 0.86 | 0.119775 | 1.45738 | 43153.27 |
| 1449 | 1 | 1.62 | 0.015742 | 0.1 | 0.86 | 0.116428 | 1.417216 | 43154.69 |
| 1449.2 | 1 | 1.62 | 0.01529 | 0.1 | 0.86 | 0.113083 | 1.377066 | 43156.06 |
| 1449.4 | 1 | 1.62 | 0.014838 | 0.1 | 0.86 | 0.109739 | 1.336929 | 43157.4 |
| 1449.6 | 1 | 1.62 | 0.014386 | 0.1 | 0.86 | 0.106396 | 1.296805 | 43158.7 |
| 1449.8 | 1 | 1.62 | 0.013934 | 0.1 | 0.86 | 0.103054 | 1.256695 | 43159.95 |
| 1450 | 1 | 1.62 | 0.013482 | 0.1 | 0.86 | 0.099713 | 1.216598 | 43161.17 |
| 1450.2 | 1 | 1.62 | 0.01303 | 0.1 | 0.86 | 0.096373 | 1.176515 | 43162.35 |
| 1450.4 | 1 | 1.62 | 0.012579 | 0.1 | 0.86 | 0.093034 | 1.136445 | 43163.48 |
| 1450.6 | 1 | 1.62 | 0.012128 | 0.1 | 0.86 | 0.089697 | 1.096388 | 43164.58 |
| 1450.8 | 1 | 1.62 | 0.011677 | 0.1 | 0.86 | 0.086361 | 1.056344 | 43165.64 |
| 1451 | 1 | 1.62 | 0.011226 | 0.1 | 0.86 | 0.083025 | 1.016314 | 43166.65 |
| 1451.2 | 1 | 1.62 | 0.010775 | 0.1 | 0.86 | 0.079691 | 0.976297 | 43167.63 |
| 1451.4 | 1 | 1.62 | 0.010324 | 0.1 | 0.86 | 0.076358 | 0.936294 | 43168.57 |
| 1451.6 | 1 | 1.62 | 0.009874 | 0.1 | 0.86 | 0.073026 | 0.896304 | 43169.46 |
| 1451.8 | 1 | 1.62 | 0.009423 | 0.1 | 0.86 | 0.069695 | 0.856327 | 43170.32 |
| 1452 | 1 | 1.62 | 0.008973 | 0.1 | 0.86 | 0.066365 | 0.816363 | 43171.14 |
| 1452.2 | 1 | 1.62 | 0.008523 | 0.1 | 0.86 | 0.063037 | 0.776412 | 43171.91 |
| 1452.4 | 1 | 1.62 | 0.008073 | 0.1 | 0.86 | 0.059709 | 0.736475 | 43172.65 |
| 1452.6 | 1 | 1.62 | 0.007623 | 0.1 | 0.86 | 0.056383 | 0.696551 | 43173.34 |
| 1452.8 | 1 | 1.62 | 0.007174 | 0.1 | 0.86 | 0.053057 | 0.65664 | 43174 |
| 1453 | 1 | 1.62 | 0.006724 | 0.1 | 0.86 | 0.049733 | 0.616742 | 43174.62 |
| 1453.2 | 1 | 1.62 | 0.006275 | 0.1 | 0.86 | 0.04641 | 0.576858 | 43175.19 |
| 1453.4 | 1 | 1.62 | 0.005826 | 0.1 | 0.86 | 0.043088 | 0.536986 | 43175.73 |
| 1453.6 | 1 | 1.62 | 0.005377 | 0.1 | 0.86 | 0.039767 | 0.497128 | 43176.23 |
| 1453.8 | 1 | 1.62 | 0.004928 | 0.1 | 0.86 | 0.036447 | 0.457283 | 43176.69 |
| 1454 | 1 | 1.62 | 0.004479 | 0.1 | 0.86 | 0.033128 | 0.417451 | 43177.1 |
| 1454.2 | 1 | 1.62 | 0.004031 | 0.1 | 0.86 | 0.02981 | 0.377632 | 43177.48 |
| 1454.4 | 1 | 1.62 | 0.003582 | 0.1 | 0.86 | 0.026494 | 0.337826 | 43177.82 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1454.6 | 1 | 1.62 | 0.003134 | 0.1 | 0.86 | 0.023178 | 0.298033 | 43178.12 |
| 1454.8 | 1 | 1.62 | 0.002686 | 0.1 | 0.86 | 0.019864 | 0.258253 | 43178.38 |
| 1455 | 1 | 1.62 | 0.002238 | 0.1 | 0.86 | 0.016551 | 0.218486 | 43178.59 |
| 1455.2 | 1 | 1.62 | 0.00179 | 0.1 | 0.86 | 0.013238 | 0.178733 | 43178.77 |
| 1455.4 | 1 | 1.62 | 0.001342 | 0.1 | 0.86 | 0.009927 | 0.138992 | 43178.91 |
| 1455.6 | 1 | 1.62 | 0.000895 | 0.1 | 0.86 | 0.006617 | 0.099264 | 43179.01 |
| 1455.8 | 1 | 1.62 | 0.000447 | 0.1 | 0.86 | 0.003308 | 0.059549 | 43179.07 |
| 1456 | 1 | 1.62 | 0 | 0.1 | 0.86 | 0 | 0.019848 | 43179.09 |

**1456 min x 60 (sec/min) x 0.13 cfs = 11,357 cf biofiltered**

# WetlandMOD - 24" Media Thickness, Volume Based

| | |
|---|---|
| **Project ID:** | |
| **Project Name:** | TEI 4022 |
| **City, State, ZIP:** | City of Industry |
| **Date:** | 29-Jun |

| |
|---|
| Blue = User Input |
| Gray = Formula |
| Green = Proceed |
| Red = Redo |

| **WetlandMOD Size** | **WM-22-21-V** |
|---|---|

| | **User Input Data** | | |
|---|---|---|---|
| LA County 24"; Bay Area 18" | Media Thickness (in) | 24 | |
| Volume By EOR | Treatment Volume (CF) | 43179 | |
| Drain Down Time in hours | Drain Down Time (hrs) | 96 | |
| LA 5-12in/hr; Bay Area 5-12in/hr | Infiltration Rate (in/hr) | 12 | |
| Add Row(s) to change footprint | Number of Row(s) | 4 | For half row, use 0.5 |
| RIM/FG to Outlet pipe | WM Vault Depth (ft) | 5.0 | Single Max depth 7ft, Double Max depth 5ft |
| Includes 1" grout above pipe | Overflow/Return Pipe (in) | 6 | Includes 1" spacing above return pipe |
| | Overflow/Return below Top Slab (ft) | -1.42 | |
| If using pump upstream | Operating head (ft) | 3.58 | Standard operating head = RIM - 9.5" |

| | **Treatment Data** | |
|---|---|---|
| Treatment volume x 448.8 = | Treatment Flow (gpm) | 56.07 |
| in/hr / 100 = | Media Loading Rate (gpm/sf) | 0.12 |
| Treatment flow / Loading rate = | Requried Media Surface Area (sf) | 467.27 |

| | **Cage, HGL Height** | |
|---|---|---|
| Provding 3" Multch on top | Cage Height (ft) | 4.75 |
| Reduced by 4" from FS | HGL Height (ft) | 3.58 |
| Length of cage in each row | Cage Length/ Row (ft) | 17.0 |

| | **Final Checks** | |
|---|---|---|
| Based on HGL head build up | Provided Media Surface Area (sf) | 487.33 |
| Unit discharge rate | Discharge Rate (cfs) | 0.130 |
| Orifice Diameter in inches | Orifice Diameter per Row (in) | 0.81 |

Provided >= Required surface area, unit dimensions in good standing.

| | **Unit Dimensions** | | |
|---|---|---|---|
| Length of Media row + Baffle wall | Length Media chamber (ft) | 17.0 | |
| Pre-treatment + Filtration chm. | Total Length of Unit (ft) | 21.0 | 4"/6" baffle wall part of Pre-treatment chamber |
| Total width of unit | Width of Unit (ft) | 22.0 | |

| **Media, Gravel Volume** | |
|---|---|
| WM Media Volume (cy) | 47.85 |
| Gravel Layer Volume (cy) | 9.97 |

Feel free to fax or email proposed sizing calculations to BioClean, for assistance with sizing, compliance, and design.
Phone: 760.433.7640 |Fax: 760.433.3176
Email: Info@modularwetlands.com

BioClean
A QUIKRETE COMPANY

**Project:** **REV0 - Nelson Ave Industrial Buildings**

| | | |
|---|---|---|
| Chamber Model - | MC-7200 | |
| Units - | Imperial | |
| Number of Chambers - | 87 | |
| Number of End Caps - | 10 | |
| Voids in the stone (porosity) - | 40 | % |
| Base of Stone Elevation - | 294.50 | ft |
| Amount of Stone Above Chambers - | 12 | in |
| Amount of Stone Below Chambers - | 36 | in |

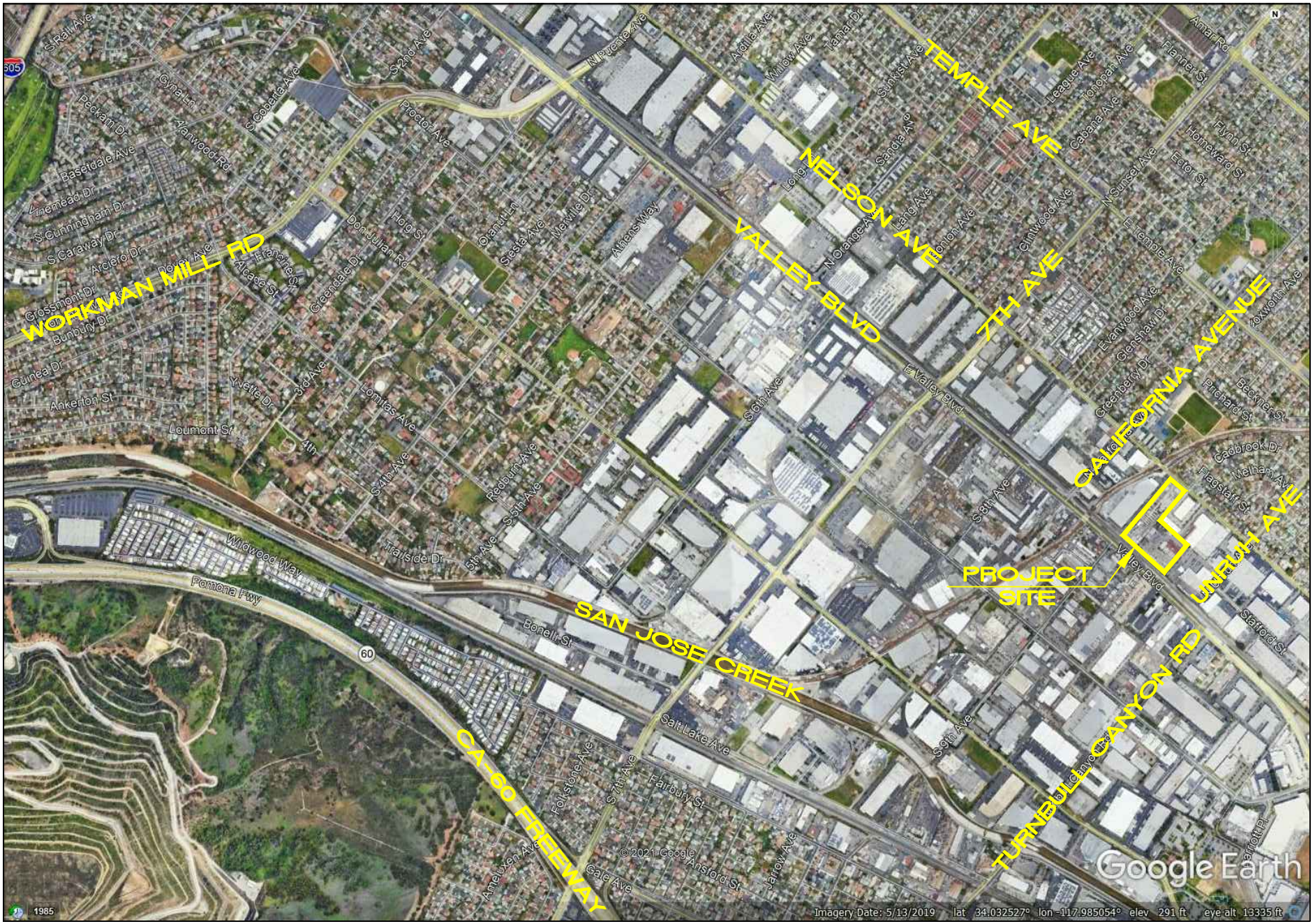
Area of system - 6303 sf Min. Area - 5548 sf min. area

## StormTech MC-7200 Cumulative Storage Volumes

| Height of System (inches) | Incremental Single Chamber (cubic feet) | Incremental Total Chamber (cubic feet) | Incremental Stone (cubic feet) | Incremental Ch & St (cubic feet) | Cumulative Chamber (cubic feet) | Elevation (feet) | Cumulative System (cubic feet) | Elevation (feet) |
|---|---|---|---|---|---|---|---|---|
| 108 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 32110.15 | 303.50 |
| 107 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 31900.05 | 303.42 |
| 106 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 31689.95 | 303.33 |
| 105 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 31479.85 | 303.25 |
| 104 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 31269.75 | 303.17 |
| 103 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 31059.65 | 303.08 |
| 102 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 30849.55 | 303.00 |
| 101 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 30639.45 | 302.92 |
| 100 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 30429.35 | 302.83 |
| 99 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 30219.25 | 302.75 |
| 98 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 30009.15 | 302.67 |
| 97 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 29799.05 | 302.58 |
| 96 | 0.06 | 0.01 | 5.17 | 0.13 | 207.98 | 213.28 | 29588.95 | 302.50 |
| 95 | 0.19 | 0.03 | 16.55 | 0.34 | 203.35 | 220.23 | 29375.67 | 302.42 |
| 94 | 0.28 | 0.05 | 23.94 | 0.52 | 200.32 | 224.77 | 29155.44 | 302.33 |
| 93 | 0.36 | 0.07 | 31.08 | 0.66 | 197.40 | 229.14 | 28930.67 | 302.25 |
| 92 | 0.46 | 0.08 | 39.88 | 0.83 | 193.82 | 234.53 | 28701.52 | 302.17 |
| 91 | 0.74 | 0.11 | 64.52 | 1.05 | 183.87 | 249.45 | 28466.99 | 302.08 |
| 90 | 1.10 | 0.13 | 95.38 | 1.32 | 171.42 | 268.13 | 28217.55 | 302.00 |
| 89 | 1.32 | 0.16 | 114.71 | 1.61 | 163.57 | 279.89 | 27949.42 | 301.92 |
| 88 | 1.50 | 0.19 | 130.35 | 1.89 | 157.21 | 289.44 | 27669.53 | 301.83 |
| 87 | 1.65 | 0.22 | 143.94 | 2.19 | 151.65 | 297.78 | 27380.09 | 301.75 |
| 86 | 1.79 | 0.25 | 156.08 | 2.47 | 146.68 | 305.23 | 27082.32 | 301.67 |
| 85 | 1.92 | 0.28 | 167.01 | 2.75 | 142.19 | 311.96 | 26777.09 | 301.58 |
| 84 | 2.04 | 0.30 | 177.26 | 3.02 | 137.99 | 318.27 | 26465.13 | 301.50 |
| 83 | 2.15 | 0.33 | 186.64 | 3.28 | 134.13 | 324.05 | 26146.87 | 301.42 |
| 82 | 2.25 | 0.35 | 195.55 | 3.55 | 130.46 | 329.56 | 25822.82 | 301.33 |
| 81 | 2.34 | 0.38 | 203.85 | 3.84 | 127.02 | 334.71 | 25493.26 | 301.25 |
| 80 | 2.43 | 0.41 | 211.71 | 4.09 | 123.78 | 339.58 | 25158.55 | 301.17 |
| 79 | 2.52 | 0.44 | 219.16 | 4.41 | 120.67 | 344.24 | 24818.96 | 301.08 |
| 78 | 2.60 | 0.47 | 226.25 | 4.69 | 117.73 | 348.66 | 24474.72 | 301.00 |
| 77 | 2.68 | 0.50 | 233.02 | 4.95 | 114.91 | 352.88 | 24126.06 | 300.92 |
| 76 | 2.75 | 0.52 | 239.47 | 5.21 | 112.23 | 356.91 | 23773.18 | 300.83 |
| 75 | 2.82 | 0.54 | 245.64 | 5.44 | 109.67 | 360.75 | 23416.27 | 300.75 |
| 74 | 2.89 | 0.57 | 251.55 | 5.67 | 107.21 | 364.43 | 23055.52 | 300.67 |
| 73 | 2.96 | 0.59 | 257.20 | 5.89 | 104.86 | 367.95 | 22691.09 | 300.58 |
| 72 | 3.02 | 0.61 | 262.63 | 6.10 | 102.61 | 371.34 | 22323.13 | 300.50 |
| 71 | 3.08 | 0.63 | 267.84 | 6.32 | 100.43 | 374.60 | 21951.79 | 300.42 |
| 70 | 3.14 | 0.64 | 272.86 | 6.43 | 98.39 | 377.67 | 21577.20 | 300.33 |
| 69 | 3.19 | 0.68 | 277.68 | 6.77 | 96.32 | 380.77 | 21199.52 | 300.25 |
| 68 | 3.25 | 0.70 | 282.32 | 7.00 | 94.37 | 383.69 | 20818.75 | 300.17 |
| 67 | 3.30 | 0.72 | 286.78 | 7.22 | 92.50 | 386.50 | 20435.06 | 300.08 |
| 66 | 3.35 | 0.74 | 291.07 | 7.44 | 90.70 | 389.20 | 20048.56 | 300.00 |
| 65 | 3.39 | 0.76 | 295.20 | 7.64 | 88.96 | 391.81 | 19659.35 | 299.92 |
| 64 | 3.44 | 0.79 | 299.18 | 7.86 | 87.29 | 394.32 | 19267.55 | 299.83 |
| 63 | 3.48 | 0.80 | 303.01 | 8.03 | 85.68 | 396.72 | 18873.23 | 299.75 |
| 62 | 3.53 | 0.82 | 306.71 | 8.20 | 84.14 | 399.04 | 18476.50 | 299.67 |
| 61 | 3.57 | 0.84 | 310.26 | 8.39 | 82.64 | 401.29 | 18077.46 | 299.58 |
| 60 | 3.61 | 0.85 | 313.69 | 8.51 | 81.22 | 403.42 | 17676.18 | 299.50 |
| 59 | 3.64 | 0.86 | 316.98 | 8.60 | 79.87 | 405.45 | 17272.76 | 299.42 |
| 58 | 3.68 | 0.89 | 320.16 | 8.89 | 78.48 | 407.53 | 16867.31 | 299.33 |
| 57 | 3.71 | 0.90 | 323.20 | 9.04 | 77.20 | 409.45 | 16459.78 | 299.25 |
| 56 | 3.75 | 0.92 | 326.14 | 9.17 | 75.98 | 411.29 | 16050.33 | 299.17 |
| 55 | 3.78 | 0.92 | 328.95 | 9.20 | 74.84 | 412.99 | 15639.05 | 299.08 |
| 54 | 3.81 | 0.94 | 331.65 | 9.43 | 73.67 | 414.75 | 15226.06 | 299.00 |
| 53 | 3.84 | 0.96 | 334.23 | 9.56 | 72.58 | 416.37 | 14811.31 | 298.92 |
| 52 | 3.87 | 0.97 | 336.70 | 9.69 | 71.54 | 417.93 | 14394.94 | 298.83 |
| 51 | 3.90 | 0.98 | 339.07 | 9.81 | 70.54 | 419.43 | 13977.00 | 298.75 |
| 50 | 3.92 | 0.97 | 341.34 | 9.71 | 69.68 | 420.73 | 13557.57 | 298.67 |
| 49 | 3.95 | 1.00 | 343.50 | 10.03 | 68.69 | 422.22 | 13136.84 | 298.58 |
| 48 | 3.97 | 1.01 | 345.56 | 10.11 | 67.83 | 423.50 | 12714.62 | 298.50 |
| 47 | 3.99 | 1.02 | 347.52 | 10.20 | 67.01 | 424.74 | 12291.12 | 298.42 |
| 46 | 4.02 | 1.03 | 349.39 | 10.30 | 66.22 | 425.91 | 11866.38 | 298.33 |
| 45 | 4.04 | 1.04 | 351.15 | 10.39 | 65.49 | 427.02 | 11440.47 | 298.25 |
| 44 | 4.06 | 1.05 | 352.82 | 10.46 | 64.79 | 428.07 | 11013.44 | 298.17 |
| 43 | 4.07 | 1.05 | 354.40 | 10.54 | 64.12 | 429.06 | 10585.37 | 298.08 |
| 42 | 4.09 | 1.05 | 355.87 | 10.50 | 63.55 | 429.93 | 10156.31 | 298.00 |
| 41 | 4.11 | 1.06 | 357.28 | 10.57 | 62.96 | 430.81 | 9726.38 | 297.92 |
| 40 | 4.12 | 1.08 | 358.62 | 10.75 | 62.35 | 431.73 | 9295.57 | 297.83 |
| 39 | 4.14 | 1.08 | 359.88 | 10.83 | 61.82 | 432.52 | 8863.85 | 297.75 |
| 38 | 4.15 | 1.09 | 361.05 | 10.88 | 61.33 | 433.26 | 8431.32 | 297.67 |
| 37 | 4.17 | 1.11 | 362.88 | 11.06 | 60.52 | 434.47 | 7998.07 | 297.58 |
| 36 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 7563.60 | 297.50 |
| 35 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 7353.50 | 297.42 |
| 34 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 7143.40 | 297.33 |
| 33 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 6933.30 | 297.25 |
| 32 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 6723.20 | 297.17 |
| 31 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 6513.10 | 297.08 |
| 30 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 6303.00 | 297.00 |
| 29 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 6092.90 | 296.92 |
| 28 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 5882.80 | 296.83 |
| 27 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 5672.70 | 296.75 |
| 26 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 5462.60 | 296.67 |
| 25 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 5252.50 | 296.58 |
| 24 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 5042.40 | 296.50 |
| 23 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 4832.30 | 296.42 |
| 22 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 4622.20 | 296.33 |
| 21 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 4412.10 | 296.25 |
| 20 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 4202.00 | 296.17 |
| 19 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 3991.90 | 296.08 |
| 18 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 3781.80 | 296.00 |
| 17 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 3571.70 | 295.92 |
| 16 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 3361.60 | 295.83 |
| 15 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 3151.50 | 295.75 |
| 14 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 2941.40 | 295.67 |
| 13 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 2731.30 | 295.58 |
| 12 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 2521.20 | 295.50 |
| 11 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 2311.10 | 295.42 |
| 10 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 2101.00 | 295.33 |
| 9 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 1890.90 | 295.25 |
| 8 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 1680.80 | 295.17 |
| 7 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 1470.70 | 295.08 |
| 6 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 1260.60 | 295.00 |
| 5 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 1050.50 | 294.92 |
| 4 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 840.40 | 294.83 |
| 3 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 630.30 | 294.75 |
| 2 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 420.20 | 294.67 |
| 1 | 0.00 | 0.00 | 0.00 | 0.00 | 210.10 | 210.10 | 210.10 | 294.58 |

# APPENDIX B

# LID Site Plan



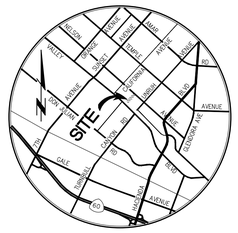

Last Update: 2/22/22
O:\4000-4099\4022\4022VicMap.dwg

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

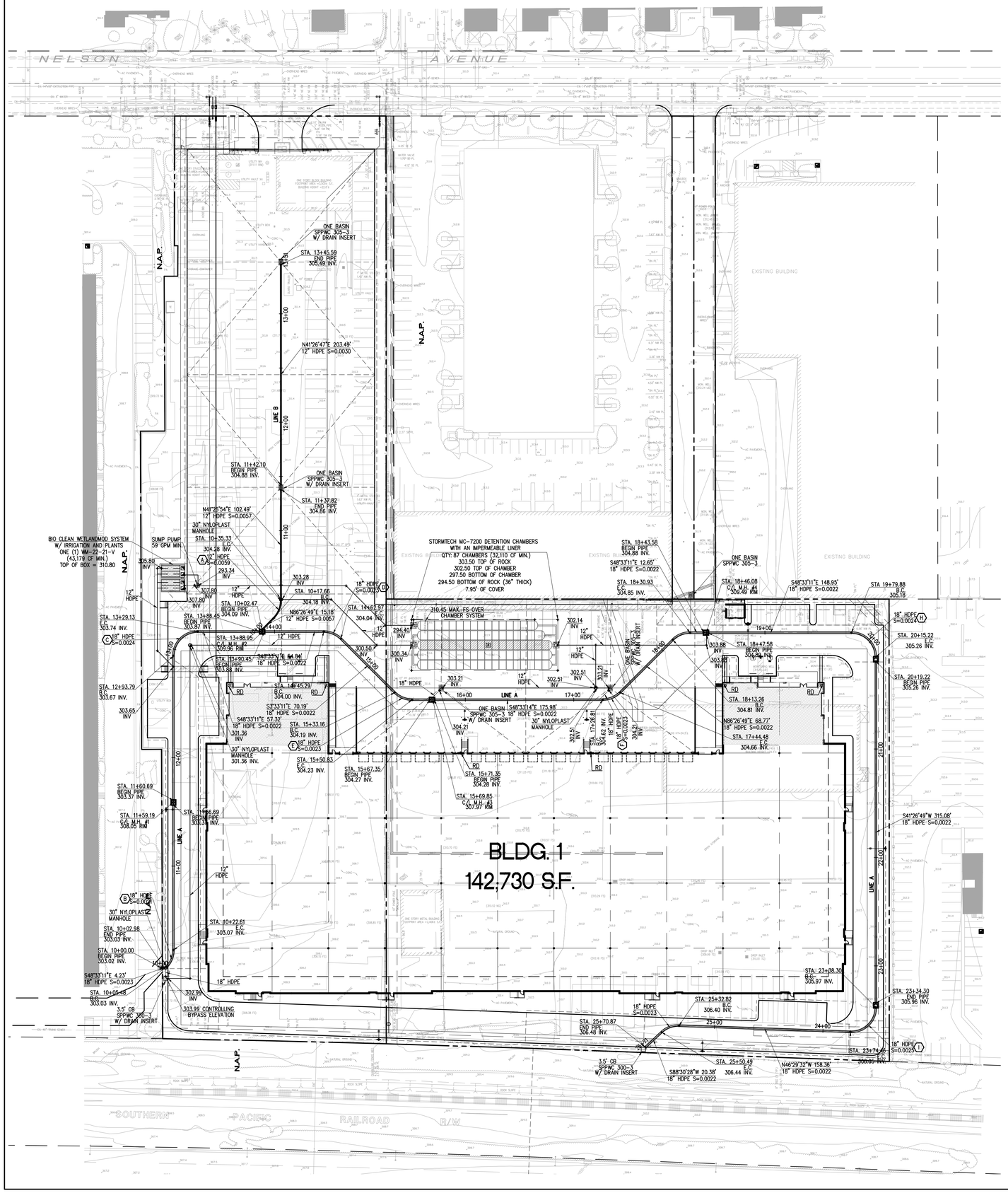
# VICINITY MAP

FOR

## NEC CALIFORNIA AVENUE AND VALLEY BOULEVARD




VICINITY MAP
N.T.S.




0 20 40 80 120
SCALE: 1"=40'

Last Update: 3/3/22
D:\4000-4099\4022\4022CGP-03-SD.dwg

# CITY OF INDUSTRY
PUBLIC WORKS DEPARTMENT

## STORM DRAIN PLAN
## NELSON AVE. INDUSTRIAL BUILDINGS
## 15010 AND 15100 NELSON AVENUE

**PREPARED FOR:**
OVERTON MOORE PROPERTIES
19300 HAMILTON AVENUE
GARDENA CA, 90248
PHONE: (310) 323-9100
FAX: (310) 608-7997

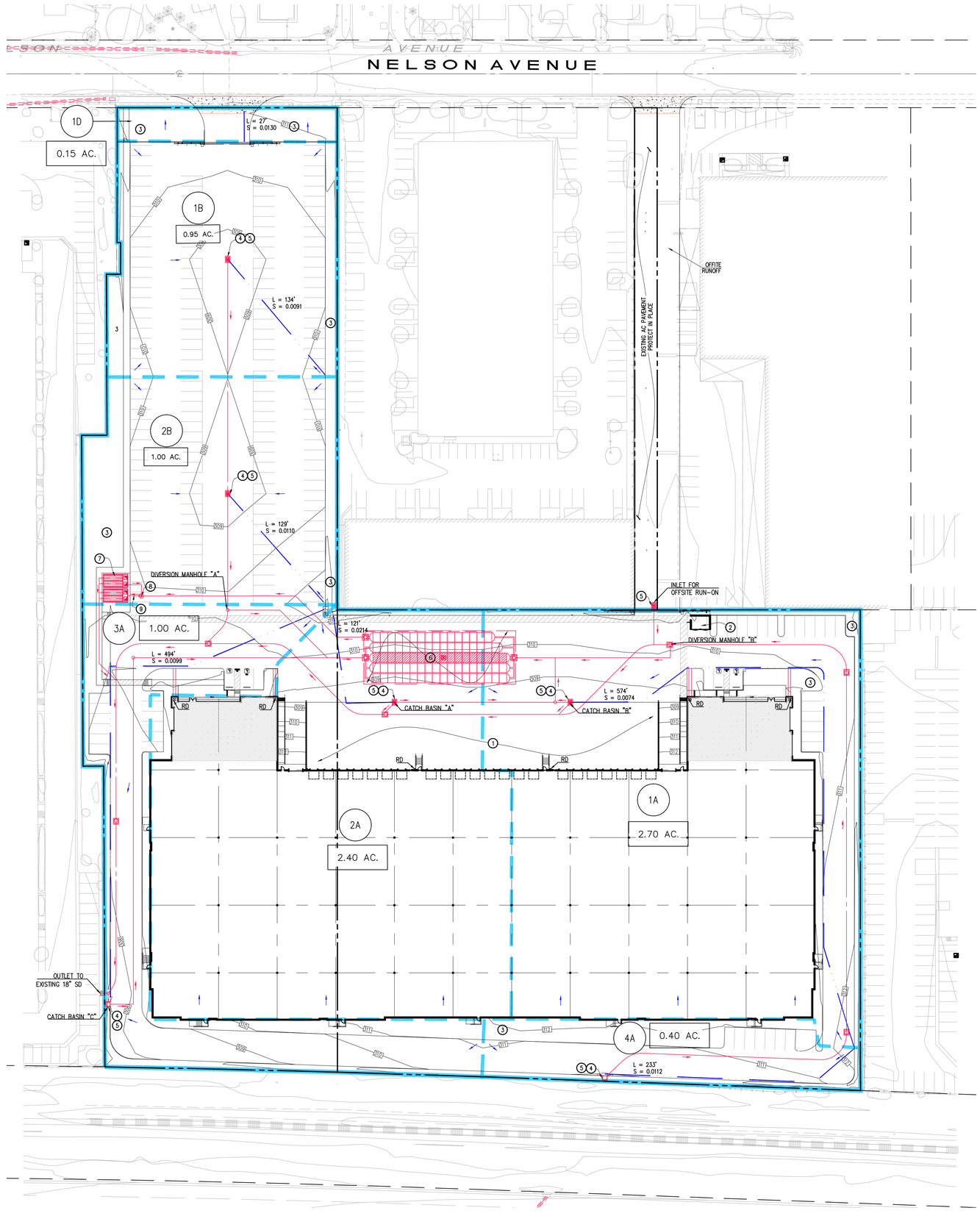
Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH:(714)521-4811 FAX:(714)521-4173

Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

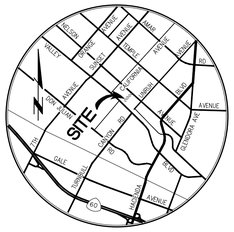
Approved by _____ Date _____
Public Works Director _____ R.C.E. XXXXX

Sheet 3 of 4 Sheets

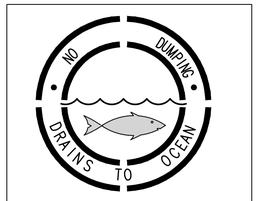
4022/3 OF 4 SHEET




| 85TH PERCENTILE STORM - SUBAREA DATA SUMMARY | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SUBAREA | AREA (ACRES) | LENGTH (FEET) | SLOPE | DEPTH | IMPERVIOUSNESS | SOIL TYPE | TC (MINUTES) | 1.5X SWQDv (CF) | VOLUME PROVIDED (CF) |
| 1A, 2A, 3A, 4A, 1B, 2B, & 1D | 8.60 | 574 | 0.0214 | 1.62 | 95% | 006 | 16.0 | 43,179 | 43,374 |




VICINITY MAP
N.T.S.



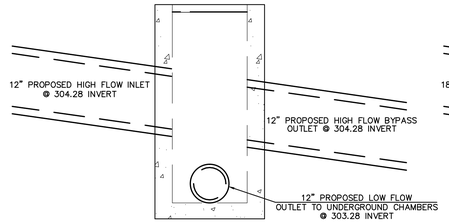

SAMPLE STENCIL TO BE USED NEAR GRATE AND CURB OPENING INLETS

SAMPLE CATCH BASIN STENCIL

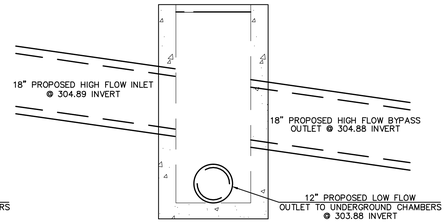
## LEGEND

1. ABOVEGROUND LOADING DOCK
2. TRASH ENCLOSURE
3. LANDSCAPE/EFFICIENT IRRIGATION
4. DRAIN INSERT(S)
5. STORM DRAIN SYSTEM SIGNS "NO DUMPING-DRAINS TO OCEAN"
6. STORMTECH MC-7200 DETENTION CHAMBERS W/ IMPERMEABLE LINER
7. PROPRIETARY BIOFILTRATION UNIT
8. SUMP PUMP
9. FORCE MAIN

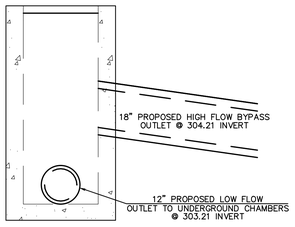
NOTES:
RD ROOF DRAIN
BOUNDARY
DRAINAGE AREAS
SURFACE FLOW LINE
SD FLOW LINE



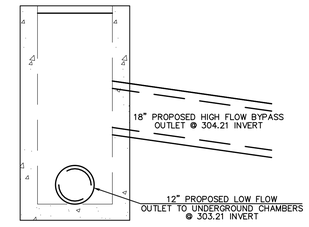

DIVERSION MANHOLE "A"
N.T.S.



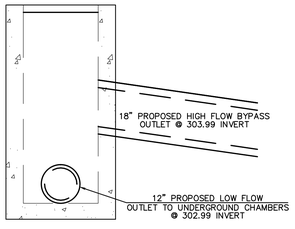

DIVERSION MANHOLE "B"
N.T.S.



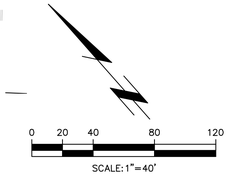

DIVERSION CATCH BASIN "A"
N.T.S.




DIVERSION CATCH BASIN "B"
N.T.S.




DIVERSION CATCH BASIN "C"
N.T.S.




SCALE: 1"=40'

Last Update: 7/26/22
G:\4000-4099\4022\4022BMPSITEMAP.dwg

**CITY OF INDUSTRY**
PUBLIC WORKS DEPARTMENT

**LID SITE MAP**

**NELSON AVENUE INDUSTRIAL BUILDING**

4022/1 OF 3 SHEET

**PREPARED FOR:**
OVERTON MOORE PROPERTIES
19700 S. VERMONT AVENUE, SUITE 101
TORRANCE, CA 90502
PHONE: (310) 323-9100

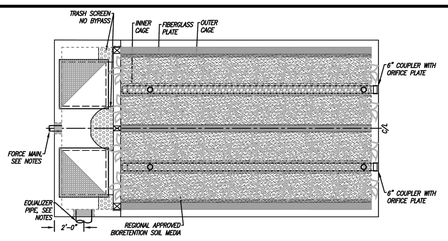
**PREPARED BY:**
Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

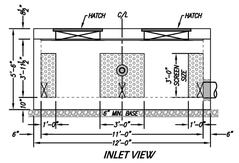
Approved by _____ Date _____
Public Works Director _____ R.C.E. _____

Sheet 1 of 3 Sheets

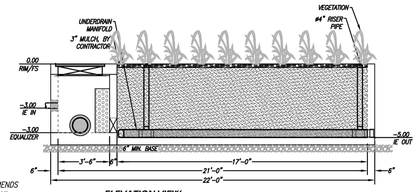
| SITE SPECIFIC DATA | | | |
|---|---|---|---|
| PROJECT ID | | / 717483 | |
| PROJECT NAME | | NELSON AVE INDUSTRIAL BUILD (TEI 4022) | |
| PROJECT LOCATION | | CITY OF INDUSTRIAL, CA | |
| STRUCTURE ID | | WM UNIT – 1 | |
| TREATMENT REQUIRED | | | |
| VOLUME BASED (CF) | | FLOW BASED (CFS) | |
| 43179 | | --- | |
| TREATMENT HGL AVAILABLE (FT) | | | --- |
| PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE | | | OFFLINE |
| PIPE DATA | I.E. | MATERIAL | DIAMETER |
| FORCE MAIN | –3.00 | N/K | 2" |
| EQUALIZER PIPE | –0.33 | N/K | 12" |
| OUTLET PIPE | –5.00 | PVC–SDR35 | 6" |
| | PRETREATMENT | BIOFILTRATION | N/A |
| RIM ELEVATION | 0.00 | 0.00 | N/A |
| SURFACE LOAD | PEDESTRIAN | OPEN PLANTER | N/A |
| FRAME & COVER | (2) 36"X36" | N/A | N/A |
| LA COUNTY MEDIA MIX VOLUME (CY) | | | 17.00 |
| GRAVEL LAYER WITHIN MEDIA CHAMBER (CY) | | | 21.00 |
| ORIFICE DIAMETER (IN) | | | Ø0.81" |
| NOTES: PRELIMINARY, NOT FOR CONSTRUCTION. | | | |



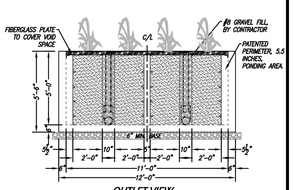

PLAN VIEW




INLET VIEW

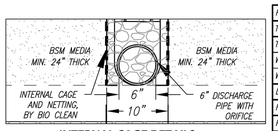



ELEVATION VIEW




OUTLET VIEW

| SOIL DATA | | | |
|---|---|---|---|
| pH | RESISTIVITY (OHM–CM) | CHLORIDE (MG/KG) | SULFATE (%) |
| 7.4 | 1400 | 8.1 | 0.010 |
| 8.3 | 560 | 122.0 | 0.074 |




INTERNAL CAGE DETAILS

| | |
|---|---|
| REQUIRED HORIZ. MEDIA THICKNESS (INCHES) | 24 |
| TREATMENT VOLUME (CF) | 43179 |
| TARGETED DRAINDOWN DURATION (HR) | 96 |
| WETLANDMEDIA INFILTRATION RATE (IN/HR) | 12 |
| OR | |
| WETLANDMEDIA LOADING RATE (GPM/SF) | 0.12 |
| DISCHARGE RATE (CFS) | 0.125 |
| REQUIRED TOTAL MEDIA SURFACE AREA (SF) | 467.27 |
| PROVIDED TOTAL MEDIA SURFACE AREA (SF) | 243.50 |
| NUMBER OF ROW(S) | 2 |

## INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON–SHRINK GROUT PER MANUFACTURER'S STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

## GENERAL NOTES

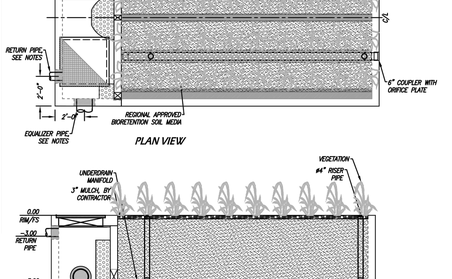
1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.



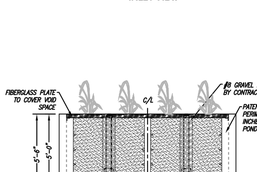
Bio Clean
A Forterra Company

# WetlandMOD-11'-21'-5'-0"-V
## STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

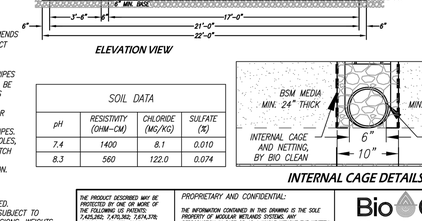

| SITE SPECIFIC DATA | | | |
|---|---|---|---|
| PROJECT ID | | / 717483 | |
| PROJECT NAME | | NELSON AVE INDUSTRIAL BUILD (TEI 4022) | |
| PROJECT LOCATION | | CITY OF INDUSTRIAL, CA | |
| STRUCTURE ID | | WM UNIT – 2 | |
| TREATMENT REQUIRED | | | |
| VOLUME BASED (CF) | | FLOW BASED (CFS) | |
| 43179 | | --- | |
| TREATMENT HGL AVAILABLE (FT) | | | --- |
| PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE | | | OFFLINE |
| PIPE DATA | I.E. | MATERIAL | DIAMETER |
| RETURN PIPE | –1.42 | N/K | 6" |
| EQUALIZER PIPE | –0.33 | N/K | 12" |
| OUTLET PIPE | –5.00 | PVC–SDR35 | 6" |
| | PRETREATMENT | BIOFILTRATION | N/A |
| RIM ELEVATION | 0.00 | 0.00 | N/A |
| SURFACE LOAD | PEDESTRIAN | OPEN PLANTER | N/A |
| FRAME & COVER | (2) 36"X36" | N/A | N/A |
| LA COUNTY MEDIA MIX VOLUME (CY) | | | 17.00 |
| GRAVEL LAYER WITHIN MEDIA CHAMBER (CY) | | | 21.00 |
| ORIFICE DIAMETER (IN) | | | Ø0.81" |
| NOTES: PRELIMINARY, NOT FOR CONSTRUCTION. | | | |

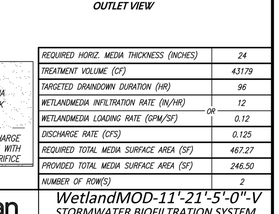

PLAN VIEW




INLET VIEW




ELEVATION VIEW




OUTLET VIEW


| SOIL DATA | | | |
|---|---|---|---|
| pH | RESISTIVITY (OHM–CM) | CHLORIDE (MG/KG) | SULFATE (%) |
| 7.4 | 1400 | 8.1 | 0.010 |
| 8.3 | 560 | 122.0 | 0.074 |





INTERNAL CAGE DETAILS


| | |
|---|---|
| REQUIRED HORIZ. MEDIA THICKNESS (INCHES) | 24 |
| TREATMENT VOLUME (CF) | 43179 |
| TARGETED DRAINDOWN DURATION (HR) | 96 |
| WETLANDMEDIA INFILTRATION RATE (IN/HR) | 12 |
| OR | |
| WETLANDMEDIA LOADING RATE (GPM/SF) | 0.12 |
| DISCHARGE RATE (CFS) | 0.125 |
| REQUIRED TOTAL MEDIA SURFACE AREA (SF) | 467.27 |
| PROVIDED TOTAL MEDIA SURFACE AREA (SF) | 246.50 |
| NUMBER OF ROW(S) | 2 |


## INSTALLATION NOTES


1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON–SHRINK GROUT PER MANUFACTURER'S STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.


## GENERAL NOTES


1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.





Bio Clean
A Forterra Company

WetlandMOD-11'-21'-5'-0"-V
STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL


# BIO CLEAN FULL CAPTURE FILTER WITH TROUGH SYSTEM

## FOR USE IN CURB INLETS

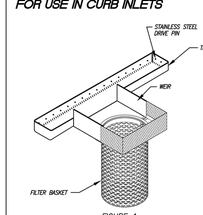



FIGURE 1: DETAIL OF PARTS

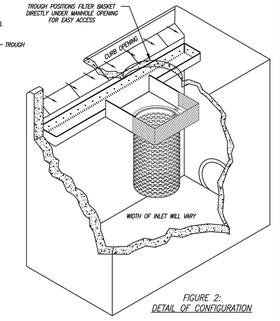



FIGURE 2: DETAIL OF CONFIGURATION

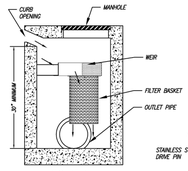



FIGURE 4: DETAIL OF PROFILE

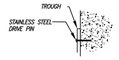



FIGURE 3: DETAIL OF MOUNTING

| MODEL NUMBER | TREATMENT FLOW (cfs)* | SOLIDS STORAGE CAPACITY (cy ft) |
|---|---|---|
| BIO–CURB–FULL–24 | 2.85 | 1.40 |
| BIO–CURB–FULL–18 | 2.85 | 1.05 |
| BIO–CURB–FULL–12 | 2.85 | 0.70 |
| DRAWING: BIO CLEAN CURB INLET FILTER DETAILS | | MEETS FULL CAPTURE REQUIREMENTS |
| TREATMENT FLOW RATE: 2.85 cfs | | MODEL #: BIO–CURB–FULL |
| WARRANTY: 5 YEAR MANUFACTURERS | | PROJECT: |
| BIO CLEAN ENVIRONMENTAL SERVICES, INC. 398 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760–433–7640 FAX: 760–433–3176 | | REVISIONS: DATE: |
| DATE: 10/12/2017 | SCALE: NTS | REVISIONS: DATE: |
| DRAFTER: M.C.F. | UNITS = INCHES | REVISIONS: DATE: |

*SEE PAGE 2 FOR EXPLANATION OF FLOW RATES

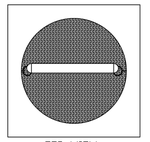
NOTES:
1. TROUGH SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO FILTER.
2. TROUGH SYSTEM MANUFACTURED FROM MARINE GRADE FIBERGLASS, GEL COATED FOR UV PROTECTION.
3. SYSTEM ATTACHED TO THE CATCH BASIN WITH NON–CORROSIVE HARDWARE.
4. FILTER MANUFACTURED OF 1008 STAINLESS STEEL.
5. FILTER MADE OF NON–CLOGGIN SCREEN WITH 4.7 MM OPENINGS AND MEETS FULL CAPTURE REQUIREMENTS.
6. FILTER CAN BE FITTED WITH HYDROCARBON ABSORBENT BOOM
7. FILTER IS LOCATED DIRECTLY UNDER THE MANHOLE FOR EASY REMOVAL AND MAINTENANCE.
8. LENGTH OF TROUGH CAN VARY FROM 2' TO 30'.
9. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE – CONTACT BIO CLEAN FOR MORE INFORMATION.
10. CONSIDERS A SAFETY FACTOR OF 2.0
11. BYPASS IS FACILITATED VIA OVERFLOW OF THE TROUGH SYSTEM AND IS EQUAL TO THE CAPACITY OF THE CURB OPENING
12. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
13. ADDITIONAL TREATMENT AND STORAGE CAPACITY CAN BE ACHIEVED BY UTILIZING MULTIPLE FILTER BASKETS.

Bio Clean
A Forterra Company

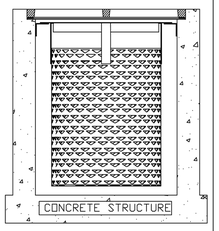
PAGE 1

# BIO CLEAN FULL CAPTURE FILTER

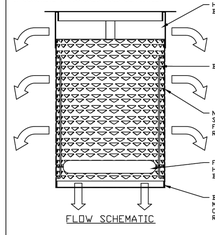
## FOR USE IN GRATE INLETS



TOP VIEW




NOTES:
1. ALL HARDWARE, FLANGE, FRAME, SCREENS SHALL BE STAINLESS STEEL
2. HYDROCARBON BOOM SHALL BE 7" DIAMETER AND CONNECTED, ORTHOGONALLY TO THE FILTER FRAME WITH RAILS ALLOWING IT TO FLOAT ON THE WATER SURFACE REGARDLESS OF HEIGHT.
3. SEE PERFORMANCE REPORTS IN MANUFACTURES SPECIFICATIONS.
4. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE – CONTACT BIO CLEAN FOR MORE INFORMATION.
5. BASED ON 37% OPEN AREA.
6. CONSIDERS A SAFETY FACTOR OF 2.0.
7. CONSIDERS A LOCAL DEPRESSION PONDING DEPTH OF 6 INCHES.
8. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
9. CONCRETE STRUCTURES SOLD SEPARATELY.




FLOW SCHEMATIC

| MODEL # | TREATMENT FLOW (CFS) | BYPASS FLOW (CFS) | SOLIDS STORAGE CAPACITY (CF) |
|---|---|---|---|
| BIO–GRATE–FULL 12–12–12 | 1.55 | 1.55 | 0.27 |
| BIO–GRATE–FULL 18–18–18 | 4.32 | 3.68 | 1.05 |
| BIO–GRATE–FULL 24–24–24 | 7.67 | 4.93 | 2.41 |
| BIO–GRATE–FULL 30–30–24 | 12.97 | 6.21 | 3.98 |
| BIO–GRATE–FULL 25–38–24 | 13.53 | 6.59 | 4.16 |
| BIO–GRATE–FULL 36–36–24 | 19.64 | 7.60 | 5.94 |
| BIO–GRATE–FULL 48–48–18 | 25.59 | 10.13 | 7.92 |

| DRAWING: BIO CLEAN GRATE INLET FILTER DETAILS | | MEETS FULL CAPTURE REQUIREMENTS |
|---|---|---|
| TYPICAL MODEL DETAIL | | |
| WARRANTY: 5 YEAR MANUFACTURERS | | PROJECT: |
| BIO CLEAN ENVIRONMENTAL SERVICES, INC. 398 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760–433–7640 FAX: 760–433–3176 | | REVISIONS: DATE: |
| DATE: 10/12/17 | SCALE: 3" = 1" | REVISIONS: DATE: |
| DRAFTER: M.C.F. | UNITS = INCHES | REVISIONS: DATE: |

Bio Clean
A Forterra Company

PAGE 1

# StormTech MC-7200 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

**Nominal Chamber Specifications**
(not to scale)

**Size (L x W x H)**
83" x 100" x 60"
2108 mm x 2540 mm x 1524 mm

**Chamber Storage**
175.9 ft³ (4.98 m³)

**Min. Installed Storage***
267.3 ft³ (7.57 m³)

**Weight**
202 lbs (91.6 kg)

**Shipping**
7 chambers/pallet
5 end caps/pallet
6 pallets/truck

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 9" (230 mm) of stone between chambers/ end caps and 40% stone porosity.

**Nominal End Cap Specifications**
(not to scale)

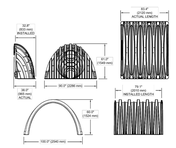
**Size (L x W x H)**
38" x 90" x 61"
965 mm x 2286 mm x 1549 mm

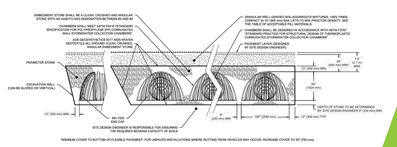
**End Cap Storage**
39.5 ft³ (1.12 m³)

**Min. Installed Storage***
115.3 ft³ (3.26 m³)

**Weight**
Nominal 90.0 lbs (40.8 kg)

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 12" (300 mm) of stone perimeter, 9" (230 mm) of stone between chambers/ end caps and 40% stone porosity.




ADS StormTech

**Working on a project?**
**Visit us at www.stormtech.com and utilize the Design Tool**

**StormTech MC-7200 Specifications**

**Storage Volume Per Chamber**

| | Bare Chamber Storage ft³ (m³) | Chamber and Stone Foundation Depth in. (mm) | | | |
|---|---|---|---|---|---|
| | | 9 in (230 mm) | 12 in (300 mm) | 15 in (375 mm) | 18 in (450 mm) |
| Chamber | 175.9 (4.98) | 267.3 (7.57) | 273.3 (7.74) | 279.3 (7.91) | 285.3 (8.08) |
| End Cap | 39.5 (1.12) | 115.3 (3.26) | 118.6 (3.36) | 121.9 (3.45) | 125.2 (3.54) |

**Note:** Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter in front of end cap.

**Amount of Stone Per Chamber**

| English Tons (yds³) | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9 in | 12 in | 15 in | 18 in |
| Chamber | 12.1 (8.5) | 12.9 (9.0) | 13.6 (9.6) | 14.3 (10.1) |
| End Cap | 9.8 (7.0) | 10.2 (7.3) | 10.6 (7.6) | 11.1 (7.9) |
| **Metric Kilograms (m³)** | **230 mm** | **300 mm** | **375 mm** | **450 mm** |
| Chamber | 10977 (6.5) | 11703 (6.9) | 12338 (7.3) | 12973 (7.7) |
| End Cap | 8890 (5.3) | 9253 (5.5) | 9616 (5.8) | 10069 (6.0) |

**Note:** Assumes 12" (300 mm) of stone above and 9" (230 mm) row spacing and 12" (300 mm) of perimeter stone in front of end caps. 1 yd³ = 1.42 english tons.

**Volume Excavation Per Chamber yd³ (m³)**

| | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9 in (230 mm) | 12 in (300 mm) | 15 in (375mm) | 18 in (450 mm) |
| Chamber | 17.2 (13.2) | 17.7 (13.5) | 18.3 (14.0) | 18.8 (14.4) |
| End Cap | 9.7 (7.4) | 10.0 (7.6) | 10.3 (7.9) | 10.6 (8.1) |

**Note:** Assumes 9" (230 mm) of separation between chamber rows, 12" (300 mm) of perimeter in front of the end caps, and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.



adspipe.com
800-821-6710

Last Update: 7/14/22
D:\4000–4099\4022\4022BMPSITEMAP.dwg

CITY OF INDUSTRY
PUBLIC WORKS DEPARTMENT

LID SITE MAP

NELSON AVENUE INDUSTRIAL BUILDING

PREPARED FOR:
OVERTON MOORE PROPERTIES
19700 S. VERMONT AVENUE, SUITE 101
TORRANCE, CA 90502
PHONE: (310) 323–9100

PREPARED BY:
Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH:(714)521–4811 FAX(714)521–4173

Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____
Public Works Director _____ R.C.E. _____

Sheet 2 of 3 Sheets

4022/2 OF 3 SHEET

## AGUA MANSA COMMERCE PARK BUILDING #1- EAST
## PACKAGED STORM WATER LIFT STATION

Lift Station model **#PSI-THI92121-EAST** as manufactured by Pacific Southwest Industries (national phone # 800-358-9095)

The pre-packaged Lift Station, in its entirety, is to be non-corrosive and shall incorporate a quick removal system manufactured by the pump manufacturer. The pump(s) shall be guided to the discharge base elbow by stainless steel guide rails. The rails shall extend from the discharge base elbow to the upper guide bracket mounted on fiberglass channel just below the basin cover. Stainless steel lifting chain or cable shall be supplied and properly installed to remove the pump from the wet well. The internal discharge piping shall be completely pre-plumbed in PVC pipe and extend 12" beyond the wet well side wall for contractor connection to the force main piping. The pump(s) discharge pipe shall have a check and ball valve installed on each discharge line. The Lift Station shall include three liquid level controls on a removable float tree and a control panel suitable for surface mounting. The pump(s), quick removal system and the level sensors shall be housed in a fiberglass wet well (basin) and shall be of sufficient length to maintain the rim of the wet well at grade.

**PUMP(S):**
Furnish and install Tsurumi, VANC'S Model 50PU2.4 submersible pump(s). Each unit shall be capable of delivering 58 GPM at 14.38 Feet TDH. The pump(s) shall be designed to pump waste water, sewage or effluent containing 1.38 inch (34mm) diameter solids without damage during operation. The pump(s) shall be designed so that the shaft power required (BHP)/ (kW) shall not exceed the motor rated output throughout the entire operating range of the pump performance curve. A two year warranty "out of the box" shall be standard.

**MATERIALS OF CONSTRUCTION:**
Construction of major parts of the pumping unit(s) including pump casing, impeller, motor head cover and intermediate brackets shall be manufactured from recyclable, application appropriate resins. The need for a protective coating shall not be required. All exposed fasteners shall be stainless steel and shall have stainless steel mating anchors integrally cast into the mating part. All units shall be furnished with a NPT discharge companion flange. Impellers shall be of the multi-vane, semi-vortex, solids handling design and shall be slip fit to the shaft. The motor shaft shall be machined to provide a positive drive of the impeller. The pump casing shall incorporate an air relief valve.

**MECHANICAL SEAL:**
All units shall be furnished with a dual inside mechanical shaft seal located completely out of the pumpage, running in a separate oil filled chamber. Units shall be fitted with a device that shall provide positive lubrication of top mechanical seal, (down to one third of the standard oil level). The device shall not consume any additional electrical power. Units shall have silicon carbide mechanical seal faces. Mechanical seal hardware shall be stainless steel.

**MOTOR:**
The pump motor(s) shall be 1/2 HP, .4 KW, 460 V, 60 Hz,3 Phase and shall be NEMA MG-1, Design Type B equivalent. Motor(s) shall be rated at .95 full load amps. Motor(s) shall have a 1.15 service factor and shall be rated for 6 starts per hour. Motor(s) shall be air filled, copper wound, class E insulated with built-in thermal protection. Motor shaft shall be 403 stainless steel and shall be supported by two permanently lubricated, high temperature ball bearings, with a B-10 life rating at best efficiency point of 60,000 hours. The bearings shall be single row, double shielded, C3, deep groove type ball bearings. Bearing seats shall be rolled carbon steel or aluminum die casting. Motor housing shall be 304 stainless steel. Motors shall be suitable variable speed applications, utilizing a properly sized variable frequency drive. (Only for 3 phase.)

**POWER CABLE AND CABLE ENTRANCE:**
The pump cable shall be suitable for submersible pump applications. The cable entrance shall incorporate built in strain relief, a one piece, three way mechanical compression seal with a fatigue reducing cable boot. The cable entrance assembly shall contain an anti-wicking block to eliminate water incursion into the motor due to Capillary wicking should the power cable be accidentally damaged.

**QUICK REMOVAL SYSTEM:**
The pumping unit(s) shall be equipped with quick removal system (QRS). The construction shall be such that the pump(s) will automatically connect to the discharge piping when lowered into place on the discharge connector. There shall be no need for personnel to enter the wet well to accomplish installation or removal of the pump(s). The pumping unit(s) shall be fitted with stainless steel lifting chain(s) of sufficient length and strength to permit the raising and lowering of the unit(s). The chain(s) shall be fastened at the top of the structure near the access opening. All parts of the QRS system including base elbow, sliding guide bracket, and guide support shall be manufactured from recyclable, application appropriate resins. The need for a protective coating shall not be required.

A sliding guide bracket shall be an integral part of the pumping unit and the pump casing shall have a machined connection with a bracket to connect with the discharge connection.

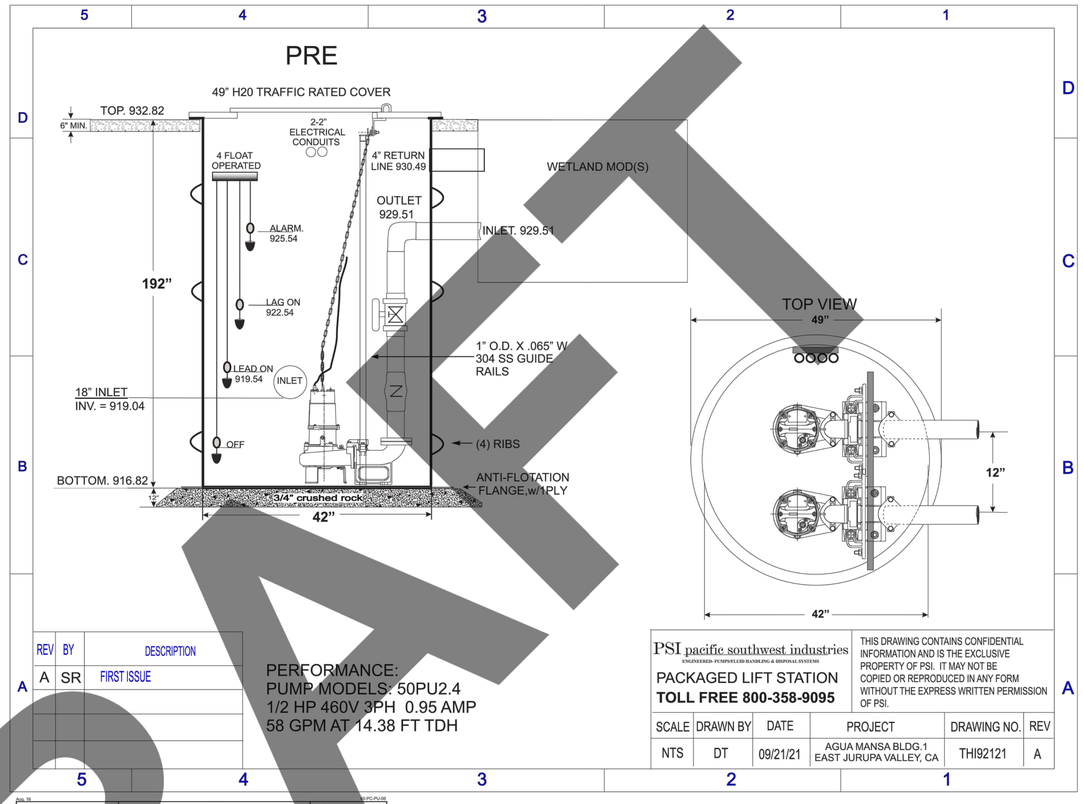
Sealing of the pumping unit to the discharge connection shall be accomplished by a single linear downward motion of the pump with the entire weight of the pumping unit guided by a pawl, thereby wedging the pumping unit tightly against the discharge connector. No portion of the pump shall bear directly on the floor of the sump nor shall a rotary motion of the pump be required for sealing. All fasteners coming into contact with the pumpage shall be stainless steel.

Two corrosion resistant guide pipes shall be furnished and installed for each pump to permit raising and lowering of the pump. Guide pipes shall be 3/4 inch (20 mm) in diameter and shall be of adequate length to extend from the lower guide holder to the upper guide bar bracket(s) mounted on the access frame.

**CONTROL PANEL:**
The control panel shall have a NEMA 4X semi dead front enclosure suitable for wall mounting. The outer face of the door shall have only the following: 1 high water alarm light with silence switch,1 buzzer. The inner workings of the control panel shall have no less than motor circuit protectors (overloads) that shall be adjustable, motor contactor, HOA selector switches, circuit breakers, Smart relay with exercise timers, elapsed timer meters, and float indicators, numbered terminal switch, and shall be listed by U.L. 508.

**PRE FIBERGLASS WET WELL:**
The fiberglass wet well shall have a minimum inside diameter of 42 inches and shall be of sufficient length to maintain the rim at grade and shall be 192 inches in length. The fiberglass wet well shall be manufactured using a process that insures that the bottom of the basin will be fabricated at the same time as the sidewalls, eliminating the possibility of any joints or seams in the wet well in the area of greatest stress concentration. The laminate shall have a barcol hardness of at least 90% of the resin manufactures minimum specified hardness for cured resin on both the interior and exterior surfaces. The minimum wall thickness of the wet well shall not be less than 3/16". 2" x 4" lumber shall be encapsulated in the bottom of the wet well to allow the mounting of the polypropylene bottom and the quick removal system. The fiberglass basin will be equipped with (4) reinforcing ribs for reinforcement. The top rim flange will be no more than 3/4" wider than the I.D. of the wet well (40.75" O.D.). The wet well shall be provided with "uniseal" fittings that can be installed in the field to insure proper elevation of the inlet, vent, and electrical on the side of the wet well.

**STEEL H20 SUITABLE FRAME AND COVER:**
The cover of the wet well shall be no less than ¼" thick and shall be suitable for H-20 traffic loads. The cover shall be solid with no penetrations through the top and shall be secured to the rim of the wet well with steel hardware. The cover is to be suspended in a Class A bed of concrete a minimum of 6" thick and to extended a minimum of 18" past the frame. The covers will be supplied with enamel primer paint.



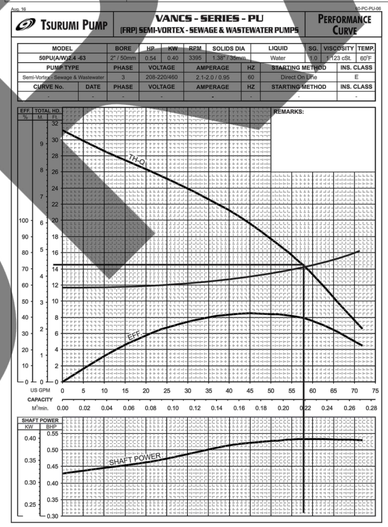

| REV | BY | DESCRIPTION |
|---|---|---|
| A | SR | FIRST ISSUE |

PERFORMANCE:
PUMP MODELS: 50PU2.4
1/2 HP 460V 3PH 0.95 AMP
58 GPM AT 14.38 FT TDH

PSI pacific southwest industries
ENGINEERED- PUMPS/FLUID HANDLING & DISPOSAL SYSTEMS
PACKAGED LIFT STATION
**TOLL FREE 800-358-9095**



| SCALE | DRAWN BY | DATE | PROJECT | DRAWING NO. | REV |
|---|---|---|---|---|---|
| NTS | DT | 09/21/21 | AGUA MANSA BLDG.1 EAST JURUPA VALLEY, CA | THI92121 | A |




### LIFT STATION PROFILE & CALCULATIONS

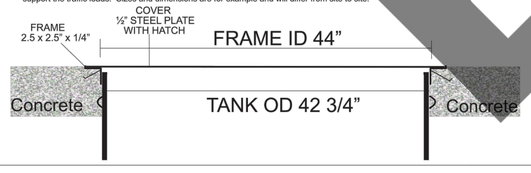
**EQUIVALENT PIPE RUN CALCULATION**

| | | | |
|---|---|---|---|
| 2" SCH 40 PVC PIPE | | | 20.0 FT |
| 2" PVC SCH 40 90 ELBOW | (1) | X 5.5 FT | 5.5 FT |
| 2" PVC SCH 40 45 BEND | (1) | X 2.5 FT | 2.5 FT |
| 2" PVC SCH 40 TEE | (0) | X 11 FT | 0.0 FT |
| 2" GATE VALVE | (1) | X 1.2 FT | 1.2 FT |
| 2" CHECK VALVE | (1) | X 13 FT | 13.0 FT |
| TOTAL EQUIVALENT LENGTH | | | 43.2 FT |
| FRIC. LOSS PER 100 FT 2" PVC @ 57 GPM 6.21 FT PER | | | 100 FT |
| FRICTION LOSS 2" | 43.2/100 X 6.21 FT = | | 2.69FT |

| | |
|---|---|
| FRICTION LOSS | 2.69 FT |
| STATIC HEAD | 11.69 FT |
| TOTAL DEVELOPED HEAD | 14.38 FT |
| PERFORMANCE 58 GPM @ 14.38 FT TDH THRU 2" PVC LINE | |

### FITTING THE TRAFFIC FRAME AND COVER

The frame and cover is meant to telescope around the OD of the tank. This will allow you to float the cover to grade and will insure the frame does not rest on the fiberglass tank. PSI suggests setting the tank approximately 1.5" lower than the finish surface to allow for the installation of the frame and cover as stated above. Concrete is recommended to be poured at least 8" thick and 24" wide around the frame and tank to support the traffic loads. Sizes and dimensions are for example and will differ from site to site.






STORM WATER PUMP SYS.

PSI pacific southwest industries
ENGINEERED- PUMPS/FLUID HANDLING & DISPOSAL SYSTEMS
18541 COLLIER AVE., LAKE ELSINORE, CA. 92530 PH: 800 358-9095

| No. | Date | Revisions: Description |
|---|---|---|
| 1 | | |

LIFT STATION DETAILS
AGUA MANSA COMMERCE PARK
BLDG 1 EAST
JURUPA VALLEY, CA

Date: 09/21/21 | Drawn by:DT | Job no:
Scale: NTS | Checked by: OR | Sheet no: 1 of 2

**LSD-1**

Last Update:7/13/22
O:\4000-4099\4022\4022BMPSITEMAP.dwg

**CITY OF INDUSTRY**
PUBLIC WORKS DEPARTMENT

**LID SITE MAP**
**NELSON AVENUE INDUSTRIAL BUILDING**

4022/3 OF 3 SHEET

PREPARED FOR:
OVERTON MOORE PROPERTIES
19700 S. VERMONT AVENUE, SUITE 101
TORRANCE, CA 90502
PHONE: (310) 323-9100

PREPARED BY:
Thienes Engineering, Inc.
CIVIL ENGINEERING * LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____
Public Works Director _____ R.C.E. _____
Sheet 3 of 3 Sheets

# APPENDIX C

# BMP Operation and Maintenance

# Operations and Maintenance (O&M) Plan

# LOW IMPACT DEVELOPMENT (LID) PLAN

# for

# PROJECT NAME: NELSON AVENUE INDUSTRIAL BUILDINGS

APN: **8208-011-009 and 8208-011-029**

ADDRESS: **15010 and 15100 Nelson Avenue, City of Industry, CA 91744**

Prepared on: **July 13, 2022**

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance, and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| **Non-Structural Source Control BMPs** | | | |
| Yes | **N1. Education for Property Owners, Tenants and Occupants** | The owners will provide the tenants with information concerning good housekeeping practices that contribute to protection of storm water quality. The owner will check with City and County at least once a year to obtain new or updated educational materials and provide these materials to tenants. Employees shall be trained to clean up spills and participate in ongoing maintenance. The project site will have annual employee training and new hires within one month. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N2. Activity Restriction** | Prohibit discharges of fertilizer, pesticides, or animal wastes to streets or storm drains. Prohibit blowing or sweeping of debris (leaf litter, grass clippings, litter, etc.) into streets or storm drains. Requirement to keep trash receptacles covered or sheltered by a roof overhang or canopy. Prohibit vehicle washing, maintenance, or repair on the premises. Activity restriction will be enforced daily. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N3. Common Area Landscape Management** | Maintenance of the landscaping shall be done weekly. Irrigation must be consistent with City's Water Conservation Ordinance. Fertilizer and pesticide usage will be consistent with County Management Guidelines for Use of Fertilizers and Pesticides. Irrigation system shall be inspected monthly by landscape contractor to check for over-watering, leaks, or excessive runoff to paved areas and landscaping shall be maintained weekly and maintenance contractor shall properly dispose of all landscape wastes. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance, and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **N4. BMP Maintenance** | All work to be done by the supplier or by a supplier approved contractor. Inspection of unit and surrounding area. Removal of tree grate and erosion control stones. Silt (if any) and mulch to be dug out. Trash, debris and foreign items will be removed. Replace mulch evenly across the entire unit to a depth of 3". Ensure correct repositioning of the erosion control stones by the Filterra inlet to allow for entry of trash during a storm event. Examine the plant's health and replace if dead. Prune as necessary to encourage growth in the correct directions. Clean area around unit and remove all refuse to be disposed of appropriately. Semi-annually through maintenance service contract with vendor or equally qualified contractor. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| No | **N5. Title 22 CCR Compliance** | Not applicable | Not applicable |
| Yes | **N7. Spill Contingency Plan** | Owner/tenant will have a spill contingency plan based on individual site needs. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| No | **N8. Underground Storage Tank Compliance** | Not applicable | Not applicable |
| Yes | **N9. Hazardous Materials Disclosure Compliance** | Site will be in compliance with ordinances typically enforced by respective fire protection agency for the management of hazardous materials. Los Angeles County, health care agencies, and/or other appropriate agencies (i.e. Department of Toxics Substances Control is typically responsible for enforcing hazardous materials and hazardous waste handling and disposal regulations. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N10. Uniform Fire Code Implementation** | Site will be in compliance with article 80 of the Uniform Fire Code enforced by fire protection agency. Inspection and maintenance as necessary. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance, and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **N11. Common Area Litter Control** | Employees, gardeners, and the property manager will help keep the site free of trash and other debris. It will be the owner's responsibility for having the site inspected weekly and cleaned as necessary. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N12. Contractor/Employee Training** | The owner will ensure that tenants are also familiar with onsite BMPs and necessary maintenance required of the tenants. Owner will check with City and County at least once a year to obtain new or updated educational materials and provide these materials to tenants. Employees shall be trained to clean up spills and participate in ongoing maintenance. This LID requires bi-annually employee training and new hires within 2 months. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N13. Housekeeping of Loading Docks.** | Keep all fluids indoors. Clean up spills immediately and keep spills from entering storm drain system. No discharges of wastewater or cleanup water from maintenance of loading docks into the storm drain system. Area shall be inspected weekly for proper containment and practices with spills cleaned up immediately and disposed of properly. Areas under "dock high" doors shall be swept daily. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N14. Common Area Catch Basin Inspection** | The owner/maintenance contractor will be responsible for cleaning the catch basins on-site on a regular basis prior to the storm season, no later than October 1st of each year. Catch basins and storm drain system will be cleaned at least twice a year and prior to October 1. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N15. Street Sweeping Private Streets and Parking Lots.** | The owner/maintenance contractor will have the private drive swept. Hosing or watering of the site will not be permitted as a method of cleaning. Parking lots and drive isles will be swept or vacuumed at least quarterly, October 1, January 1, April 1 and July 1 and as necessary. If there is any trash or debris in between the routine sweeping it will be swept or vacuumed immediately. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |

| 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 | **N17. Retail Gasoline Outlets** | Not applicable | Not applicable |
| | **Structural Source Control BMPs** | | |
| Yes | **Provide Storm Drain System Stenciling and Signage** | All storm drain inlets and catch basins shall have stenciling or labeling such as "No Dumping – Drains to Ocean" and/or other graphical icons to alert the public to the destination of pollutants discharged into stormwater. In addition, legibility of stencils and signs must be maintained. The owner/ or maintenance contractor shall inspect signage for legibility biannually. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| No | **Design and Construct Outdoor Material Storage Areas to Reduce Pollutant Introduction** | Not applicable | Not applicable |
| No | **Design and Construct Trash and Waste Storage Areas to Reduce Pollutant Introduction** | Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements diverted around the area, and screened or walled to prevent off-site transport of trash. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **Use Efficient Irrigation Systems & Landscape Design** | Irrigation of the landscaping shall be implemented as indicated on the approved landscape drawings and be consistent with the City's Water Conservation Ordinance. The irrigation system shall have rain shutoff controls as well as a programmable timer. Short irrigation cycles should be used to meet with the plant/landscaping needs. System shall be inspected (by the owner/ or maintenance contractor) once a month to check for over watering, broken sprinkler heads or lines, and excessive runoff onto paved areas. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| No | **Protect Slopes and Channels and Provide Energy Dissipation** | Not applicable | Not applicable |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance, and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **Loading Docks** | Keep all fluids indoors. Clean up spills immediately and keep spills from entering storm drain system. No discharges of wastewater or cleanup water from maintenance of loading docks into the storm drain system. Area shall be inspected weekly for proper containment and practices with spills cleaned up immediately and disposed of properly. Areas under "dock high" doors shall be swept daily. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| No | **Maintenance Bays** | Not applicable | Not applicable |
| No | **Vehicle Wash Areas** | Not applicable | Not applicable |
| No | **Outdoor Processing Areas** | Not applicable | Not applicable |
| No | **Equipment Wash Areas.** | Not applicable | Not applicable |
| No | **Fueling Area** | Not applicable | Not applicable |
| No | **Hillside Landscaping** | Not applicable | Not applicable |
| No | **Wash Water Controls for Food Preparation Areas** | Not applicable | Not applicable |
| No | **Community Car Wash Racks** | Not applicable | Not applicable |
| **Treatment Control BMPs (i.e. Filter Inserts, Media Filter, etc.)** | | | |
| Yes | **Drain Inserts BMP** | Catch basin inserts will need to be inspected four times a year and serviced three times a year. Debris will be removed that may cause the drain to clog. Filter medium needs to be replaced at least once a year. Per manufacturer's specifications and after September 1, shortly before the rainy season, October 1. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| **LID BMPs** | | | |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance, and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **WetlandMod** | All work to be done by the supplier or by a supplier approved contractor. Maintenance should be done semi-annually (October 1st and February 1st). Clean separation (sediment) chamber, located directly under the manhole. Replace media in pre-filtration cartridges. Media life depends on the loading conditions and can easily be replaced and disposed of without any equipment. The BioMediaGREEN filter can be ordered from the manufacturer. Replace drain down filter media. Replacement of media takes approximately 5 minutes and is performed without any equipment. Replace wetland media. The life of the media can be up to 20 years. Remove spent media with shovel or vacuum truck and replace with new media. Media can be ordered from the manufacturer. See manufacturer's maintenance requirements for additional information. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **Sump Pump** | Maintenance should be done semi-annually (October 1st and February 1st). Verify automatic and manual operations of pump(s). Inspect floats for proper elevation and movement. Correct any obstructions. Check incoming power and amperage for proper voltage. Hose down lift station to clean pump and floats. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **Underground Retention System** | The isolator rows shall be inspected semi-annually (by October 1st and February 1st) and cleaned by water-flush and vacuum when solids accumulate to 3" depth. The isolator rows shall be inspected for debris and sediment accumulations and maintained by a qualified technician and he/she will properly dispose of all wastes and inspect for standing water. A manhole is installed in order to inspect and maintain the inlet row. All entry into the chamber system must be done per OSHA codes to ensure operator and inspector safety. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |

## Responsible Party

The owner(s), **Overton Moore Properties**, is aware of the maintenance responsibilities of the proposed BMPs. A funding mechanism is in place to maintain the BMPs at the frequency stated in the LID. The contact information for the entity responsible is below:

| | |
|---|---|
| Name: | Timur Tecimer |
| Company: | Overton Moore Properties |
| Title: | Chief Executive Officer |
| Address: | 19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502 |
| Phone Number: | (949) 296-2945 |
| Email: | Ttecimer@omprop.com |

## 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 |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

# 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

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

# SD-13 Storm Drain Signage

– 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.

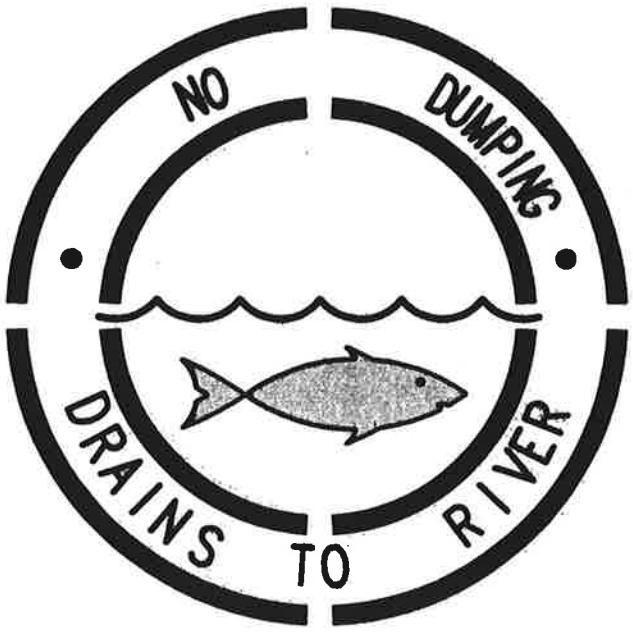
## Other Resources

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.




SAMPLE STENCIL TO BE USED NEAR GRATE AND CURB OPENING INLETS

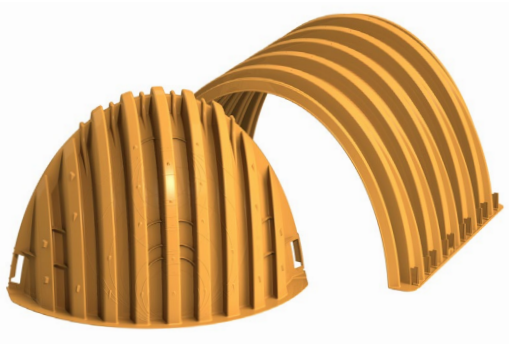
SYMBOL TO BE 24" IN DIAMETER

Thienes Engineering
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

SAMPLE CATCH BASIN STENCIL
PER BMP SD-13

# StormTech MC-7200 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



**Nominal Chamber Specifications**
(not to scale)

**Size (L x W x H)**
83” x 100” x 60”
2108 mm x 2540 mm x 1524 mm

**Chamber Storage**
175.9 ft³ (4.98 m³)

**Min. Installed Storage***
267.3 ft³ (7.57 m³)

**Weight**
202 lbs (91.6 kg)

**Shipping**
7 chambers/pallet
5 end caps/pallet
6 pallets/truck

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 9” (230 mm) of stone between chambers/ end caps and 40% stone porosity.

**Nominal End Cap Specifications**
(not to scale)

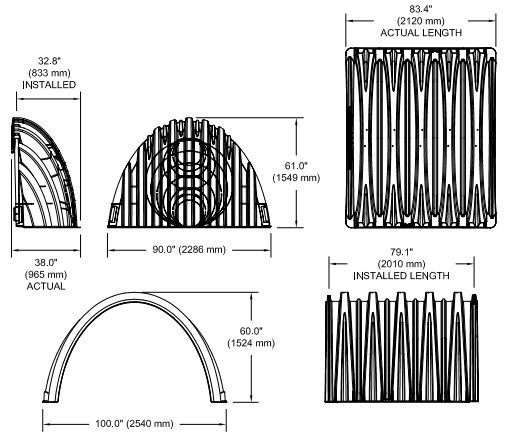
**Size (L x W x H)**
38” x 90” x 61”
965 mm x 2286 mm x 1549 mm

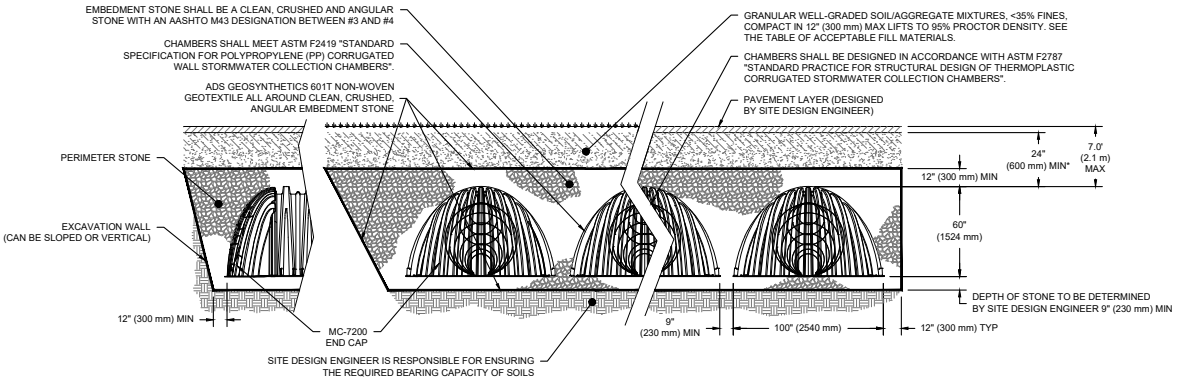
**End Cap Storage**
39.5 ft³ (1.12 m³)

**Min. Installed Storage***
115.3 ft³ (3.26 m³)

**Weight**
Nominal 90.0 lbs (40.8 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 12” (300 mm) of stone perimeter, 9” (230 mm) of stone between chambers/ end caps and 40% stone porosity.




*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

ADS StormTech™

# StormTech MC-7200 Specifications

## Storage Volume Per Chamber

| | Bare Chamber Storage ft³ (m³) | Chamber and Stone Foundation Depth in. (mm) | | | |
|---|---|---|---|---|---|
| | | 9 in (230 mm) | 12 in (300 mm) | 15 in (375 mm) | 18 in (450 mm) |
| Chamber | 175.9 (4.98) | 267.3 (7.57) | 273.3 (7.74) | 279.3 (7.91) | 285.3 (8.08) |
| End Cap | 39.5 (1.12) | 115.3 (3.26) | 118.6 (3.36) | 121.9 (3.45) | 125.2 (3.54) |

**Note:** Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter in front of end cap.

## Amount of Stone Per Chamber

| English Tons (yds³) | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9 in | 12 in | 15 in | 18 in |
| Chamber | 12.1 (8.5) | 12.9 (9.0) | 13.6 (9.6) | 14.3 (10.1) |
| End Cap | 9.8 (7.0) | 10.2 (7.3) | 10.6 (7.6) | 11.1 (7.9) |
| **Metric Kilograms (m³)** | **230 mm** | **300 mm** | **375 mm** | **450 mm** |
| Chamber | 10977 (6.5) | 11703 (6.9) | 12338 (7.3) | 12973 (7.7) |
| End Cap | 8890 (5.3) | 9253 (5.5) | 9616 (5.8) | 10069 (6.0) |

**Note:** Assumes 12" (300 mm) of stone above and 9" (230 mm) row spacing and 12" (300 mm) of perimeter stone in front of end caps. 1 yd³ = 1.42 english tons.

## Volume Excavation Per Chamber yd³ (m³)

| | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9 in (230 mm) | 12 in (300 mm) | 15 in (375mm) | 18 in (450 mm) |
| Chamber | 17.2 (13.2) | 17.7 (13.5) | 18.3 (14.0) | 18.8 (14.4) |
| End Cap | 9.7 (7.4) | 10.0 (7.6) | 10.3 (7.9) | 10.6 (8.1) |

**Note:** Assumes 9" (230 mm) of separation between chamber rows, 12" (300 mm) of perimeter in front of the end caps, and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

**Working on a project?**
**Visit us at www.stormtech.com and utilize the Design Tool**

ADS StormTech™

**adspipe.com**
800-821-6710

StormTech
Detention • Retention • Water Quality
An ADS company

# Isolator® Row O&M Manual


SC-740


MC-3500


MC-4500

THE MOST ADVANCED NAME IN WATER MANAGEMENT SOLUTIONS™

ADS®

# THE ISOLATOR® ROW

## INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.

## THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-160LP, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the SC-160LP, DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

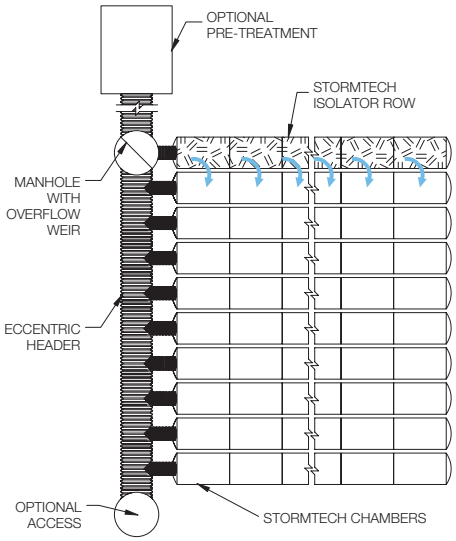
The Isolator Row is typically designed to capture the “first flush” and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

*Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.*

**Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.**

**StormTech Isolator Row with Overflow Spillway** (not to scale)



# ISOLATOR ROW INSPECTION/MAINTENANCE

## INSPECTION

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

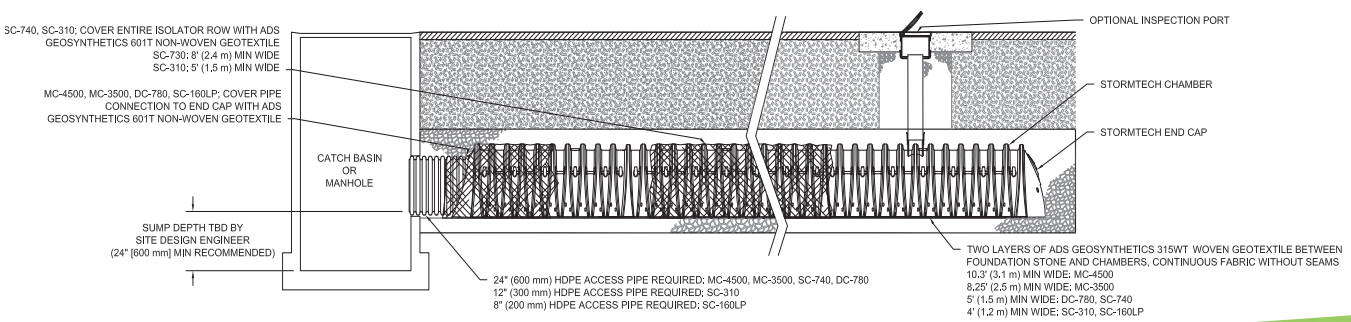
## MAINTENANCE

The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

**StormTech Isolator Row** (not to scale)

*Note: Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-4500 chamber models and is not required over the entire Isolator Row.*



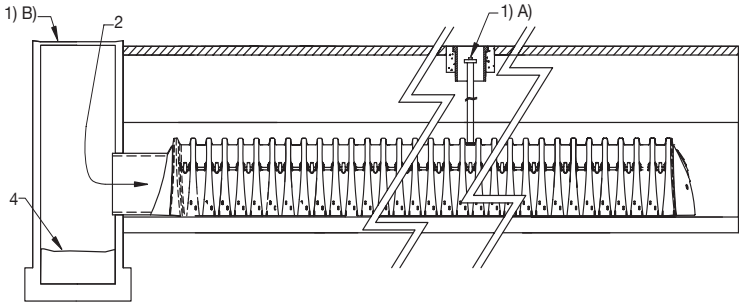
# ISOLATOR ROW STEP BY STEP MAINTENANCE PROCEDURES

**STEP 1**
Inspect Isolator Row for sediment.
- A) Inspection ports (if present)
  - i. Remove lid from floor box frame
  - ii. Remove cap from inspection riser
  - iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
  - iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.
- B) All Isolator Rows
  - i. Remove cover from manhole at upstream end of Isolator Row
  - ii. Using a flashlight, inspect down Isolator Row through outlet pipe
    1. Mirrors on poles or cameras may be used to avoid a confined space entry
    2. Follow OSHA regulations for confined space entry if entering manhole
  - iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2. If not, proceed to Step 3.

**STEP 2**
Clean out Isolator Row using the JetVac process.
- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

**STEP 3**
Replace all caps, lids and covers, record observations and actions.

**STEP 4**
Inspect & clean catch basins and manholes upstream of the StormTech system.




**SAMPLE MAINTENANCE LOG**

| Date | Stadia Rod Readings | | Sediment Depth (1)–(2) | Observations/Actions | Inspector |
|---|---|---|---|---|---|
| | Fixed point to chamber bottom (1) | Fixed point to top of sediment (2) | | | |
| 3/15/11 | 6.3 ft | none | | New installation. Fixed point is CI frame at grade | DJM |
| 9/24/11 | | 6.2 | 0.1 ft | Some grit felt | SM |
| 6/20/13 | | 5.8 | 0.5 ft | Mucky feel, debris visible in manhole and in Isolator Row, maintenance due | NV |
| 7/7/13 | 6.3 ft | | 0 | System jetted and vacuumed | DJM |



StormTech® Detention • Retention • Water Quality
A division of ADS®

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

# PSI Pacific Southwest Industries

**ENGINEERED - PUMPS/FLUID HANDLING & DISPOSAL SYSTEMS - PACKAGED LIFT STATIONS**

## LIFT STATION REQUIRED MAINTENANCE

The lift station should be inspected twice a year for proper operation, and should be checked for overabundance of solid matter such as grease and soap buildup.

Proper operation and inspection would include the following:

1) Automatic operation of the system by float activation. One pump starting at lead on levels, second pump starting at high level conditions; manual operation by use of the selector switches.

2) Inspect floats for proper elevation and for proper movement. Correct any obstructions.

3) Check incoming power for proper voltage. Check voltage at motor connections.

4) Check amperage of each motor.

5) Hose down lift station to clean the walls of the wet well, pumps and floats.

## MECHANICAL SEAL INSPECTION OF PUMPS

Inspection of the mechanical seals should be done every two years.

The inspection will include the following:

Pull pump out of wet well. Remove oil seal plug and inspect the oil for clarity. Clear oil indicates no water intrusion and chamber is to be topped off with 30 weight turbine oil. If oil is cloudy the mechanical seal and oil needs to be replaced.

PSI recommends that preventive maintenance and service be performed by a qualified technician.

Any question regarding your lift station should be directed to Scott Richardson at 800-358-9095.

P O Box 520 Lake Elsinore, CA 92531 – 18541 Collier Ave., Lake Elsinore, CA 92530
(800) 358-9095 (909) 674-2144 fax (909) 674-9444 CSL #583052
www.psipumps.com Email: info@psipumps.com

Bio Clean
A Forterra Company

**Maintenance Overview –**

A. Every installed WetlandMOD unit is to be maintained by the Supplier, or a Supplier approved contractor. The cost of this service varies among providers.

B. The WetlandMOD is a multi-stage self-contained treatment train for stormwater treatment. Each stage protects subsequent stages from clogging. Stages include: screening, separation, and Biofiltration. The biofiltration stage contains various types of vegetation which will require annual evaluation and trimming.

1. **Clean Bio Clean® Pre-Filter Screen –** Screening is provided by well proven continuous modular screen filter. The filter removes gross solids, including litter, and sediments greater than 5 mm. This procedure is easily done by hand or with a small industrial vacuum device.

2. **Clean Separation (sediment) Chamber –** separation occurs in the pre-treatment chamber. This chamber targets TSS, and particulate metals and nutrients. This procedure can be performed with a standard vacuum truck. This chamber is located directly under the manhole, hatch, or grate access cover.

3. **Trim Vegetation –** The system utilizes multiple plants in the biofiltration chamber to provide enhanced treatment. The vegetation will need to be maintained (trimmed) as needed. This can be done as part of the project normal landscape maintenance. NO FERTILIZER SHALL BE USED IN THIS CHAMBER.

4. **Evaluate Biofiltration Media Flow Hydraulic Conductivity –** The systems flow can be assessed from the discharge. This should be done during a rain event. By viewing into the discharge pipe the flow out of the system can be observed. If little to no flow is observed this is a sign of potential Biofiltration media maintenance needs.

5. Biofiltration Media Replacement –This filter contains a mix that supports abundant plant life. Replacement of the media is simple. Removal of spent media can be done with a shovel of a vacuum truck.

C. The WetlandMOD pre-filter, separation chamber, and Biofiltration media are designed to allow for the use of vacuum removal of captured pollutants and spent filter media by centrifugal compressor vacuum units without causing damage to the filter or during normal cleaning and maintenance. Filter and chambers can be cleaned from finish surface through standard manhole, hatch, or grate access.

**Maintenance Procedures –**

1. Clean Bio Clean® Pre-Filter – Bio Clean recommends the **pre-filter** be inspected and cleaned a minimum of once every six months. The procedure is easily done with the use of any standard vacuum truck. *This procedure takes approximately 15 minutes.*

1. Remove grate, manhole, or hatch to gain access to catch basin filter insert. Where possible the maintenance should be performed from the ground surface. Note: entry into an underground stormwater vault such as an inlet vault may require certification in confined space training.
2. Remove all trash, debris, organics, and sediments collected by the pre-filter. Removal of the trash and debris can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screen of the filter.
3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements. Hazardous material can only be handled by a certified hazardous waste trained person (minimum 24-hour hazwoper).

2. Clean Separation (sediment) Chamber – Bio Clean recommends the **separation chamber** be inspected and cleaned a minimum of once a year. The procedure is easily done with the use of any standard vacuum truck. *This procedure takes approximately 30 minutes.*

1. Remove grate, manhole, or hatch to gain access to the Separation Chamber.
2. Where possible the maintenance should be performed from the ground surface. Note: entry into an underground stormwater vault such as an inlet vault may require certification in confined space training.
3. With a pressure washer spray down pollutants accumulated on walls and pre-filters.
4. Vacuum out separation chamber and remove all accumulated debris and sediments.
5. Replace grate, manhole, or hatch cover.
6. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

3. Trim Vegetation – Bio Clean recommends the plants/vegetation be inspected and maintained a minimum of once a year. It is also recommended that the plants receive the same care as other landscaped areas. Note: No fertilizer is to be used on this area. *Trimming of vegetation takes approximately 15 minutes.*

4. Evaluate Biofiltration Media Flow Hydraulic Conductivity – Bio Clean recommends system flow be inspected and observed a minimum of once a year. This needs to be done during a rain event. *Inspection and Observation takes approximately 5 minutes.*

1. Observe discharge out of system
2. Observe the level of flow from the bottom of the pipe.
3. If flow is steady and high the system is operating normally.
4. If little or no flow is observed exiting the discharge pipe possible maintenance to the Biofiltration media may be needed. Contact Bio Clean for further assistance.

5. Biofiltration Media Replacement – Bio Clean recommends the Biofiltration media be replaced a minimum of one every 20 years. *Inspection takes approximately 15 minutes. Replacement of rock media takes approximately 6 hours and requires a vacuum truck.*

1. Remove plants from the Biofiltration chamber.
2. Use a vacuum truck or shovel to remove all wetland media.
3. Spray down the walls and floor of the chamber and vacuum out any accumulated pollutants.
4. Spray down perforated piping and netting of flow matrix and the inflow and outflow end to remove any accumulated pollutants.
5. Vacuum out any standing water from the media removal and insure the chamber is cleaning.
6. Use a small backhoe to fill chamber with new media. Call Bio Clean for media delivery information.
7. Plant new vegetation in the same configuration and quantity as old vegetation.
8. Spray down the plants and media with water to saturate.
9. Continue supplemental irrigation (spray or drip) for at lest 90 days.

6. Other Maintenance Notes –

1. Following maintenance and/or inspection, the maintenance operator shall prepare a maintenance/inspection record. The record shall include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanism. .
2. The owner shall retain the maintenance/inspection record for a minimum of five years from the date of maintenance. These records shall be made available to the governing municipality for inspection upon request at any time.
3. Any person performing maintenance activities must have completed a minimum of OSHA 24-hour hazardous waste worker (hazwoper) training.
4. Remove access manhole lid or grate to gain access to filter screens and sediment chambers. Where possible the maintenance should be performed

from the ground surface. Note: entry into an underground stormwater vault such as an inlet vault requires certification in confined space training.

5. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
6. The hydrocarbon boom is classified as hazardous material and will have to be picked up and disposed of as hazardous waste. Hazardous material can only be handled by a certified hazardous waste trained person (minimum 24-hour hazwoper).

# 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

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

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

Weather Condition _____ Additional Notes _____

## 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:

# 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:

# APPENDIX D

# Maintenance and Covenant Agreement

RECORDING REQUESTED BY AND
MAIL TO:

CITY OF INDUSTRY
ENGINEERING DEPARTMENT
15625 EAST STAFFORD STREET #100
CITY OF INDUSTRY, CA 91744

Space above this line is for Recorder's use

# COVENANT AND AGREEMENT
# REGARDING THE MAINTENANCE OF LOW IMPACT DEVELOPMENT (LID) & NATIONAL POLLUTANTS DISCHARGE ELIMINATION SYSTEM (NPDES) BMPs

The undersigned, _____ ("Owner"), hereby certifies that it owns the real property described as follows ("Subject Property"), located in the City of Industry, County of Los Angeles, State of California:

LEGAL DESCRIPTION

See attached Exhibits A and B

ASSESSOR'S ID #8208-011-009, -029 PARCEL MAP NO._____PARCEL NO._____

ADDRESS: 15010 and 15100 Nelson Avenue, City of Industry, CA 91744

Owner is aware of the requirements of the City of Industry Code Section 13.16 (LID Ordinance), and National Pollutant Discharge Elimination System (NPDES) permit. The following post-construction BMP features have been installed on the Subject Property:

□ Underground chambers for detention with impermeable liner
□ Modular Wetland unit for volume-based biofiltration

The location, including GPS x-y coordinates, and type of each post-construction BMP feature installed on the Subject Property is identified on the site diagram attached hereto as Exhibit 1 (LID Site Plan).

Owner hereby covenants and agrees to maintain the above-described post-construction BMP features in a good and operable condition at all times, and in accordance with the Operation and Maintenance requirements, attached hereto as Exhibit 2 (LID Plan).

Owner further covenants and agrees that the above-described post-construction BMP features shall not be removed from the Subject Property unless and until they have been replaced with other post-construction BMP features in accordance with City of Industry Code Section 13.16 (LID Ordinance) and NPDES permit.

Owner further covenants and agrees that if Owner hereafter sells the Subject Property, Owner shall provide printed educational materials to the buyer regarding the post-construction BMP features that are located on the Subject Property, including the type(s) and location(s) of all such features, and instructions for properly maintaining all such features.

Owner makes this Covenant and Agreement on behalf of itself and its successors and assigns. This Covenant and Agreement shall run with the Subject Property and shall be binding upon owner, future owners, and their heirs, successors and assignees, and shall continue in effect until the release of this Covenant and Agreement by the City of Industry, in its sole discretion.

Owner(s): Overton Moore Properties - Timur Tecimer, Chief Executive Officer

By:_____ Date:_____

By:_____ Date:_____

(PLEASE ATTACH NOTARY)

# ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California }
County of _____ }

On _____ before me, _____,
(here insert name and title of the officer)

personally appeared _____

_____

_____,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____

(Seal)

# Operations and Maintenance (O&M) Plan

# LOW IMPACT DEVELOPMENT (LID) PLAN

# for

# PROJECT NAME: NELSON AVENUE INDUSTRIAL BUILDINGS

APN: **8208-011-009 and 8208-011-029**

ADDRESS: **15010 and 15100 Nelson Avenue, City of Industry, CA 91744**

Prepared on: **July 13, 2022**

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance, and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| **Non-Structural Source Control BMPs** | | | |
| Yes | **N1. Education for Property Owners, Tenants and Occupants** | The owners will provide the tenants with information concerning good housekeeping practices that contribute to protection of storm water quality. The owner will check with City and County at least once a year to obtain new or updated educational materials and provide these materials to tenants. Employees shall be trained to clean up spills and participate in ongoing maintenance. The project site will have annual employee training and new hires within one month. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N2. Activity Restriction** | Prohibit discharges of fertilizer, pesticides, or animal wastes to streets or storm drains. Prohibit blowing or sweeping of debris (leaf litter, grass clippings, litter, etc.) into streets or storm drains. Requirement to keep trash receptacles covered or sheltered by a roof overhang or canopy. Prohibit vehicle washing, maintenance, or repair on the premises. Activity restriction will be enforced daily. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N3. Common Area Landscape Management** | Maintenance of the landscaping shall be done weekly. Irrigation must be consistent with City's Water Conservation Ordinance. Fertilizer and pesticide usage will be consistent with County Management Guidelines for Use of Fertilizers and Pesticides. Irrigation system shall be inspected monthly by landscape contractor to check for over-watering, leaks, or excessive runoff to paved areas and landscaping shall be maintained weekly and maintenance contractor shall properly dispose of all landscape wastes. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance, and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **N4. BMP Maintenance** | All work to be done by the supplier or by a supplier approved contractor. Inspection of unit and surrounding area. Removal of tree grate and erosion control stones. Silt (if any) and mulch to be dug out. Trash, debris and foreign items will be removed. Replace mulch evenly across the entire unit to a depth of 3". Ensure correct repositioning of the erosion control stones by the Filterra inlet to allow for entry of trash during a storm event. Examine the plant's health and replace if dead. Prune as necessary to encourage growth in the correct directions. Clean area around unit and remove all refuse to be disposed of appropriately. Semi-annually through maintenance service contract with vendor or equally qualified contractor. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| No | **N5. Title 22 CCR Compliance** | Not applicable | Not applicable |
| Yes | **N7. Spill Contingency Plan** | Owner/tenant will have a spill contingency plan based on individual site needs. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| No | **N8. Underground Storage Tank Compliance** | Not applicable | Not applicable |
| Yes | **N9. Hazardous Materials Disclosure Compliance** | Site will be in compliance with ordinances typically enforced by respective fire protection agency for the management of hazardous materials. Los Angeles County, health care agencies, and/or other appropriate agencies (i.e. Department of Toxics Substances Control is typically responsible for enforcing hazardous materials and hazardous waste handling and disposal regulations. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N10. Uniform Fire Code Implementation** | Site will be in compliance with article 80 of the Uniform Fire Code enforced by fire protection agency. Inspection and maintenance as necessary. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance, and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **N11. Common Area Litter Control** | Employees, gardeners, and the property manager will help keep the site free of trash and other debris. It will be the owner's responsibility for having the site inspected weekly and cleaned as necessary. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N12. Contractor/Employee Training** | The owner will ensure that tenants are also familiar with onsite BMPs and necessary maintenance required of the tenants. Owner will check with City and County at least once a year to obtain new or updated educational materials and provide these materials to tenants. Employees shall be trained to clean up spills and participate in ongoing maintenance. This LID requires bi-annually employee training and new hires within 2 months. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N13. Housekeeping of Loading Docks.** | Keep all fluids indoors. Clean up spills immediately and keep spills from entering storm drain system. No discharges of wastewater or cleanup water from maintenance of loading docks into the storm drain system. Area shall be inspected weekly for proper containment and practices with spills cleaned up immediately and disposed of properly. Areas under "dock high" doors shall be swept daily. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N14. Common Area Catch Basin Inspection** | The owner/maintenance contractor will be responsible for cleaning the catch basins on-site on a regular basis prior to the storm season, no later than October 1st of each year. Catch basins and storm drain system will be cleaned at least twice a year and prior to October 1. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **N15. Street Sweeping Private Streets and Parking Lots.** | The owner/maintenance contractor will have the private drive swept. Hosing or watering of the site will not be permitted as a method of cleaning. Parking lots and drive isles will be swept or vacuumed at least quarterly, October 1, January 1, April 1 and July 1 and as necessary. If there is any trash or debris in between the routine sweeping it will be swept or vacuumed immediately. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |

| 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 | **N17. Retail Gasoline Outlets** | Not applicable | Not applicable |
| | **Structural Source Control BMPs** | | |
| Yes | **Provide Storm Drain System Stenciling and Signage** | All storm drain inlets and catch basins shall have stenciling or labeling such as "No Dumping – Drains to Ocean" and/or other graphical icons to alert the public to the destination of pollutants discharged into stormwater. In addition, legibility of stencils and signs must be maintained. The owner/ or maintenance contractor shall inspect signage for legibility biannually. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| No | **Design and Construct Outdoor Material Storage Areas to Reduce Pollutant Introduction** | Not applicable | Not applicable |
| No | **Design and Construct Trash and Waste Storage Areas to Reduce Pollutant Introduction** | Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements diverted around the area, and screened or walled to prevent off-site transport of trash. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **Use Efficient Irrigation Systems & Landscape Design** | Irrigation of the landscaping shall be implemented as indicated on the approved landscape drawings and be consistent with the City's Water Conservation Ordinance. The irrigation system shall have rain shutoff controls as well as a programmable timer. Short irrigation cycles should be used to meet with the plant/landscaping needs. System shall be inspected (by the owner/ or maintenance contractor) once a month to check for over watering, broken sprinkler heads or lines, and excessive runoff onto paved areas. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| No | **Protect Slopes and Channels and Provide Energy Dissipation** | Not applicable | Not applicable |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance, and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **Loading Docks** | Keep all fluids indoors. Clean up spills immediately and keep spills from entering storm drain system. No discharges of wastewater or cleanup water from maintenance of loading docks into the storm drain system. Area shall be inspected weekly for proper containment and practices with spills cleaned up immediately and disposed of properly. Areas under "dock high" doors shall be swept daily. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| No | **Maintenance Bays** | Not applicable | Not applicable |
| No | **Vehicle Wash Areas** | Not applicable | Not applicable |
| No | **Outdoor Processing Areas** | Not applicable | Not applicable |
| No | **Equipment Wash Areas.** | Not applicable | Not applicable |
| No | **Fueling Area** | Not applicable | Not applicable |
| No | **Hillside Landscaping** | Not applicable | Not applicable |
| No | **Wash Water Controls for Food Preparation Areas** | Not applicable | Not applicable |
| No | **Community Car Wash Racks** | Not applicable | Not applicable |
| **Treatment Control BMPs (i.e. Filter Inserts, Media Filter, etc.)** | | | |
| Yes | **Drain Inserts BMP** | Catch basin inserts will need to be inspected four times a year and serviced three times a year. Debris will be removed that may cause the drain to clog. Filter medium needs to be replaced at least once a year. Per manufacturer's specifications and after September 1, shortly before the rainy season, October 1. | Overton Moore Properties<br>19700 S. Vermont Avenue, Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| **LID BMPs** | | | |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance, and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **WetlandMod** | All work to be done by the supplier or by a supplier approved contractor. Maintenance should be done semi-annually (October 1st and February 1st). Clean separation (sediment) chamber, located directly under the manhole. Replace media in pre-filtration cartridges. Media life depends on the loading conditions and can easily be replaced and disposed of without any equipment. The BioMediaGREEN filter can be ordered from the manufacturer. Replace drain down filter media. Replacement of media takes approximately 5 minutes and is performed without any equipment. Replace wetland media. The life of the media can be up to 20 years. Remove spent media with shovel or vacuum truck and replace with new media. Media can be ordered from the manufacturer. See manufacturer's maintenance requirements for additional information. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **Sump Pump** | Maintenance should be done semi-annually (October 1st and February 1st). Verify automatic and manual operations of pump(s). Inspect floats for proper elevation and movement. Correct any obstructions. Check incoming power and amperage for proper voltage. Hose down lift station to clean pump and floats. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |
| Yes | **Underground Retention System** | The isolator rows shall be inspected semi-annually (by October 1st and February 1st) and cleaned by water-flush and vacuum when solids accumulate to 3" depth. The isolator rows shall be inspected for debris and sediment accumulations and maintained by a qualified technician and he/she will properly dispose of all wastes and inspect for standing water. A manhole is installed in order to inspect and maintain the inlet row. All entry into the chamber system must be done per OSHA codes to ensure operator and inspector safety. | Overton Moore Properties<br>19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502<br>(310) 323-9100<br>Contact: Timur Tecimer |

## Responsible Party

The owner(s), **Overton Moore Properties**, is aware of the maintenance responsibilities of the proposed BMPs. A funding mechanism is in place to maintain the BMPs at the frequency stated in the LID. The contact information for the entity responsible is below:

| | |
|---|---|
| Name: | Timur Tecimer |
| Company: | Overton Moore Properties |
| Title: | Chief Executive Officer |
| Address: | 19700 S. Vermont Avenue,<br>Suite 101<br>Torrance, CA 90502 |
| Phone Number: | (949) 296-2945 |
| Email: | Ttecimer@omprop.com |

## 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 |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

# 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

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

# SD-13 Storm Drain Signage

– 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.

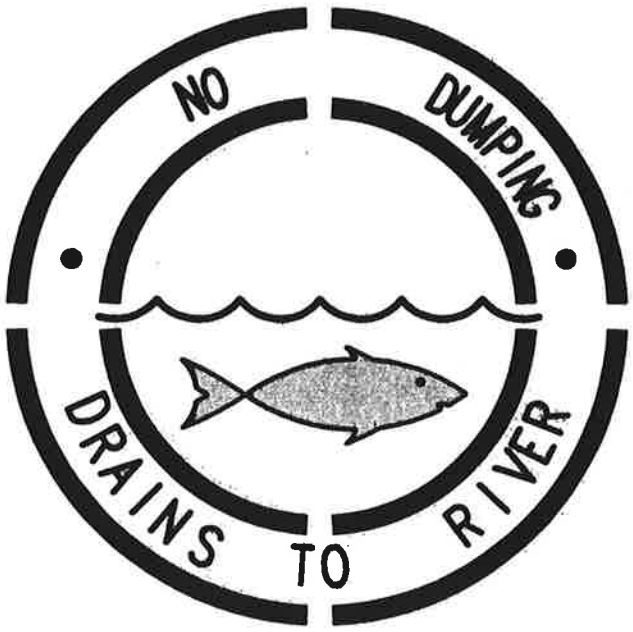
## Other Resources

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.




SAMPLE STENCIL TO BE USED NEAR GRATE AND CURB OPENING INLETS

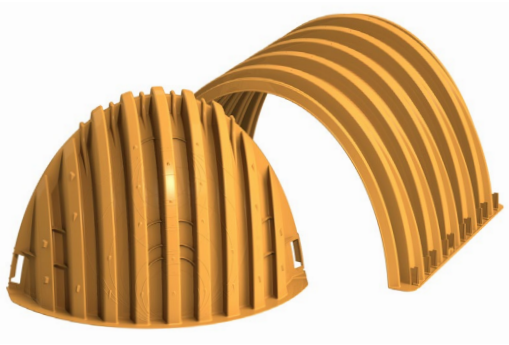
SYMBOL TO BE 24" IN DIAMETER

Thienes Engineering
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

SAMPLE CATCH BASIN STENCIL
PER BMP SD-13

# StormTech MC-7200 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



**Nominal Chamber Specifications**
(not to scale)

**Size (L x W x H)**
83” x 100” x 60”
2108 mm x 2540 mm x 1524 mm

**Chamber Storage**
175.9 ft³ (4.98 m³)

**Min. Installed Storage***
267.3 ft³ (7.57 m³)

**Weight**
202 lbs (91.6 kg)

**Shipping**
7 chambers/pallet
5 end caps/pallet
6 pallets/truck

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 9” (230 mm) of stone between chambers/ end caps and 40% stone porosity.

**Nominal End Cap Specifications**
(not to scale)

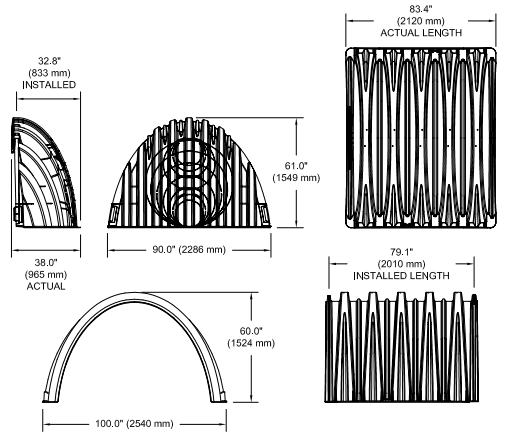
**Size (L x W x H)**
38” x 90” x 61”
965 mm x 2286 mm x 1549 mm

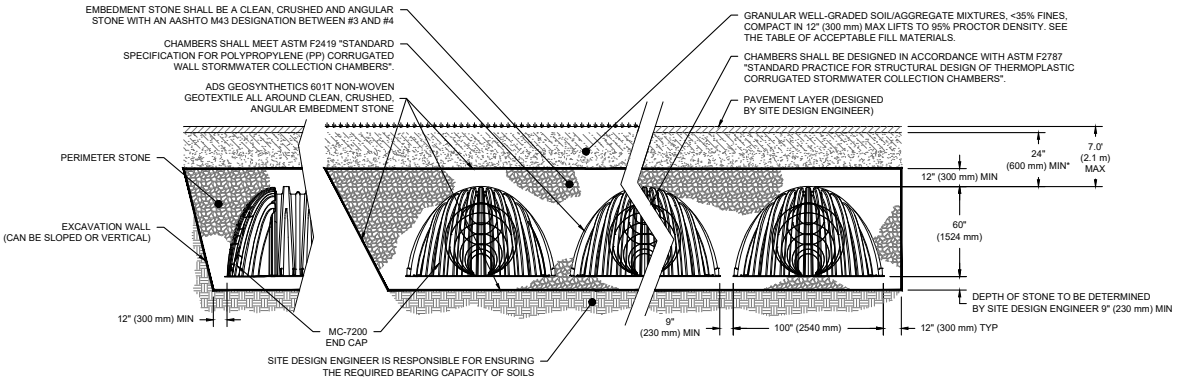
**End Cap Storage**
39.5 ft³ (1.12 m³)

**Min. Installed Storage***
115.3 ft³ (3.26 m³)

**Weight**
Nominal 90.0 lbs (40.8 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 12” (300 mm) of stone perimeter, 9” (230 mm) of stone between chambers/ end caps and 40% stone porosity.




*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

ADS StormTech™

# StormTech MC-7200 Specifications

## Storage Volume Per Chamber

| | Bare Chamber Storage ft³ (m³) | Chamber and Stone Foundation Depth in. (mm) | | | |
|---|---|---|---|---|---|
| | | 9 in (230 mm) | 12 in (300 mm) | 15 in (375 mm) | 18 in (450 mm) |
| Chamber | 175.9 (4.98) | 267.3 (7.57) | 273.3 (7.74) | 279.3 (7.91) | 285.3 (8.08) |
| End Cap | 39.5 (1.12) | 115.3 (3.26) | 118.6 (3.36) | 121.9 (3.45) | 125.2 (3.54) |

**Note:** Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter in front of end cap.

## Amount of Stone Per Chamber

| English Tons (yds³) | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9 in | 12 in | 15 in | 18 in |
| Chamber | 12.1 (8.5) | 12.9 (9.0) | 13.6 (9.6) | 14.3 (10.1) |
| End Cap | 9.8 (7.0) | 10.2 (7.3) | 10.6 (7.6) | 11.1 (7.9) |
| **Metric Kilograms (m³)** | **230 mm** | **300 mm** | **375 mm** | **450 mm** |
| Chamber | 10977 (6.5) | 11703 (6.9) | 12338 (7.3) | 12973 (7.7) |
| End Cap | 8890 (5.3) | 9253 (5.5) | 9616 (5.8) | 10069 (6.0) |

**Note:** Assumes 12" (300 mm) of stone above and 9" (230 mm) row spacing and 12" (300 mm) of perimeter stone in front of end caps. 1 yd³ = 1.42 english tons.

## Volume Excavation Per Chamber yd³ (m³)

| | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9 in (230 mm) | 12 in (300 mm) | 15 in (375mm) | 18 in (450 mm) |
| Chamber | 17.2 (13.2) | 17.7 (13.5) | 18.3 (14.0) | 18.8 (14.4) |
| End Cap | 9.7 (7.4) | 10.0 (7.6) | 10.3 (7.9) | 10.6 (8.1) |

**Note:** Assumes 9" (230 mm) of separation between chamber rows, 12" (300 mm) of perimeter in front of the end caps, and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

**Working on a project?**
**Visit us at www.stormtech.com and utilize the Design Tool**

ADS StormTech™

**adspipe.com**
800-821-6710

StormTech
Detention • Retention • Water Quality
An ADS company

# Isolator® Row O&M Manual


SC-740


MC-3500


MC-4500

THE MOST ADVANCED NAME IN WATER MANAGEMENT SOLUTIONS™

ADS®

# THE ISOLATOR® ROW

## INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.

## THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-160LP, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the SC-160LP, DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

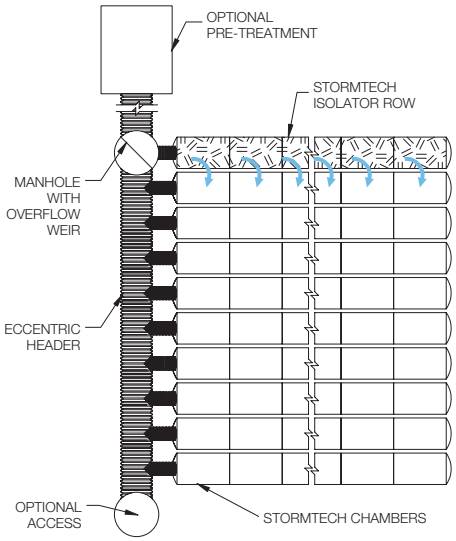
The Isolator Row is typically designed to capture the “first flush” and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

*Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.*

**Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.**

**StormTech Isolator Row with Overflow Spillway** (not to scale)



# ISOLATOR ROW INSPECTION/MAINTENANCE

## INSPECTION

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

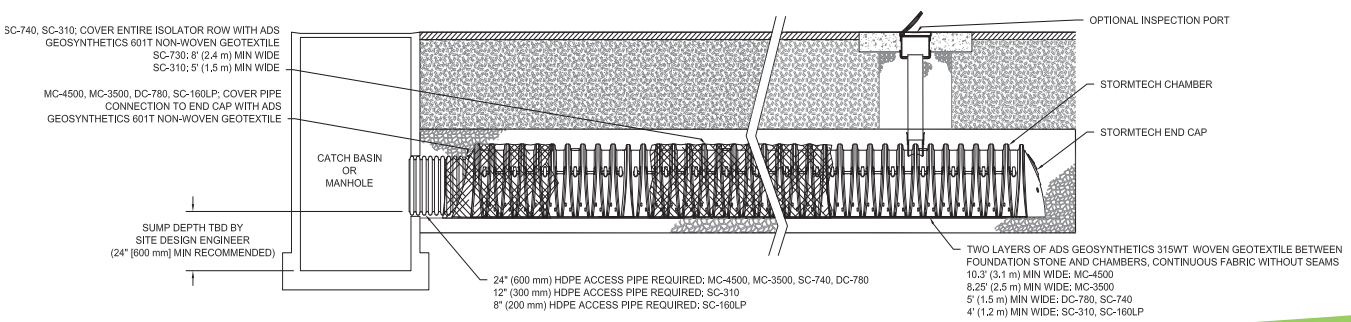
## MAINTENANCE

The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

**StormTech Isolator Row** (not to scale)

*Note: Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-4500 chamber models and is not required over the entire Isolator Row.*



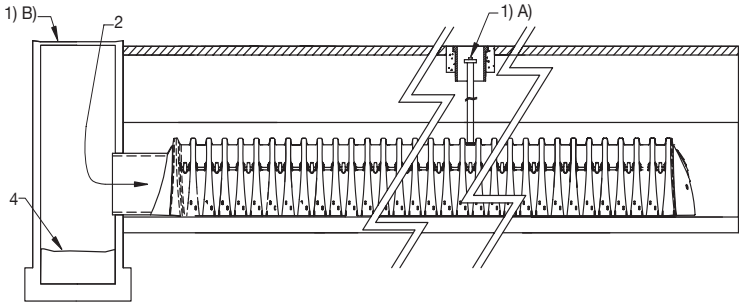
# ISOLATOR ROW STEP BY STEP MAINTENANCE PROCEDURES

**STEP 1**
Inspect Isolator Row for sediment.
- A) Inspection ports (if present)
  - i. Remove lid from floor box frame
  - ii. Remove cap from inspection riser
  - iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
  - iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.
- B) All Isolator Rows
  - i. Remove cover from manhole at upstream end of Isolator Row
  - ii. Using a flashlight, inspect down Isolator Row through outlet pipe
    1. Mirrors on poles or cameras may be used to avoid a confined space entry
    2. Follow OSHA regulations for confined space entry if entering manhole
  - iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2. If not, proceed to Step 3.

**STEP 2**
Clean out Isolator Row using the JetVac process.
- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

**STEP 3**
Replace all caps, lids and covers, record observations and actions.

**STEP 4**
Inspect & clean catch basins and manholes upstream of the StormTech system.




**SAMPLE MAINTENANCE LOG**

| Date | Stadia Rod Readings | | Sediment Depth (1)–(2) | Observations/Actions | Inspector |
|---|---|---|---|---|---|
| | Fixed point to chamber bottom (1) | Fixed point to top of sediment (2) | | | |
| 3/15/11 | 6.3 ft | none | | New installation. Fixed point is CI frame at grade | DJM |
| 9/24/11 | | 6.2 | 0.1 ft | Some grit felt | SM |
| 6/20/13 | | 5.8 | 0.5 ft | Mucky feel, debris visible in manhole and in Isolator Row, maintenance due | NV |
| 7/7/13 | 6.3 ft | | 0 | System jetted and vacuumed | DJM |



StormTech® Detention • Retention • Water Quality
A division of ADS®

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

# PSI Pacific Southwest Industries

**ENGINEERED - PUMPS/FLUID HANDLING & DISPOSAL SYSTEMS - PACKAGED LIFT STATIONS**

## LIFT STATION REQUIRED MAINTENANCE

The lift station should be inspected twice a year for proper operation, and should be checked for overabundance of solid matter such as grease and soap buildup.

Proper operation and inspection would include the following:

1) Automatic operation of the system by float activation. One pump starting at lead on levels, second pump starting at high level conditions; manual operation by use of the selector switches.

2) Inspect floats for proper elevation and for proper movement. Correct any obstructions.

3) Check incoming power for proper voltage. Check voltage at motor connections.

4) Check amperage of each motor.

5) Hose down lift station to clean the walls of the wet well, pumps and floats.

## MECHANICAL SEAL INSPECTION OF PUMPS

Inspection of the mechanical seals should be done every two years.

The inspection will include the following:

Pull pump out of wet well. Remove oil seal plug and inspect the oil for clarity. Clear oil indicates no water intrusion and chamber is to be topped off with 30 weight turbine oil. If oil is cloudy the mechanical seal and oil needs to be replaced.

PSI recommends that preventive maintenance and service be performed by a qualified technician.

Any question regarding your lift station should be directed to Scott Richardson at 800-358-9095.

P O Box 520 Lake Elsinore, CA 92531 – 18541 Collier Ave., Lake Elsinore, CA 92530
(800) 358-9095 (909) 674-2144 fax (909) 674-9444 CSL #583052
www.psipumps.com Email: info@psipumps.com

Bio Clean
A Forterra Company

**Maintenance Overview –**

A. Every installed WetlandMOD unit is to be maintained by the Supplier, or a Supplier approved contractor. The cost of this service varies among providers.

B. The WetlandMOD is a multi-stage self-contained treatment train for stormwater treatment. Each stage protects subsequent stages from clogging. Stages include: screening, separation, and Biofiltration. The biofiltration stage contains various types of vegetation which will require annual evaluation and trimming.

1. **Clean Bio Clean® Pre-Filter Screen –** Screening is provided by well proven continuous modular screen filter. The filter removes gross solids, including litter, and sediments greater than 5 mm. This procedure is easily done by hand or with a small industrial vacuum device.

2. **Clean Separation (sediment) Chamber –** separation occurs in the pre-treatment chamber. This chamber targets TSS, and particulate metals and nutrients. This procedure can be performed with a standard vacuum truck. This chamber is located directly under the manhole, hatch, or grate access cover.

3. **Trim Vegetation –** The system utilizes multiple plants in the biofiltration chamber to provide enhanced treatment. The vegetation will need to be maintained (trimmed) as needed. This can be done as part of the project normal landscape maintenance. NO FERTILIZER SHALL BE USED IN THIS CHAMBER.

4. **Evaluate Biofiltration Media Flow Hydraulic Conductivity –** The systems flow can be assessed from the discharge. This should be done during a rain event. By viewing into the discharge pipe the flow out of the system can be observed. If little to no flow is observed this is a sign of potential Biofiltration media maintenance needs.

5. Biofiltration Media Replacement –This filter contains a mix that supports abundant plant life. Replacement of the media is simple. Removal of spent media can be done with a shovel of a vacuum truck.

C. The WetlandMOD pre-filter, separation chamber, and Biofiltration media are designed to allow for the use of vacuum removal of captured pollutants and spent filter media by centrifugal compressor vacuum units without causing damage to the filter or during normal cleaning and maintenance. Filter and chambers can be cleaned from finish surface through standard manhole, hatch, or grate access.

**Maintenance Procedures –**

1. Clean Bio Clean® Pre-Filter – Bio Clean recommends the **pre-filter** be inspected and cleaned a minimum of once every six months. The procedure is easily done with the use of any standard vacuum truck. *This procedure takes approximately 15 minutes.*

1. Remove grate, manhole, or hatch to gain access to catch basin filter insert. Where possible the maintenance should be performed from the ground surface. Note: entry into an underground stormwater vault such as an inlet vault may require certification in confined space training.
2. Remove all trash, debris, organics, and sediments collected by the pre-filter. Removal of the trash and debris can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screen of the filter.
3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements. Hazardous material can only be handled by a certified hazardous waste trained person (minimum 24-hour hazwoper).

2. Clean Separation (sediment) Chamber – Bio Clean recommends the **separation chamber** be inspected and cleaned a minimum of once a year. The procedure is easily done with the use of any standard vacuum truck. *This procedure takes approximately 30 minutes.*

1. Remove grate, manhole, or hatch to gain access to the Separation Chamber.
2. Where possible the maintenance should be performed from the ground surface. Note: entry into an underground stormwater vault such as an inlet vault may require certification in confined space training.
3. With a pressure washer spray down pollutants accumulated on walls and pre-filters.
4. Vacuum out separation chamber and remove all accumulated debris and sediments.
5. Replace grate, manhole, or hatch cover.
6. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

3. Trim Vegetation – Bio Clean recommends the plants/vegetation be inspected and maintained a minimum of once a year. It is also recommended that the plants receive the same care as other landscaped areas. Note: No fertilizer is to be used on this area. *Trimming of vegetation takes approximately 15 minutes.*

4. Evaluate Biofiltration Media Flow Hydraulic Conductivity – Bio Clean recommends system flow be inspected and observed a minimum of once a year. This needs to be done during a rain event. *Inspection and Observation takes approximately 5 minutes.*

1. Observe discharge out of system
2. Observe the level of flow from the bottom of the pipe.
3. If flow is steady and high the system is operating normally.
4. If little or no flow is observed exiting the discharge pipe possible maintenance to the Biofiltration media may be needed. Contact Bio Clean for further assistance.

5. Biofiltration Media Replacement – Bio Clean recommends the Biofiltration media be replaced a minimum of one every 20 years. *Inspection takes approximately 15 minutes. Replacement of rock media takes approximately 6 hours and requires a vacuum truck.*

1. Remove plants from the Biofiltration chamber.
2. Use a vacuum truck or shovel to remove all wetland media.
3. Spray down the walls and floor of the chamber and vacuum out any accumulated pollutants.
4. Spray down perforated piping and netting of flow matrix and the inflow and outflow end to remove any accumulated pollutants.
5. Vacuum out any standing water from the media removal and insure the chamber is cleaning.
6. Use a small backhoe to fill chamber with new media. Call Bio Clean for media delivery information.
7. Plant new vegetation in the same configuration and quantity as old vegetation.
8. Spray down the plants and media with water to saturate.
9. Continue supplemental irrigation (spray or drip) for at lest 90 days.

6. Other Maintenance Notes –

1. Following maintenance and/or inspection, the maintenance operator shall prepare a maintenance/inspection record. The record shall include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanism. .
2. The owner shall retain the maintenance/inspection record for a minimum of five years from the date of maintenance. These records shall be made available to the governing municipality for inspection upon request at any time.
3. Any person performing maintenance activities must have completed a minimum of OSHA 24-hour hazardous waste worker (hazwoper) training.
4. Remove access manhole lid or grate to gain access to filter screens and sediment chambers. Where possible the maintenance should be performed

from the ground surface. Note: entry into an underground stormwater vault such as an inlet vault requires certification in confined space training.

5. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
6. The hydrocarbon boom is classified as hazardous material and will have to be picked up and disposed of as hazardous waste. Hazardous material can only be handled by a certified hazardous waste trained person (minimum 24-hour hazwoper).

# 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

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

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

Weather Condition _____ Additional Notes _____

## 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:

# 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:

# APPENDIX E

# Educational Materials

# Non-Stormwater Discharges SC-10

## Description

Non-stormwater discharges (NSWDs) are flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain if local regulations allow. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include: potable water sources, fire hydrant flushing, air conditioner condensate, landscape irrigation drainage and landscape watering, emergency firefighting, etc. as discussed in Section 2.

However there are certain non-stormwater discharges that pose an environmental concern. These discharges may originate from illegal dumping of industrial material or wastes and illegal connections such as internal floor drains, appliances, industrial processes, sinks, and toilets that are illegally connected to the nearby storm drainage system through on-site drainage and piping. These unauthorized discharges (examples of which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains.

Non-stormwater discharges will need to be addressed through a combination of detection and elimination. The ultimate goal is to effectively eliminate unauthorized non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of

| Objectives |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |
| ■ *Product Substitution* |

| Targeted Constituents | |
|---|---|
| *Sediment* | |
| *Nutrients* | ✓ |
| *Trash* | |
| *Metals* | ✓ |
| *Bacteria* | ✓ |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

pollutants on streets and into the storm drain system and downstream water bodies.

## Approach

Initially the Discharger must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is the elimination of unauthorized non-stormwater discharges. See other BMP Fact Sheets for activity-specific pollution prevention procedures.

### *General Pollution Prevention Protocols*

- Implement waste management controls described in SC-34 Waste Handling and Disposal.

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" or similar stenciled or demarcated next to them to warn against ignorant or unintentional dumping of pollutants into the storm drainage system.

- Manage and control sources of water such as hose bibs, faucets, wash racks, irrigation heads, etc. Identify hoses and faucets in the SWPPP, and post signage for appropriate use.

### *Non-Stormwater Discharge Investigation Protocols*

Identifying the sources of non-stormwater discharges requires the Discharger to conduct an investigation of the facility at regular intervals. There are several categories of non-stormwater discharges:

- Visible, easily identifiable discharges, typically generated as surface runoff, such as uncontained surface runoff from vehicle or equipment washing; and

- Non-visible, (e.g., subsurface) discharges into the site drainage system through a variety of pathways that are not obvious.

The approach to detecting and eliminating non-stormwater discharges will vary considerably, as discussed below:

### *Visible and identifiable discharges*

- Conduct routine inspections of the facilities and of each major activity area and identify visible evidence of unauthorized non-stormwater discharges. This may include:

  - ✓ Visual observations of actual discharges occurring;

- ✓ Evidence of surface staining, discoloring etc. that indicates that discharges have occurred;
- ✓ Pools of water in low lying areas when a rain event has not occurred; and
- ✓ Discussions with operations personnel to understand practices that may lead to unauthorized discharges.

- ☐ If evidence of non-stormwater discharges is discovered:
  - ✓ Document the location and circumstances using Worksheets 5 and 6 (Section 2 of the manual), including digital photos;
  - ✓ Identify and implement any quick remedy or corrective action (e.g., moving uncovered containers inside or to a proper location); and
  - ✓ Develop a plan to eliminate the discharge. Consult the appropriate activity-specific BMP Fact Sheet for alternative approaches to manage and eliminate the discharge.

- ☐ Consult the appropriate activity-specific BMP Fact Sheet for alternative approaches to manage and eliminate the discharge. Make sure the facility SWPPP is up-to-date and includes applicable BMPs to address the non-stormwater discharge.

***Other Illegal Discharges (Non visible)***

*Illicit Connections*

- ☐ Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of "as-built" piping schematics.
- ☐ Isolate problem areas and plug illicit discharge points.
- ☐ Locate and evaluate discharges to the storm drain system.
- ☐ Visual Inspection and Inventory:
  - ✓ Inventory and inspect each discharge point during dry weather.
  - ✓ Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system.
  - ✓ Non-stormwater discharges are often intermittent and may require periodic inspections.

*Review Infield Piping*

- ☐ A review of the "as-built" piping schematic is a way to determine if there are any connections to the stormwater collection system.

- Inspect the path of loading/unloading area drain inlets and floor drains in older buildings.

- Never assume storm drains are connected to the sanitary sewer system.

*Monitoring for investigation/detection of illegal discharges*

- If a suspected illegal or unknown discharge is detected, monitoring of the discharge may help identify the content and/or suggest the source. This may be done with a field screening analysis, flow meter measurements, or by collecting a sample for laboratory analysis. Section 5 and Appendix D describe the necessary field equipment and procedures for field investigations.

- Investigative monitoring may be conducted over time. For example if, a discharge is intermittent, then monitoring might be conducted to determine the timing of the discharge to determine the source.

- Investigative monitoring may be conducted over a spatial area. For example, if a discharge is observed in a pipe, then monitoring might be conducted at accessible upstream locations in order to pinpoint the source of the discharge.

- Generally, investigative monitoring requiring collection of samples and submittal for lab analysis requires proper planning and specially trained staff.

*Smoke Testing*

Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two piping systems. Smoke testing is generally performed at a downstream location and the smoke is forced upstream using blowers to create positive pressure. The advantage to smoke testing is that it can potentially identify multiple potential discharge sources at once.

- Smoke testing uses a harmless, non-toxic smoke cartridges developed specifically for this purpose.

- Smoke testing requires specialized equipment (e.g., cartridges, blowers) and is generally only appropriate for specially trained staff.

- A Standard Operating Procedure (SOP) for smoke testing is highly desirable. The SOP should address the following elements:

  - ✓ Proper planning and notification of nearby residents and emergency services is necessary since introducing smoke into the system may result in false alarms;

  - ✓ During dry weather, the stormwater collection system is filled with smoke and then traced back to sources;

- ✓ Temporary isolation of segments of pipe using sand bags is often needed to force the smoke into leaking pipes; and
- ✓ The appearance of smoke in a waste vent pipe, at a sewer manhole, or even the base of a toilet indicates that there may be a connection between the sanitary and storm water systems.

- Most municipal wastewater agencies will have necessary staff and equipment to conduct smoke testing and they should be contacted if cross connections with the sanitary sewer are suspected. See SC-44 Drainage System Maintenance for more information.

*Dye Testing*

- Dye testing is typically performed when there is a suspected specific pollutant source and location (i.e., leaking sanitary sewer) and there is evidence of dry weather flows in the stormwater collection system.
- Dye is released at a probable upstream source location, either the facility's sanitary or process wastewater system. The dye must be released with a sufficient volume of water to flush the system.
- Operators then visually examine the downstream discharge points from the stormwater collection system for the presence of the dye.
- Dye testing can be performed informally using commercially available products in order to conduct an initial investigation for fairly obvious cross-connections.
- More detailed dye testing should be performed by properly trained staff and follow SOPs. Specialized equipment such as fluorometers may be necessary to detect low concentrations of dye.
- Most municipal wastewater agencies will have necessary staff and equipment to conduct dye testing and they should be contacted if cross connections with the sanitary sewer are suspected.

*TV Inspection of Drainage System*

- Closed Circuit Television (CCTV) can be employed to visually identify illicit connections to the industrial storm drainage system. Two types of CCTV systems are available: (1) a small specially designed camera that can be manually pushed on a stiff cable through storm drains to observe the interior of the piping, or (2) a larger remote operated video camera on treads or wheels that can be guided through storm drains to view the interior of the pipe.
- CCTV systems often include a high-pressure water jet and camera on a flexible cable. The water jet cleans debris and biofilm off the inside of pipes so the camera can take video images of the pipe condition.

- CCTV units can detect large cracks and other defects such as offsets in pipe ends caused by root intrusions or shifting substrate.
- CCTV can also be used to detect dye introduced into the sanitary sewer.
- CCTV inspections require specialized equipment and properly trained staff and are generally best left to specialized contractors or municipal public works staff.

***Illegal Dumping***

- Substances illegally dumped on streets and into the storm drain systems and creeks may include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. These wastes can cause stormwater and receiving water quality problems as well as clog the storm drain system itself.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - ✓ Illegal dumping hot spots;
  - ✓ Types and quantities (in some cases) of wastes;
  - ✓ Patterns in time of occurrence (time of day/night, month, or year);
  - ✓ Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills);
  - ✓ An anonymous tip/reporting mechanism; and
  - ✓ Evidence of responsible parties (e.g., tagging, encampments, etc.).
- One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

Once a site has been cleaned:

- Post "No Dumping" signs with a phone number for reporting dumping and disposal.
- Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.
- See fact sheet SC-11 Spill Prevention, Control, and Cleanup.

*Inspection*

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

***Spill and Leak Prevention and Response***

- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.
- See SC-11 Spill Prevention Control and Cleanup.

***Employee Training Program***

- Training of technical staff in identifying and documenting illegal dumping incidents is required. The frequency of training must be presented in the SWPPP, and depends on site-specific industrial materials and activities.
- Consider posting a quick reference table near storm drains to reinforce training.
- Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.
- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan. Employees should be able to identify work/jobs with high potential for spills and suggest methods to reduce possibility.
- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.

- Conduct spill response drills annually (if no events occurred) in order to evaluate the effectiveness of the plan.
- When a responsible party is identified, educate the party on the impacts of his or her actions.


***Quality Assurance and Record Keeping***

*Performance Evaluation*

- Annually review internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.
- Develop document and data management procedures.
- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.
- Annually document and report the results of the program.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.
- Document training activities.

## Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds."

- Many facilities do not have accurate, up-to-date 'as-built' plans or drawings which may be necessary in order to conduct non-stormwater discharge assessments.
  - ✓ Online tools such as Google Earth™ can provide an aerial view of the facility and may be useful in understanding drainage patterns and potential sources of non-stormwater discharges
  - ✓ Local municipal jurisdictions may have useful drainage systems maps.

- Video surveillance cameras are commonly used to secure the perimeter of industrial facilities against break-ins and theft. These surveillance systems may also be useful for capturing illegal dumping activities. Minor, temporary adjustments to the field of view of existing surveillance camera systems to target known or suspected problem areas may be a cost-effective way of capturing illegal dumping activities and identifying the perpetrators.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

- Capital facility cost requirements may be minimal unless cross-connections to storm drains are detected.
- Indoor floor drains may require re-plumbing if cross-connections are detected.
- Leaky sanitary sewers will require repair or replacement which can have significant costs depending on the size and industrial activity at the facility.

### *Maintenance (including administrative and staffing)*

- The primary effort is for staff time and depends on how aggressively a program is implemented.
- Costs for containment, and disposal of any leak or discharge is borne by the Discharger.
- Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

## Supplemental Information

### *Permit Requirements*

The IGP authorizes certain Non-Storm Water Discharges (NSWDs) provided BMPs are included in the SWPPP and implemented to:

- Reduce or prevent the contact of authorized NSWDs with materials or equipment that are potential sources of pollutants;
- Reduce, to the extent practicable, the flow or volume of authorized NSWDs;
- Ensure that authorized NSWDs do not contain quantities of pollutants that cause or contribute to an exceedance of a water quality standards (WQS); and,

- Reduce or prevent discharges of pollutants in authorized NSWDs in a manner that reflects best industry practice considering technological availability and economic practicability and achievability."

## References and Resources

Center for Watershed Protection, 2004. *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, EPA Cooperative Agreement X-82907801-0.

Dublin San Ramon Sanitation District. http://www.dsrsd.com/wwrw/smoketest.html.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Sacramento Stormwater Management Program, *Best Management Practices for Industrial Storm Water Pollution Control*, Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

Santa Clara Valley Urban Runoff Pollution Prevention Program. http://www.scvurppp.org.

Southern California Coastal Water Research Project, 2013. *The California Microbial Source Identification Manual: A Tiered Approach to Identifying Fecal Pollution Sources to Beaches,* Technical Report 804.

The Storm Water Managers Resource Center, http://www.stormwatercenter.net/.

US EPA. National Pollutant Discharge Elimination System. Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=111.

WEF Press Alexandria, Virginia, 2009.Existing Sewer Evaluation and Rehabilitation: *WEF Manual of Practice No. FD-6 ASCE/EWRI Manuals and Reports on Engineering Practice No. 62, Third Edition.*

# Spill Prevention, Control & Cleanup SC-11

## Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental spills. Preparation for accidental spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify hazardous material storage areas, specify material handling procedures, describe spill response procedures, and provide locations of spill clean-up equipment and materials. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills. An adequate supply of spill clean-up materials must be maintained onsite.

| Objectives |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |
| ■ *Product Substitution* |

| Targeted Constituents | |
|---|---|
| *Sediment* | |
| *Nutrients* | |
| *Trash* | |
| *Metals* | ✓ |
| *Bacteria* | |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | |
| *Preventative Maintenance* | |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

## Approach

### *General Pollution Prevention Protocols*

- ☐ Develop procedures to prevent/mitigate spills to storm drain systems.
- ☐ Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.
- ☐ Establish procedures and/or controls to minimize spills and leaks. The procedures should address:
  - ✓ Description of the facility, owner and address, activities, chemicals, and quantities present;

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- ✓ Facility map of the locations of industrial materials;
- ✓ Notification and evacuation procedures;
- ✓ Cleanup instructions;
- ✓ Identification of responsible departments; and
- ✓ Identify key spill response personnel.

- ☐ Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

### *Spill and Leak Prevention and Response*

*Spill Prevention*

- ☐ Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- ☐ If illegal dumping is observed at the facility:

  - ✓ Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - ✓ Landscaping and beautification efforts may also discourage illegal dumping.
  - ✓ Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- ☐ Store and contain liquid materials in such a manner that if the container is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

- ☐ If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

### *Preventative Maintenance*

- ☐ Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.

- ☐ Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.

- Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain.*

- Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- Label all containers according to their contents (e.g., solvent, gasoline).

- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).

- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).

- Identify key spill response personnel.

*Spill Response*

- Clean up leaks and spills immediately.

- Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).

- On paved surfaces, clean up spills with as little water as possible.

  - ✓ Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills.

  - ✓ If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

  - ✓ If possible use physical methods for the cleanup of dry chemicals (e.g., brooms, shovels, sweepers, or vacuums).

- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.

- Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.

- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

*Reporting*

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board or local authority as location regulations dictate.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).
- Report spills to 911 for dispatch and clean-up assistance when needed. Do not contact fire agencies directly.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - ✓ Types and quantities (in some cases) of wastes;
  - ✓ Patterns in time of occurrence (time of day/night, month, or year);
  - ✓ Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills);
  - ✓ Clean-up procedures; and
  - ✓ Responsible parties.

***Employee Training Program***

- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills:
  - ✓ The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur; and
  - ✓ Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.
- Train employees to recognize and report illegal dumping incidents.

### *Other Considerations (Limitations and Regulations)*

- State regulations exist for facilities with a storage capacity of 10,000 gallons or more of petroleum to prepare a Spill Prevention Control and Countermeasure (SPCC) Plan (Health & Safety Code Chapter 6.67).
- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.
- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

## Requirements

### *Costs (including capital and operation & maintenance)*

- Will vary depending on the size of the facility and the necessary controls.
- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

### *Maintenance (including administrative and staffing)*

- Develop spill prevention and control plan, provide and document training, conduct inspections of material storage areas, and supply spill kits.
- Extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

## Supplemental Information

### *Further Detail of the BMP*

*Reporting*

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident;
- Weather conditions;
- Duration of the spill/leak/discharge;

- Cause of the spill/leak/discharge;
- Response procedures implemented;
- Persons notified; and
- Environmental problems associated with the spill/leak/discharge.

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- Date and time the inspection was performed;
- Name of the inspector;
- Items inspected;
- Problems noted;
- Corrective action required; and
- Date corrective action was taken.

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

*Aboveground Tank Leak and Spill Control*

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems;
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves);
- External corrosion and structural failure;
- Spills and overfills due to operator error; and
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa.

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanges, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.
- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.

- Periodically conduct integrity testing by a qualified professional.

*Vehicle Leak and Spill Control*

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

*Vehicle and Equipment Maintenance*

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use absorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

*Vehicle and Equipment Fueling*

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:

  Cover fueling area if possible.

  Use a perimeter drain or slope pavement inward with drainage to a sump.

  Pave fueling area with concrete rather than asphalt.

- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage "topping-off" of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use absorbent materials on small spills and general cleaning rather than hosing down the area. Remove the absorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

### *Industrial Spill Prevention Response*

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities.

The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department).
- Develop procedures to prevent/mitigate spills to storm drain systems.
- Identify responsible departments.

- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.
- Address spills at municipal facilities, as well as public areas.
- Provide training concerning spill prevention, response and cleanup to all appropriate personnel.

## References and Resources

California's Nonpoint Source Program Plan. http://www.swrcb.ca.gov/nps/index.html.

Clark County Storm Water Pollution Control Manual. Available online at: http://www.co.clark.wa.us/pubworks/bmpman.pdf.

King County Storm Water Pollution Control Manual. Available online at: http://dnr.metrokc.gov/wlr/dss/spcm.htm.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities

Santa Clara Valley Urban Runoff Pollution Prevention Program. http://www.scvurppp.org.

The Stormwater Managers Resource Center. http://www.stormwatercenter.net/.

# Outdoor Loading/Unloading SC-30

## Description

The loading/unloading of materials usually takes place outside on docks or terminals; therefore, materials spilled, leaked, or lost during loading/unloading may collect in the soil or on other surfaces and have the potential to be carried away by wind, stormwater runoff or when the area is cleaned. Additionally, rainfall may wash pollutants from machinery used to unload or move materials. Implementation of the following protocols will prevent or reduce the discharge of pollutants to stormwater from outdoor loading/unloading of materials.

## Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *General Pollution Prevention Protocols*

- Park tank trucks or delivery vehicles in designated areas so that spills or leaks can be contained.
- Limit exposure of material to rainfall whenever possible.
- Prevent stormwater run-on.
- Check equipment regularly for leaks.

### *Good Housekeeping*

- Develop an operations plan that describes procedures for loading and/or unloading.
- Conduct loading and unloading in dry weather if possible.

| Objectives |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |
| ■ *Product Substitution* |

| Targeted Constituents | |
|---|---|
| *Sediment* | ✓ |
| *Nutrients* | ✓ |
| *Trash* | |
| *Metals* | ✓ |
| *Bacteria* | |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | ✓ |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- Cover designated loading/unloading areas to reduce exposure of materials to rain.
- Consider placing a seal or door skirt between delivery vehicles and building to prevent exposure to rain.
- Design loading/unloading area to prevent stormwater run-on, which would include grading or berming the area, and position roof downspouts so they direct stormwater away from the loading/unloading areas.
- Have employees load and unload all materials and equipment in covered areas such as building overhangs at loading docks if feasible.
- Load/unload only at designated loading areas.
- Use drip pans underneath hose and pipe connections and other leak-prone spots during liquid transfer operations, and when making and breaking connections. Several drip pans should be stored in a covered location near the liquid transfer area so that they are always available, yet protected from precipitation when not in use. Drip pans can be made specifically for railroad tracks. Drip pans must be cleaned periodically, and drip collected materials must be disposed of properly.
- Pave loading areas with concrete instead of asphalt.
- Avoid placing storm drains inlets in the area.
- Grade and/or berm the loading/unloading area with drainage to sump; regularly remove materials accumulated in sump.

### *Spill Response and Prevention Procedures*

- Keep your spill prevention and control plan up-to-date or have an emergency spill cleanup plan readily available, as applicable.
- Contain leaks during transfer.
- Store and maintain appropriate spill cleanup materials in a location that is readily accessible and known to all employees.
- Ensure that employees are familiar with the site's spill control plan and proper spill cleanup procedures.
- Use drip pans or comparable devices when transferring oils, solvents, and paints.

### *Material Handling and Waste Management*

- Spot clean leaks and drips routinely to prevent runoff of spillage.
- Do not pour liquid wastes into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.

- Do not put used or leftover cleaning solutions, solvents, and automotive fluids in the storm drain or sanitary sewer.
- Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.
- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- Minimize the possibility of stormwater pollution from outside waste receptacles by doing at least one of the following:
  - ✓ Use only watertight waste receptacle(s) and keep the lid(s) closed.
  - ✓ Grade and pave the waste receptacle area to prevent run-on of stormwater.
  - ✓ Install a roof over the waste receptacle area.
  - ✓ Install a low containment berm around the waste receptacle area.
  - ✓ Use and maintain drip pans under waste receptacles.
- Post "no littering" signs.
- Perform work area clean-up and dry sweep after daily operations.

### *Employee Training Program*

- Train employees (e.g., fork lift operators) and contractors on proper spill containment and cleanup.
- Have employees trained in spill containment and cleanup present during loading/unloading.
- Train employees in proper handling techniques during liquid transfers to avoid spills.
- Make sure forklift operators are properly trained on loading and unloading procedures.


### *Quality Assurance and Record Keeping*

- Keep accurate maintenance logs that document activities performed, quantities of materials removed, and improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.
- Keep accurate logs of daily clean-up operations.

## Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds."

- Space and time limitations may preclude all transfers from being performed indoors or under cover.
  - ✓ Designate specific areas for outdoor loading and unloading.
  - ✓ Require employees to understand and follow spill and leak prevention BMPs.
- It may not be possible to conduct transfers only during dry weather.
  - ✓ Limit materials and equipment rainfall exposure to all extents practicable.
  - ✓ Require employees to understand and follow spill and leak prevention BMPs.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

Many facilities will already have indoor or covered areas where loading/unloading takes place and will require no additional capital expenditures.

If outdoor activities are required, construction of berms or other means to retain spills and leaks may require appropriate constructed systems for containment. These containment areas may require significant new capital investment.

Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

### *Maintenance*

Most of the operations and maintenance activities associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore additional O&M is not required.

- Conduct regular inspections and make repairs and improvements as necessary.
- Check loading and unloading equipment regularly for leaks.
- Conduct regular broom dry-sweeping of area. Do not wash with water.

## Supplemental Information

### *Loading and Unloading of Liquids*

- Loading or unloading of liquids should occur in the manufacturing building so that any spills that are not completely retained can be discharged to the sanitary sewer,

treatment plant, or treated in a manner consistent with local sewer authorities and permit requirements.

- For loading and unloading tank trucks to above and below ground storage tanks, the following procedures should be used:
  - ✓ The area where the transfer takes place should be paved. If the liquid is reactive with the asphalt, Portland cement should be used to pave the area.
  - ✓ The transfer area should be designed to prevent run-on of stormwater from adjacent areas. Sloping the pad and using a curb, like a speed bump, around the uphill side of the transfer area should reduce run-on.
  - ✓ The transfer area should be designed to prevent runoff of spilled liquids from the area. Sloping the area to a drain should prevent runoff. The drain should be connected to a dead-end sump or to the sanitary sewer. A positive control valve should be installed on the drain.
- For transfer from rail cars to storage tanks that must occur outside, use the following procedures:
  - ✓ Drip pans should be placed at locations where spillage may occur, such as hose connections, hose reels, and filler nozzles. Use drip pans when making and breaking connections.
  - ✓ Drip pan systems should be installed between the rails to collect spillage from tank cars.

## References and Resources

Minnesota Pollution Control Agency, *Industrial Stormwater Best Management Practices Guidebook BMP 26 Fueling and Liquid Loading/Unloading Operations*. Available online at: http://www.pca.state.mn.us/index.php/view-document.html?gid=10557.

New Jersey Department of Environmental Protection, 2013. *Basic Industrial Stormwater General Permit Guidance Document NJPDES General Permit No NJ0088315*. Available online at: http://www.nj.gov/dep/dwq/pdf/5G2_guidance_color.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Oregon Department of Environmental Quality, 2013. *Industrial Stormwater Best Management Practices Manual- BMP 26 Fueling and Liquid Loading/Unloading Operations*. Available online at: http://www.deq.state.or.us/wq/wqpermit/docs/IndBMP021413.pdf.

Sacramento Stormwater Management Program, *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

Sacramento County Environmental Management Stormwater Program: *Best Management Practices*. Available online at: http://www.emd.saccounty.net/EnvHealth/Stormwater/Stormwater-BMPs.html.

Santa Clara Valley Urban Runoff Pollution Prevention Program. http://www.scvurppp-w2k.com/.

US EPA. National Pollutant Discharge Elimination System – Industrial Fact Sheet Series for Activities Covered by EPA's Multi Sector General Permit. Available online at: http://cfpub.epa.gov/npdes/stormwater/swsectors.cfm.

# Outdoor Equipment Operations SC-32

## Description

Outside process equipment operations and maintenance can contaminate stormwater runoff. Activities, such as grinding, painting, coating, sanding, degreasing or parts cleaning, landfills and waste piles, and solid waste treatment and disposal are examples of process operations that can lead to contamination of stormwater runoff. The targeted constituents will vary for each site depending on the operation being performed.

## Approach

Implement source control BMPs to limit exposure of outdoor equipment to direct precipitation and stormwater run-on. Refer to SC-22 Vehicle and Equipment Repair for additional information.

### *General Pollution Prevention Protocols*

- ☐ Perform the activity during dry periods whenever possible.
- ☐ Install secondary containment measures where leaks and spills may occur.
- ☐ Use non-toxic chemicals for maintenance and minimize or eliminate the use of solvents.
- ☐ Connect process equipment area to public sanitary sewer or facility wastewater treatment system when possible. Some jurisdictions require that secondary containment areas be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

### *Good Housekeeping*

- ☐ Manage materials and waste properly (see Material Handling and Waste Management) to reduce adverse impacts on stormwater quality.

| Objectives |
|---|
| ■ Cover |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |

| Targeted Constituents | |
|---|---|
| *Sediment* | ✓ |
| *Nutrients* | ✓ |
| *Trash* | ✓ |
| *Metals* | ✓ |
| *Bacteria* | ✓ |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | ✓ |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | ✓ |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- Cover the work area with a permanent roof if possible.
- Use drop cloths for sanding and painting operations.
- Use a vacuum for fine particle clean-up in pavement cracks and crevices.
- Minimize contact of stormwater with outside process equipment operations through berming and drainage routing (run-on prevention).
- "Spot clean" leaks and drips routinely. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.
- Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- Use roll down or permanent walls when windy/breezy to prevent wind transport of particulates/pollutants.

***Preventative Maintenance***

- Design outdoor equipment areas to prevent stormwater runoff and spills. Use a perimeter drain or slope pavement inward with drainage to sump.
- Dry clean the work area regularly. Do not wash outdoor equipment with water if there is a direct connection to the storm drain.
- Pave area with concrete rather than asphalt.
- Inspect outdoor equipment regularly for leaks or spills. Also check for structural failure, spills and overfills due to operator error, and/or failure of piping system.
- Inspect and clean, if necessary, storm drain inlets and catch basins within the outdoor equipment area before October 1 each year.

***Spill Response and Prevention Procedures***

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Have employees trained in emergency spill cleanup procedures present when dangerous waste, liquid chemicals, or other wastes are delivered.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Prevent operator errors by using engineering safe guards and thus reducing accidental releases of pollutant.

***Material Handling and Waste Management***

- Do not pour liquid wastes into floor drains, sinks, outdoor storm drain inlets, or other storm drain or sewer connections.
- Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.
- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- Minimize the possibility of stormwater pollution from outside waste receptacles by doing at least one of the following:
  - ✓ Use only watertight waste receptacle(s) and keep the lid(s) closed.
  - ✓ Grade and pave the waste receptacle area to prevent run-on of stormwater.
  - ✓ Install a roof over the waste receptacle area.

### *Employee Training Program*

- Educate employees about pollution prevention measures and goals.
- Train employees on proper equipment operation and maintenance procedures.
- Train all employees upon hiring and annually thereafter on proper methods for handling and disposing of waste. Ensure that all employees understand stormwater discharge prohibitions, wastewater discharge requirements, and these best management practices.
- Use a training log or similar method to document training.
- Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.


### *Quality Assurance and Record Keeping*

- Keep accurate maintenance logs that document minimum BMP activities performed for outdoor equipment, types and quantities of materials removed and disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

## Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds."

- Providing cover over outdoor equipment may be impractical or cost-prohibitive.
  - ✓ Operate outdoor equipment only during periods of dry weather.
- Regular operations and time limitations may require outdoor activities during wet weather.
  - ✓ Designate specific areas for outdoor activities.
  - ✓ Allow time for work area clean-up after each shift.
  - ✓ Require employees to understand and follow preventive maintenance and spill and leak prevention BMPs.
  - ✓ Design and install secondary containment and good housekeeping BMPs for outdoor equipment area.
- Storage sheds often must meet building and fire code requirements.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

- Many facilities will already have indoor covered areas where vehicle and equipment repairs take place and will require no additional capital expenditures.
- If outdoor activities are required, construction of berms or other means to retain spills and leaks may require appropriate constructed systems for containment. These containment areas may require significant new capital investment.
- Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

### *Maintenance*

- Most of the operations and maintenance activities associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore additional O&M is not required.
- For facilities responsible for pre-treating their wastewater prior to discharging, the proper functioning of structural treatment system is an important maintenance consideration.
- Routine cleanout of oil and grease is required for the devices to maintain their effectiveness, usually at least once a month. During periods of heavy rainfall, cleanout is required more often to ensure pollutants are not washed through the trap. Sediment removal is also required on a regular basis to keep the device working efficiently.

## References and Resources

Minnesota Pollution Control Agency. *Industrial Stormwater Best Management Practices Guidebook BMP 26 Fueling and Liquid Loading/Unloading Operations*. Available online at: http://www.pca.state.mn.us/index.php/view-document.html?gid=10557.

New Jersey Department of Environmental Protection, 2013. *Basic Industrial Stormwater General Permit Guidance Document NJPDES General Permit No NJ0088315*. Available online at: http://www.nj.gov/dep/dwq/pdf/5G2_guidance_color.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Oregon Department of Environmental Quality, *Industrial Stormwater Best Management Practices Manual- BMP 26 Fueling and Liquid Loading/Unloading Operations*, February 2013. Available online at: http://www.deq.state.or.us/wq/wqpermit/docs/IndBMP021413.pdf.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

Sacramento County Environmental Management Stormwater Program: Best Management Practices. Available online at: http://www.emd.saccounty.net/EnvHealth/Stormwater/Stormwater-BMPs.html.

Santa Clara Valley Urban Runoff Pollution Prevention Program. http://www.scvurppp-w2k.com/

US EPA. National Pollutant Discharge Elimination System – Industrial Fact Sheet Series for Activities Covered by EPA's Multi Sector General Permit. Available online at: http://cfpub.epa.gov/npdes/stormwater/swsectors.cfm.

# Waste Handling & Disposal SC-34

## Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, reuse, and recycling; and preventing run-on and runoff.

## Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *General Pollution Prevention Protocols*

- ☐ Accomplish reduction in the amount of waste generated using the following source controls:
  - ✓ Production planning and sequencing;
  - ✓ Process or equipment modification;
  - ✓ Raw material substitution or elimination;
  - ✓ Loss prevention and housekeeping;
  - ✓ Waste segregation and separation; and
  - ✓ Close loop recycling.
- ☐ Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- ☐ Recycle materials whenever possible.

| Objectives |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |
| ■ *Product Substitution* |

| Targeted Constituents | |
|---|---|
| *Sediment* | |
| *Nutrients* | |
| *Trash* | |
| *Metals* | ✓ |
| *Bacteria* | ✓ |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | ✓ |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | ✓ |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- Use the entire product before disposing of the container.
- To the extent possible, store wastes under cover or indoors after ensuring all safety concerns such as fire hazard and ventilation are addressed.
- Provide containers for each waste stream at each work station. Allow time after shift to clean area.

### *Good Housekeeping*

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater run-on and runoff with a berm. The waste containers or piles must be covered except when in use.
- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain. Clean in a designated wash area that drains to a clarifier.
- Transfer waste from damaged containers into safe containers.
- Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.
- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- Stencil or demarcate storm drains on the facility's property with prohibitive message regarding waste disposal.
- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.
- If possible, move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

### *Preventative Maintenance*

- Prevent stormwater run-on from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent waste materials from directly contacting rain.

- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- Check waste containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the waste management area regularly. Use dry methods when possible (e.g., sweeping, vacuuming, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Repair leaking equipment including valves, lines, seals, or pumps promptly.

### *Spill Response and Prevention Procedures*

- Keep your spill prevention and plan up-to-date.
- Have an emergency plan, equipment and trained personnel ready at all times to deal immediately with major spills.
- Collect all spilled liquids and properly dispose of them.
- Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.
- Ensure that vehicles transporting waste have spill prevention equipment that can prevent spills during transport. Spill prevention equipment includes:
  - ✓ Vehicles equipped with baffles for liquid waste; and
  - ✓ Trucks with sealed gates and spill guards for solid waste.

### *Material Handling and Waste Management*

*Litter Control*

- Post “No Littering” signs and enforce anti-litter laws.
- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.

*Waste Collection*

- Keep waste collection areas clean.

- Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Do not fill waste containers with washout water or any other liquid.
- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers (see chemical/ hazardous waste collection section below).
- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal. Affix labels to all waste containers.

*Chemical/Hazardous Wastes*

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers and protect them from vandalism.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Hazardous waste cannot be reused or recycled; it must be disposed of by a licensed hazardous waste hauler.

### *Employee Training Program*

- Educate employees about pollution prevention measures and goals.
- Train employees how to properly handle and dispose of waste using the source control BMPs described above.
- Train employees and subcontractors in proper hazardous waste management.
- Use a training log or similar method to document training.
- Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.


### *Quality Assurance and Record Keeping*

- Keep accurate maintenance logs that document minimum BMP activities performed for waste handling and disposal, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.

- Establish procedures to complete logs and file them in the central office.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

- Capital costs will vary substantially depending on the size of the facility and the types of waste handled. Significant capital costs may be associated with reducing wastes by modifying processes or implementing closed-loop recycling.
- Many facilities will already have indoor covered areas where waste materials will be stored and will require no additional capital expenditures for providing cover.
- If outdoor storage of wastes is required, construction of berms or other means to prevent stormwater run-on and runoff may require appropriate constructed systems for containment.
- Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

### *Maintenance*

- Check waste containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the waste management area regularly. Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Repair leaking equipment including valves, lines, seals, or pumps promptly.

## References and Resources

Minnesota Pollution Control Agency, *Industrial Stormwater Best Management Practices Guidebook*. Available online at: http://www.pca.state.mn.us/index.php/view-document.html?gid=10557.

New Jersey Department of Environmental Protection, 2013. *Basic Industrial Stormwater General Permit Guidance Document NJPDES General Permit No NJ0088315,* Revised. Available online at: http://www.nj.gov/dep/dwq/pdf/5G2_guidance_color.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities

Oregon Department of Environmental Quality, 2013. *Industrial Stormwater Best Management Practices Manual- BMP 26 Fueling and Liquid Loading/Unloading Operations*. Available online at: http://www.deq.state.or.us/wq/wqpermit/docs/IndBMP021413.pdf.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

Sacramento County Environmental Management Stormwater Program: Best Management Practices. Available online at: http://www.emd.saccounty.net/EnvHealth/Stormwater/Stormwater-BMPs.html.

Santa Clara Valley Urban Runoff Pollution Prevention Program. http://www.scvurppp-w2k.com/

US EPA. National Pollutant Discharge Elimination System – Industrial Fact Sheet Series for Activities Covered by EPA's Multi Sector General Permit. Available online at: http://cfpub.epa.gov/npdes/stormwater/swsectors.cfm.

# Safer Alternative Products SC-35

## Description

Promote the use of less harmful products and products that contain little or no TMDL and 303(d) list pollutants. Alternatives exist for most product classes including chemical fertilizers, pesticides, cleaning solutions, janitorial chemicals, automotive and paint products, and consumables (batteries, fluorescent lamps).

## Approach

Pattern a new program after the many established programs around the state and country. Integrate this best management practice as much as possible with existing programs at your facility.

Develop a comprehensive program based on:

- The "Precautionary Principle," which is an alternative to the "Risk Assessment" model that says it's acceptable to use a potentially harmful product until physical evidence of its harmful effects are established and deemed too costly from an environmental or public health perspective. For instance, a risk assessment approach might say it's acceptable to use a pesticide until there is direct proof of an environmental impact. The Precautionary Principle approach is used to evaluate whether a given product is safe, whether it is really necessary, and whether alternative products would perform just as well.
- Environmentally Preferable Purchasing Program to minimize the purchase of products containing hazardous ingredients used in the facility's custodial services, fleet maintenance, and facility maintenance in favor of using alternate products that pose less risk to employees and to the environment.
- Integrated Pest Management (IPM) or Less-Toxic Pesticide Program, which uses a pest management approach that minimizes the use of toxic chemicals and gets rid of pests

| Objectives |
|---|
| ■ *Educate* |
| ■ *Reduce/Minimize* |
| ■ *Product Substitution* |

| Targeted Constituents | |
|---|---|
| *Sediment* | |
| *Nutrients* | ✓ |
| *Trash* | |
| *Metals* | ✓ |
| *Bacteria* | |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | |
| *Preventative Maintenance* | |
| *Spill and Leak Prevention and Response* | |
| *Material Handling & Waste Management* | |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

by methods that pose a lower risk to employees, the public, and the environment.

- Energy Efficiency Program including no-cost and low-cost energy conservation and efficiency actions that can reduce both energy consumption and electricity bills, along with long-term energy efficiency investments.

Consider the following mechanisms for developing and implementing a comprehensive program:

- Policies
- Procedures
  - ✓ Standard operating procedures (SOPs);
  - ✓ Purchasing guidelines and procedures; and
  - ✓ Bid packages (services and supplies).
- Materials
  - ✓ Preferred or approved product and supplier lists;
  - ✓ Product and supplier evaluation criteria;
  - ✓ Training sessions and manuals; and
  - ✓ Fact sheets for employees.

Implement this BMP in conjunction with the Vehicle and Equipment Management fact sheets (SC-20 – SC-22) and SC-41 Building and Grounds Maintenance.

***Employee Training Program***

- Employees who handle potentially harmful materials should be trained in the use of safer alternatives.
- Purchasing departments should be trained on safer alternative products and encouraged to procure less hazardous materials and products that contain little or no harmful substances or TMDL pollutants.
- Employees and contractors / service providers can both be educated about safer alternatives by using information developed by a number of organizations including the references and resources provided in this fact sheet.

## Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds"

- Alternative products may not be available, suitable, or effective in every case.

- ✓ Minimize use of hazardous/harmful products if no alternative product is available.

## Regulatory Considerations

This BMP has no regulatory requirements unless local/municipal ordinance applies. Existing regulations already encourage facilities to reduce the use of hazardous materials through incentives such as reduced:

- Specialized equipment storage and handling requirements;
- Storm water runoff sampling requirements;
- Training and licensing requirements; and
- Record keeping and reporting requirements.

## Cost Considerations

- The primary cost is for staff time to: 1) develop new policies and procedures and 2) educate purchasing departments and employees who handle potentially harmful materials about the availability, procurement, and use of safer alternatives.
- Some alternative products may be slightly more expensive than conventional products.

## Supplemental Information

The following discussion provides some general information on safer alternatives. More specific information on particular hazardous materials and the available alternatives may be found in the references and resources listed below.

- Automotive products – Less toxic alternatives are not available for many automotive products, especially engine fluids. But there are alternatives to grease lubricants, car polishes, degreasers, and windshield washer solution. Refined motor oil is also available.
- Vehicle/Trailer lubrication – Fifth wheel bearings on trucks require routine lubrication. Adhesive lubricants are available to replace typical chassis grease.
- Cleaners – Vegetables-based or citrus-based soaps are available to replace petroleum-based soaps/detergents.
- Paint products – Water-based paints, wood preservatives, stains, and finishes with low VOC content are available.
- Pesticides – Specific alternative products or methods exist to control most insects, fungi, and weeds.
- Chemical Fertilizers – Compost and soil amendments are natural alternatives.
- Consumables – Manufacturers have either reduced or are in the process of reducing the amount of heavy metals in consumables such as batteries and fluorescent lamps.

All fluorescent lamps contain mercury, however low-mercury containing lamps are now available from most hardware and lighting stores. Fluorescent lamps are also more energy efficient than the average incandescent lamp.

- Janitorial chemicals – Even biodegradable soap can harm fish and wildlife before it biodegrades. Biodegradable does not mean non-toxic. Safer products and procedures are available for floor stripping and cleaning, as well as carpet, glass, metal, and restroom cleaning and disinfecting. Use paper products with post-consumer recycled content and implement electric had dryers.

***Examples***

There are a number of business and trade associations, and communities with effective programs. Some of the more prominent are listed below in the references and resources section.

## References and Resources

Note: Many of these references provide alternative products for materials that typically are used inside and disposed to the sanitary sewer as well as alternatives to products that usually end up in the storm drain.

***General Sustainable Practices and Pollution Prevention Including Pollutant-Specific Information***

California Department of Toxic Substances Control, http://www.dtsc.ca.gov/PollutionPrevention/GreenTechnology/Index.cfm.

CalRecycle, http://www.calrecycle.ca.gov/Business/Regulated.htm.

City of Santa Monica Office of Sustainability and Environment, http://www.smgov.net/departments/ose/.

City of Palo Alto, http:// www.city.palo-alto.ca.us/cleanbay.

City and County of San Francisco, Department of the Environment, http://www.sfenvironment.org/toxics-health/greener-business-practices.

Green Business Program, http://www.greenbiz.ca.gov/GRlocal.html .

Product Stewardship Institute, http://www.productstewardship.us/index.cfm.

Sacramento Clean Water Business Partners. http://www.sacstormwater.org/CleanWaterBusinessPartners/CleanWaterBusinessPartners.html.

USEPA. National Pollutant Discharge Elimination System (NPDES) Stormwater Discharges From Industrial Facilities, http://cfpub.epa.gov/npdes/stormwater/indust.cfm.

USEPA Region IX Pollution Prevention Program, http://www.epa.gov/region9/waste/p2/business.html.

Western Sustainability and Pollution Prevention Network, http://wsppn.org/.

***Metals (mercury, copper)***

National Electrical Manufacturers Association – Environmental Stewardship, http://www.nema.org/Policy/Environmental-Stewardship/pages/default.aspx.

Sustainable Conservation, http://www.suscon.org.

Auto Recycling Project

Brake Pad Partnership

***Pesticides and Chemical Fertilizers***

Bio-Integral Resource Center, http://www.birc.org.

California Department of Pesticide Regulation, http://www.cdpr.ca.gov/dprprograms.htm.

University of California Statewide IPM Program, http://www.ipm.ucdavis.edu/default.html.

***Dioxins***

Bay Area Dioxins Project, http://www.abag.ca.gov/bayarea/dioxin/project_materials.htm.

# Building & Grounds Maintenance SC-41

## Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

## Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *General Pollution Prevention Protocols*

- ☐ Switch to non-toxic chemicals for maintenance to the maximum extent possible.
- ☐ Choose cleaning agents that can be recycled.
- ☐ Encourage proper lawn management and landscaping, including use of native vegetation.
- ☐ Encourage use of Integrated Pest Management techniques for pest control.
- ☐ Encourage proper onsite recycling of yard trimmings.
- ☐ Recycle residual paints, solvents, lumber, and other material as much as possible.

| **Objectives** |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |
| ■ *Product Substitution* |

| **Targeted Constituents** | |
|---|---|
| *Sediment* | ✓ |
| *Nutrients* | ✓ |
| *Trash* | |
| *Metals* | ✓ |
| *Bacteria* | ✓ |
| *Oil and Grease* | |
| *Organics* | |

| **Minimum BMPs Covered** | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | ✓ |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- Clean work areas at the end of each work shift using dry cleaning methods such as sweeping and vacuuming.

***Good Housekeeping***

*Pressure Washing of Buildings, Rooftops, and Other Large Objects*

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.

- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.

- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

*Landscaping Activities*

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.

- Use mulch or other erosion control measures on exposed soils. See also SC-40, Contaminated and Erodible Areas, for more information.

*Building Repair, Remodeling, and Construction*

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.

- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.

- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.

- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.

- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and

solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

*Mowing, Trimming, and Planting*

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- Use hand weeding where practical.

*Fertilizer and Pesticide Management*

- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Apply pesticides only when wind speeds are low.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.

*Inspection*

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

# Building & Grounds Maintenance SC-41

### *Spill Response and Prevention Procedures*

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.

### *Material Handling and Waste Management*

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Dispose of empty pesticide containers according to the instructions on the container label.
- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

### *Employee Training Program*

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the needs of individual staff.


### *Quality Assurance and Record Keeping*

- Keep accurate logs that document maintenance activities performed and minimum BMP measures implemented.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

***Facilities***

- Additional capital costs are not anticipated for building and grounds maintenance. Implementation of the minimum BMPs described above should be conducted as part of regular site operations.

***Maintenance***

- Maintenance activities for the BMPs described above will be minimal, and no additional cost is anticipated.

## Supplemental Information

***Fire Sprinkler Line Flushing***

Site fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

## References and Resources

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual.*

Kennedy/Jenks Consultants, 2007. *The Truckee Meadows Industrial and Commercial Storm Water Best Management Practices Handbook*. Available online at: http://www.cityofsparks.us/sites/default/files/assets/documents/env-control/construction/TM-I-C_BMP_Handbook_2-07-final.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at:

http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

US EPA, 1997. *Best Management Practices Handbook for Hazardous Waste Containers*. Available online at: http://www.epa.gov/region6/6en/h/handbk4.pdf.

Ventura Countywide Stormwater Management Program Clean Business Fact Sheets. Available online at: http://www.vcstormwater.org/documents/programs_business/building.pdf.

# Building Repair and Construction SC-42

## Description

Site modifications are common, particularly at large industrial sites. The activity may vary from minor and normal building repair to major remodeling, or the construction of new facilities. These activities can generate pollutants including solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, adhesive residues, and old asbestos installation. Protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants to stormwater from building repair, remodeling, and minor construction by using soil erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using safer alternative products, and training employees.

This fact sheet is intended to be used for minor repairs and construction. If major construction is required, the guidelines in the Construction BMP Handbook should be followed.

## Approach

The BMP approach is to reduce potential for pollutant discharges through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *General Pollution Prevention Protocols*

- ☐ Recycle residual paints, solvents, lumber, and other materials to the maximum extent practicable.
- ☐ Avoid outdoor repairs and construction during periods of wet weather.
- ☐ Use safer alternative products to the maximum extent practicable. See also SC-35 Safer Alternative Products for more information.

| **Objectives** |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |
| ■ *Product Substitution* |

| **Targeted Constituents** | |
|---|---|
| *Sediment* | ✓ |
| *Nutrients* | |
| *Trash* | ✓ |
| *Metals* | ✓ |
| *Bacteria* | |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| **Minimum BMPs Covered** | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | ✓ |
| *Erosion and Sediment Controls* | ✓ |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- Buy recycled products to the maximum extent practicable.
- Inform on-site contractors of company policy on these matters and include appropriate provisions in their contract to ensure certain proper housekeeping and disposal practices are implemented.
- Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.

***Good Housekeeping***

*Repair & Remodeling*

- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep and vacuum the area regularly to remove sediments and small debris.
- Cover raw materials of particular concern that must be left outside, particularly during the rainy season. See also SC-33 Outdoor Storage of Raw Materials for more information.
- Use equipment and tools such as bag sanders to reduce accumulation of debris.
- Limit/prohibit work on windy days; implement roll-down walls or other measures to reduce wind transport of pollutants.
- Do not dump waste liquids down the storm drain.
- Dispose of wash water, sweepings, and sediments properly.
- Store liquid materials properly that are normally used in repair and remodeling such as paints and solvents. See also SC-31 Outdoor Liquid Container Storage for more information.
- Sweep out rain gutters or wash the gutter and trap the particles at the outlet of the downspout. A sock or geofabric placed over the outlet may effectively trap the materials. If the downspout is tight lined, place a temporary plug at the first convenient point in the storm drain and pump out the water with a vactor truck, and clean the catch basin sump where you placed the plug.
- Clean the storm drain system in the immediate vicinity of the construction activity after it is completed. See also SC-44 Drainage System Maintenance for more information.

*Painting*

- Enclose painting operations consistent with local air quality regulations and OSHA.
- Local air pollution regulations may, in many areas of the state, specify painting procedures which if properly carried out are usually sufficient to protect water quality.
- Develop paint handling procedures for proper use, storage, and disposal of paints.

- Transport paint and materials to and from job sites in containers with secure lids and tied down to the transport vehicle.
- Test and inspect spray equipment prior to starting to paint. Tighten all hoses and connections and do not overfill paint containers.
- Mix paint indoors before using so that any spill will not be exposed to rain. Do so even during dry weather because cleanup of a spill will never be 100 percent effective.
- Transfer and load paint and hot thermoplastic away from storm drain inlets.
- Do not transfer or load paint near storm drain inlets.
- Plug nearby storm drain inlets prior to starting painting and remove plugs when job is complete when there is risk of a spill reaching storm drains.
- Cover nearby storm drain inlets prior to starting work if sand blasting is used to remove paint.
- Use a ground cloth to collect the chips if painting requires scraping or sand blasting of the existing surface. Dispose of the residue properly.
- Cover or enclose painting operations properly to avoid drift.
- Clean the application equipment in a sink that is connected to the sanitary sewer if using water based paints.
- Capture all cleanup-water and dispose of properly.
- Dispose of paints containing lead or tributyl tin and considered a hazardous waste properly.
- Store leftover paints if they are to be kept for the next job properly, or dispose properly.
- Recycle paint when possible. Dispose of paint at an appropriate household hazardous waste facility.

***Spill Response and Prevention Procedures***

- Keep your spill prevention and control plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Clean up spills immediately.
- Excavate and remove the contaminated (stained) soil if a spill occurs on dirt.

***Material Handling and Waste Management***

- Post “No Littering” signs and enforce anti-litter laws.

- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Keep waste collection areas clean.
- Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Do not fill waste containers with washout water or any other liquid.
- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers (see chemical/ hazardous waste collection section below).
- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal. Affix labels to all waste containers.
- Make sure that hazardous waste is collected, removed, and disposed of properly. See also SC-34, Waste Handling and Disposal for more information.

***Sediment and Erosion Controls***

- Limit disturbance to bare soils and preserve natural vegetation whenever possible. See also EC-2, Preservation of Existing Vegetation, in the Construction BMP Handbook.
- Stabilize loose soils by re-vegetating whenever possible. See also EC-4 Hydroseeding, in the Construction BMP Handbook.
- Utilize non-vegetative stabilization methods for areas prone to erosion where vegetative options are not feasible. Examples include:
  - ✓ Areas of vehicular or pedestrian traffic such as roads or paths;
  - ✓ Arid environments where vegetation would not provide timely ground coverage, or would require excessive irrigation;
  - ✓ Rocky substrate, infertile or droughty soils where vegetation would be difficult to establish; and
  - ✓ Areas where vegetation will not grow adequately within the construction time frame.

  There are several non-vegetative stabilization methods and selection should be based on site-specific conditions. See also EC-16 Non-Vegetative Stabilization, in the Construction BMP Handbook.

- Utilize chemical stabilization when needed. See also EC-5 Soil Binders, in the Construction BMP Handbook.
- Use geosynthetic membranes to control erosion if feasible. See also EC-7 Geotextiles and Mats, in the Construction BMP Handbook.
- Stabilize all roadways, entrances, and exits to sufficiently control discharges of erodible materials from discharging or being tracked off the site. See also TC 1-3 Tracking Control, in the Construction BMP Handbook.
- Refer to the supplemental information provided below for projects that involve more extensive soil disturbance activities.

***Employee Training Program***

- Educate employees about pollution prevention measures and goals.
- Train employees how to properly implement the source control BMPs described above. Detailed information for Sediment and Erosion Control BMPs is provided in the Construction BMP Handbook.
- Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained employees can be lost by unknowing off-site contractors, so make sure they are well informed about pollutant source control responsibilities.
- Use a training log or similar method to document training.


***Quality Assurance and Record Keeping***

- Keep accurate maintenance logs that document minimum BMP activities performed for building repair and construction, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

## Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds."

- This BMP is for minor construction only. The State's General Construction Activity Stormwater Permit has more extensive requirements for larger projects that would disturb one or more acres of surface.
  - ✓ Refer to the companion "Construction Best Management Practice Handbook" which contains specific guidance and best management practices for larger-scale projects.

- Time constraints may require some outdoor repairs and construction during wet weather.
  - ✓ Require employees to understand and follow good housekeeping and spill and leak prevention BMPs.
  - ✓ Inspect sediment and erosion control BMPs daily during periods of wet weather and repair or improve BMP implementation as necessary.
- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
  - ✓ Minimize use of hazardous materials to the maximum extent practicable.
- Be certain that actions to help stormwater quality are consistent with Cal- and Fed-OSHA and air quality regulations.
- Prices for recycled/safer alternative materials and fluids may be higher than those of conventional materials.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

- Limited capital investments may be required at some sites if adequate cover and containment facilities do not exist for construction materials and wastes.
- Purchase and installation of erosion and sediment controls, if needed will require additional capital investments, and this amount will vary depending on site characteristics and the types of BMPs being implemented.
- Minimize costs by maintaining existing vegetation and limiting construction operations on bare soils.

### *Maintenance*

- The erosion and sediment control BMPs described above require periodic inspection and maintenance to remain effective. The cost of these actions will vary depending on site characteristics and the types of BMPs being implemented.
- Irrigation costs may be required to establish and maintain vegetation.

## Supplemental Information

### *Soil/Erosion Control*

If the work involves exposing large areas of soil, employ the appropriate soil erosion and control techniques. See the Construction Best Management Practice Handbook. If old buildings are being torn down and not replaced in the near future, stabilize the site using measures described in SC-40 Contaminated or Erodible Areas.

# Building Repair and Construction SC-42

If a building is to be placed over an open area with a storm drainage system, make sure the storm inlets within the building are covered or removed, or the storm line is connected to the sanitary sewer. If because of the remodeling a new drainage system is to be installed or the existing system is to be modified, consider installing catch basins as they serve as effective "in-line" treatment devices. Include in the catch basin a "turn-down" elbow or similar device to trap floatables.

## References and Resources


City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual*.

California Stormwater Quality Association, 2012. *Construction Stormwater Best Management Practice Handbook*. Available at http://www.casqa.org.

Kennedy/Jenks Consultants, 2007. *The Truckee Meadows Industrial and Commercial Storm Water Best Management Practices Handbook*. Available online at: http://www.cityofsparks.us/sites/default/files/assets/documents/env-control/construction/TM-I-C_BMP_Handbook_2-07-final.pdf.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

US EPA. *Construction Site Stormwater Runoff Control*. Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=4.

# Parking Area Maintenance SC-43

## Description

Parking lots can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

BMPs for other outdoor areas on site (loading/unloading, material storage, and equipment operations) are described in SC-30 through SC-33.

## Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *General Pollution Prevention Protocols*

- Encourage advanced designs and maintenance strategies for impervious parking lots. Refer to the treatment control BMP fact sheets in this manual for additional information.
- Keep accurate maintenance logs to evaluate BMP implementation.

### *Good Housekeeping*

- Keep all parking areas clean and orderly. Remove debris, litter, and sediments in a timely fashion.
- Post "No Littering" signs and enforce anti-litter laws.

| Objectives |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |
| ■ *Product Substitution* |

| Targeted Constituents | |
|---|---|
| *Sediment* | ✓ |
| *Nutrients* | |
| *Trash* | ✓ |
| *Metals* | ✓ |
| *Bacteria* | |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | ✓ |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- ☐ Provide an adequate number of litter receptacles.
- ☐ Clean out and cover litter receptacles frequently to prevent spillage.

### *Preventative Maintenance*

*Inspection*

Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.

- ☐ Inspect cleaning equipment/sweepers for leaks on a regular basis.

*Surface Cleaning*

- ☐ Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- ☐ Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- ☐ Sweep all parking lots at least once before the onset of the wet season.
- ☐ Dispose of parking lot sweeping debris and dirt at a landfill.
- ☐ Follow the procedures below if water is used to clean surfaces:
  - ✓ Block the storm drain or contain runoff.
  - ✓ Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
- ☐ Follow the procedures below when cleaning heavy oily deposits:
  - ✓ Clean oily spots with absorbent materials.
  - ✓ Use a screen or filter fabric over inlet, then wash surfaces.
  - ✓ Do not allow discharges to the storm drain.
  - ✓ Vacuum/pump discharges to a tank or discharge to sanitary sewer.
  - ✓ Dispose of spilled materials and absorbents appropriately.

*Surface Repair*

- ☐ Check local ordinance for SUSMP/LID ordinance.
- ☐ Preheat, transfer or load hot bituminous material away from storm drain inlets.
- ☐ Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- ☐ Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in

place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.

- Use only as much water as necessary for dust control during sweeping to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

### *Spill Response and Prevention Procedures*

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

### *Employee Training Program*

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Use a training log or similar method to document training.


### *Quality Assurance and Record Keeping*

- Keep accurate maintenance logs that document minimum BMP activities performed for parking area maintenance, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

- Capital investments may be required at some sites to purchase sweeping equipment, train sweeper operators, install oil/water/sand separators, or implement advanced BMPs. These costs can vary significantly depending upon site conditions and the amount of BMPs required.

***Maintenance***

- Sweep and clean parking lots regularly to minimize pollutant transport into storm drains from stormwater runoff.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Maintain advanced BMPs such as vegetated swales, infiltration trenches, or detention basins as appropriate. Refer to the treatment control fact sheets for more information.

## Supplemental Information

***Advanced BMPs***

Some parking areas may require advanced BMPs to further reduce pollutants in stormwater runoff, and a few examples are listed below. Refer to the Treatment Control Fact Sheets and the New Development and Redevelopment Manual for more information.

- When possible, direct sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.

## References and Resources

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual.*

California Stormwater Quality Association, 2003. *New Development and Redevelopment Stormwater Best Management Practice Handbook*. Available online at: https://www.casqa.org/resources/bmp-handbooks/new-development-redevelopment-bmp-handbook.

Kennedy/Jenks Consultants, 2007. *The Truckee Meadows Industrial and Commercial Storm Water Best Management Practices Handbook*. Available online at: http://www.cityofsparks.us/sites/default/files/assets/documents/env-control/construction/TM-I-C_BMP_Handbook_2-07-final.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Pollution from Surface Cleaning Folder, 1996, 2003. Bay Area Stormwater Management Agencies Association. Available online at: http://basmaa.org/Portals/0/documents/pdf/Pollution%20from%20Surface%20Cleaning.pdf.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

The Storm Water Managers Resource Center, http://www.stormwatercenter.net.

US EPA. *Post-Construction Stormwater Management in New Development and Redevelopment*. BMP Fact Sheets. Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=5.

# Parking Area Maintenance SC-43

## Description

Parking lots can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

BMPs for other outdoor areas on site (loading/unloading, material storage, and equipment operations) are described in SC-30 through SC-33.

## Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *General Pollution Prevention Protocols*

- Encourage advanced designs and maintenance strategies for impervious parking lots. Refer to the treatment control BMP fact sheets in this manual for additional information.
- Keep accurate maintenance logs to evaluate BMP implementation.

### *Good Housekeeping*

- Keep all parking areas clean and orderly. Remove debris, litter, and sediments in a timely fashion.
- Post "No Littering" signs and enforce anti-litter laws.

| Objectives |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |
| ■ *Product Substitution* |

| Targeted Constituents | |
|---|---|
| *Sediment* | ✓ |
| *Nutrients* | |
| *Trash* | ✓ |
| *Metals* | ✓ |
| *Bacteria* | |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | ✓ |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- ☐ Provide an adequate number of litter receptacles.
- ☐ Clean out and cover litter receptacles frequently to prevent spillage.

### *Preventative Maintenance*

*Inspection*

Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.

- ☐ Inspect cleaning equipment/sweepers for leaks on a regular basis.

*Surface Cleaning*

- ☐ Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- ☐ Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- ☐ Sweep all parking lots at least once before the onset of the wet season.
- ☐ Dispose of parking lot sweeping debris and dirt at a landfill.
- ☐ Follow the procedures below if water is used to clean surfaces:
  - ✓ Block the storm drain or contain runoff.
  - ✓ Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
- ☐ Follow the procedures below when cleaning heavy oily deposits:
  - ✓ Clean oily spots with absorbent materials.
  - ✓ Use a screen or filter fabric over inlet, then wash surfaces.
  - ✓ Do not allow discharges to the storm drain.
  - ✓ Vacuum/pump discharges to a tank or discharge to sanitary sewer.
  - ✓ Dispose of spilled materials and absorbents appropriately.

*Surface Repair*

- ☐ Check local ordinance for SUSMP/LID ordinance.
- ☐ Preheat, transfer or load hot bituminous material away from storm drain inlets.
- ☐ Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- ☐ Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in

place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.

- Use only as much water as necessary for dust control during sweeping to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

### *Spill Response and Prevention Procedures*

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

### *Employee Training Program*

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Use a training log or similar method to document training.


### *Quality Assurance and Record Keeping*

- Keep accurate maintenance logs that document minimum BMP activities performed for parking area maintenance, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

- Capital investments may be required at some sites to purchase sweeping equipment, train sweeper operators, install oil/water/sand separators, or implement advanced BMPs. These costs can vary significantly depending upon site conditions and the amount of BMPs required.

***Maintenance***

- Sweep and clean parking lots regularly to minimize pollutant transport into storm drains from stormwater runoff.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Maintain advanced BMPs such as vegetated swales, infiltration trenches, or detention basins as appropriate. Refer to the treatment control fact sheets for more information.

## Supplemental Information

***Advanced BMPs***

Some parking areas may require advanced BMPs to further reduce pollutants in stormwater runoff, and a few examples are listed below. Refer to the Treatment Control Fact Sheets and the New Development and Redevelopment Manual for more information.

- When possible, direct sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.

## References and Resources

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual.*

California Stormwater Quality Association, 2003. *New Development and Redevelopment Stormwater Best Management Practice Handbook*. Available online at: https://www.casqa.org/resources/bmp-handbooks/new-development-redevelopment-bmp-handbook.

Kennedy/Jenks Consultants, 2007. *The Truckee Meadows Industrial and Commercial Storm Water Best Management Practices Handbook*. Available online at: http://www.cityofsparks.us/sites/default/files/assets/documents/env-control/construction/TM-I-C_BMP_Handbook_2-07-final.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Pollution from Surface Cleaning Folder, 1996, 2003. Bay Area Stormwater Management Agencies Association. Available online at: http://basmaa.org/Portals/0/documents/pdf/Pollution%20from%20Surface%20Cleaning.pdf.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

The Storm Water Managers Resource Center, http://www.stormwatercenter.net.

US EPA. *Post-Construction Stormwater Management in New Development and Redevelopment*. BMP Fact Sheets. Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=5.

# Drainage System Maintenance SC-44

## Description

As a consequence of its function, the stormwater drainage facilities on site convey stormwater that may contain certain pollutants either to the offsite conveyance system that collects and transports urban runoff and stormwater, or directly to receiving waters. The protocols in this fact sheet are intended to reduce pollutants leaving the site to the offsite drainage infrastructure or to receiving waters through proper on-site conveyance system operation and maintenance. The targeted constituents will vary depending on site characteristics and operations.

## Approach

Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *General Pollution Prevention Protocols*

- ☐ Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.
- ☐ Develop and follow a site specific drainage system maintenance plan that describes maintenance locations, methods, required equipment, water sources, sediment collection areas, disposal requirements, and any other pertinent information.

### *Good Housekeeping*

*Illicit Connections and Discharges*

- ☐ Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:

| Objectives |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |

| Targeted Constituents | |
|---|---|
| *Sediment* | ✓ |
| *Nutrients* | ✓ |
| *Trash* | ✓ |
| *Metals* | ✓ |
| *Bacteria* | ✓ |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | ✓ |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- ✓ Identify evidence of spills such as paints, discoloring, odors, etc.
- ✓ Record locations of apparent illegal discharges/illicit connections.
- ✓ Track flows back to potential discharges and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- ✓ Eliminate the discharge once the origin of flow is established.

- ☐ Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" or similar stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- ☐ Refer to fact sheet SC-10 Non-Stormwater Discharges for additional information.

*Illegal Dumping*

- ☐ Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- ☐ Establish a system for tracking incidents. The system should be designed to identify the following:
  - ✓ Illegal dumping hot spots;
  - ✓ Types and quantities (in some cases) of wastes;
  - ✓ Patterns in time of occurrence (time of day/night, month, or year);
  - ✓ Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills); and
  - ✓ Responsible parties.
- ☐ Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- ☐ Refer to fact sheet SC-10 Non-Stormwater Discharges for additional information.

***Preventative Maintenance***

*Catch Basins/Inlet Structures*

- ☐ Staff should regularly inspect facilities to ensure compliance with the following:
  - ✓ Immediate repair of any deterioration threatening structural integrity.
  - ✓ Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Prioritize storm drain inlets; clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

*Storm Drain Conveyance System*

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

*Pump Stations*

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

*Open Channel*

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Wildlife. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Army Corps of Engineers and USFWS.

***Spill Response and Prevention Procedures***

- Keep your spill prevention control plan up-to-date.

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.

***Employee Training Program***

- Educate employees about pollution prevention measures and goals.
- Train employees how to properly handle and dispose of waste using the source control BMPs described above.
- Train employees and subcontractors in proper hazardous waste management.
- Use a training log or similar method to document training.
- Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - ✓ OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).
  - ✓ OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
  - ✓ Procedural training (field screening, sampling, smoke/dye testing, TV inspection).


***Quality Assurance and Record Keeping***

- Keep accurate maintenance logs that document minimum BMP activities performed for drainage system maintenance, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Keep accurate logs of illicit connections, illicit discharges, and illegal dumping into the storm drain system including how wastes were cleaned up and disposed.
- Establish procedures to complete logs and file them in the central office.

## Potential Limitations and Work-Arounds

Provided below are typical limitations and recommended "work-arounds" for drainage system maintenance:

- 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.

  - ✓ Perform all maintenance onsite and do not flush accumulated material downstream to private property or riparian habitats.

- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, and liquid/sediment disposal.

  - ✓ Develop and follow a site specific drainage system maintenance plan that describes maintenance locations, methods, required equipment, water sources, sediment collection areas, disposal requirements, and any other pertinent information.

- Regulations may include adoption of substantial penalties for illegal dumping and disposal.

  - ✓ Do not dump illegal materials anywhere onsite.

  - ✓ Identify illicit connections, illicit discharge, and illegal dumping.

  - ✓ Cleanup spills immediately and properly dispose of wastes.

- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the sanitary sewer system.

  - ✓ Collect all materials and pollutants accumulated in drainage system and dispose of according to local regulations.

  - ✓ Install debris excluders in areas with a trash TMDL.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

- Capital costs will vary substantially depending on the size of the facility and characteristics of the drainage system. Significant capital costs may be associated with purchasing water trucks, vacuum trucks, and any other necessary cleaning equipment or improving the drainage infrastructure to reduce the potential .

- Developing and implementing a site specific drainage system maintenance plan will require additional capital if a similar program is not already in place.

***Maintenance***

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.
- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

## Supplemental Information

*Storm Drain Flushing*

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing re-suspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used if allowed or that fire hydrant line flushing coincide with storm sewer flushing.

## References and Resources

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual*.

Knox County Tennessee *Stormwater Management Manual* Chapter 5 Drainage System Maintenance, 2008. Available online at: http://www.knoxcounty.org/stormwater/manual/Volume%201/knoxco_swmm_v1_chap5_jan2008.pdf.

US EPA. Storm Drain System Cleaning, 2012. Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=102.

# 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.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- 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

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

– 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.

# Maintenance Bays & Docks SD-31

**Design Objectives**

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

## Description

Several measures can be taken to prevent operations at maintenance bays and loading docks from contributing a variety of toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to the stormwater conveyance system.

## Approach

In designs for maintenance bays and loading docks, containment is encouraged. Preventative measures include overflow containment structures and dead-end sumps. However, in the case of loading docks from grocery stores and warehouse/distribution centers, engineered infiltration systems may be considered.

## Suitable Applications

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

## Design Considerations

Design requirements for vehicle maintenance and repair are governed by Building and Fire Codes, and by current local agency ordinances, and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code requirements.

### *Designing New Installations*

Designs of maintenance bays should consider the following:

- Repair/maintenance bays and vehicle parts with fluids should be indoors; or designed to preclude urban run-on and runoff.
- Repair/maintenance floor areas should be paved with Portland cement concrete (or equivalent smooth impervious surface).

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Repair/maintenance bays should be designed to capture all wash water leaks and spills. Provide impermeable berms, drop inlets, trench catch basins, or overflow containment structures around repair bays to prevent spilled materials and wash-down waters form entering the storm drain system. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.

- Other features may be comparable and equally effective.

The following designs of loading/unloading dock areas should be considered:

- Loading dock areas should be covered, or drainage should be designed to preclude urban run-on and runoff.

- Direct connections into storm drains from depressed loading docks (truck wells) are prohibited.

- Below-grade loading docks from grocery stores and warehouse/distribution centers of fresh food items should drain through water quality inlets, or to an engineered infiltration system, or an equally effective alternative. Pre-treatment may also be required.

- Other features may be 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.

## Additional Information

Stormwater and non-stormwater will accumulate in containment areas and sumps with impervious surfaces. Contaminated accumulated water must be disposed of in accordance with applicable laws and cannot be discharged directly to the storm drain or sanitary sewer system without the appropriate permit.

## 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.

# Trash Storage Areas SD-32

## Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

## Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

**Design Objectives**

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

## 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

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

### *Designing New Installations*

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

### *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.

## Additional Information

### *Maintenance Considerations*

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

## 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.

# APPENDIX F

# Infiltration Feasibility

December 8, 2021

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Overton Moore Properties
19700 S. Vermont Avenue, Suite 101
Torrance, CA 90502

Attention: Ms. Montana Kanen
Analyst

Project No.: **21G265-2**

Subject: **Results of Infiltration Testing**
Two Proposed Commercial/Industrial Buildings
15006 – 15100 Nelson Avenue
Industry, California

Reference: Geotechnical Investigation, Two Proposed Commercial/Industrial Buildings, 15006 – 15100 Nelson Avenue, Industry, California, prepared by Southern California Geotechnical, Inc. (SCG) for Overton Moore Properties, SCG Project No. 21G265-1, dated December 8, 2021.

Ms. Kanen:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

## Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 21P363R, dated November 2, 2021. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the onsite soils. The infiltration testing was performed in general accordance with Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration (GS200.1) published by Los Angeles County Public Works – Geotechnical Engineering and Materials Division, dated June 30, 2021.

## Site and Project Description

The subject site is located on the southwest side of Nelson Avenue at Cadbrook Drive in City of Industry, California. The site is also referenced by the street addresses 15006, 15010 and 15100 Nelson Avenue. The site is bounded to the northeast by Nelson Avenue, to the northwest by an existing commercial/industrial building, to the southwest by a railroad easement, and to the southeast by existing commercial/industrial buildings. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of two irregular-shaped parcels, 8.87± acres in size. The site is presently developed with five (5) commercial/industrial buildings, ranging in size from 1,400 to 14,850± $ft^2$ in size. Additionally, the site is developed with one (1) canopy, 2,500± $ft^2$ in size. Pipe products

are presently stored in the northwest area of the site. Semi-trucks are presently parked in the southwestern area of the site. A semi-truck driving school is in the southeastern area of the site. Ground surface consists of Portland cement concrete (PCC) pavements across the majority of the site, with asphaltic concrete pavements in northeastern area of the site. Landscape planters are present in the northwestern area of the site.

Detailed topographic information was not available at the time of this report. Based on elevations obtained from Google Earth and visual observations made at the time of the subsurface investigation, the overall site slopes downward to the southwest at gradients ranging from 0.5 to 1± percent.

## Proposed Development

Based on a conceptual site plan provided to our office by the client, the site will be developed with two (2) new industrial buildings. One building, 32,800± $ft^2$ in size, will be located in the northern area of the site; the second building, 133,130± $ft^2$ in size, will be located in the southern area of the site. Dock-high doors will be constructed along a portion of at least one building wall. The buildings will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout.

We understand that the site may utilize on-site stormwater disposal. The type, depth, and location of the proposed infiltration system is not known at the time of this report. The infiltration system is expected to consist of below-grade chambers located in the north-central area of the site. The bottom of the infiltration system is expected to be at 10± feet below the bottom of the existing site grades.

## Concurrent Study

### Geotechnical Investigation

SCG concurrently conducted a geotechnical investigation for the subject site, referenced above. As a part of this study, five (5) borings were advanced to depths of 15 to 50± feet below the currently existing site grades. In addition to the borings, four (4) Cone Penetration Test (CPT) soundings were advanced to a depth of 50± feet.

Asphaltic concrete pavements were encountered at the ground surface of Boring No. B-4. The pavement section consists of 3± inches of Asphaltic concrete underlain by 2± inches of Aggregate base. Portland cement concrete, 6± inches in thickness, was encountered at the ground surface of Boring Nos. B-1, B-2, B-3 and B-5. Artificial fill soils were encountered beneath the pavements of Boring Nos. B-1, B-2 and B-5, extending to depths of 2½ to 3± feet below ground surface. The fill soils generally consist of medium stiff to very stiff silty clays and clayey silts. Native alluvium was encountered beneath the pavements of Boring Nos. B-3 and B-4, and beneath the fill of the remaining borings, extending to at least the maximum depth explored of 50± feet below ground surface. The near-surface alluvial soils generally consist of loose to medium dense silty sands, clayey sands and sandy silts, and medium stiff to stiff silty clays, sandy clays and clayey silts, extending to depths of 12 to 22± feet. At greater depths the alluvium consists of medium dense to very dense fine to coarse sands, silty sands and sandy silts, and stiff to very stiff silty

clays and sandy clays. The alluvium generally possesses trace to little iron oxide staining and calcareous nodules/veining.

Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 50± feet at the time of the subsurface exploration.

## Subsurface Exploration

Scope of Exploration

The subsurface exploration for the infiltration testing consisted of two (2) borings, advanced to a depth of 10± feet below existing site grades. The borings were logged during excavation by a member of our staff. The approximate locations of the infiltration borings (identified as Infiltration Boring Nos. I-1 and I-2) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Geotechnical Conditions

PCC pavements were encountered at the ground surface at both infiltration test locations. The pavement sections at these locations generally consist of 5 to 8± inches of unreinforced PCC. Undocumented fill was encountered beneath the pavements, extending to a depth of 3± feet below the existing site grades. The fill soils generally consist of medium dense fine to coarse sands with varying gravel content, and stiff silty clay with little fine sand. The fill material appeared to be mottled, resulting in the classification of fill. Native alluvium was encountered beneath the undocumented fill soils at both of the infiltration boring locations. The near-surface alluvial soils generally consist of stiff to very stiff silty clays and sandy clays, extending to a depth 8± feet. Below these materials, the alluvium consists of medium dense fine sandy silts with varying medium to coarse sand and clay content, extending to at least the maximum depth explored of 10± feet below the ground surface.

Free water was not encountered during the drilling of any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 10± feet at the time of the subsurface exploration.

Recent water level data was obtained from the California State Water Resources Control Board, GeoTracker, website, https://geotracker.waterboards.ca.gov/. One monitoring wells on record is located 30± feet north of the site. Water level readings within this monitoring wells indicate a high groundwater level of 66± feet below the ground surface in September 2016.

## Infiltration Testing

We understand that the results of the testing will be used to prepare a preliminary design for the storm water infiltration systems that will be used at the subject site. As previously mentioned, the infiltration testing was performed in general accordance with Guidelines for Geotechnical

Investigation and Reporting Low Impact Development Stormwater Infiltration (GS200.1) published by Los Angeles County Public Works – Geotechnical Engineering and Materials Division, dated June 30, 2021.

Pre-soaking

Both of the infiltration test borings were pre-soaked for at least 1 hour to ensure the sand around the annulus of the perforated pipe was fully saturated. The pre-soaking procedure consisted of filling each test boring with clean potable water to an elevation of at least 12± inches above the bottom of each test boring. In accordance with the Los Angeles County guidelines, since the water in both of the infiltration test borings did not completely infiltrate within a 30-minute time period after filling each boring, a falling head test was the appropriate test method.

Infiltration Testing Procedure

After the completion of the pre-soaking process, SCG performed the infiltration testing. A sufficient amount of water was added to the test borings so that the water level was approximately 12± inches higher than the bottom of the borings and less than or equal to the water level used during the pre-soaking process. Readings were taken at 30-minute intervals at all of the infiltration test locations. A stabilized rate of drop, where the highest and lowest readings from three consecutive readings are within 10 percent of each other, was obtained for each of the test borings. These water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

The infiltration rates for the tests are tabulated in inches per hour. In accordance with the typically accepted practice, it is recommended that the most conservative reading from the latter part of the infiltration tests be used for design. These rates are summarized below:

| Infiltration Test No. | Depth (feet) | Soil Description | Measured Infiltration Rate (inches/hour) |
|---|---|---|---|
| I-1 | 10 | Light Gray Brown fine Sandy Silt, little Clay, trace medium to coarse Sand | 1.9 |
| I-2 | 10 | Light Brown fine Sandy Silt, little Clay | 0.0 |

## Laboratory Testing

Moisture Content

The moisture contents for selected soil samples from the trenches were determined in accordance with ASTM D-2216 and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Grain Size Analysis

The grain size distribution of selected soils collected from the base of each infiltration test trench has been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of the grainsize analysis are presented on Plates C-1 and C-2 of this report.

## Design Recommendations

Two (2) infiltration tests were performed at the subject site. As noted above, the measured infiltration rates at the infiltration test locations range from 0.0 to 1.9 inches per hour. The Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS200.1 prepared by the County of Los Angeles, Department of Public Works, Geotechnical and Materials Division (GMED) on June 30, 2021 dictate that a reduction factor be utilized in the design infiltration rate. The following reduction factors are considered in the design assumed infiltration rate:

| **Reduction Factor** | |
|---|---|
| Small Diameter Boring | $RF_t = 2$ |
| Site Variability, number of tests, and thoroughness of subsurface investigation | $RF_v = 2$ |
| Long-term siltation plugging and maintenance | $RF_v = 1$ |
| Total Reduction Factor, $RF = RF_t + RF_v + RF_v$ | $RF = 5$ |
| Design Infiltration Rate (DIR) = Measured Infiltration Rate (MIR)/RF | **DIR = 0.0** |

Based on the results of the infiltration testing, silt and clay content, and reduction factors, infiltration is not recommended for this project.

## General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rates contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur. The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between trench locations and testing depths. If the conditions encountered during construction vary significantly from those

detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted. The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

## Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

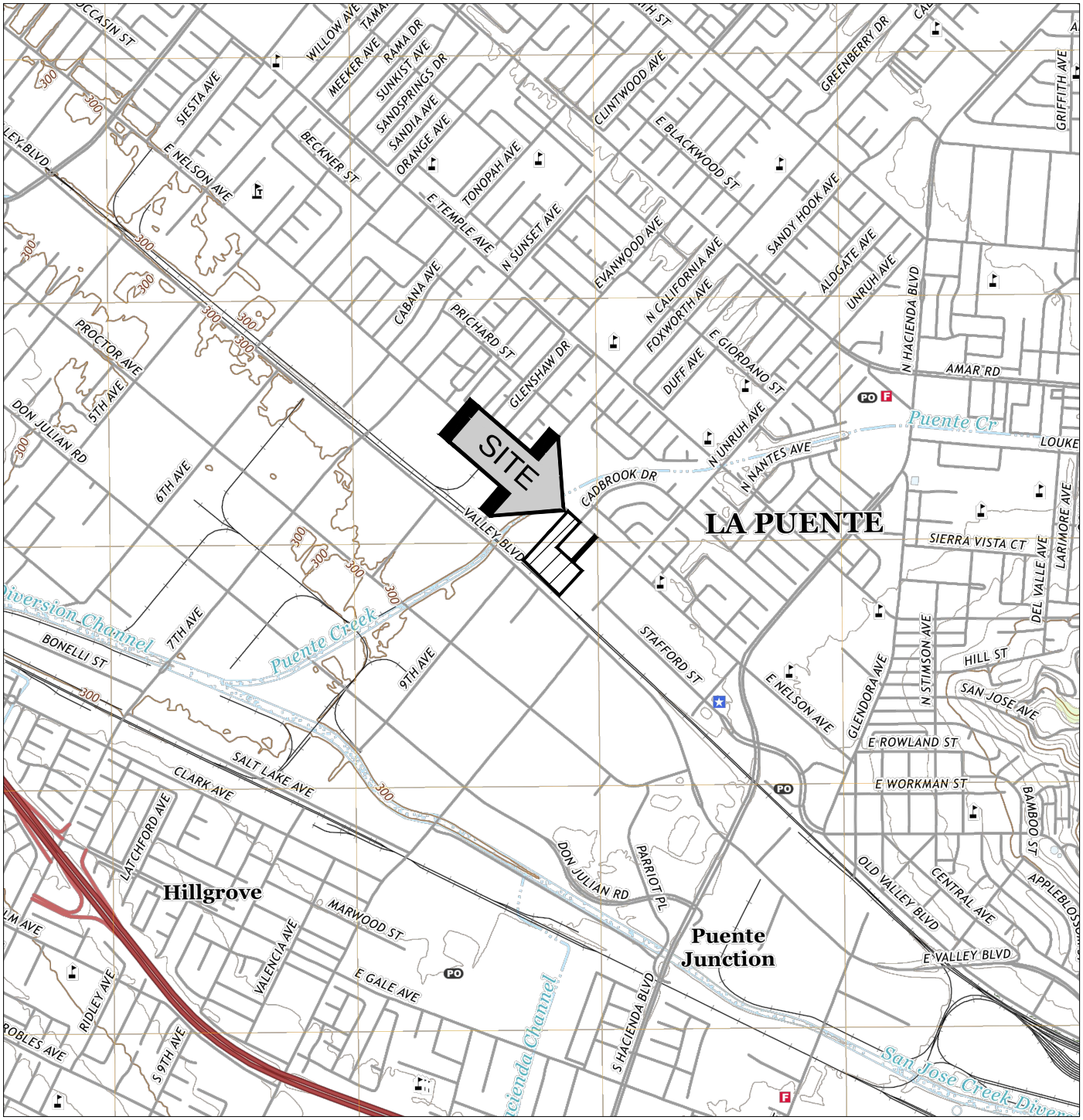
Respectfully Submitted,
SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Pablo Montes Jr.
Staff Engineer


Robert G. Trazo, GE 2655
Principal Engineer

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Boring Logs and Legend (4 pages)
Infiltration Test Results Spreadsheets (2 pages)
Grain Size Distribution Graphs (2 pages)




SOURCE: USGS TOPOGRAPHIC MAP OF THE BALDWIN PARK, LOS ANGELES COUNTY, CALIFORNIA, 2018.

**SITE LOCATION MAP**

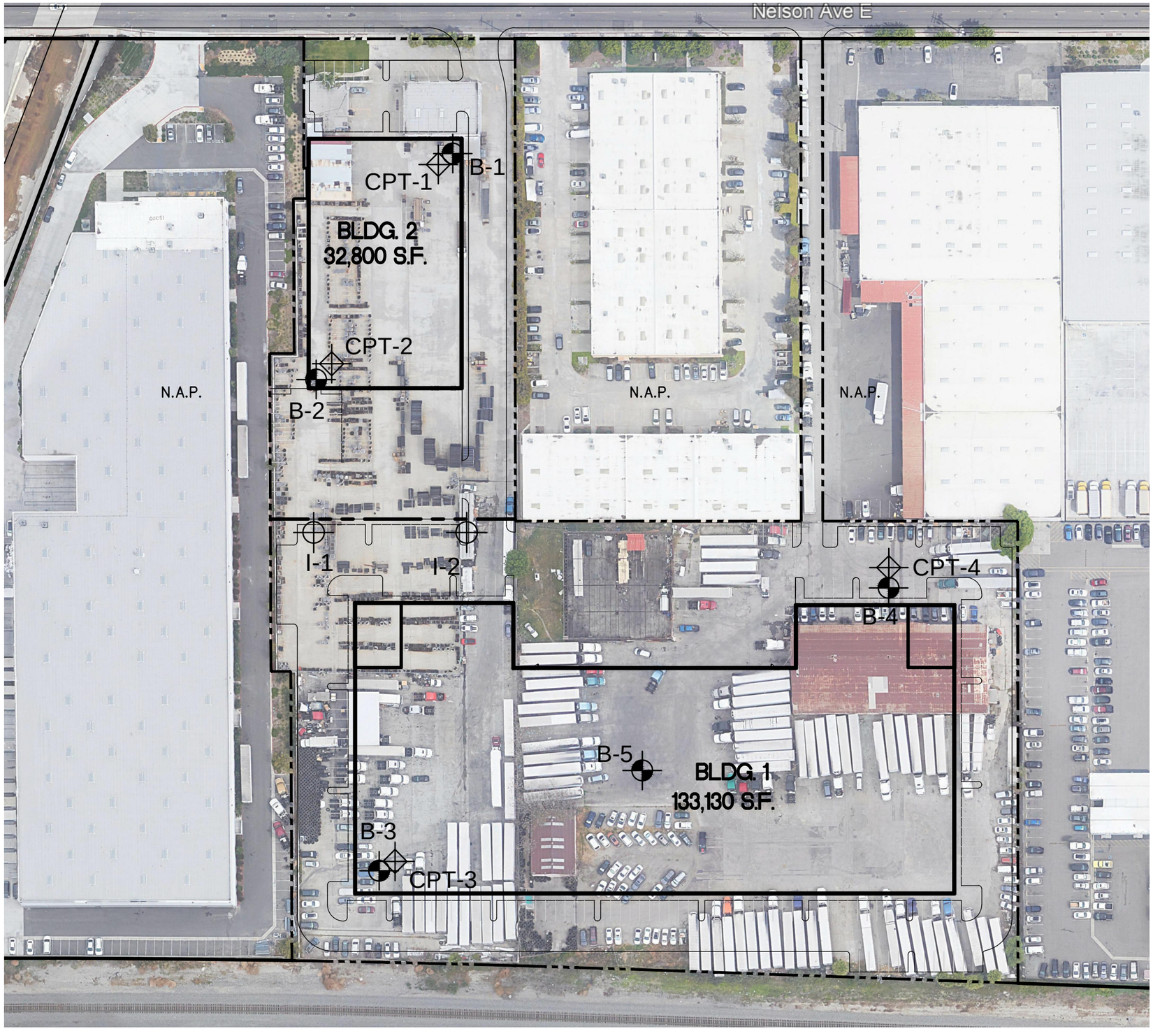
TWO PROPOSED COMMERCIAL/INDUSTRIAL BUILDINGS

CITY OF INDUSTRY, CALIFORNIA

| | |
|---|---|
| SCALE: 1" = 2000' | |
| DRAWN: MD<br>CHKD: RGT | |
| SCG PROJECT<br>21G265-2 | |
| **PLATE 1** | |

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL




NORTH
SoCalGeo

## GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- APPROXIMATE BORING LOCATION (SCG PROJECT NO. 21G265-1)
- APPROXIMATE CPT LOCATION (SCG PROJECT NO. 21G265-1)

NOTE: SITE PLAN PREPARED BY HPA ARCHITECTURE.
AIR PHOTO OBTAINED FROM GOOGLE EARTH.

**INFILTRATION TEST LOCATION PLAN**

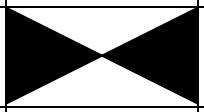
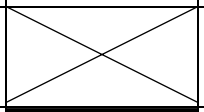
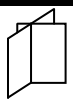
TWO PROPOSED COMMERCIAL/INDUSTRIAL BUILDINGS

CITY OF INDUSTRY, CALIFORNIA

| | |
|---|---|
| SCALE: 1" = 100' | |
| DRAWN: JAH<br>CHKD: RGT | |
| SCG PROJECT<br>21G265-2 | |
| **PLATE 2** | |

SOUTHERN CALIFORNIA GEOTECHNICAL

# BORING LOG LEGEND

| SAMPLE TYPE | GRAPHICAL SYMBOL | SAMPLE DESCRIPTION |
|---|---|---|
| **AUGER** |  | SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED) |
| **CORE** |  | ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK. |
| **GRAB** |  | SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED) |
| **CS** |  | CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED) |
| **NSR** |  | NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL. |
| **SPT** |  | STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED) |
| **SH** |  | SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED) |
| **VANE** |  | VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED. |

**COLUMN DESCRIPTIONS**

**DEPTH:** Distance in feet below the ground surface.

**SAMPLE**: Sample Type as depicted above.

**BLOW COUNT**: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

**POCKET PEN.**: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

**GRAPHIC LOG**: Graphic Soil Symbol as depicted on the following page.

**DRY DENSITY**: Dry density of an undisturbed or relatively undisturbed sample in $lbs/ft^3$.

**MOISTURE CONTENT**: Moisture content of a soil sample, expressed as a percentage of the dry weight.

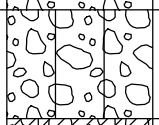
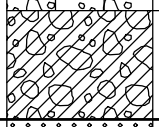
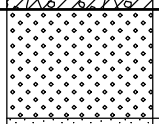
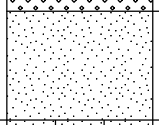
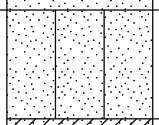
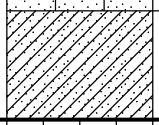
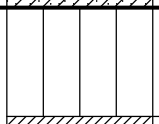
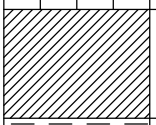
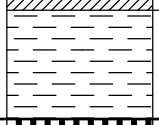
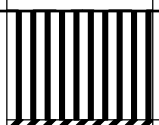
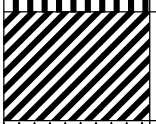
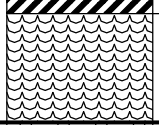
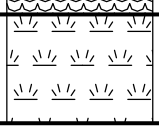
**LIQUID LIMIT**: The moisture content above which a soil behaves as a liquid.

**PLASTIC LIMIT**: The moisture content above which a soil behaves as a plastic.

**PASSING #200 SIEVE**: The percentage of the sample finer than the #200 standard sieve.

**UNCONFINED SHEAR**: The shear strength of a cohesive soil sample, as measured in the unconfined state.

# SOIL CLASSIFICATION CHART

| MAJOR DIVISIONS | | | SYMBOLS | | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|---|
| | | | GRAPH | LETTER | |
| COARSE GRAINED SOILS<br>MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE | GRAVEL AND GRAVELLY SOILS<br>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | CLEAN GRAVELS<br>(LITTLE OR NO FINES) |  | GW | WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | |  | GP | POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | GRAVELS WITH FINES<br>(APPRECIABLE AMOUNT OF FINES) |  | GM | SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES |
| | | |  | GC | CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES |
| | SAND AND SANDY SOILS<br>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE | CLEAN SANDS<br>(LITTLE OR NO FINES) |  | SW | WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES |
| | | |  | SP | POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES |
| | | SANDS WITH FINES<br>(APPRECIABLE AMOUNT OF FINES) |  | SM | SILTY SANDS, SAND - SILT MIXTURES |
| | | |  | SC | CLAYEY SANDS, SAND - CLAY MIXTURES |
| FINE GRAINED SOILS<br>MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE | SILTS AND CLAYS | LIQUID LIMIT LESS THAN 50 |  | ML | INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY |
| | | |  | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
| | | |  | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| | SILTS AND CLAYS | LIQUID LIMIT GREATER THAN 50 |  | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS |
| | | |  | CH | INORGANIC CLAYS OF HIGH PLASTICITY |
| | | |  | OH | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS |
| HIGHLY ORGANIC SOILS | | |  | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS |

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

# BORING NO. I-1

JOB NO.: 21G265-2
PROJECT: Two Proposed C/I Buildings
LOCATION: Industry, California

DRILLING DATE: 11/4/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: At Completion

| FIELD RESULTS | | | | | | LABORATORY RESULTS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (FEET) | SAMPLE | BLOW COUNT | POCKET PEN. (TSF) | GRAPHIC LOG | DESCRIPTION<br>SURFACE ELEVATION: --- MSL | DRY DENSITY (PCF) | MOISTURE CONTENT (%) | LIQUID LIMIT | PLASTIC LIMIT | PASSING #200 SIEVE (%) | ORGANIC CONTENT (%) | COMMENTS |
| | | | | | CONCRETE: 8± inches Portland Cement, no discernible Aggregate Base | | | | | | | |
| | | 16 | | | FILL: Light Gray Brown fine to coarse Sand, little fine to coarse Gravel, trace to little Silt, medium dense-dry to damp | | 3 | | | | | |
| | | | 3.0 | | FILL: Black Silty Clay, little fine Sand, stiff-very moist | | 17 | | | | | |
| | | 15 | 4.5 | | ALLUVIUM: Dark Brown Silty Clay, little fine to medium Sand, trace Iron Oxide staining, trace Calcareous nodules and veining, stiff to very stiff-moist | | 15 | | | | | |
| 5 | | | | | | | | | | | | |
| | | 10 | 3.5 | | Light Brown fine Sandy Clay, little to some Calcareous nodules, little Iron Oxide staining, stiff-moist | | 13 | | | | | |
| | | 10 | | | Light Gray Brown fine Sandy Silt, little Clay, trace medium to coarse Sand, medium dense-very moist | | 28 | | | | | |
| 10 | | | | | | | | | | | | |
| | | | | | Boring Terminated at 10' | | | | | | | |

TBL 21G265-2.GPJ SOCALGEO.GDT 12/8/21

**TEST BORING LOG** **PLATE B-1**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

# BORING NO. I-2

JOB NO.: 21G265-2
PROJECT: Two Proposed C/I Buildings
LOCATION: Industry, California

DRILLING DATE: 11/4/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: At Completion

| FIELD RESULTS | | | | | | LABORATORY RESULTS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH (FEET) | SAMPLE | BLOW COUNT | POCKET PEN. (TSF) | GRAPHIC LOG | DESCRIPTION<br>SURFACE ELEVATION: --- MSL | DRY DENSITY (PCF) | MOISTURE CONTENT (%) | LIQUID LIMIT | PLASTIC LIMIT | PASSING #200 SIEVE (%) | ORGANIC CONTENT (%) | COMMENTS |
| | | | | | CONCRETE: 5± inches Portland Cement, no discernible Aggregate Base | | | | | | | |
| | | 9 | 3.0 | | FILL: Dark Brown to Black Silty Clay, little fine Sand, porous, stiff-very moist | | 17 | | | | | |
| | | 10 | 4.0 | | ALLUVIUM: Brown fine Sandy Clay, little Calcareous nodules and veining, stiff-very moist | | 19 | | | | | |
| 5 | | 9 | 3.5 | | @ 6', trace porosity | | 23 | | | | | |
| | | 10 | | | Light Brown fine Sandy Silt, little Clay, little Calcareous nodules and veining, little Iron Oxide staining, medium dense-very moist | | 26 | | | | | |
| 10 | | | | | Boring Terminated at 10' | | | | | | | |

TBL 21G265-2.GPJ SOCALGEO.GDT 12/8/21

**TEST BORING LOG**

**PLATE B-2**

**INFILTRATION CALCULATIONS**

| | |
|---|---|
| Project Name | Two Proposed Commercial/Industrial Building |
| Project Location | Industry, California |
| Project Number | 21G265-2 |
| Engineer | Ryan Bremer |

| | | |
|---|---|---|
| Test Hole Radius | 4.00 | (in) |
| Test Depth | 10.00 | (ft) |

Infiltration Test Hole: I-1

| | | | |
|---|---|---|---|
| Start Time for Pre-Soak | 10:09 AM | Water Remaining in Boring (Y/N) | Y |
| Start Time for Standard | 11:09 AM | Time Interal Between Readings | 30min |

| Interval Number | | Time | Time Interval (min) | Water Depth (ft) | Change in Water Level (ft) | Average Head Height (ft) | Measured Infiltration Rate Q (in/hr) | Reduction Factor (RF) | Design Infiltration Rate Q (in/hr) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Initial | 11:09 AM | 30.0 | 6.45 | 1.43 | 2.8 | 1.9 | 5.0 | 0.4 |
| | Final | 11:39 AM | | 7.88 | | | | | |
| 2 | Initial | 11:39 AM | 30.0 | 6.45 | 1.35 | 2.9 | 1.8 | 5.0 | 0.4 |
| | Final | 12:09 PM | | 7.80 | | | | | |
| 3 | Initial | 12:09 PM | 30.0 | 6.45 | 1.44 | 2.8 | 1.9 | 5.0 | 0.4 |
| | Final | 12:39 PM | | 7.89 | | | | | |
| 4 | Initial | 12:39 PM | 30.0 | 6.45 | 1.47 | 2.8 | 2.0 | 5.0 | 0.4 |
| | Final | 1:09 PM | | 7.92 | | | | | |
| 5 | Initial | 1:09 PM | 30.0 | 6.45 | 1.45 | 2.8 | 1.9 | 5.0 | 0.4 |
| | Final | 1:39 PM | | 7.90 | | | | | |
| 6 | Initial | 1:39 PM | 30.0 | 6.45 | 1.43 | 2.8 | 1.9 | 5.0 | 0.4 |
| | Final | 2:09 PM | | 7.88 | | | | | |

Design Infiltration Rate = (Measured Infiltration Rate)/(Reduction Factor)
Reduction Factor (RF) = $RF_t+RF_v+RF_s$

| Reduction Factors | |
|---|---|
| Double-ring Infiltrometer | $RF_t$ = 1 to 3 |
| Shallow Test Pit | |
| Small Diameter Boring | |
| Large Diameter Boring | |
| High Fow-rate | $RF_t$ = 3 |
| Grain Size Analysis Method | $RF_t$ = 2 to 3 |
| Site variability, number of tests and thoroughness of subsurface investigation | $RF_v$ = 1 to 3 |
| Long-term siltation, plugging, and maintenance | $RF_s$ = 1 to 3 |

$$Q = \frac{\Delta H(60r)}{\Delta t(r+2H_{avg})}$$

Where:
- Q = Measured Infiltration Rate (in inches per hour)
- ΔH = Change in Height (Water Level) over the time interval
- r = Test Hole (Borehole) Radius
- Δt = Time Interval
- $H_{avg}$ = Average Head Height over the time interval

**INFILTRATION CALCULATIONS**

| | |
|---|---|
| Project Name | Two Proposed Commercial/Industrial Building |
| Project Location | Industry, California |
| Project Number | 21G265-2 |
| Engineer | Ryan Bremer |

| | | |
|---|---|---|
| Test Hole Radius | 4.00 | (in) |
| Test Depth | 10.00 | (ft) |

Infiltration Test Hole: I-2

| | | | |
|---|---|---|---|
| Start Time for Pre-Soak | 10:13 AM | Water Remaining in Boring (Y/N) | Y |
| Start Time for Standard | 11:13 AM | Time Interal Between Readings | 30min |

| Interval Number | | Time | Time Interval (min) | Water Depth (ft) | Change in Water Level (ft) | Average Head Height (ft) | Measured Infiltration Rate Q (in/hr) | Reduction Factor (RF) | Design Infiltration Rate Q (in/hr) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Initial | 11:13 AM | 30.0 | 7.12 | 0.01 | 2.9 | 0.0 | 5.0 | 0.0 |
| | Final | 11:43 AM | | 7.13 | | | | | |
| 2 | Initial | 11:43 AM | 30.0 | 7.13 | 0.01 | 2.9 | 0.0 | 5.0 | 0.0 |
| | Final | 12:13 PM | | 7.14 | | | | | |
| 3 | Initial | 12:13 PM | 30.0 | 7.14 | 0.00 | 2.9 | 0.0 | 5.0 | 0.0 |
| | Final | 12:43 PM | | 7.14 | | | | | |
| 4 | Initial | 12:43 PM | 30.0 | 7.14 | 0.01 | 2.9 | 0.0 | 5.0 | 0.0 |
| | Final | 1:13 PM | | 7.15 | | | | | |
| 5 | Initial | 1:13 PM | 30.0 | 7.15 | 0.00 | 2.9 | 0.0 | 5.0 | 0.0 |
| | Final | 1:43 PM | | 7.15 | | | | | |
| 6 | Initial | 1:43 PM | 30.0 | 7.15 | 0.00 | 2.9 | 0.0 | 5.0 | 0.0 |
| | Final | 2:13 PM | | 7.15 | | | | | |

Design Infiltration Rate = (Measured Infiltration Rate)/(Reduction Factor)
Reduction Factor (RF) = $RF_t+RF_v+RF_s$

| Reduction Factors | |
|---|---|
| Double-ring Infiltrometer | $RF_t$ = 1 to 3 |
| Shallow Test Pit | |
| Small Diameter Boring | |
| Large Diameter Boring | |
| High Fow-rate | $RF_t$ = 3 |
| Grain Size Analysis Method | $RF_t$ = 2 to 3 |
| Site variability, number of tests and thoroughness of subsurface investigation | $RF_v$ = 1 to 3 |
| Long-term siltation, plugging, and maintenance | $RF_s$ = 1 to 3 |

$$Q = \frac{\Delta H(60r)}{\Delta t(r+2H_{avg})}$$

Where:
- Q = Measured Infiltration Rate (in inches per hour)
- ΔH = Change in Height (Water Level) over the time interval
- r = Test Hole (Borehole) Radius
- Δt = Time Interval
- $H_{avg}$ = Average Head Height over the time interval

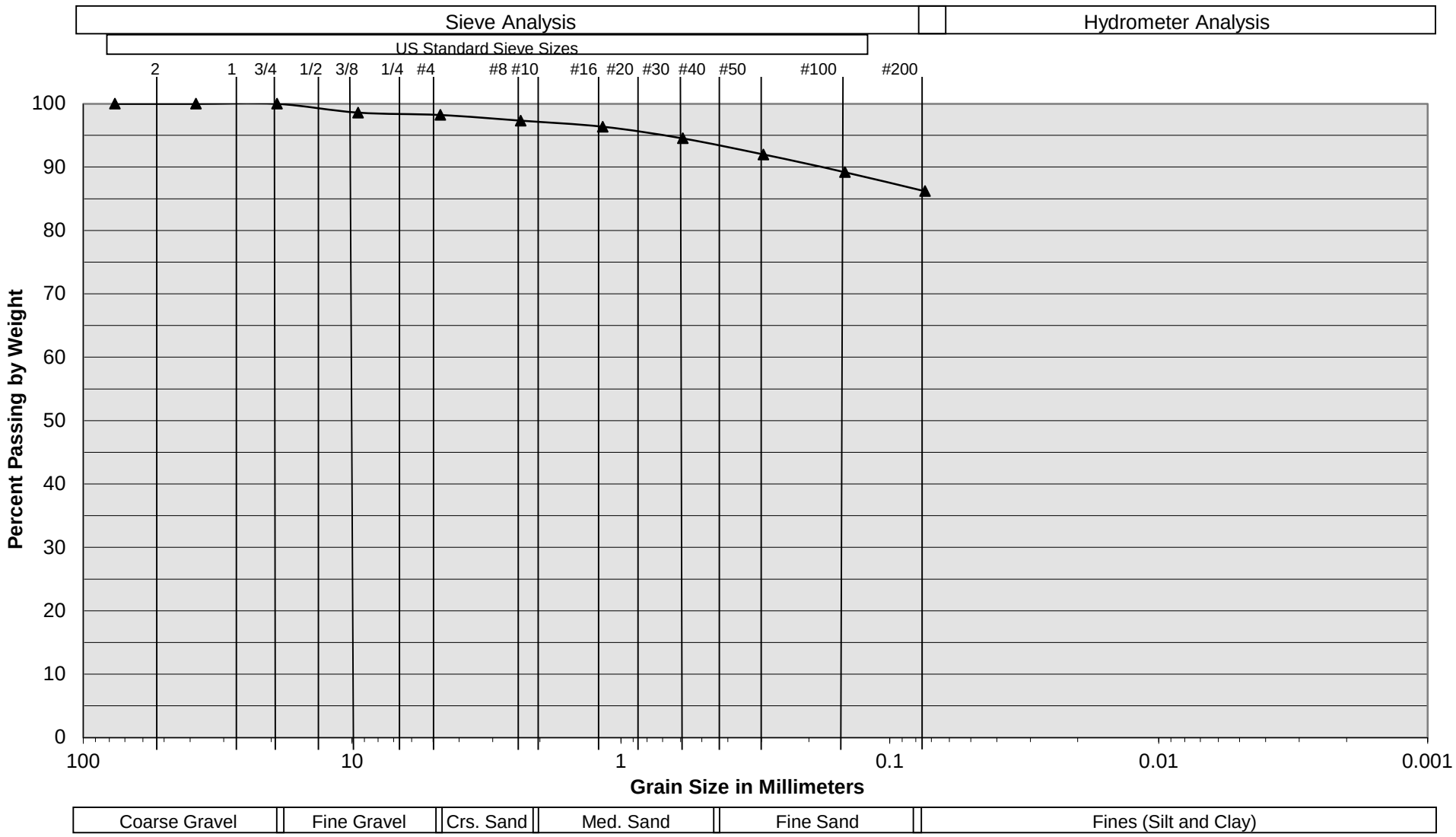
# Grain Size Distribution


| | |
|---|---|
| Sample Description | I-1 @ 8½' |
| Soil Classification | Light Gray Brown fine Sandy Silt, little Clay, trace medium to coarse Sand |

Two Proposed Commercial/Industrial Buildings
Industry, California
Project No. 21G265-2
**PLATE C- 1**

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

# Grain Size Distribution




| | |
|---|---|
| Sample Description | I-2 @ 8½' |
| Soil Classification | Light Brown fine Sandy Silt, little Clay |

Two Proposed Commercial/Industrial Buildings
Industry, California
Project No. 21G265-2
**PLATE C- 2**

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
*A California Corporation*