Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING

# PROJECT SPECIFIC PRELIMINARY WATER QUALITY MANAGEMENT PLAN (P-WQMP)

FOR:
**LOVETT 215**
TRUMBLE ROAD
MENIFEE, CALIFORNIA 92585
APNs: 329-240-046, -048 AND -051

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JUNE 24, 2022

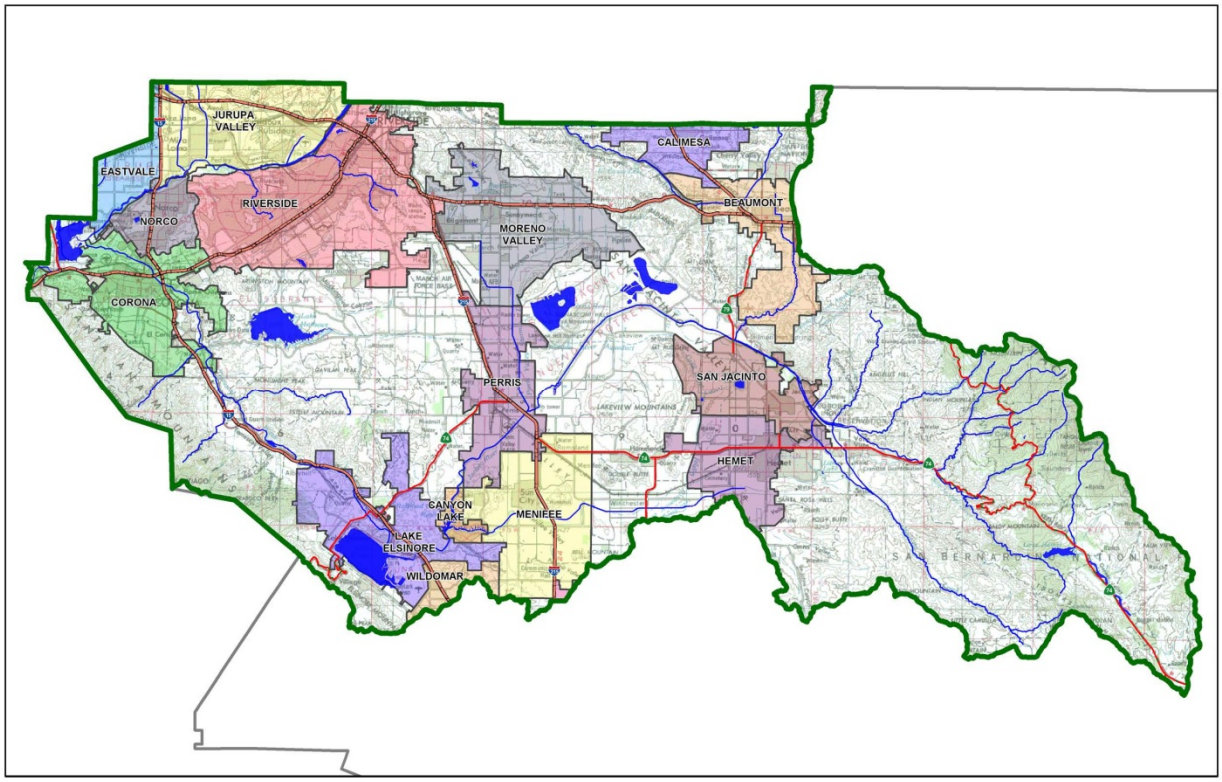
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# Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

**Project Title:** Lovett 215
**Development No:** DEV2022-XXX
**Design Review/Case No:** WQ-XXXX




☒ **Preliminary**
☐ **Final**

**Original Date Prepared**: June 24, 2022

**Revision Date(s)**:

*Prepared for Compliance with*
*Regional Board Order No*. **R8-2010-0033**

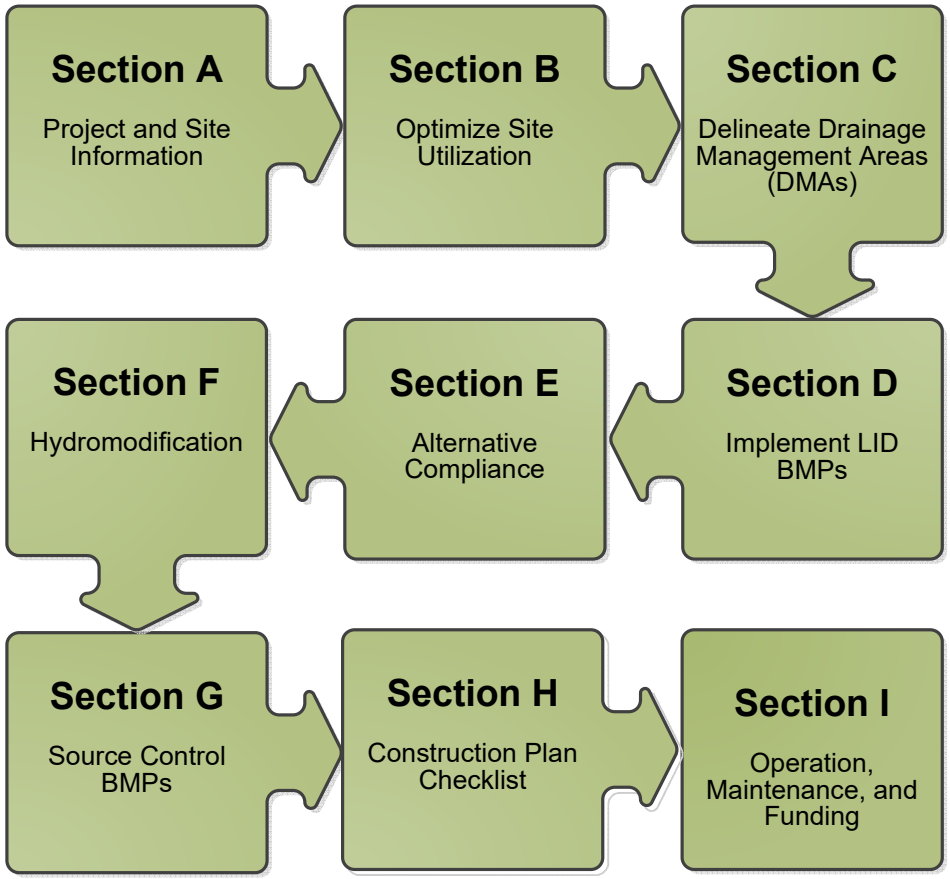
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## A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



## OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for **Lovett Industrial** by **Thienes Engineering, Inc.** for the **Lovett 215** project (DEV2022-XXX).

This WQMP is intended to comply with the requirements of **City of Menifee** for **Ordinance No. 8.26.050** which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under **City of Menifee** Ordinance **No. No. 8.26.050**.

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

| | |
|---|---|
| Owner's Signature | Date |
| Owner's Printed Name | Owner's Title/Position |

## PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

| | |
|---|---|
| Preparer's Signature | 6/24/2022<br>Date |
| Reinhard Stenzel<br>Preparer's Printed Name | Director of Engineering<br>Preparer's Title/Position |

Preparer's Licensure:



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# Section A: Project and Site Information

| | |
|---|---|
| **PROJECT INFORMATION** | |
| Type of Project: | Light Industrial Warehouse |
| Planning Area: | Economic Development Corridor (EDC) |
| Community Name: | N/A |
| Development Name: | Lovett 215 |
| **PROJECT LOCATION** | |
| Latitude & Longitude (GIS): 33.748307, -117.183210 | |
| Project Watershed and Sub-Watershed: Santa Ana River & San Jacinto | |
| APN(s): 329-240-046, -048 and -051 | |
| Map Book and Page No.: Assessor's Map BK329 PG. 24 | |
| **PROJECT CHARACTERISTICS** | |
| Proposed or Potential Land Use(s) | Light Industrial |
| Proposed or Potential SIC Code(s) | 4225 |
| Area of Impervious Project Footprint (SF) | 725,013 (16.64 acres) |
| Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement | 725,013 (16.64 acres) |
| Does the project consist of offsite road improvements? | ☒ Y ☐ N |
| Does the project propose to construct unpaved roads? | ☐ Y ☒ N |
| Is the project part of a larger common plan of development (phased project)? | ☐ Y ☒ N |
| **EXISTING SITE CHARACTERISTICS** | |
| Total area of existing Impervious Surfaces within the project limits (SF) | 0 |
| Is the project located within any MSHCP Criteria Cell? | ☐ Y ☒ N |
| If so, identify the Cell number: | n/a |
| Are there any natural hydrologic features on the project site? | ☐ Y ☒ N |
| Is a Geotechnical Report attached? | ☒ Y ☐ N |
| If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D) | Infiltration Report Available |
| What is the Water Quality Design Storm Depth for the project? | 0.61 |

Project Description:

The project site is located at the northeast corner of Illinois Avenue and Trumble Road, Menifee, CA. The project site encompasses approximately 17.52 acres. Proposed improvements include a light industrial warehouse approximately 327,631 square feet. There will be a truck yard on the east side of the building. Vehicle parking areas will be located on the westerly side of the building. Landscaping will be adjacent to the street and scattered throughout the site. Per the geotechnical investigation, the proposed project at completion, will consist almost entirely of compacted fill soils and therefore infiltration is not recommended. Due to the compaction of fill soils, infiltration rates are assumed to be near 0.0 inches per hour. Additionally, the project is located within Airport Land Use Commission (ALUC) jurisdiction Zone D. In accordance with Wildlife Hazard Management at Riverside County Airports: Background and Policy, Table 5-4, bioretention facilities are limited to 30 feet in length or width. Given that the project is a proposed light industrial warehouse with continuous truck yards without landscape breaks and large impervious areas makes bioretention facilities difficult to implement. Instead, the project proposes to use underground detention systems and proprietary biotreatment units to treat runoff produced by the 85th percentile storm rainfall depth. In addition, catch basin filters will be provided in order to pre-treat runoff prior to entering the water quality features.

Existing Site:

The site is currently a rough graded, undeveloped open pit. Runoff from most of the site sheet flows easterly into the open pit and is detained onsite.

Runoff from a portion of the site along Trumble Road and the southerly property line sheet flows southerly through the site and sits in a low spot along the southerly property line. A temporary solid fence prevents runoff from entering the residential houses to the south of the site.

Runoff from a portion of the northerly adjacent site sheet flows westerly onto the project site. These flows comingle with onsite runoff and are similarly detained onsite.

Hydrology:
Runoff from the easterly half of the proposed building, the truck yard, a portion of the northerly drive aisle and the southerly drive aisle will drain to catch basins located in the truck yard area drive aisle. Runoff will then be conveyed westerly across the southerly drive aisle via a proposed onsite storm drain.

Runoff from the westerly half of the proposed building, the westerly vehicular parking lot, the remaining portions of the northerly and southerly drive aisles will drain to catch basins located in the vehicular parking lot and southerly drive aisle. Runoff will then connect to the previously mentioned storm drain via two separate storm drain pipes. Ultimately, the project proposes to connect into an existing Caltrans RCB (that runs underneath Interstate 215) via a proposed 30" RCP public storm drain system in Trumble Road and Illinois Avenue.

Prior to runoff discharging offsite, diversion structures will be utilized to direct the DCV into the underground detention systems (STC-A and STC-B) and then slowly pumping the treatment flowrate through the proprietary biotreatment units (MWS-A and MWS-B). Proposed pumps will be utilized to pump treated flows back into the proposed storm drain systems.

The underground detention systems will also be utilized to mitigate the HCOC volume. A secondary outlet in the underground detention systems, located above the DCV depth, will discharge the HCOC volume into pumps that are designed to limit the discharge to a flowrate not greater than 110% of the pre-development 2-year peak flowrate.

The northerly offsite run-on will be captured in a v-gutter along the northerly property line and conveyed southerly through the site. Flows will ultimately discharge into the onsite storm drain past the water quality "bleed off" point.

The proposed pumps will be 1 HP, 460 V, 3 PH FLA, and 1.8 AMP. Pump specific details will be provided in final design.

Public Storm Drain:
There is an existing public storm drain, Line "A", that runs southerly in Trumble Road and continues westerly in Illinois Avenue. This storm drain system, designed by Albert A. Webb Associates (City File No. P8-921), discharges into an existing 6'x5' Caltrans RCB that runs underneath the Interstate 215 Freeway. However, though the site is tabled to the Caltrans RCB, it appears that the project site was not intended to discharge into Line "A". The existing pipe is also full, therefore, any additional flow added to the pipe will cause negative downstream hydraulic impacts.

Instead, the project site will drain to the existing Caltrans RCB via a proposed 30" RCP public storm drain system. The onsite storm drain system will "bubble out" into the public storm drain system. Once sufficient head is lost, a proposed pump will dry the pipe. The storm drain will convey flows southerly in Trumble Road then westerly in Illinois Avenue, running parallel to the existing storm drain. A proposed headwall structure will allow for both Line "A" and the proposed RCP to connect to the RCB.

## A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

## A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, and the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

**Table A.1** Identification of Receiving Waters

| Receiving Waters | EPA Approved 303(d) List Impairments | Designated Beneficial Uses | Proximity to RARE Beneficial Use |
|---|---|---|---|
| San Jacinto River, Reach 3 | None | AGR, GWR, REC1, REC2, WARM, WILD | Not classified as a RARE waterbody. |
| Canyon Lake (aka San Jacinto River, Reach 2) | Nutrients | MUN, AGR, GWR, REC1, REC2, WARM, WILD | Not classified as a RARE waterbody. |
| San Jacinto River, Reach 1 | None | MUN, AGR, GWR, REC1, REC2, WARM, WILD | Not classified as a RARE waterbody. |
| Lake Elsinore | DDT, Nutrients, Organic Enrichment/Low Dissolved Oxygen, Polychlorinated biphenyls (PCBs), Toxicity | REC1, REC2, WARM, WILD | Not classified as a RARE waterbody. |

## A.3 Additional Permits/Approvals required for the Project:

**Table A.2** Other Applicable Permits

| Agency | Permit Required | |
|---|---|---|
| State Department of Fish and Game, 1602 Streambed Alteration Agreement | ☐ Y | ☒ N |
| State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert. | ☐ Y | ☒ N |
| US Army Corps of Engineers, CWA Section 404 Permit | ☐ Y | ☒ N |
| US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion | ☐ Y | ☒ N |
| Statewide Construction General Permit Coverage | ☒ Y | ☐ N |
| Statewide Industrial General Permit Coverage | ☒ Y | ☐ N |
| Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP) | ☐ Y | ☒ N |
| Other *(please list in the space below as required)*<br>City of Menifee Grading Permit | ☒ Y | ☐ N |
| Other *(please list in the space below as required)*<br>City of Menifee Building Permit | ☒ Y | ☐ N |

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

# Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

## Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

- *The site is currently a rough graded, undeveloped open pit. Most of the site sheet flows easterly into the open pit and is detained onsite. However, runoff from the site is tabled to the existing Caltrans RCB running underneath I-215 Freeway. The project will detain onsite to meet hydrology requirements and then discharge to the existing Caltrans RCB via a proposed 30" RCP in Trumble Road and Illinois Avenue.*

Did you identify and protect existing vegetation? If so, how? If not, why?

- *Not applicable, there are no existing trees or vegetation to preserve.*
- *Not applicable, there are no sensitive areas.*

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

- *Per the geotechnical investigation, the proposed project at completion, will consist almost entirely of compacted fill soils and therefore infiltration is not recommended. Due to the compaction of fill soils, infiltration rates are assumed to be near 0.0 inches per hour. Instead of infiltration type BMPs, the project proposes to use underground detention systems and proprietary biotreatment units to treat runoff produced by the 85th percentile storm rainfall depth.*

Did you identify and minimize impervious area? If so, how? If not, why?

- *Impervious area on the site has been minimized to City standards.*
- *Due to the nature of the project site (large trucks), substitution of pavement for landscaping is not feasible. The project does not propose overflow parking where substitution of pavement for landscaping would be optimal. Landscaping has been provided wherever applicable and to the maximum extent practicable.*
- *The entire Design Capture Volume (DCV) is handled by the proposed underground detention systems and proprietary biotreatment units. Permeable pavement is not needed to meet the DCV.*

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

- *Roof runoff is directed to the underground detention systems and proprietary biotreatment units for treatment.*
- *The site is not on a hillside.*
- *All stormwater runoff will be piped or sheet flow into the underground detention systems and proprietary biotreatment units; therefore, curb-cuts into landscaped areas are not utilized.*

# Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

**Table C.1** DMA Classifications

| DMA Name or ID | Surface Type(s)[1] | Area (Sq. Ft.) | Area (Acres) | DMA Type |
|---|---|---|---|---|
| A1 | Roofs/Conc/Asphalt | 427,890 | 9.82 | Type D |
| A2 | Ornamental Landscaping | 22,521 | 0.52 | Type D |
| B1 | Roofs/Conc/Asphalt | 297,123 | 6.82 | Type D |
| B2 | Ornamental Landscaping | 15,638 | 0.36 | Type D |

[1]*Reference Table 2-1 in the WQMP Guidance Document to populate this column.*

**Table C.2** Type 'A', Self-Treating Areas

| DMA Name or ID | Area (Sq. Ft.) | Stabilization Type | Irrigation Type (if any) |
|---|---|---|---|
| | | | |

**Table C.3** Type 'B', Self-Retaining Areas

| **Self-Retaining Area** | | | | **Type 'C' DMAs that are draining to the Self-Retaining Area** | | |
|---|---|---|---|---|---|---|
| DMA Name/ ID | Post-project surface type | Area (square feet) [A] | Storm Depth (inches) [B] | DMA Name / ID | [C] from Table C.4 = [C] | Required Retention Depth (inches) [D] |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a |

$$[D] = [B] + \frac{[B]\cdot[C]}{[A]}$$

**Table C.4** Type 'C', Areas that Drain to Self-Retaining Areas

| DMA | | | | | Receiving Self-Retaining DMA | | |
|---|---|---|---|---|---|---|---|
| DMA Name/ ID | Area (square feet) | Post-project surface type | Runoff factor | Product | DMA name /ID | Area (square feet) | Ratio |
| | [A] | | [B] | [C] = [A] x [B] | | [D] | [C]/[D] |
| n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |

**Table C.5** Type 'D', Areas Draining to BMPs

| DMA Name or ID | BMP Name or ID |
|---|---|
| A1 | STC-A & MWS-A |
| A2 | STC-A & MWS-A |
| B1 | STC-B & MWS-B |
| B2 | STC-B & MWS-B |

*Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.*

# Section D: Implement LID BMPs

## D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site. If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

### Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

### Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

**Table D.1** Infiltration Feasibility

| Does the project site… | YES | NO |
|---|---|---|
| …have any DMAs with a seasonal high groundwater mark shallower than 10 feet? | | X |
| If Yes, list affected DMAs: | | |
| …have any DMAs located within 100 feet of a water supply well? | | X |
| If Yes, list affected DMAs: | | |
| …have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact? | | X |
| If Yes, list affected DMAs: | | |
| …have measured in-situ infiltration rates of less than 1.6 inches / hour? | | X |
| If Yes, list affected DMAs: | | |
| …have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface? | X | |
| If Yes, list affected DMAs: Per the geotechnical investigation, the proposed project at completion, will consist almost entirely of compacted fill soils and therefore infiltration is not recommended. | | |
| …geotechnical report identify other site-specific factors that would preclude effective and safe infiltration? | | X |
| Describe here: | | |

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

## D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐ Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐ The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

☒ None of the above

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If neither of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

### Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

*Total Area of Irrigated Landscape*: 0.88 acres

*Type of Landscaping (Conservation Design or Active Turf)*: Conservative Design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

*Total Area of Impervious Surfaces:* 16.64 acres

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

*Enter your EIATIA factor*: 0.79

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

*Minimum required irrigated area*: 13.1 acres

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

| Minimum required irrigated area (Step 4) | Available Irrigated Landscape (Step 1) |
|---|---|
| 13.1 acres | 0.88 acres |

## Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

*Projected Number of Daily Toilet Users:* 323 (approximate # of parking stalls)

*Project Type:* Light Industrial

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

*Total Area of Impervious Surfaces:* 16.64 acres

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

*Enter your TUTIA factor:* 172

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

*Minimum number of toilet users:* 2,862

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

| **Minimum required Toilet Users (Step 4)** | **Projected number of toilet users (Step 1)** |
|---|---|
| 2,862 | 323 |

### Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

*Average Daily Demand:* N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

*Total Area of Impervious Surfaces:* N/A

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-3 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

*Enter the factor from Table 2-3:* N/A

Step 4: Multiply the unit value obtained from Step 4 by the total of impervious areas from Step 3 to develop the minimum number of gallons per day of non-potable use that would be required.

*Minimum required use:* N/A

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

| **Minimum required non-potable use (Step 4)** | **Projected average daily use (Step 1)** |
|---|---|
| N/A | N/A |

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

## D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

*Select one of the following:*

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

## D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

**Table D.2** LID Prioritization Summary Matrix

| DMA Name/ID | LID BMP Hierarchy | | | | Alternative Compliance |
|---|---|---|---|---|---|
| | 1. Infiltration | 2. Harvest and use | 3. Bioretention | 4. Biotreatment | |
| A1 | ☐ | ☐ | ☐ | ☒ | ☐ |
| A2 | ☐ | ☐ | ☐ | ☒ | ☐ |
| B1 | ☐ | ☐ | ☐ | ☒ | ☐ |
| B2 | ☐ | ☐ | ☐ | ☒ | ☐ |

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

Per the geotechnical investigation, the proposed project at completion, will consist almost entirely of compacted fill soils and therefore infiltration is not recommended. Due to the compaction of fill soils, infiltration rates are assumed to be near 0.0 inches per hour. Additionally, the project is located within Airport Land Use Commission (ALUC) jurisdiction Zone D. In accordance with Wildlife Hazard Management at Riverside County Airports: Background and Policy, Table 5-4, bioretention facilities are limited to 30 feet in length or width. Given that the project is a proposed light industrial warehouse with continuous truck yards without landscape breaks and large impervious areas makes bioretention facilities difficult to implement. Ultimately, underground detention systems and proprietary biotreatment units are proposed for treatment.

## D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the $V_{BMP}$ worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required $V_{BMP}$ using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

**Table D.3** DCV Calculations for LID BMPs

| DMA Type/ID | DMA Area (square feet) | Post-Project Surface Type | Effective Impervious Fraction, $I_f$ | DMA Runoff Factor | DMA Areas x Runoff Factor | *Design Storm Depth (in)* | *Design Capture Volume, $V_{BMP}$ (cubic feet)* | *Proposed Volume on Plans (cubic feet)* |
|---|---|---|---|---|---|---|---|---|
| | [A] | | [B] | [C] | [A] x [C] | | | |
| A1 | 427,890 | Roofs/Conc/Asphalt | *1.00* | *0.89* | *381,677.9* | *0.61* | *19402* | *20,230* |
| A2 | 22,521 | Ornamental Landscaping | *0.10* | *0.11* | *2,487.6* | *0.61* | *126.5* | |
| B1 | 297,123 | Roofs/Conc/Asphalt | *1.00* | *0.89* | *265,033.7* | *0.61* | *13472.5* | *14,099* |
| B2 | 15,638 | Ornamental Landscaping | *0.10* | *0.11* | *1,727.3* | *0.61* | *87.8* | |
| | *763,172* | | | | *650,927* | 0.61 | 33,088.8 | 34,329 |

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

# Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

*- Or -*

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

## E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

**Table E.1** Potential Pollutants by Land Use Type

| Priority Development Project Categories and/or Project Features (check those that apply) | General Pollutant Categories | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Bacterial Indicators | Metals | Nutrients | Pesticides | Toxic Organic Compounds | Sediments | Trash & Debris | Oil & Grease |
| ☐ Detached Residential Development | P | N | P | P | N | P | P | P |
| ☐ Attached Residential Development | P | N | P | P | N | P | P | P(2) |
| ☒ Commercial/Industrial Development | P(3) | P | P(1) | P(1) | P(5) | P(1) | P | P |
| ☐ Automotive Repair Shops | N | P | N | N | P(4, 5) | N | P | P |
| ☐ Restaurants (>5,000 ft²) | P | N | N | N | N | N | P | P |
| ☐ Hillside Development (>5,000 ft²) | P | N | P | P | N | P | P | P |
| ☐ Parking Lots (>5,000 ft²) | P(6) | P | P(1) | P(1) | P(4) | P(1) | P | P |
| ☐ Retail Gasoline Outlets | N | P | N | N | P | N | P | P |
| **Project Priority Pollutant(s) of Concern** | ☐ | ☒ | ☐ | ☐ | ☐ | ☐ | ☒ | ☒ |

*P = Potential*

*N = Not Potential*

*(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected*

*(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected*

*(3) A potential Pollutant is land use involving animal waste*

*(4) Specifically petroleum hydrocarbons*

*(5) Specifically solvents*

*(6) Bacterial indicators are routinely detected in pavement runoff*

## E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

**Table E.2** Water Quality Credits

| Qualifying Project Categories | Credit Percentage[2] |
|---|---|
| N/A | |
| | |
| | |
| *Total Credit Percentage[1]* | |

*[1]Cannot Exceed 50%*

*[2]Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

## E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

**Table E.3** Treatment Control BMP Sizing

| DMA Type/ ID | DMA Area (square feet) | Post-Project Surface Type | Effective Imp Fraction, $I_f$ | DMA Runoff Factor | DMA Area x Runoff Factor | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | [A] | | [B] | [C] | [A] x [C] | | | | |
| ***N/A*** | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *Design Storm Depth (in)* | *Minimum Design Capture Volume (cubic feet)* | *Total Storm Water Credit % Reduction* | *Proposed Volume or Flow on Plans (cubic feet or cfs)* |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

## E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

**Table E.4** Treatment Control BMP Selection

| Selected Treatment Control BMP Name or ID[1] | Priority Pollutant(s) of Concern to Mitigate[2] | Removal Efficiency Percentage[3] |
|---|---|---|
| N/A | | |
| N/A | | |

*[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.*
*[2] Cross Reference Table E.1 above to populate this column.*
*[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.*

# Section F: Hydromodification

### F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

**HCOC EXEMPTION 1**: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐Y ☒N

If Yes, HCOC criteria do not apply.

**HCOC EXEMPTION 2**: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐Y ☒ N

If yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

**Table F.1** Hydrologic Conditions of Concern Summary

| | 2 year – 24 hour | | |
|---|---|---|---|
| | **Pre-condition** | **Post-condition** | **% Difference** |
| **Time of Concentration (min)** | | | |
| **Volume (cubic-feet)** | | | |

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

**HCOC EXEMPTION 3**: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier: The project site drains to Canyon Lake and Lake Elsinore.

## F.2 HCOC Mitigation

As an alternative to the HCOC Exemption Criteria above, HCOC criteria is considered mitigated if the project meets one of the following conditions, as indicated:

☐ a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

☐ b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

☒ c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

| | 2 year – 24 hour | | | |
|---|---|---|---|---|
| | Pre-condition | Post-condition | Difference | Difference (as % of pre-condition) |
| **Flowrate (cfs)** | TBD | TBD | TBD | TBD |

Since the excess volume cannot be infiltrated or captured and reused, the entire volume of the proposed condition 2-year storm event was detained in the underground system. Discharge from the underground detention system has been limited by the pump from the underground detention system to the main storm drain line at a flowrate of X.XX cfs. This is approximately XXX% more than the pre-development 2-year peak flow and mitigates the HCOC criteria. Refer to the hydrographs in Appendix 7 (PENDING).

☐ d. None of the above.

# Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

**Table G.1** Permanent and Operational Source Control Measures

| Potential Sources of Runoff pollutants | Permanent Structural Source Control BMPs | Operational Source Control BMPs |
|---|---|---|
| **A.** On-site storm drain inlets | • Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. | • Maintain and periodically repaint or replace inlet markings annually.<br>• Provide stormwater pollution prevention information to new site owners, lessees, or operators upon occupancy and annually thereafter.<br>• See CASQA fact sheet SC-44 for "Drainage System Maintenance," included in Appendix of this document.<br>• Include the following lease agreements: "Tenant shall not allow anyone to discharge anything to storm drain or to store or deposit materials so as to create a potential discharge to storm drains." |

| Potential Sources of Runoff pollutants | Permanent Structural Source Control BMPs | Operational Source Control BMPs |
|---|---|---|
| **B.** Interior floor drains and elevator shaft sump pumps | • Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer. | • Inspect and maintain drains semi-annually to prevent blockages and overflow. |
| **D2.** Landscape / Outdoor Pesticide Use | • Landscape plans will minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.<br>• Pest-resistant plans will be used adjacent to hardscape.<br>• The landscape plans will consider plants appropriate to the site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions. | • Maintain landscaping only using minimum pesticides, when needed.<br>• See Appendix 10 for "Landscape and Gardening" brochure by RCFlood.<br>• Provide Integrated Pest Management (IPM) information to new owners, lessees and operators upon occupancy and annually thereafter. IPM is an effective and environmentally sensitive approach to pest management. |
| **G.** Refuse Areas | • Site refuse will be handled by contractor on a weekly basis.<br>• Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar. | • A minimum of two receptacles will be provided and located indoors. Receptacles are to be inspected daily and repairs or replacements to leaky receptacles will be completed immediately. Receptacles are to remain covered when not in use. Dumping of liquid or hazardous wastes is prohibited. A "no hazardous materials" sign will be posted. Spills will be cleaned immediately upon discovery. Spill control materials will be available onsite. See Appendix 10 for CASQA fact sheet SC-34 for "Waste Handling and Disposal." |
| **H.** Industrial processes | • All process activities to be performed indoors. No processes to drain to exterior or to storm drain system. | • See Appendix 10 for CASQA fact sheet SC-10 for "Non-Stormwater Discharges" |
| **M.** Loading Docks | • Spills will be cleaned up immediately and disposed of properly. | • Move loaded and unloaded items indoors as soon as possible.<br>• See Appendix 10 for CASQA fact sheet SC-30 for "Outdoor Loading and Unloading" |
| **O.** Miscellaneous Drain or Wash Water or Other Sources | • Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. | |
| **P.** Plazas, sidewalks, and parking lots | | • Sweep plazas, sidewalks, and parking lots monthly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain. |

# Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

**Table H.1** Construction Plan Cross-reference

| BMP No. or ID | BMP Identifier and Description | Corresponding Plan Sheet(s) | Latitude | Longitude |
|---|---|---|---|---|
| A | On-site storm drain inlets | WQMP Site Map | --- | --- |
| B | Interior floor drains and elevator shaft sump pumps | N/A | --- | --- |
| D2 | Landscape / Outdoor Pesticide Use | On-Site Landscape Improvement Plans | --- | --- |
| G | Refuse Areas | WQMP Site Map | --- | --- |
| H | Industrial processes | WQMP Site Map | --- | --- |
| M | Loading Docks | WQMP Site Map | --- | --- |
| P | Plazas, sidewalks, and parking lots | WQMP Site Map | --- | --- |
| MWS-A | Modular Wetlands System | WQMP Site Map | 33.747242 | -117.181840 |
| STC-A | Underground Detention System | WQMP Site Map | 33.747601 | -117.182002 |
| MWS-B | Modular Wetlands System | WQMP Site Map | 33.747665 | -117.184421 |
| STC-B | Underground Detention System | WQMP Site Map | 33.747954<br>33.748780 | -117.184299<br>-117.184297 |

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

# Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

**Maintenance Mechanism:** City of Menifee Water Quality Management Plan and Stormwater Best Management Practices Operation, Transfer, Maintenance and Right of Entry Agreement

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

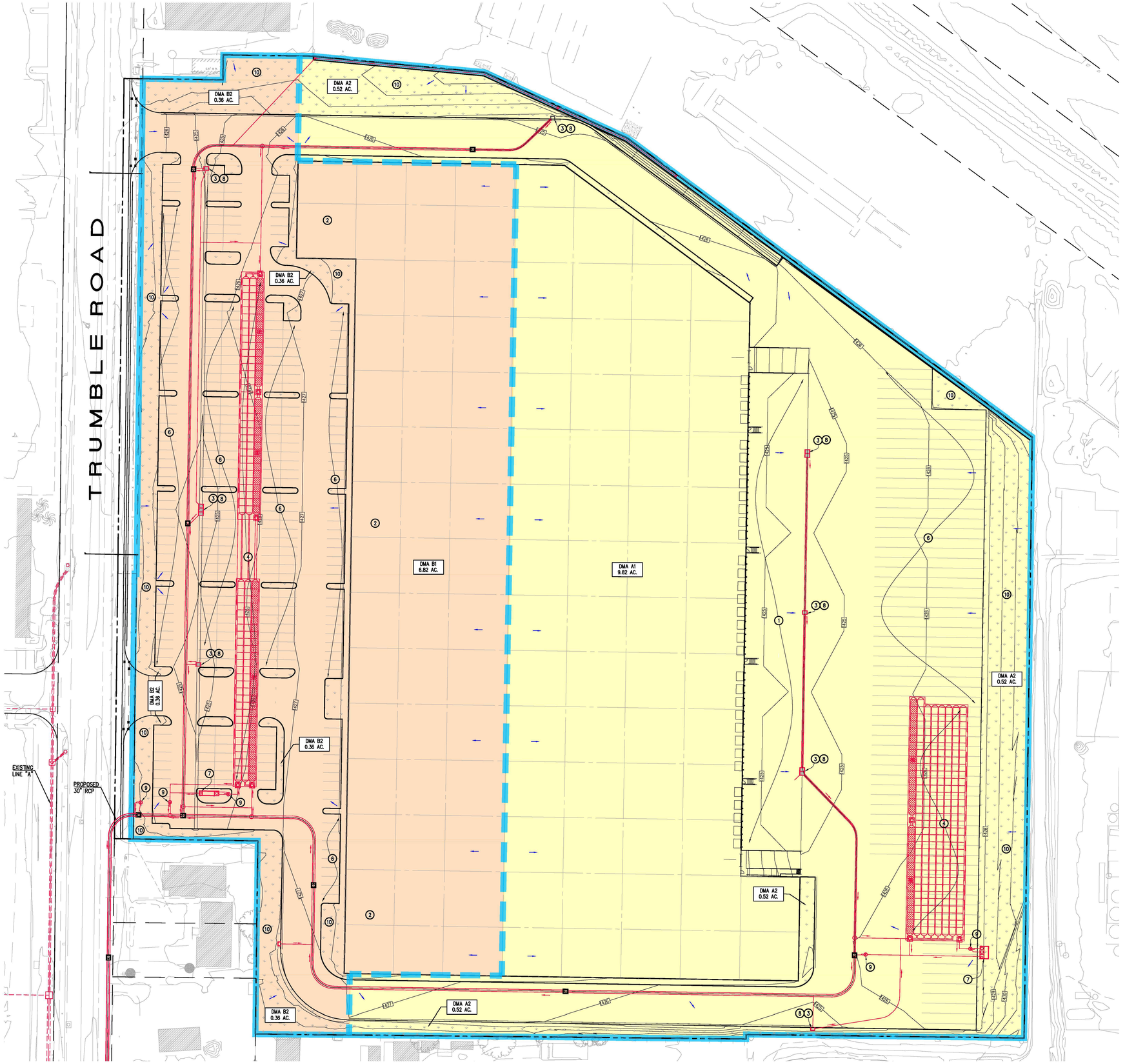
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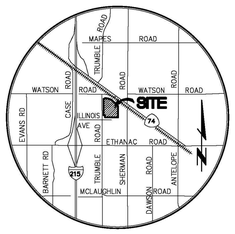
Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

This section will be completed and addressed at the time of the final WQMP Submittal.

# Appendix 1: Maps and Site Plans

*Location Map, WQMP Site Plan and Receiving Waters Map*




VICINITY MAP
N.T.S.

## LEGEND

1. LOADING/UNLOADING TRUCK DOCKS
2. EDUCATIONAL MATERIAL
3. STORM DRAIN STENCIL
4. STORMTECH MC-3500 DETENTION CHAMBERS
5. TRASH ENCLOSURE
6. PARKING LOT MAINTENANCE (SWEEPING)
7. PROPRIETARY BIOTREATMENT UNIT
8. DRAIN INSERT(S)
9. SUMP PUMP
10. LANDSCAPE/OUTDOOR PESTICIDE USE

NOTE:

RD ROOF DRAIN
BOUNDARY
SUBAREAS
SURFACE FLOW LINE
SD FLOW LINE
DMA A
DMA B

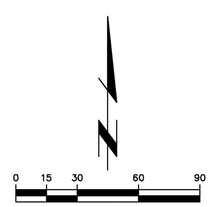



SAMPLE STORM DRAIN STENCIL

| DMA | AREA (ACRES) | DCV (CF) | MODULAR WETLANDS SYSTEM (MWS) MWS MODEL | VOLUME PROCESSED THROUGH MWS (CF) | LINEAR STATIC CAPACITY (CF) | MC-3500 DETENTION CHAMBERS DETENTION REQUIRED (CF) | DETENTION PROVIDED (CF)* | # OF CHAMBERS | TOTAL VOLUME PROVIDED (CF) |
|---|---|---|---|---|---|---|---|---|---|
| A | 10.34 | 19,529 | MWS-L-8-12-V | 0 | 187 | 19,342 | 20,043 | 256 | 20,230 |
| B | 7.18 | 13,561 | MWS-L-4-19-V | 0 | 131 | 13,430 | 13,968 | 180 | 14,099 |
| **TOTAL** | **17.52** | **19,529** | | **0** | **187** | **19,342** | **20,043** | **256** | **20,230** |

*The underground chambers will be utilized to store the DCV plus the HCOC mitigation volume. The DCV is met at approximately 3.33 feet above the bottom of stone. The volume above this depth will be released via a flow-control orifice.

| DMA Name or ID | Surface Type(s)* | Area (Sq. Ft.) | Area (Acres) | DMA Type |
|---|---|---|---|---|
| A1 | Roofs/Conc/Asphalt | 427,890 | 9.82 | Type D |
| A2 | Ornamental Landscaping | 22,521 | 0.52 | Type D |
| B1 | Roofs/Conc/Asphalt | 297,123 | 6.82 | Type D |
| B2 | Ornamental Landscaping | 15,638 | 0.36 | Type D |
| | | **763,172** | **17.52** | |




Last Update: 6/24/22
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# CITY OF MENIFEE
PUBLIC WORKS DEPARTMENT

## WQMP SITE MAP

## LOVETT 215
## TRUMBLE ROAD

4100/1 OF 2 SHEET

**PREPARED FOR:**
LOVETT INDUSTRIAL
1902 WASHINGTON AVENUE, SUITE A
HOUSTON, TEXAS 77007
PHONE: (713) 212-1560

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

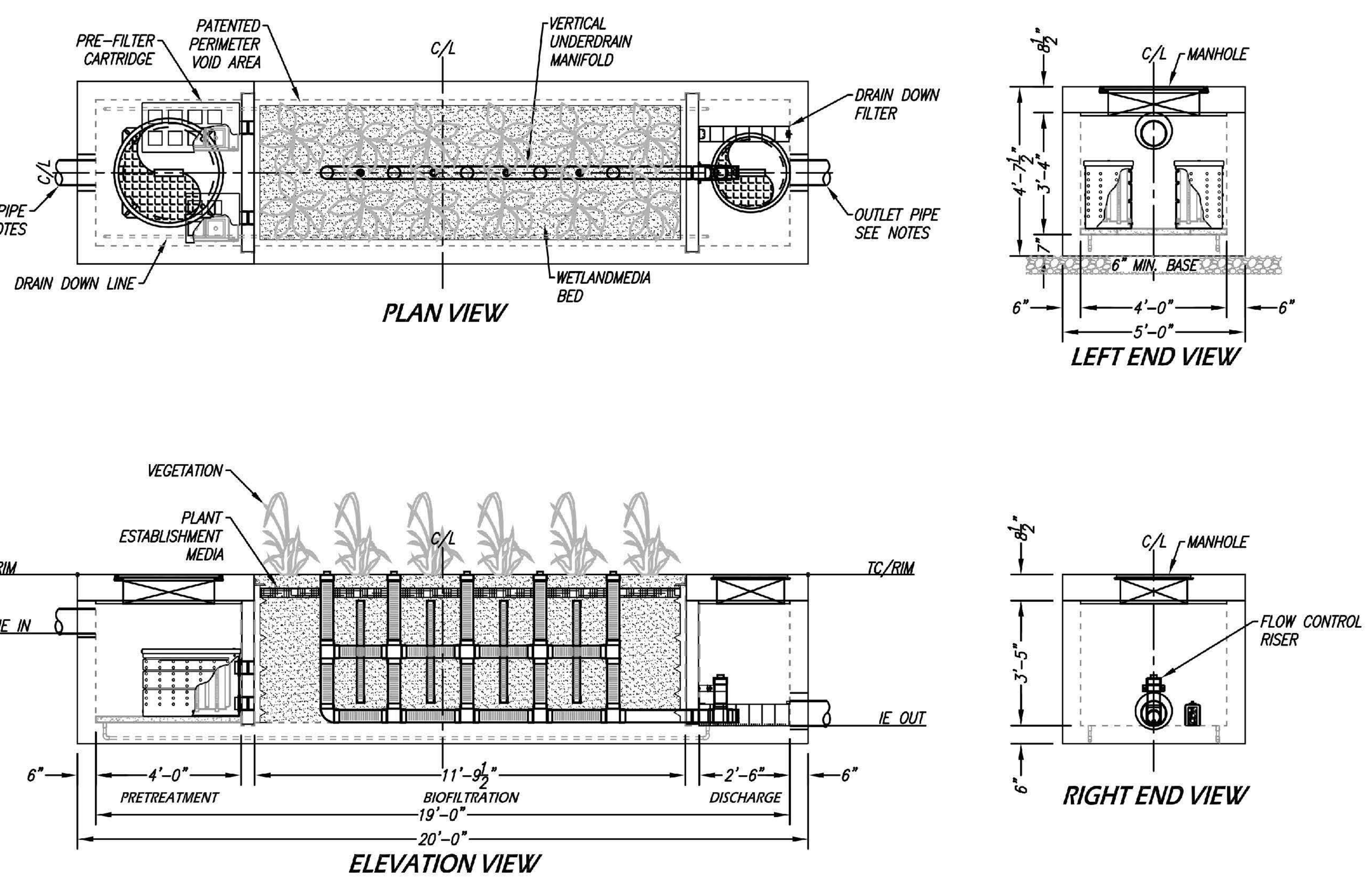
Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

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

Sheet 1 of 2 Sheets

## SITE SPECIFIC DATA

| SITE SPECIFIC DATA | | | |
|---|---|---|---|
| PROJECT NAME | | | |
| PROJECT LOCATION | | | |
| STRUCTURE ID | | | |
| TREATMENT REQUIRED | | | |
| VOLUME BASED (CF) | | FLOW BASED (CFS) | |
| | | | |
| TREATMENT HGL AVAILABLE (FT) | | | |
| PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE | | | |
| PIPE DATA | I.E. | MATERIAL | DIAMETER |
| INLET PIPE 1 | | | |
| INLET PIPE 2 | | | |
| OUTLET PIPE | | | |
| | PRETREATMENT | BIOFILTRATION | DISCHARGE |
| RIM ELEVATION | | | |
| SURFACE LOAD | PARKWAY | OPEN PLANTER | PARKWAY |
| FRAME & COVER | ø30" | N/A | ø24" |
| WETLANDMEDIA VOLUME (CY) | | | 6.52 |
| WETLANDMEDIA DELIVERY METHOD | | | TBD |
| ORIFICE SIZE (DIA. INCHES) | | | ø2.20" |
| MAXIMUM PICK WEIGHT (LBS) | | | 40000 |
| NOTES: | | | |




### 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 MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS 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 TO VERIFY PROJECT ENGINEERS 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 MANUFACTURERS 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 GROUT ALL MANHOLES AND HATCHES TO MATCH 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.

| | |
|---|---|
| TREATMENT FLOW (CFS) | 0.237 |
| OPERATING HEAD (FT) | 3.4 |
| PRETREATMENT LOADING RATE (GPM/SF) | TBD |
| WETLAND MEDIA LOADING RATE (GPM/SF) | 1.0 |

THE PRODUCT DESCRIBED MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

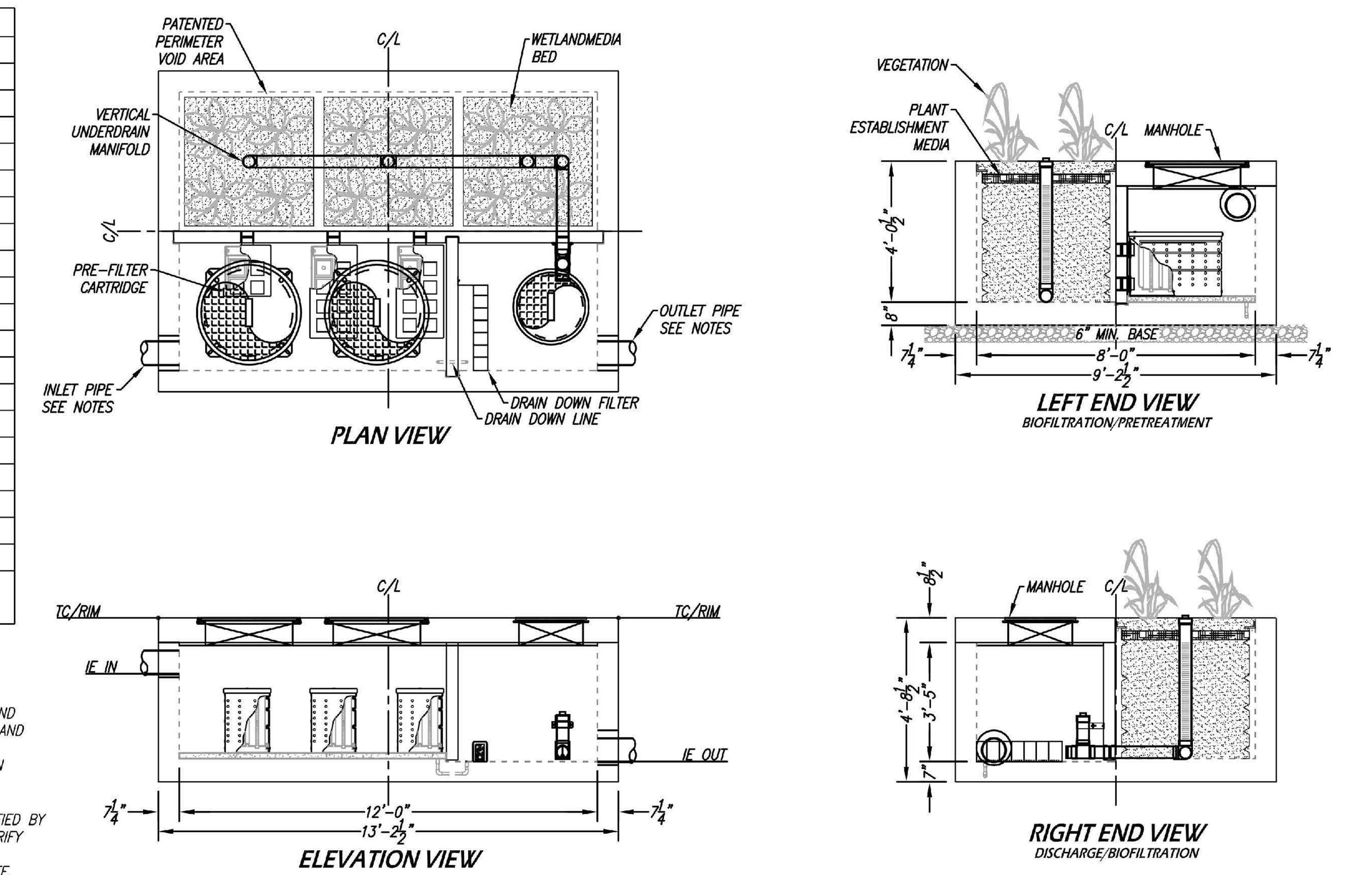
PROPRIETARY AND CONFIDENTIAL:
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MODULAR WETLANDS SYSTEMS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MODULAR WETLANDS SYSTEMS IS PROHIBITED.

MODULAR WETLANDS
www.ModularWetlands.com | (855) 5MOD-WET

**MWS-L-4-19-V**
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

## SITE SPECIFIC DATA

| SITE SPECIFIC DATA | | | |
|---|---|---|---|
| PROJECT NAME | | | |
| PROJECT LOCATION | | | |
| STRUCTURE ID | | | |
| TREATMENT REQUIRED | | | |
| VOLUME BASED (CF) | | FLOW BASED (CFS) | |
| | | | |
| TREATMENT HGL AVAILABLE (FT) | | | |
| PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE | | | |
| PIPE DATA | I.E. | MATERIAL | DIAMETER |
| INLET PIPE 1 | | | |
| INLET PIPE 2 | | | |
| OUTLET PIPE | | | |
| | PRETREATMENT | BIOFILTRATION | DISCHARGE |
| RIM ELEVATION | | | |
| SURFACE LOAD | PARKWAY | OPEN PLANTER | PARKWAY |
| FRAME & COVER | ø30" | N/A | ø24" |
| WETLANDMEDIA VOLUME (CY) | | | 7.26 |
| WETLANDMEDIA DELIVERY METHOD | | | TBD |
| ORIFICE SIZE (DIA. INCHES) | | | ø2.66" |
| MAXIMUM PICK WEIGHT (LBS) | | | TBD |
| NOTES: | | | |




### 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 MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS 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 TO VERIFY PROJECT ENGINEERS 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 MANUFACTURERS 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 GROUT ALL MANHOLES AND HATCHES TO MATCH 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.

| | |
|---|---|
| TREATMENT FLOW (CFS) | 0.346 |
| OPERATING HEAD (FT) | 3.4 |
| PRETREATMENT LOADING RATE (GPM/SF) | TBD |
| WETLAND MEDIA LOADING RATE (GPM/SF) | 1.0 |

THE PRODUCT DESCRIBED MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

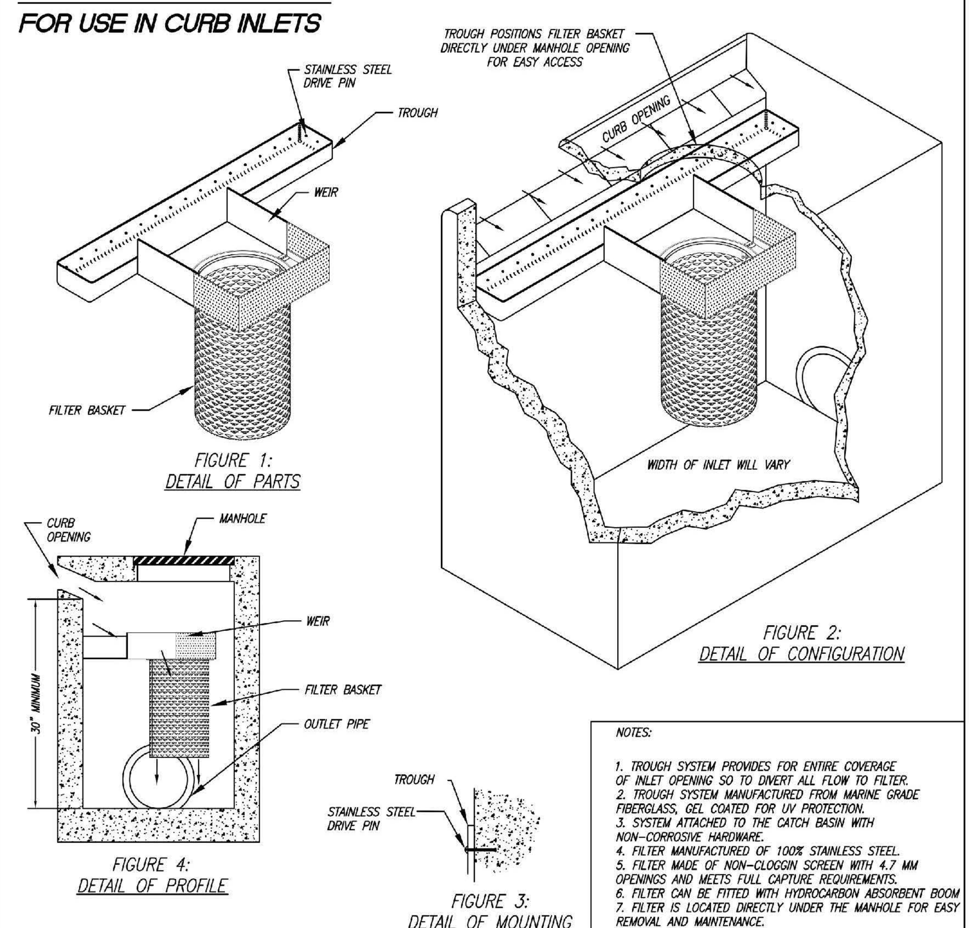
PROPRIETARY AND CONFIDENTIAL:
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**MWS-L-8-12-V**
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

## BIO CLEAN FULL CAPTURE FILTER WITH TROUGH SYSTEM

### FOR USE IN CURB INLETS




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 100% 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.

| MODEL NUMBER | TREATMENT FLOW (cfs)* | SOLIDS STORAGE CAPACITY (cu 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 |

*SEE PAGE 2 FOR EXPLANATION OF FLOW RATES

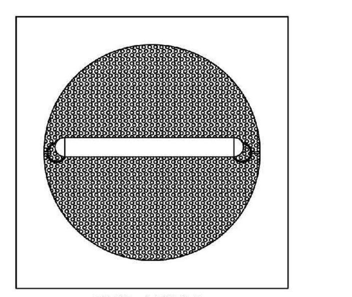
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|---|---|---|---|
| DRAWING: BIO CLEAN CURB INLET FILTER DETAILS | | MEETS FULL CAPTURE REQUIREMENTS | |
| TREATMENT FLOW RATE: 2.85 cfs | | MODEL #: BIO-CURB-FULL | |
| WARRANTY: 8 YEAR MANUFACTURERS | | PROJECT: | |
| BIO CLEAN ENVIRONMENTAL SERVICES, INC. 398 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176 | | REVISIONS: | DATE: |
| | | REVISIONS: | DATE: |
| DATE: 10/12/2017 | SCALE: NTS | REVISIONS: | DATE: |
| DRAFTER: M.C.P. | UNITS = INCHES | REVISIONS: | DATE: |

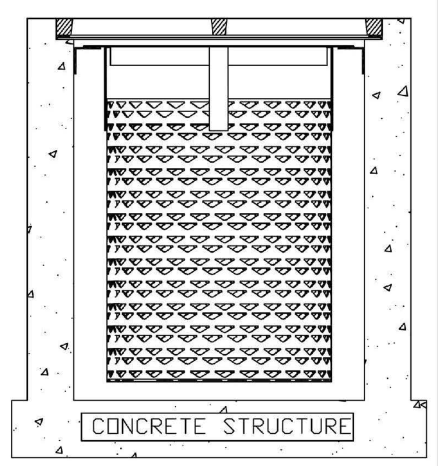
Bio Clean
A Forterra Company



## BIO CLEAN FULL CAPTURE FILTER

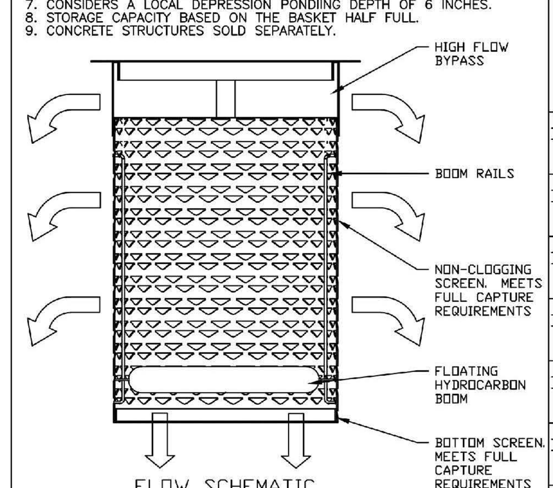
### FOR USE IN GRATE INLETS




NOTES:

1. ALL HARDWARE, FLANGE, FRAME, SCREENS SHALL BE STAINLESS STEEL
2. HYDROCARBON BOOM SHALL BE 2" DIAMETER AND CONNECTED, MECHANICALLY 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 PONDIING DEPTH OF 6 INCHES.
8. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
9. CONCRETE STRUCTURES SOLD SEPARATELY.




| 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 | 4.83 | 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: 8 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: |
| | | REVISIONS: | DATE: |
| DATE: 10/12/17 | SCALE: SF = 15 | REVISIONS: | DATE: |
| DRAFTER: M.C.P. | UNITS = INCHES | REVISIONS: | DATE: |

Bio Clean
A Forterra Company



StormTech ADS

## STORMTECH MC-3500 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.



**STORMTECH MC-3500 CHAMBER** (not to scale)

**Nominal Chamber Specifications**

**Size (L x W x H)**
90" x 77" x 45"
2,286 mm x 1,956 mm x 1,143 mm

**Chamber Storage**
109.9 ft³ (3.11 m³)

**Min. Installed Storage***
175.0 ft³ (4.96 m³)

**Weight**
134 lbs (60.8 kg)

**Shipping**
15 chambers/pallet
7 end caps/pallet
7 pallets/truck

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 6" (150 mm) of stone between chambers/end caps and 40% stone porosity.

**STORMTECH MC-3500 END CAP** (not to scale)

**Nominal End Cap Specifications**

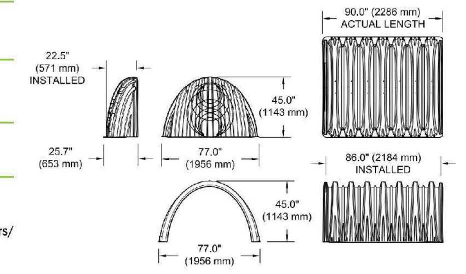
**Size (L x W x H)**
26.5" x 71" x 45.1"
673 mm x 1,803 mm x 1,145 mm

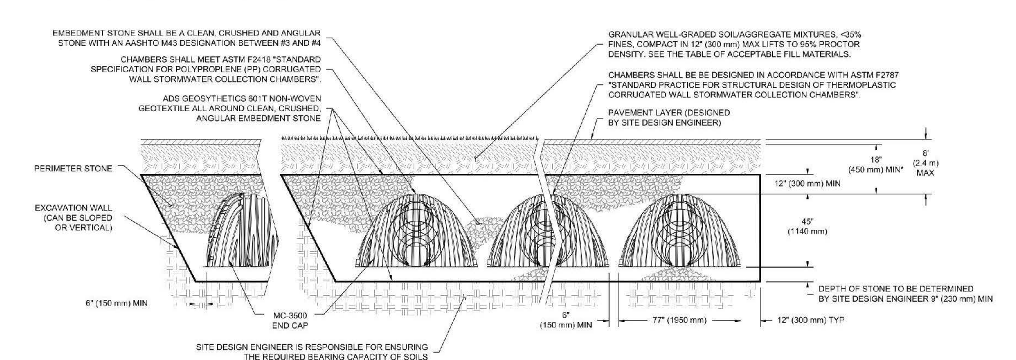
**End Cap Storage**
14.9 ft³ (0.42 m³)

**Min. Installed Storage***
45.1ft³ (1.28 m³)

**Weight**
49 lbs (22.2 kg)

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 6" (150 mm) of stone perimeter, 6" (150 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 24" (600 mm).

StormTech ADS

### MC-3500 CHAMBER SPECIFICATION

**STORAGE VOLUME PER CHAMBER FT³ (M³)**

| | Bare Chamber Storage ft³ (m³) | Chamber and Stone Foundation Depth in. (mm) | | | |
|---|---|---|---|---|---|
| | | 9" (230 mm) | 12" (300 mm) | 15" (375 mm) | 18" (450 mm) |
| MC-3500 Chamber | 109.9 (3.11) | 175.0 (4.96) | 179.9 (5.09) | 184.9 (5.24) | 189.9 (5.38) |
| MC-3500 End Cap | 14.9 (.42) | 45.1 (1.28) | 46.6 (1.32) | 48.3 (1.37) | 49.9 (1.41) |

**Note:** Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

**AMOUNT OF STONE PER CHAMBER**

| ENGLISH TONS (yds³) | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9" | 12" | 15" | 18" |
| MC-3500 Chamber | 8.5 (6.0) | 9.1 (6.5) | 9.7 (6.9) | 10.4 (7.4) |
| MC-3500 End Cap | 3.9 (2.8) | 4.1 (2.9) | 4.3 (3.1) | 4.5 (3.2) |
| METRIC KILOGRAMS (m³) | 230 mm | 300 mm | 375 mm | 450 mm |
| MC-3500 Chamber | 7711 (4.6) | 8255 (5.0) | 8800 (5.3) | 9435 (5.7) |
| MC-3500 End Cap | 3538 (2.1) | 3719 (2.2) | 3901 (2.4) | 4082 (2.5) |

**Note:** Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

**VOLUME EXCAVATION PER CHAMBER YD³ (M³)**

| | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9" (230 mm) | 12" (300 mm) | 15" (375mm) | 18" (450 mm) |
| MC-3500 Chamber | 11.9 (9.1) | 12.4 (9.5) | 12.8(9.8) | 13.3 (10.2) |
| MC-3500 End Cap | 4.0 (3.1) | 4.1 (3.2) | 4.3 (3.3) | 4.4 (3.4) |

**Note:** Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

ADS DESIGN TOOL 2.0

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

For more information on the StormTech MC-3500 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

THE MOST ADVANCED NAME IN WATER MANAGEMENT SOLUTIONS®

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

Last Update: 6/24/22
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**CITY OF MENIFEE**
PUBLIC WORKS DEPARTMENT

**WQMP SITE MAP**

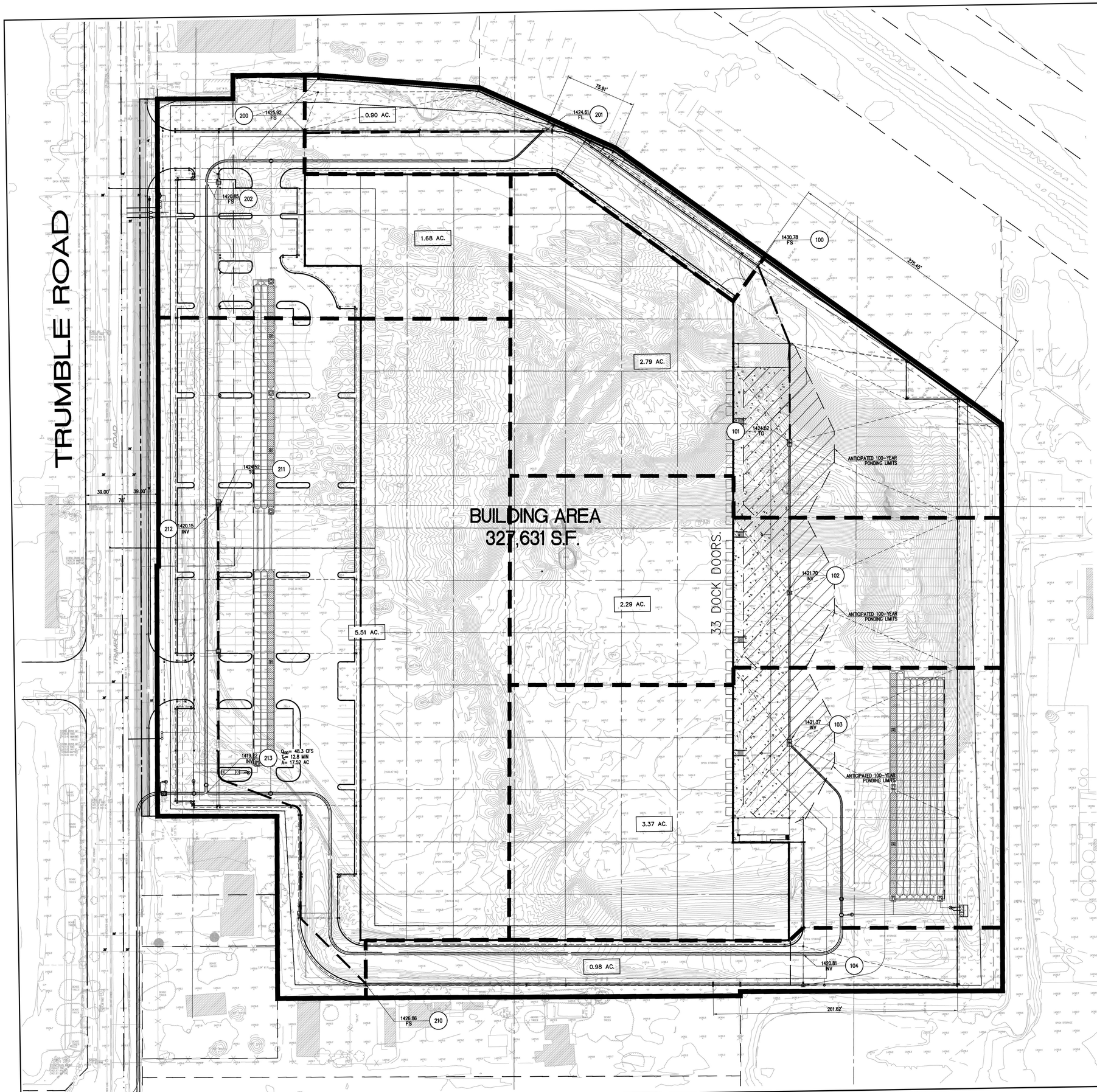
**LOVETT 215**
**TRUMBLE ROAD**

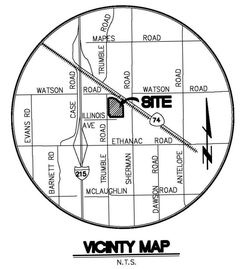
**PREPARED FOR:**
LOVETT INDUSTRIAL
1902 WASHINGTON AVENUE, SUITE A
HOUSTON, TEXAS 77007
PHONE: (713) 212-1560

**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 ______ | Approved by | Date ______ |
| Date ______ | | |
| Checked by ______ | | |
| Date ______ | | |
| Designed by ______ | Public Works Director | R.C.E. ______ |
| Date ______ | | |
| Checked by ______ | Sheet 2 of 2 Sheets | |
| Date ______ | | |

4100/2 OF 2 SHEET




VICINITY MAP

N.T.S.

LEGEND

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- 4.10 AC. — SUBAREA AREA
- 100 — NODE NUMBER
- PONDING LIMITS

0 20 40 80 120

SCALE:1"=40'

Last Updated: 9/14/22
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CITY OF MENIFEE
PUBLIC WORKS DEPARTMENT

PREPARED FOR:
LOVETT INDUSTRIAL
1902 WASHINGTON AVENUE SUITE A
HOUSTON, TEXAS 77007
PHONE: (713) 212-1560

# PRELIMINARY HYDROLOGY MAP
## LOVETT 215
## TRUMBLE ROAD

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 1 of 1 Sheets

4100/1 OF 1 SHEETS

# Appendix 2:  Construction Plans

*Grading and Drainage Plans*

TRUMBLE ROAD

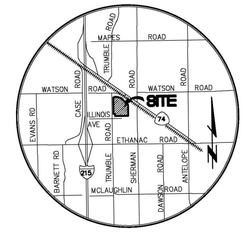
BUILDING AREA
327,631 S.F.
1429.26 FF
1428.68 PAD

33 DOCK DOORS

PROPOSED STREET IMPROVEMENT
5' WIDE GRIND AND OVERLAY
SAWCUT AND REMOVE 2' WIDE AC PAVEMENT
AC PAVEMENT, 8" CURB AND GUTTER
5.5' WIDE SIDEWALK, PUBLIC LANDSCAPE

## LEGEND

- REMOVE & REPLACE EXISTING AC PAVEMENT
- PROPOSED STREET IMPROVEMENT




VICINITY MAP
N.T.S.

6/15/2022

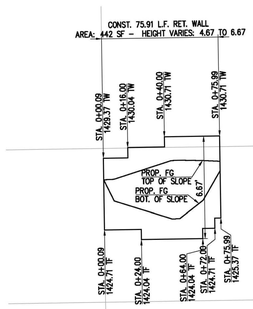
**EARTHWORK BALANCE CALCULATIONS**

PROJECT: Lovett 215
JOB#: 4100

| | | |
|---|---|---|
| K. | SITE AREA: | 767,527 SF |
| L. | SUBSIDENCE FACTOR: | - |
| M. | SHRINKAGE FACTOR: | 0.0 % |
| N. | SITE STRIPPING FACTOR: | 0.0 |
| O. | OVEREXCAVATION: | - CY |
| A. | CALCULATED CUT: | 19,213 CY |
| B. | FOOTING AND UTILITY SPOILS | 4,325 CY |
| B1. | UNDERGROUND STORAGE | 6,832 CY |
| C. | **TOTAL CUT: (A+B)** | 30,370 CY |
| D. | CALCULATED FILL: | 30,370 CY |
| E. | LIGHT PAVING FILL: | - CY |
| F. | SUBSIDENCE: (LxK)/27= | - CY |
| G. | SHRINKAGE: (M/100)C= | - CY |
| H. | SITE STRIPPING | - CY |
| I. | OVEREXCAVATION SHRINKAGE | - CY |
| J. | **TOTAL FILL: (D+E+F+G+H)=** | 30,370 CY |
| K. | **TOTAL (IMPORT) OR EXPORT:** | (0) CY |

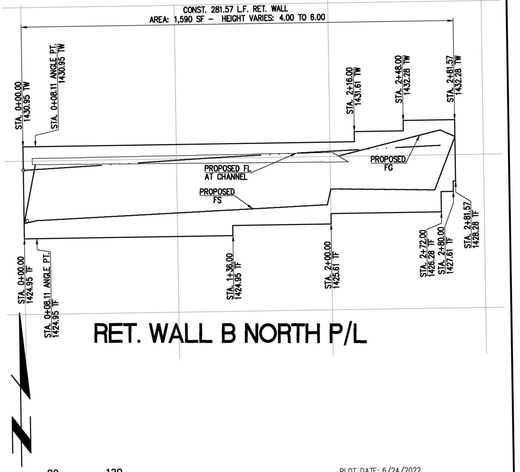
SITE ADJUSTMENT (0.00)

CONST. 75.91 L.F. RET. WALL
AREA: 442 SF – HEIGHT VARIES: 4.67 TO 6.67




RET. WALL A NORTH P/L

CONST. 281.57 L.F. RET. WALL
AREA: 1,590 SF – HEIGHT VARIES: 4.00 TO 6.00




RET. WALL B NORTH P/L

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

PLOT DATE: 6/24/2022
D:\4100-4199\4100\4100CGP-01.dwg

**CITY OF MENIFEE**
PUBLIC WORKS DEPARTMENT

**CONCEPTUAL GRADING PLAN**
**LOVETT 215**
**TRUMBLE ROAD**

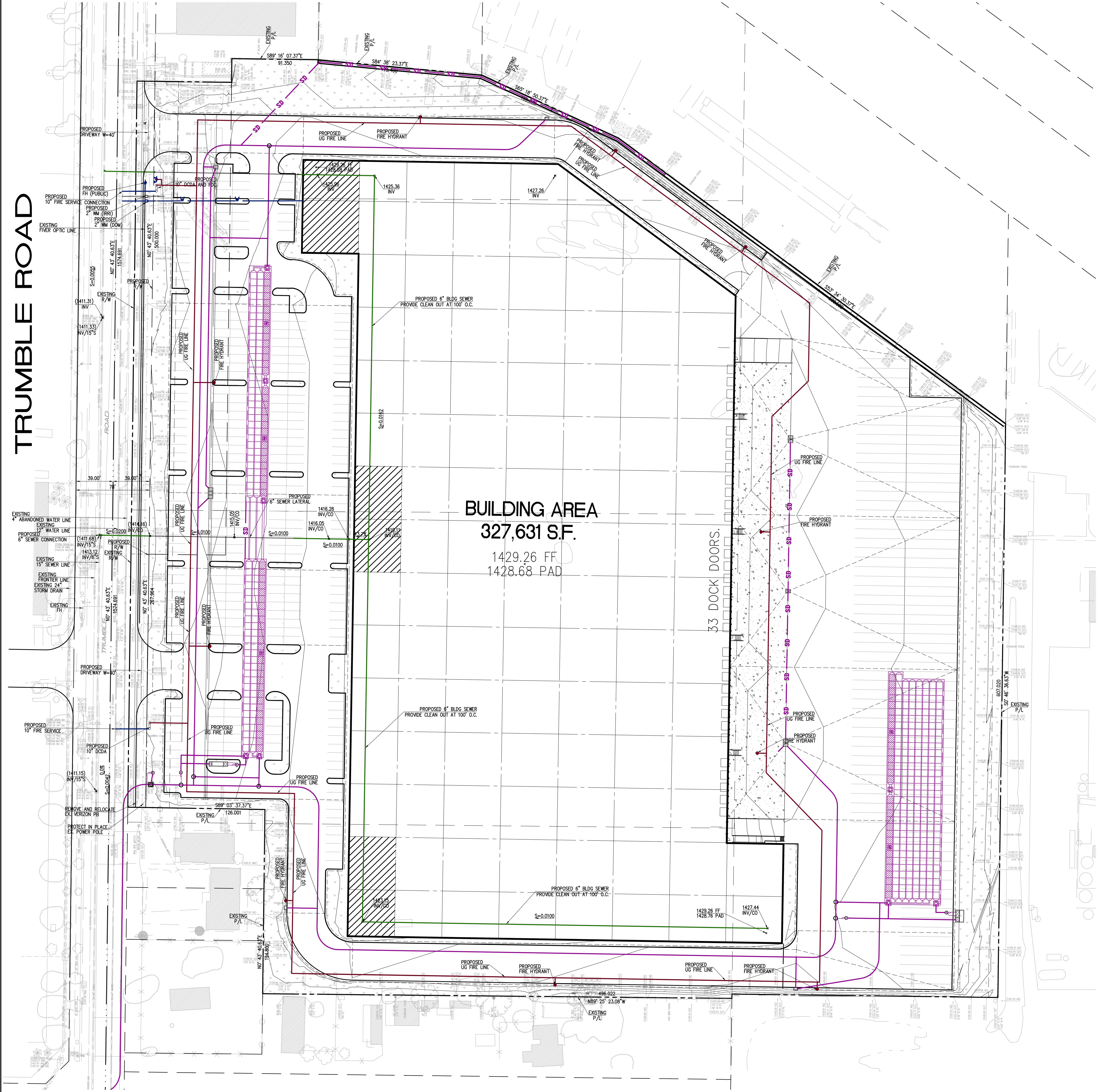
4100/1 OF 5 SHEETS

PREPARED FOR:
LOVETT INDUSTRIAL
1902 WASHINGTON AVENUE SUITE A
HOUSTON, TEXAS 77007
PHONE: (713) 212-1560


Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14,349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
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Designed by _____ Date _____
Checked by _____ Date _____
Approved by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____
Public Works Director _____ R.C.E. XXXXX

Sheet 1 of 5 Sheets




0 20 40 80 120

SCALE: 1"=40'

PLOT DATE: 6/24/2022
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# CITY OF MENIFEE
PUBLIC WORKS DEPARTMENT

## CONCEPTUAL UTILITY PLAN
**LOVETT 215**
**TRUMBLE ROAD**

**PREPARED FOR:**

LOVETT INDUSTRIAL
1902 WASHINGTON AVENUE SUITE A
HOUSTON, TEXAS 77007
PHONE: (713) 212-1560

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PH.(714)521-4811 FAX(714)521-4173

| | | | |
|---|---|---|---|
| Designed by ____ | Approved by | | Date ____ |
| Date ____ | | | |
| Checked by ____ | | | |
| Date ____ | | | |
| Designed by ____ | Public Works Director | | R.C.E. XXXXX |
| Date ____ | | | |
| Checked by ____ | Sheet 2 of 5 Sheets | | |
| Date ____ | | | |

4100/2 OF 5 SHEETS

TRUMBLE ROAD

BUILDING AREA
327,631 S.F.

33 DOCK DOORS.

N.A.P.

PROPOSED 24" CMP RISER

12" HDPE

18" HDPE

STA 16+90.29 E.C. 1420.89 INV.

S89°04'3"E 257.21' 24" HDPE S=0.0020

STA 16+54.95 B.C. 1420.65 INV.

1 BASIN SPPWC 305-4 W/ DRAIN INSERT (S)

STA 16+50.95 END PIPE 1420.97 INV.

STA 16+53.45 C/L M.H. #2 1425.14 RIM

STA 19+50.00 C/L M.H. #2 1425.63 RIM

STA 19+86.46 B.C. 1421.50 INV.

STA 20+03.97 E.C. 1421.54 INV.

3.5' CB SPPWC 305-4 W/ DRAIN INSERT (S) STA 20+40.36 END PIPE 1421.81 INV.

N45°20'40"E 30.36' 18" HDPE S=0.0020

S89°04'3"E 34.96' 18" HDPE S=0.0002

STA 19+47.50 END PIPE 1421.43 INV.

STA 19+51.50 BEGIN PIPE 1421.44 INV.

LINE B

LINE A

N0°55'57"E 353.60' 24" HDPE S=0.0020

N0°55'57"E 291.60' 30" HDPE S=0.0033

STA 12+97.35 BEGIN PIPE 1420.81 INV.

STA 12+95.86 C/L M.H. #1 1424.88 RIM

STA 11+93.35 END PIPE 1420.15 INV.

STORMTECH MC-3500 DETENTION CHAMBERS QTY: 181 CHAMBERS (19,529 CF FOR MH AND 39,058 CF FOR HOOC) 36" STONE FOUNDATION PROVIDE SEPARATE BEDS FOR EACH CHAMBER SET

BRV CLEAN MODULAR WETLANDS SYSTEM MODEL #MWS-L-4-15-V (13,561 CF MIN.)

SUMP PUMP 77 GPM (MIN.)

PROPOSED SUMP PUMP

STA 26+14.87 BEGIN PIPE 1419.14 INV.

STA 26+13.37 C/L M.H. #3 1422.43 RIM

STA 26+10.87 END PIPE 1422.05 INV.

STA 26+06.99 E.C. 1422.05 INV.

30" RCP S=0.0025

STA 25+71.53 B.C. 1421.97 INV.

CONCRETE MANHOLE

STA 26+56.00 BEGIN PIPE 1419.22 INV.

48" NYLOPLAST MANHOLE

STA 26+80.00 END PIPE 1419.23 INV.

REMOVED ABANDONED EX. 4" WATER

STA 26+58.50 C/L M.H. #2 1422.57 RIM

STA 28+47.50 END PIPE 1419.80 INV.

STA 28+03.85 B.C. 1419.82 INV.

S0°55'57"W 43.65' 30" HDPE S=0.0020

STA 28+50.00 C/L M.H. #1 1427.26 RIM

STA 28+91.50 BEGIN PIPE 1419.81 INV.

S0°55'57"W 78.67' 30" HDPE S=Infinity

STA 29+30.17 B.C. 1419.77 INV.

STA 29+65.51 E.C. 1419.84 INV.

STA 24+51.83 BEGIN PIPE 1421.74 INV.

STA 24+50.00 C/L M.H. #1 1427.51 RIM

3.5' CB SPPWC 305-4 W/ DRAIN INSERT (S)

STA 24+47.17 END PIPE 1421.73 INV.

REMOVED ABANDONED EX. 4" WATER

STA 22+56.95 BEGIN PIPE 1421.36 INV.

CITY OF PERRIS CITY LIMITS

S89°04'3"E 231.99' 30" HDPE S=0.0020

STA 32+00.00 C/L M.H. #1 1428.35 RIM

STA 32+91.59 BEGIN PIPE 1420.31 INV.

S89°04'3"E 266.97' 30" HDPE S=0.0020

STA 31+97.50 END PIPE 1420.30 INV.

30" HDPE S=0.0022

2 BASINS SPPWC 305-4 W/ DRAIN INSERT (S)

STA 40+44.96 END PIPE 1422.09 INV.

N0°55'57"E 155.76' 18" HDPE S=0.0020

1 BASIN SPPWC 305-4 W/ DRAIN INSERT (S)

STA 38+91.20 BEGIN PIPE 1421.71 INV.

STA 38+88.96 END PIPE 1421.70 INV.

N0°55'57"E 155.76' 18" HDPE S=0.0020

2 BASINS SPPWC 305-4 W/ DRAIN INSERT (S)

STA 37+32.51 BEGIN PIPE 1421.39 INV.

STA 37+25.50 END PIPE 1421.37 INV.

N44°04'3"W 66.79' 18" HDPE S=0.0020

STA 36+58.51 E.C. 1421.24 INV.

18" HDPE S=0.0021

STA 36+40.84 END PIPE 1421.20 INV.

N0°55'57"E 116.36' 18" HDPE S=0.0020

48" NYLOPLAST MANHOLE

STA 35+24.46 BEGIN PIPE 1420.97 INV.

STA 35+22.96 C/L M.H. #1 1425.98 RIM

STA 35+20.46 END PIPE 1420.95 INV.

STA 35+03.81 E.C. 1420.92 INV.

12" HDPE HCOC OUTLET

SUMP PUMP 40 GPM (MIN.)

STA 34+68.47 B.C. 1420.85

3.5' CB SPPWC 305-4 W/ DRAIN INSERT (S)

BRV CLEAN MODULAR WETLANDS SYSTEM MODEL #MWS-L-8-12-V (19,529 CF MIN.)

STORMTECH MC-3500 DETENTION CHAMBERS QTY: 256 CHAMBERS (19,529 CF FOR MH AND 39,058 CF FOR HOOC) 36" STONE FOUNDATION

275.45'

0 20 40 80 120

SCALE: 1"=40'

PLOT DATE: 6/24/2022
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CITY OF MENIFEE
PUBLIC WORKS DEPARTMENT

CONCEPTUAL GRADING PLAN
LOVETT 215
TRUMBLE ROAD

PREPARED FOR:
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1902 WASHINGTON AVENUE SUITE A
HOUSTON, TEXAS 77007
PHONE: (713) 212-1560

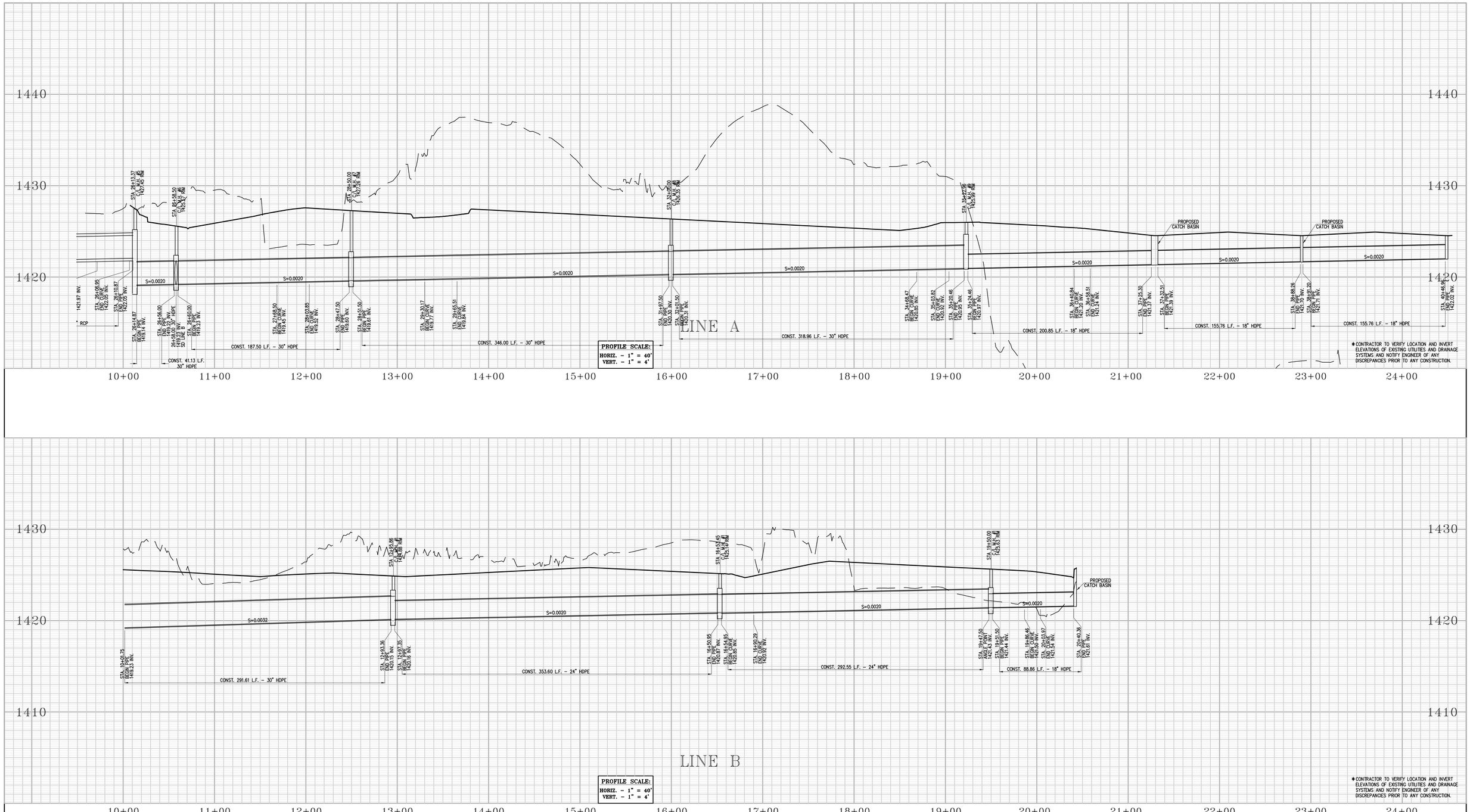
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Date
Checked by
Date
Designed by
Date
Checked by
Date

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

Sheet 3 of 5 Sheets

4100/3 OF 5 SHEETS







PLOT DATE: 6/24/2022
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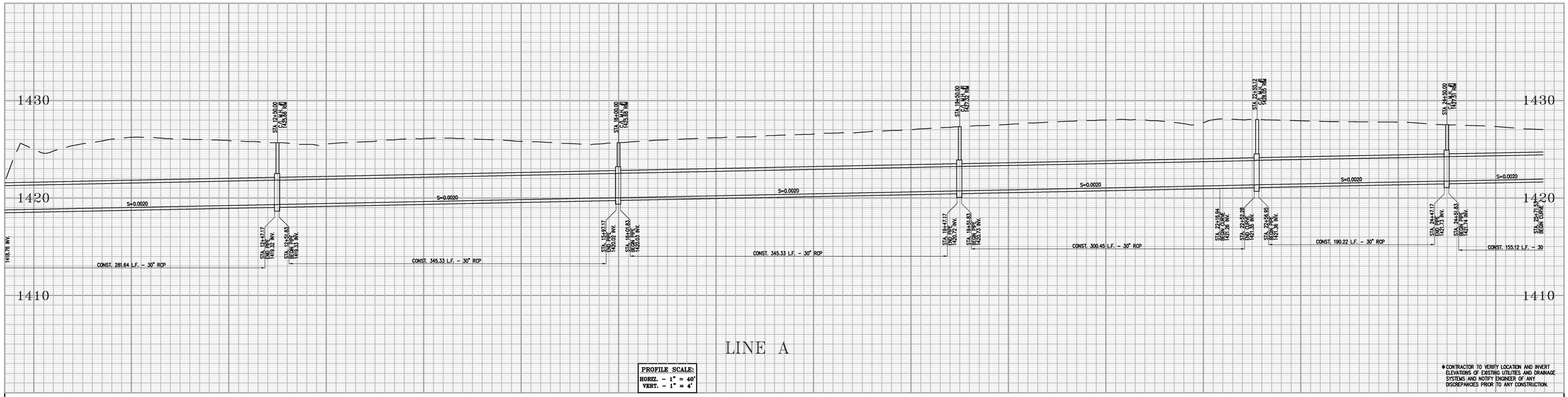
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HOUSTON, TEXAS 77007
PHONE: (713) 212-1560

# CONCEPTUAL STORM DRAIN PROFILE
## LOVETT 215
## TRUMBLE ROAD

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Public Works Director R.C.E. XXXXX
Designed by _____ Date _____
Checked by _____ Date _____
Sheet 4 of 5 Sheets

4100/4 OF 5 SHEETS




LINE A

**PROFILE SCALE:**
HORIZ. - 1" = 40'
VERT. - 1" = 4'

* CONTRACTOR TO VERIFY LOCATION AND INVERT ELEVATIONS OF EXISTING UTILITIES AND DRAINAGE SYSTEMS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO ANY CONSTRUCTION.




PLOT DATE: 6/24/2022
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**CITY OF MENIFEE**
PUBLIC WORKS DEPARTMENT

**PREPARED FOR:**
LOVETT INDUSTRIAL
1902 WASHINGTON AVENUE SUITE A
HOUSTON, TEXAS 77007
PHONE: (713) 212-1560

# CONCEPTUAL PUBLIC STORM DRAIN PLAN AND PROFILE
## LOVETT 215
## TRUMBLE ROAD


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 5 of 5 Sheets

4100/5 OF 5 SHEETS

# Appendix 3: Soils Information

*Geotechnical Study and Other Infiltration Testing Data*

May 17, 2022 Project No. 17172-02

Mr. Ted Hart
***Lovett Industrial***
1730 East Holly Avenue, #808
El Segundo, California 90245

***Subject:*** ***Updated Geotechnical Recommendations for Proposed Industrial Development, 25630 Trumble Road, Menifee, California***

In accordance with your request, LGC Geotechnical, Inc. has prepared this updated geotechnical report regarding the proposed industrial development of the property located at 25630 Trumble Road in Menifee, California.

Should you have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Respectfully,

***LGC Geotechnical, Inc.***






Ryan L. Douglas, GE 3147
Project Engineer






Kevin B. Colson, CEG 2210
Vice President

KBC/RLD/klr

Distribution: (5) Addressee (4 wet-signed copies and 1 electronic copy)

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Appendix A – References

## *1.0 INTRODUCTION*

LGC Geotechnical has previously performed a geotechnical evaluation of the site and provided geotechnical recommendations for remedial grading and backfill for the open pit restoration at the site (LGC Geotechnical, 2018). We are also providing geotechnical observation and testing services during the in-progress grading operations for the pit backfill. This report has been prepared to provide recommendations for the proposed development of the site at the completion of site grading.

Although recommendations and parameters for site development were provided in our previous report (LGC Geotechnical, 2018), they were conceptual only and were per the 2016 California Building Code (CBC). The recommendation and parameters provided herein are specific to the current proposed site development and are updated to the 2019 CBC.

This report is not a stand-alone document and must be used in conjunction with the referenced geotechnical report (LGC Geotechnical, 2018) for completeness. In the case of conflict, the recommendations contained herein should supersede those provided in our previous report. The remaining recommendations provided in our previous geotechnical report (LGC Geotechnical, 2018) remain valid and applicable.

### *1.1 Project Description*

The approximately 17.8-acre, irregular-shaped site is located just southeast of the intersection at Interstate 215 (I-215) and Highway 74 (CA-74). The site is bounded by Trumble Road to the west, an industrial welding building and empty lot to the north, a food waste recycling center to the east, and residential housing to the south (Figure 1). The site was originally used as an open pit mine and more recently was used as a soils and concrete recycling area.

Remedial grading and backfill grading of the pit began in April of 2019. The operations have been performed periodically since then under the observation and testing services of LGC Geotechnical. The operations to date have been performed in general accordance with the recommendations of the project geotechnical report (LGC Geotechnical, 2018). We understand that ultimately, the pit will be backfilled with compacted fill to the approximate elevation of the adjacent Trumble Road.

Once finish grade has been achieved, we understand that the proposed site development will include precise and post grading for and construction of an approximately 327,865 square-foot, one-story industrial warehouse, associated parking, drive isles, and improvements (HPA, 2022).

We understand that preliminary maximum column and wall structural (dead plus live) loads are estimated to be on the order of 90 kips and 9 kips per lineal foot, respectively.

The recommendations provided in this report are based on preliminary structural loads and grading information as indicated above. LGC Geotechnical should be provided with any updated project information, plans, and/or updated structural loads as they become available in order to either confirm or modify the recommendations provided herein.

## *1.2 Seismic Design Parameters*

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2019 California Building Code (CBC) and applicable portions of ASCE 7-16 which has been adopted by the CBC. Please note that the following seismic parameters are only applicable for code-based acceleration response spectra and are not applicable for where site-specific ground motion procedures are required by ASCE 7-16. Representative site coordinates of latitude 33.7485 degrees north and longitude -117.1822 west were utilized in our analysis. The maximum considered earthquake (MCE) spectral response accelerations ($S_{MS}$ and $S_{M1}$) and adjusted design spectral response acceleration parameters ($S_{DS}$ and $S_{D1}$) for Site Class D are provided in Table 1 on the following page. Since site soils are Site Class D, additional adjustments are required to code acceleration response spectrums as outlined below and provided in ASCE 7-16. The structural designer should contact the geotechnical consultant if structural conditions (e.g., number of stories, seismically isolated structures, etc.) require site-specific ground motions.

A deaggregation of the PGA based on a 2,475-year average return period (MCE) indicates that an earthquake magnitude of 6.94 at a distance of approximately 16.21 km from the site would contribute the most to this ground motion (USGS, 2014).

Section 1803.5.12 of the 2019 CBC (per Section 11.8.3 of ASCE 7) states that the maximum considered earthquake geometric mean ($MCE_G$) Peak Ground Acceleration (PGA) should be used for liquefaction potential. The $PGA_M$ for the site is equal to 0.55g (SEAOC, 2022). The design PGA is equal to 0.37g (2/3 of $PGA_M$).

***TABLE 1***

***Seismic Design Parameters***

| Selected Parameters from 2019 CBC, Section 1613 - Earthquake Loads | Seismic Design Values | Notes/Exceptions |
|---|---|---|
| Distance to applicable faults classifies the site as a "Near-Fault" site. | | Section 11.4.1 of ASCE 7 |
| Site Class | D* | Chapter 20 of ASCE 7 |
| Ss (Risk-Targeted Spectral Acceleration for Short Periods) | 1.424g | From SEAOC, 2022 |
| $S_1$ (Risk-Targeted Spectral Accelerations for 1-Second Periods) | 0.529g | From SEAOC, 2022 |
| $F_a$ (per Table 1613.2.3(1)) | 1.000 | For Simplified Design Procedure of Section 12.14 of ASCE 7, $F_a$ shall be taken as 1.4 (Section 12.14.8.1) |
| $F_v$ (per Table 1613.2.3(2)) | 1.771 | Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7 |
| $S_{MS}$ for Site Class D [Note: $S_{MS} = F_aS_S$] | 1.424g | - |
| $S_{M1}$ for Site Class D [Note: $S_{M1} = F_vS_1$] | 0.937g | Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7 |
| $S_{DS}$ for Site Class D [Note: $S_{DS} = (^2/_3)S_{MS}$] | 0.949g | - |
| $S_{D1}$ for Site Class D [Note: $S_{D1} = (^2/_3)S_{M1}$] | 0.625g | Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7 |
| $C_{RS}$ (Mapped Risk Coefficient at 0.2 sec) | 0.935 | ASCE 7 Chapter 22 |
| $C_{R1}$ (Mapped Risk Coefficient at 1 sec) | 0.918 | ASCE 7 Chapter 22 |
| *Since site soils are Site Class D and $S_1$ is greater than or equal to 0.2, the seismic response coefficient Cs is determined by Eq. 12.8-2 for values of $T \leq 1.5T_s$ and taken equal to 1.5 times the value calculated in accordance with either Eq. 12.8-3 for $T_L \geq T > T_s$, or Eq. 12.8-4 for $T > T_L$. Refer to ASCE 7-16. | | |

## *2.0 FINDINGS AND CONCLUSIONS*

Based on review of our previous geotechnical evaluation (LGC Geotechnical, 2018), the results of our geotechnical observation and testing services performed to date, and review of the proposed development plan (HPA, 2022), it is our opinion that the proposed site development is feasible from a geotechnical standpoint, provided that the grading operations continue to be performed in accordance with the recommendations of the project geotechnical report (LGC Geotechnical, 2018) or as revised and/or updated herein. In the case of conflict, the recommendations provided herein shall supersede all previous.

## *3.0 RECOMMENDATIONS*

The following recommendations are to be considered preliminary and should be confirmed upon completion of earthwork operations. In addition, they should be considered minimal from a geotechnical viewpoint, as there may be more restrictive requirements from the architect, structural engineer, building codes, governing agencies, or the City. It is the responsibility of the builder to ensure these recommendations are provided to the appropriate parties.

It should be noted that the following geotechnical recommendations are intended to provide sufficient information to develop the site in general accordance with the 2019 California Building Code (CBC) requirements. Regarding the potential occurrence of potentially catastrophic geotechnical hazards such as fault rupture, earthquake-induced landslides, liquefaction, etc., the following geotechnical recommendations should provide adequate protection for the proposed development to the extent required to reduce seismic risk to an "acceptable level." The "acceptable level" of risk is defined by the California Code of Regulations as "the level that provides reasonable protection of the public safety, though it does not necessarily ensure continued structural integrity and functionality of the project" [Section 3721(a)]. Therefore, repair and remedial work of the proposed improvement may be required after a significant seismic event. With regards to the potential for less significant geologic hazards to the proposed development, the recommendations contained herein are intended as a reasonable protection against the potential damaging effects of geotechnical phenomena such as expansive soils, fill settlement, groundwater seepage, etc. It should be understood, however, that although our recommendations are intended to maintain the structural integrity of the proposed development and structures given the site geotechnical conditions, they cannot preclude the potential for some cosmetic distress or nuisance issues to develop as a result of the site geotechnical conditions.

The geotechnical recommendations contained herein must be confirmed to be suitable or modified based on the actual exposed conditions.

### *3.1 Site Earthwork*

We anticipate that earthwork at the site will consist of required earthwork removals, fill placement, and utility line construction and backfill. We recommend that earthwork onsite continue to be performed in accordance with the project geotechnical report (LGC Geotechnical, 2018), 2019 CBC, and City of Menifee requirements. In case of conflict, the following recommendations shall supersede previous recommendations.

As previously recommended; from a geotechnical viewpoint, "select" import soils would be preferable in the upper 15 feet of the finish surface of the area of proposed development. These soils should consist of clean, relatively granular soils of Very Low expansion potential (expansion index 20 or less based on ASTM D4829) and no particles larger than 3 inches in greatest dimension. Source samples of planned importation of select materials should be provided to the geotechnical consultant for laboratory testing a minimum of 3 working days prior to any planned importation for required laboratory testing. The recommendations and parameters provided herein are contingent upon implementation of this select import. The geotechnical properties of the material placed in the upper 15 feet of site grades should be confirmed prior to import, during site grading and based on laboratory testing of the finish grade soils.

### *3.2 Settlement Waiting Period for Deep Fills*

Where overlying deep fills (generally 50 feet deep or greater), shallow footings and slabs-on-grade foundations should be constructed after a waiting period to verify that total settlements are within tolerable limits. Please note, that it is very difficult to predict the settlement waiting period.

#### *3.2.1 Settlement Monuments and Monitoring*

Fill soils are subject to post-grading settlement. For shallower fills (up to approximately 50 feet deep), fill settlement typically occurs during grading for granular soils, and/or within a few months of the completion of grading. Longer settlement periods are expected for deeper fill and for those comprised of finer-grained soils and deeper fills. This occurs even to properly compacted fill soils over competent removal bottoms. Development areas above areas of deep fill should not be released for construction until settlement monitoring indicates settlement has diminished to within the tolerable limits for the proposed foundations and other structural improvements.

Settlement monuments must be installed after grading, in order to monitor settlement of deeper fills (approximately 50 feet or deeper). We anticipated that three surface settlement monuments will be required. The monuments should be installed in accordance with the details provided in Appendix C of our referenced report (LGC Geotechnical, 2018). The monuments installation should be performed by or under the observation of the project geotechnical consultant. The approximate locations for recommended monuments are depicted on the attached Settlement Monument Location Map (Figure 2); the actual installation locations may vary at the discretion of the geotechnical consultant, based on as-graded conditions. Settlement monuments should be installed as site grading is completed.

At the completion of their construction, the monuments should be surveyed by a licensed surveyor to a fixed benchmark, preferably within Trumble Road. Other locations may be considered but must ultimately be approved by the geotechnical consultant. All survey must be performed by a digital level capable of reading to an accuracy of at least 0.001-foot. The survey must be performed by an experienced surveyor who has previously performed level surveys to this level of precision. The survey must close to 0.004-feet per mile. All surveys must take place early in the morning in good weather for survey work. The geotechnical consultant will determine the appropriate survey schedule, but the schedule may be varied slightly by the surveyor based on anticipated weather.

The monuments should then be monitored periodically at regular intervals (four times in the first two months, twice in the third month, and then once a month thereafter until informed otherwise by the geotechnical consultant). The readings should be provided to this office and continue until total settlements are within tolerable limits. The frequency of the readings may be adjusted during the monitoring period based on results of the readings.

### *3.2.2 Preliminary Foundation Recommendations*

The proposed structures may be supported on spread or continuous footings and conventional slabs, provided earthwork is performed in accordance with the recommendations presented in this report. Since the finish grade site soils are anticipated to be "Very Low" expansion potential (EI of 20 or less per ASTM D4829), special design considerations from a geotechnical perspective are not anticipated, however, this must be verified based on as-graded conditions. Footings should be supported on properly compacted fill. Please note that the following foundation recommendations are preliminary and must be confirmed by LGC Geotechnical at the completion of grading.

Preliminary foundation recommendations are provided in the following sections. The foundation design must be performed by the structural engineer based on the following geotechnical parameters and minimum values provided.

### *3.2.3 Slab Design and Construction*

From a geotechnical perspective, minimum slab thicknesses of 6 inches and 4 inches are recommended for new slabs in the warehouse areas and office areas, respectively. Slabs are to be supported on compacted fill soils properly prepared in accordance with the recommendations provided in this report. Actual slab reinforcement and thickness should be determined by the structural engineer based on the imposed loading. Additional slab-on-grade recommendations can be provided for alternative building types upon request.

The foundation designer may use a modulus of vertical subgrade reaction (k) of 200 pounds per cubic inch (pounds per square inch per inch of deflection). This value is for a 1-foot by 1-foot square loaded area and should be adjusted by the structural designer for the area of the proposed footing using the following formula:

$k = 200 \times [(B+1)/2B]^2$
k = modulus of vertical subgrade reaction, pounds per cubic inch (pci)
B = foundation width (feet)

It is recommended that subgrade soils below slabs be moisture conditioned in order to maintain the recommended moisture content up to the time of concrete placement. The recommended moisture content of the slab subgrade soils should be between optimum moisture content and approximately 2 percent above optimum moisture content to a minimum depth of 12 inches. The moisture content of the slab subgrade should be verified by the geotechnical consultant within 1 to 2 days prior to concrete placement. In addition, this moisture content should be maintained around the immediate perimeter of the slab during construction and up to occupancy of the building structures.

The following recommendations are for informational purposes only, as they are unrelated to the geotechnical performance of the foundation. The following recommendations may be superseded by the foundation engineer and/or owner. Some post-construction moisture migration should be expected below the foundation. In

general, interior floor slabs with moisture sensitive floor coverings should be underlain by a minimum 10 mil thick polyolefin material vapor retarder, which has a water vapor transmission rate (permeance) of less than 0.03 perms. The need for sand and/or the sand thickness (above and/or below the vapor retarder) should be specified by the structural engineer, architect or concrete contactor. The selection and thickness of sand is not a geotechnical engineering issue and is therefore outside our purview.

### *3.2.4 Foundation Design Parameters*

For the proposed industrial warehouse structures, minimum continuous wall and column footing widths are to be 12 inches and 24 inches, respectively, minimum exterior foundation embedment is to extend a minimum of 18 inches below the adjacent exterior grade, and interior column footings should be embedded a minimum of 12 inches beneath the adjacent subgrade. The following allowable bearing pressures for both continuous and column spread footings presented in Table 2 below are recommended for corresponding footing widths and embedments.

***TABLE 2***

***Allowable Soil Bearing Pressures***

| Allowable Static Bearing Pressure (psf) | Minimum Footing Width (feet) | Minimum Footing Embedment* (feet) |
|---|---|---|
| 3,500 | 4 | 2 |
| 3,000 | 3 | 2 |
| 2,500 | 2 | 1.5 |
| 2,000 | 1 | 1.5 |

* Refers to minimum depth measured below lowest adjacent grade.

These allowable bearing values indicated above (exclusive of the weight of the footings) are for total dead loads and frequently applied live loads and may be increased by ⅓ for short duration loading (i.e., wind or seismic loads). The allowable bearing pressures are applicable for level (ground slope equal to or flatter than 5H:1V) conditions only.

In utilizing the above-mentioned allowable bearing capacity and provided our earthwork recommendations are implemented, foundation settlement due to structural loads is anticipated to be on the order of 1-inch. Differential static settlement may be taken as half of the static settlement (i.e., ½-inch over a horizontal span of 40 feet). Liquefaction recommendations are provided in reference geotechnical report (LGC Geotechnical, 2018). Liquefaction potential and potential for liquefaction-induced settlement is considered very low.

### *3.2.5 Foundation Construction*

The foundation is to be excavated into competent compacted artificial fill placed during grading operations. It is recommended that the foundation subgrade soils be evaluated by the geotechnical engineer prior to steel and/or concrete placement.

The geotechnical parameters provided herein assume that if the areas adjacent to the foundations are planted and irrigated, these areas will be designed with proper drainage and adequately maintained so that ponding, which causes significant moisture changes below the foundation, does not occur. Our recommendations do not account for excessive irrigation and/or incorrect landscape design. Plants should only be provided with sufficient irrigation for life and not overwatered to saturate subgrade soils. Sunken planters placed adjacent to the foundation should either be designed with an efficient drainage system or liners to prevent moisture infiltration below the foundation.

### *3.2.6 Lateral Load Resistance*

Resistance to lateral loads can be provided by friction acting at the base of foundations and by passive earth pressure. For concrete/soil frictional resistance, an allowable coefficient of friction of 0.35 may be assumed with dead-load forces. An allowable passive lateral earth pressure of 250 psf per foot of depth (or pcf) to a maximum of 2,500 psf may be used for the sides of footings poured against properly compacted fill. Allowable passive pressure may be increased to 340 pcf (maximum of 3,400 psf) for short duration seismic loading. This passive pressure is applicable for level (ground slope equal to or flatter than 5H:1V) conditions. Frictional resistance and passive pressure may be used in combination without reduction. We recommend that the upper foot of passive resistance be neglected if finished grade will not be covered with concrete or asphalt. The provided allowable passive pressures are based on a factor of safety of 1.5 and 1.1 for static and seismic loading conditions, respectively.

## *3.3 Lateral Earth Pressures for Retaining Walls*

The following preliminary lateral earth pressures may be used for any minor site retaining walls 8 feet or less. Lateral earth pressures are provided as equivalent fluid unit weights, in pound per square foot (psf) per foot of depth or pcf. These values do not contain an appreciable factor of safety, so the retaining wall designer should apply the applicable factors of safety and/or load factors during design.

The following lateral earth pressures are presented on Table 3 on the following page for approved select granular soils with a maximum of 35 percent fines (passing the No. 200 sieve per ASTM D-421/422) and Very Low expansion potential (EI of 20 or less per ASTM D4829). The wall designer should clearly indicate on the retaining wall plans the required sandy soil backfill criteria.

***TABLE 3***

***Lateral Earth Pressures – Select Sandy Backfill***

| Conditions | Equivalent Fluid Unit Weight (pcf) | |
|---|---|---|
| | Level Backfill | 2:1 Backfill Sloping Upwards |
| | Sandy Backfill | Sandy Backfill |
| Active | 35 | 55 |
| At-Rest | 55 | 75 |

If the wall can yield enough to mobilize the full shear strength of the soil, it can be designed for "active" pressure. If the wall cannot yield under the applied load, the earth pressure will be higher. Such walls should be designed for "at-rest." The equivalent fluid pressure values assume free-draining conditions. Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed (Refer to Figure 3). Please note that waterproofing and outlet systems are not the purview of the geotechnical consultant. If conditions other than those assumed above are anticipated, the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical consultant.

Surcharge loading effects from any adjacent structures should be evaluated by the retaining wall designer. In general, structural loads within a 1:1 (horizontal to vertical) upward projection from the bottom of the proposed retaining wall footing will surcharge the proposed retaining structure. In addition to the recommended earth pressure, retaining walls adjacent to streets should be designed to resist vehicular traffic if applicable. Uniform surcharges may be estimated using the applicable coefficient of lateral earth pressure using a rectangular distribution. A factor of 0.5 and 0.33 may be used for at-rest and active conditions, respectively. The vertical traffic surcharge may be determined by the structural designer. The structural designer should contact the geotechnical engineer for any required geotechnical input in estimating any applicable surcharge loads.

If required, the retaining wall designer may use a seismic lateral earth pressure increment of 10 pcf. This increment should be applied in addition to the provided static lateral earth pressure using a "normal" triangular distribution with the resultant acting at H/3 in relation to the base of the retaining structure (where H is the retained height). For the restrained, at-rest condition, the seismic increment may be added to the applicable active lateral earth pressure (in lieu of the at-rest lateral earth pressure) when analyzing short duration seismic loading. Per Section 1803.5.12 of the 2019 CBC, the seismic lateral earth pressure is applicable to structures assigned to Seismic Design Category D through F for retaining wall structures supporting more than 6 feet of backfill height. This seismic lateral earth pressure is estimated using the procedure outlined by the Structural Engineers Association of California (Lew, et al, 2010).

Soil bearing and lateral resistance (friction coefficient and passive resistance) are provided in the "Foundation Design Parameters" Section. Earthwork considerations (temporary backcuts, backfill, compaction, etc.) for retaining walls are provided in the reference geotechnical report

(LGC Geotechnical 2018).

### *3.4 Preliminary Asphalt Concrete Pavement Sections*

For the purposes of these preliminary recommendations, we used an estimated R-value of 40 and calculated pavement sections for Traffic Indices of 5.0 (or less) and 7.0. R-value testing of the drive aisle and parking subgrade will need to be performed to confirm our preliminary testing results/assumptions once the drive aisles and parking areas have been graded to finish subgrade elevations and the final Traffic Index is determined by the Civil Engineer. Determination of the Traffic Index is not the purview of the geotechnical consultant. The City of Menifee may have more stringent minimum pavement sections. Final street sections should be confirmed by the project civil engineer based upon the projected design Traffic Index. If requested, LGC Geotechnical will provide sections for alternate TI values.

***TABLE 4***

***Preliminary Asphalt Concrete Pavement Sections***

| **Assumed Traffic Index** | 5.0 (or less) | 7.0 |
|---|---|---|
| **R -Value Subgrade** | 40 | 40 |
| **AC Thickness** | 4.0 inches | 4.0 inches |
| **CAB Thickness** | 4.0 inches | 7.0 inches |

The thicknesses shown are minimum thicknesses. Increasing the thickness of any or all of the above layers will reduce the likelihood of the pavement experiencing distress during its service life. The above recommendations are based on the assumption that proper maintenance and irrigation of the areas adjacent to the roadway will occur through the design life of the pavement. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the pavement.

Aggregate base material (crushed aggregate base and crushed miscellaneous base) should be compacted to a minimum of 95 percent relative compaction at or slightly above optimum moisture content per ASTM D1557. Subgrade below aggregate base should be compacted to a minimum of 90 percent relative compaction, or the City of Menifee specifications, at or slightly above optimum moisture content per ASTM D1557. Earthwork recommendations are provided in the reference report (LGC Geotechnical, 2018).

### *3.5 Preliminary Portland Cement Concrete Pavement Sections*

For the purposes of these preliminary recommendations, we used an estimated R-value of 40. Preliminary minimum Portland Cement Concrete (PCC) pavement street sections are provided in Table 5 on the following page for Traffic Indices of 5.0 (or less), 6.0, and 7.0 and may be utilized in the design of the truck parking/circulation areas or loading docks. These recommendations must be confirmed with R-value testing of representative near-surface soils at the completion of grading and after underground utilities have been installed and backfilled. Final street sections

should be confirmed by the project civil engineer based upon the projected design Traffic Index. If requested, LGC Geotechnical will provide sections for alternate TI values. The appropriate paving section must be selected by the project civil engineer/client based on design traffic indexes.

***TABLE 5***

***Preliminary PCC Pavement Sections***

| **Provided Traffic Index** | 5.0 (or less) | 6.0 | 7.0 |
|---|---|---|---|
| **R -Value Subgrade** | 40 | 40 | 40 |
| **PCC Thickness** | 5.0 inches | 6.0 inches | 7.0 inches |
| **95% Compacted Subgrade** | 12.0 inches | 12.0 inches | 12.0 inches |

For preliminary planning purposes, the PCC pavement sections may consist of a minimum of concrete over subgrade soils compacted to 95 percent relative compaction (see Table 5 for section thicknesses). The concrete should have a minimum compressive strength of 3,000 psi and a minimum flexural strength of 475 psi at the time the pavement is subjected to traffic. Steel reinforcement is not required (ACI, 2017). The provided pavement sections assume that edge restraints like a curb and gutter will be provided. To reduce the potential (but not eliminate) for cracking, paving should provide control joints at regular intervals in each direction. The maximum joint spacing within all PCC pavements is recommended to be equal to or less than 30 times the pavement thickness; however, we recommend joint spacing not exceed 15 feet in each direction. Joints should be a depth of 1/3 of the concrete thickness. Decreasing the spacing of these joints will further reduce, but not eliminate the potential for unsightly cracking.

If semi-trailers are to be disconnected from the tractors from dolly jacks the design should consider concentrated loads imposed on the concrete pavement. These loads typically exceed the axle loads of the semi-trailer combination and are applied to smaller contact areas, especially if applied near joint locations. If these irregular loadings are confined to specific areas of the site, the pavement section required thickness can be economized. These and other factors (e.g., traffic patterns, irregular loading, doweled vs un-doweled joints, etc.) outlined in ACI, 2017 should be addressed for the final design.

The thicknesses shown are minimum thicknesses. Increasing the thickness of any or all of the above layers will reduce the likelihood of the pavement experiencing distress during its service life. The above recommendations are based on the assumption that proper maintenance and irrigation of the areas adjacent to the roadway will occur through the design life of the pavement. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the pavement.

Subgrade below the PCC pavement should be compacted to a minimum of 95 percent relative compaction per ASTM D1557 near optimum moisture content (generally within optimum and 2 percent above optimum moisture content). Earthwork recommendations are provided in the reference report (LGC Geotechnical, 2018).

## *3.6 Soil Corrosivity*

Although not corrosion engineers (LGC Geotechnical is not a corrosion consultant), several governing agencies in Southern California require the geotechnical consultant to determine the corrosion potential of soils to buried concrete and metal facilities. However, grading within the subject site has yet to be completed and is likely to be/has been graded using multiple sources of imported materials. Therefore, testing should be performed at the completion of grading.

## *3.7 Nonstructural Concrete Flatwork*

Nonstructural concrete (such as flatwork, sidewalks, etc.) has a potential for cracking due to changes in soil volume related to soil-moisture fluctuations. To reduce the potential for excessive cracking and lifting, concrete should be designed in accordance with the minimum guidelines outlined below. These guidelines will reduce the potential for irregular cracking and promote cracking along construction joints but will not eliminate all cracking or lifting. Thickening the concrete and/or adding additional reinforcement will further reduce cosmetic distress.

Nonstructural and non-vehicular concrete flatwork placed on compacted non-expansive subgrade may be a minimum 4-inches in thickness with crack control joints spaced 8 feet apart for flatwork slabs and 6 feet apart for flatwork sidewalks. Crack control joints should be sawcut or deep open tool joint to a minimum of 1/3 the concrete thickness. The compacted subgrade below the nonstructural and non-vehicular concrete flatwork should be wet down prior to placing concrete.

To reduce the potential for nonstructural concrete flatwork to separate from entryways and doorways, the owner may elect to install dowels to tie these two elements together.

## *3.8 Surface Drainage and Landscaping*

### *3.8.1 Precise Grading*

From a geotechnical perspective, we recommend that compacted finished grade soils adjacent to proposed structures be sloped away from the proposed building structures and towards an approved drainage device or unobstructed swale. Drainage swales, wherever feasible, should not be constructed within 5 feet of buildings. Where lot and building geometry necessitates that drainage swales be routed closer than 5 feet to structural foundations, we recommend the use of area drains together with drainage swales. Drainage swales used in conjunction with area drains should be designed by the project civil engineer so that a properly constructed and maintained system will prevent ponding within 5 feet of the foundation. Code compliance of grades is not the purview of the geotechnical consultant.

Planters with open bottoms adjacent to buildings should be avoided. Planters should not be designed adjacent to buildings unless provisions for drainage, such as catch basins, liners, and/or area drains, are made. Overwatering must be avoided.

### *3.8.2 Landscaping*

Planters adjacent to a building or structure should be avoided wherever possible or be properly designed (e.g., lined with a membrane), to reduce the penetration of water into the adjacent footing subgrades and thereby reduce moisture-related damage to the foundation. Planting areas at grade should be provided with appropriate positive drainage. Wherever possible, exposed soil areas should be above adjacent paved grades to facilitate drainage. Planters should not be depressed below adjacent paved grades unless provisions for drainage, such as multiple depressed area drains, are constructed. Adequate drainage gradients, devices, and curbing should be provided to prevent runoff from adjacent pavement or walks into the planting areas. Irrigation methods should promote uniformity of moisture in planters and beneath adjacent concrete flatwork. Overwatering and underwatering of landscape areas must be avoided. Irrigation levels should be kept to the absolute minimum level necessary to maintain healthy plant life.

Area drain inlets should be maintained and kept clear of debris in order to properly function. Owners and property management personnel should also be made aware that excessive irrigation of neighboring properties can cause seepage and moisture conditions. Owners and property management personnel should be furnished with these recommendations communicating the importance of maintaining positive drainage away from structures, towards streets, when they design their improvements.

The impact of heavy irrigation or inadequate runoff gradients can create perched water conditions. This may result in seepage or shallow groundwater conditions where previously none existed. Maintaining adequate surface drainage and controlled irrigation will significantly reduce the potential for nuisance-type moisture problems. To reduce differential earth movements such as heaving and shrinkage due to the change in moisture content of foundation soils, which may cause distress to a structure and associated improvements, moisture content of the soils surrounding the structure should be kept as relatively constant as possible.

## *3.9 Subsurface Water Infiltration*

Recent regulatory changes have occurred that mandate that storm water be infiltrated below grade rather than collected in a conventional storm drain system. Typically, a combination of methods is implemented to reduce surface water runoff and increase infiltration including; permeable pavements/pavers for roadways and walkways, directing surface water runoff to grass-lined swales, retention areas, and/or drywells, etc.

It should be noted that collecting and concentrating surface water for the purpose of intentional infiltration below grade, conflicts with the geotechnical engineering objective of directing surface water away from slopes, structures and other improvements. The geotechnical stability and integrity of a site is reliant upon appropriately handling surface water. In general, the vast

majority of geotechnical distress issues are directly related to improper drainage. In general, distress in the form of movement of improvements could occur as a result of soil saturation and loss of soil support, expansion, internal soil erosion, collapse and/or settlement.

At completion, the proposed development will consist almost entirely of compacted fill soils, we do not recommend that surface water be intentionally infiltrated into subsurface soils.

### *3.10 Geotechnical Plan Review*

Grading, foundation and any retaining wall plans, and final project drawings should be reviewed by this office prior to construction to verify that our geotechnical recommendations, provided herein, have been appropriately incorporated. Additional or modified geotechnical recommendations may be required based on the proposed layout.

### *3.11 Geotechnical Observation and Testing During Construction*

The recommendations provided in this report are based on limited subsurface observations and geotechnical analysis. The interpolated subsurface conditions should be checked in the field during construction by a representative of LGC Geotechnical. Geotechnical observation and testing are required per Section 1705 of the 2019 California Building Code (CBC).

Geotechnical observation and/or testing should be performed by LGC Geotechnical at the following stages:

- During grading (removal bottoms, fill placement, etc.);
- During utility trench and any retaining wall backfill and compaction;
- Preparation of pavement subgrade and placement of aggregate base;
- After building/wall foundation excavation and prior to placing reinforcement and/or concrete; and
- When any unusual soil conditions are encountered during any construction operation subsequent to issuance of this report.

## *4.0 LIMITATIONS*

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report. The samples taken and submitted for laboratory testing, the observations made, and the in-situ field testing performed are believed representative of the entire project; however, soil and geologic conditions revealed by excavation may be different than our preliminary findings. If this occurs, the changed conditions must be evaluated by the project soils engineer and geologist and design(s) adjusted as required or alternate design(s) recommended.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and/or project engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and/or subcontractor properly implements the recommendations in the field. The contractor and/or subcontractor should notify the owner if they consider any of the recommendations presented herein to be unsafe.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. Therefore, the findings, conclusions, and recommendations presented in this report can be relied upon only if LGC Geotechnical has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site.

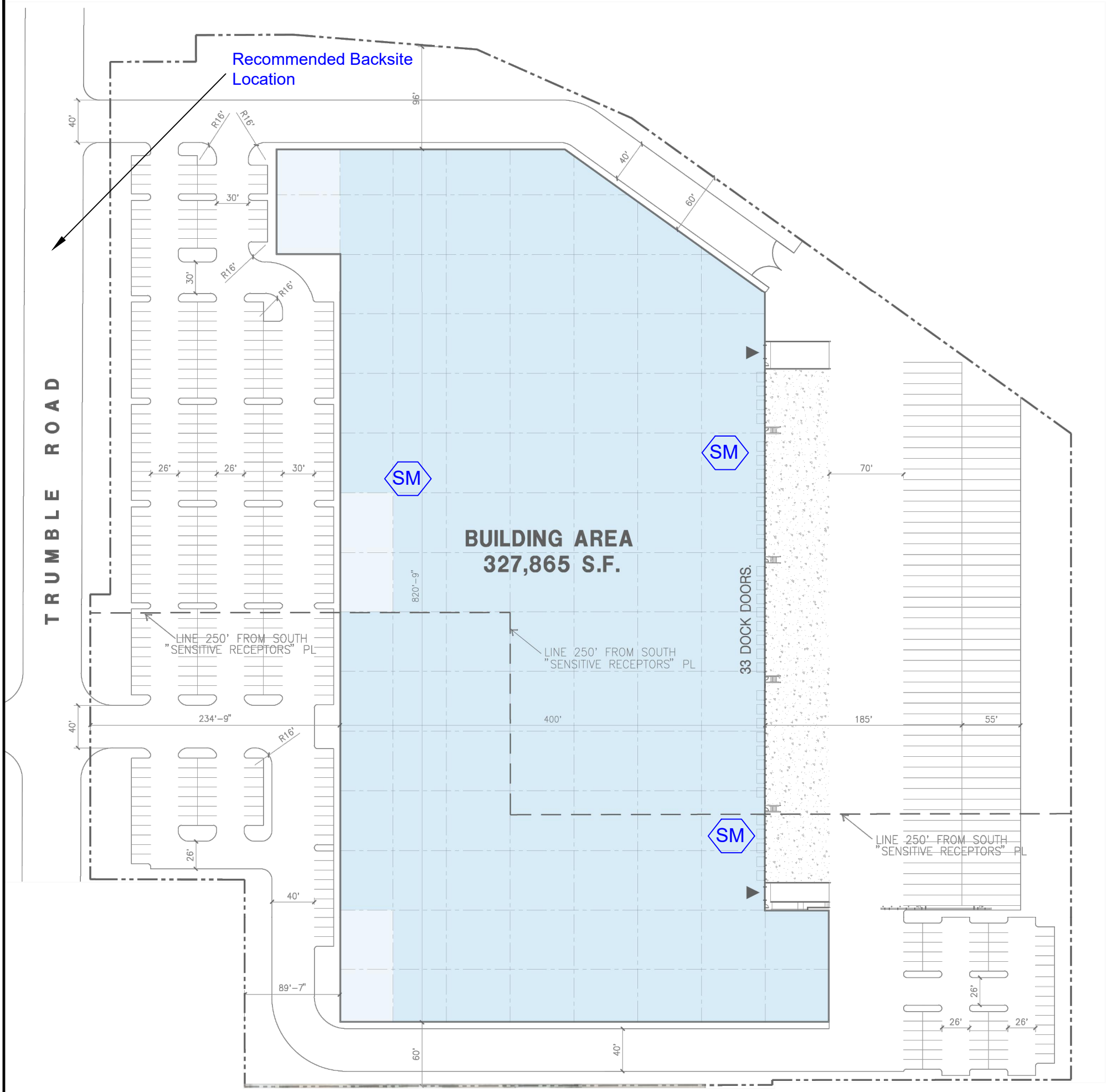
In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and modification, and should not be relied upon after a period of 3 years.




LGC Geotechnical, Inc.

**FIGURE 1**
**Site Location Map**

| | |
|---|---|
| PROJECT NAME | Lovett Industrial - Trumble Road |
| PROJECT NO. | 17172-02 |
| ENG. / GEOL. | RLD/KBC |
| SCALE | Not to Scale |
| DATE | May 2022 |




**LEGEND**

SM — Approximate Location of Recommended Settlement Monuments

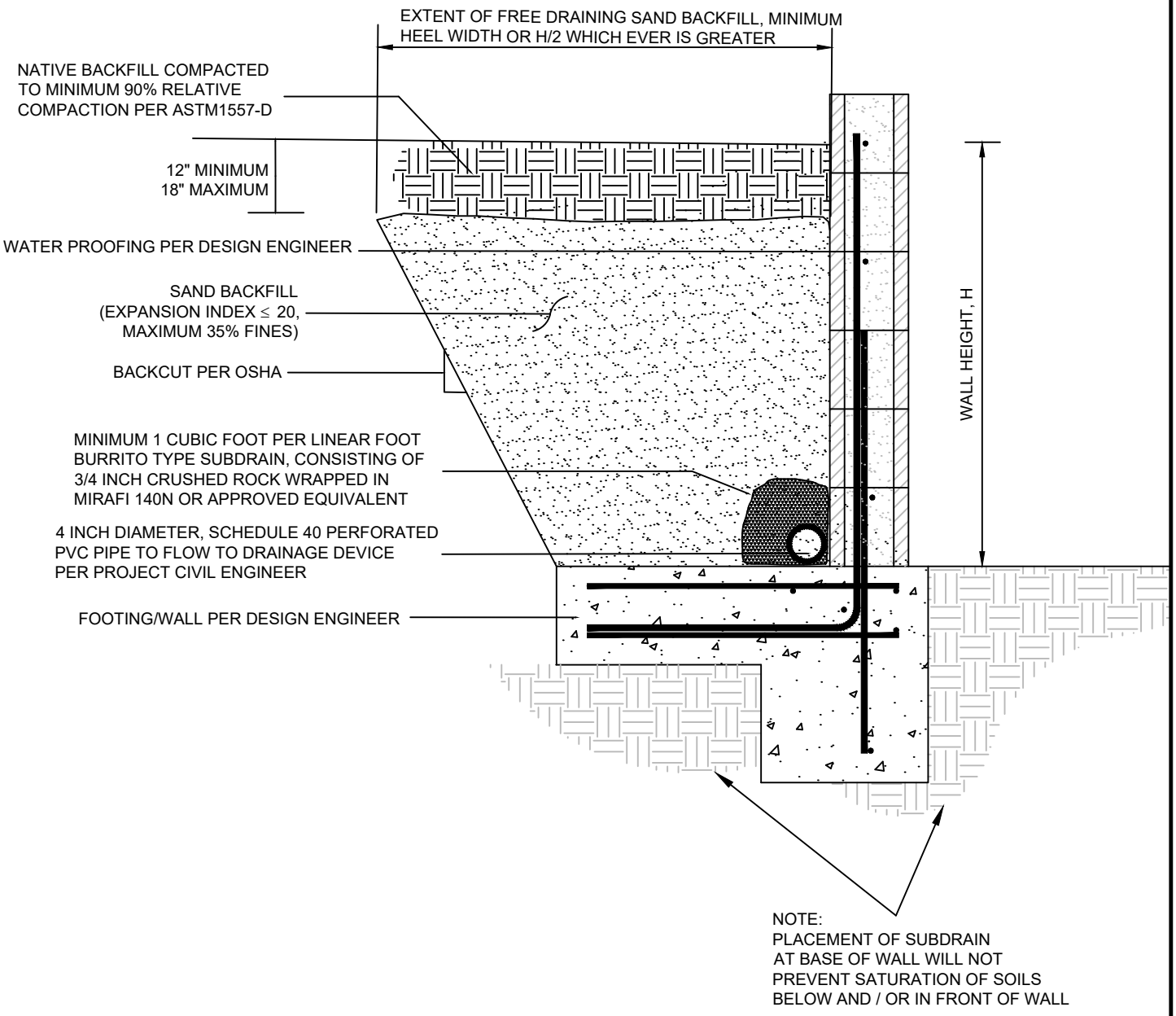
SCALE: 1"=100'

100' 0 100' 200'

LGC Geotechnical, Inc.
131 Calle Iglesia, Ste. 200
San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

# FIGURE 2 - Settlement Monument Location Map

| | |
|---|---|
| PROJECT NAME | Lovett Industrial - Trumble Road |
| PROJECT NO. | 17172-02 |
| ENG. / GEOL. | RLD/KBC |
| SCALE | 1" = 100' |
| DATE | May 2022 |




LGC Geotechnical, Inc.

**FIGURE 3**
**Retaining Wall Backfill Detail**

| | |
|---|---|
| PROJECT NAME | Lovett Industrial - Trumble Road |
| PROJECT NO. | 17172-02 |
| ENG. / GEOL | RLD/KBC |
| SCALE | Not to Scale |
| DATE | May 2022 |

# *Appendix A*
# *References*

## *APPENDIX A*

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LGC Geotechnical, Inc.

January 18, 2018

Project No. 17172-01

Mr. Ron Burek
***North Pacific Developments***
20 Old Ranch Road
Laguna Niguel, California 92677

***Subject:*** ***Preliminary Geotechnical Evaluation for the Proposed Open Pit Restoration at 25630 Trumble Road, City of Menifee, County of Riverside, California***

In accordance with your request, LGC Geotechnical, Inc. has performed a preliminary geotechnical evaluation for the proposed open pit restoration at 25630 Trumble Road, located in the City of Menifee, County of Riverside, California. The purpose of our study was to evaluate the existing onsite geotechnical conditions and to provide preliminary geotechnical recommendations relative to the proposed development of the site.

Should you have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Respectfully,

***LGC Geotechnical, Inc.***




Benjamin R. Grenis, RCE 83971
Senior Staff Engineer




Kevin B. Colson, CEG 2210
Vice President

KBC/BRG/BPG/aca

Distribution: (5) Addressee (4 wet signed copies and 1 electronic copy)

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## *1.0 INTRODUCTION*

LGC Geotechnical has performed a preliminary geotechnical evaluation for the open pit restoration at 25630 Trumble Road, located in the City of Menifee, County of Riverside, California (Figure 1). This report summarizes our findings, conclusions, and preliminary geotechnical design recommendations relative to the proposed development.

### *1.1 Project Description and Background*

The approximately 17.8-acre, irregular-shaped site is located just southeast of the intersection at Interstate 215 (I-215) and Highway 74 (CA-74). The site is bounded by Trumble Road to the west, an industrial welding building and empty lot to the north, a food waste recycling center to the east, and residential housing to the south (Figure 1). The site was originally used as an open pit mine and is now used as a soils and concrete recycling area. Topographically, the site elevations drop approximately 44 feet from street level at Trumble Road to the bottom of the pit. The pit bottom is generally within the center of the subject site, with slopes rising to roughly street grade at the west, north, and east sides. A slope approximately 28 feet high, rises to a flat pad at the south end of the site.

Based on the preliminary plans, the proposed development will include grading of the site in order to create a relatively level pad on the west side of the site with a 5:1 (horizontal to vertical) slope descending east to the bottom of the existing pit (RDS, 2018). The preliminary plan indicates cuts and fills on the order of approximately 4 feet and 44 feet, respectively. It is our understanding, that the property will be utilized as an equipment storage area for heavy duty construction equipment. Paving of driveway and equipment parking areas is not anticipated. Although not currently proposed, additional development of the site, including grading of low areas and construction of structures, may be desired in the future.

Preliminary building (dead plus live) loads were not provided at the time of this report as no structures are proposed at this time. However, we have estimated the maximum column and wall structural (dead plus live) loads to be 100 kips and 4 kips per lineal foot, respectively. It is anticipated that any proposed structure will be at-grade and limited to two stories.

**The recommendations provided in this report are based on estimated structural loads and grading information as indicated above. LGC Geotechnical should be provided with any updated project information, plans, and/or any structural loads as they become available in order to either confirm or modify the recommendations provided herein.**

### *1.2 Subsurface Geotechnical Evaluation*

On November 2, 2017 LGC Geotechnical performed a limited site reconnaissance and subsurface geotechnical evaluation consisting of the excavation of seven test pits in order to evaluate onsite geotechnical conditions.

Seven exploratory test pits (TP-1 through TP-7) were excavated and logged to depths ranging from approximately 3 feet to 27.5 feet below the existing ground surface. The test pits were excavated using a CAT 330F excavator with a 36-inch bucket. The test pits were excavated until suitable materials, consisting of Quaternary older alluvial fan deposits (Qof), were exposed. The test pits were geotechnically logged by a representative of LGC Geotechnical. Soil descriptions are presented in the

test pit logs, which are included in Appendix B. The test pit excavations were backfilled with the excavated materials to the existing ground surface. Please note that some settlement of the backfill may occur over time and the excavations should be topped off as needed.

The approximate locations of the test pits performed by LGC Geotechnical are presented on the Preliminary Geotechnical Map (Sheet 1).

## *2.0 GEOTECHNICAL CONDITIONS*

### *2.1 Regional Geology*

The subject site is generally located in the west-central portion of the broad San Bernardino Basin that is bound to the north by the San Gorgonio Mountains and to the west by the Santa Ana Mountains. Regional topography is dominated by the presence of the northwest trending faults that define the mountains and hills of the Southern California region. Structurally, the site is located on the west-central portion of the Perris block of the northern Peninsular Ranges of Southern California. The 'Perris block' is bound by the Elsinore fault zone to the west and the San Jacinto fault zone to the east. Despite the surrounding proximal fault systems, the low relief of the Perris block has remained near unchanged and unreformed for hundreds of thousands of years (Doehring, 1971; Menifee General Plan, 2012).

### *2.2 Site-Specific Geology*

Based on the Geologic Map of the Romoland 7.5' Quadrangle (Morton, 2003), the majority of the subject site is underlain by Quaternary old alluvial fan deposits which are overlain by relatively significant amounts of undocumented artificial fill soils in localized areas. The approximate lateral limits of the geologic units are depicted on the Preliminary Geotechnical Map (Sheet 1).

#### *2.2.1 Artificial Fill - Undocumented (Map Symbol – afu)*

Undocumented artificial fill was encountered throughout the site to depths up to approximately 27 feet from the existing ground surface. As encountered, the undocumented artificial fill generally consisted of light brown to dark brown, dry to moist silty sand to clayey sand. Additionally, the materials were found to be loose and contain trash and other debris.

#### *2.2.2 Quaternary Old Alluvial Fan Deposits (Map Symbol – Qof)*

The late to middle Pleistocene age Quaternary old alluvial fan deposits are indurated deposits of alluvial fans and headward drainages. These materials are described as consisting of slightly to moderately dissected, reddish-brown, very coarse through very fine sand. During our subsurface field evaluation, the fan deposits typically consisted of silty sand which were red brown and slightly moist. Localized areas of moderately indurated sands caused slightly difficult excavation in exploratory Test Pits TP-2, TP-5, and TP-7.

### *2.3 Landslides*

Our research and field observations do not indicate the presence of landslides on or in the immediate vicinity of the subject site. Review of the regional geologic map of the area does not indicate the presence of known or suspected landslides in the vicinity of the site.

## *2.4 Groundwater*

Groundwater was not encountered during our subsurface field evaluation to the maximum explored depth of approximately 27 feet below existing ground, or approximately 57 feet below street level. Based on our review of the California Department of Water Resources (CDWR, 2017) Water Data Library, the nearest groundwater monitoring well is approximately 0.25 miles southwest of the subject site on Illinois Ave. The high groundwater level recorded was at a depth of approximately 96 feet below ground surface or an elevation of approximately 1,332 feet above mean sea level (MSL).

Seasonal fluctuations of groundwater elevations should be expected over time. In general, groundwater levels fluctuate with the seasons and local zones of perched groundwater may be present within the near-surface deposits due to local seepage or during rainy seasons. Local perched groundwater conditions or surface seepage may develop once site development is completed and landscape irrigation commences.

## *2.5 Faulting and Seismic Hazards*

Prompted by damaging earthquakes in Northern and Southern California, State legislation and policies concerning the classification and land-use criteria associated with faults have been developed. The Alquist-Priolo Earthquake Fault Zoning Act was implemented in 1972 to prevent the construction of urban developments across the trace of active faults, most recently revised in 2007 (CGS, 2007). According to the State Geologist, an "active" fault is defined as one which has had surface displacement within the Holocene Epoch (roughly the last 11,000 years). A "potentially active" fault is defined as any fault which has had surface displacement during Quaternary time (last 1,600,000 years), but not necessarily within the Holocene. Regulatory Earthquake Fault Zones have been delineated to generally encompass the traces of active and the most sufficiently active and well-defined potential faults within California. Where developments for human occupation are proposed within these zones, the state requires detailed fault evaluations be performed so that engineering-geologists can identify the locations of active faults and recommend setbacks from locations of possible surface rupture.

The subject site is not located within an Alquist-Priolo Earthquake Fault Zone and no faults were identified on the site during our site evaluation. In addition, the site is not located within a fault zone as delineated by the City of Menifee (Menifee General Plan, 2012a). The possibility of damage due to ground rupture is considered low since no active faults are known to cross the site. The closest active fault is the Anza segment of the San Jacinto Fault Zone; an active, right-lateral, strike-slip fault, located approximately 9.9 miles northeast of the site.

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the Southern California region, which may affect the site, include ground lurching and shallow ground rupture, soil liquefaction, and dynamic settlement. These secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault and the onsite geology. Some additional major active nearby faults that could produce these secondary effects include the Elsinore and San Andreas Fault Zones, among others (USGS, 2006). A discussion of these secondary effects is provided in the following sections

### *2.5.1 Lurching and Shallow Ground Rupture*

Soil lurching refers to the rolling motion on the ground surface by the passage of seismic surface waves. Effects of this nature are not likely to be significant where the thickness of soft

sediments do not vary appreciably under structures. Ground rupture due to active faulting is not likely to occur onsite due to the absence of known active fault traces. Ground cracking due to shaking from distant seismic events is not considered a significant hazard, although it is a possibility at any site.

### *2.5.2 Liquefaction and Dynamic Settlement*

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions coexist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose near-surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential. In general, cohesive soils are not considered susceptible to liquefaction, depending on their plasticity and moisture content (Bray & Sancio, 2006). Effects of liquefaction on level ground include settlement, sand boils, and bearing capacity failures below structures. Dynamic settlement of dry loose sands can occur as the sand particles tend to settle and densify as a result of a seismic event.

The site is not located within a mapped zone for liquefaction potential (Menifee General Plan, 2012b). Due to the depth of groundwater greater than 50 feet, the potential for liquefaction and liquefaction-induced settlement is considered very low. Additionally, the proposed development will primarily consist of compacted fill over dense alluvial deposits. These soils are not considered susceptible to dynamic settlement.

### *2.5.3 Lateral Spreading*

Lateral spreading is a type of liquefaction-induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluid mass, gravity plus the earthquake inertial forces may cause the mass to move down-slope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements and such movement typically damages pipelines, utilities, bridges, and structures.

Due to the very low potential for liquefaction, the potential for lateral spreading is also considered very low.

## *2.6 Subsidence*

The subject site is located within an area considered susceptible to subsidence as delineated by the County of Riverside. However, the proposed development is not anticipated to contribute regional subsidence issues. Local subsidence related to the proposed development is not anticipated.

## *2.7 Rippability*

Based upon our field observations and previous experience in the area, we anticipate that near-surface undocumented fill and alluvium encountered near the surface will be readily excavatable with conventional earthwork equipment utilizing ‘standard-to-heavy ripping” techniques.

## *2.8 Oversized Material*

Oversized material (material larger than 8 inches in maximum dimension) should be anticipated during site grading. Recommendations are provided for appropriate handling of oversized materials in Appendix D. If feasible, crushing oversized materials or exporting to an offsite location may be considered.

## *3.0 ANALYSIS*

### *3.1 Seismic Design Parameters*

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2016 California Building Code (CBC). Representative site coordinates of latitude 33.7484 degrees north and longitude -117.1837 west were utilized in our analyses. Please note that these coordinates are generally considered representative of the site for preliminary planning purposes, however, their applicability must be verified with respect to a desired specific location within the site. The maximum considered earthquake (MCE) spectral response accelerations ($S_{MS}$ and $S_{M1}$) and adjusted design spectral response acceleration parameters ($S_{DS}$ and $S_{D1}$) for Site Class D are provided in Table 1 below.

***TABLE 1***

***Seismic Design Parameters***

| Selected Parameters from 2016 CBC, Section 1613 - Earthquake Loads | Seismic Design Values |
|---|---|
| Site Class per Chapter 20 of ASCE 7 | D |
| Risk-Targeted Spectral Acceleration for Short Periods ($S_S$) | 1.500g |
| Risk-Targeted Spectral Accelerations for 1-Second Periods ($S_1$) | 0.600g |
| Site Coefficient $F_a$ per Table 1613.3.3(1) | 1.0 |
| Site Coefficient $F_v$ per Table 1613.3.3(2) | 1.5 |
| Site Modified Spectral Acceleration for Short Periods ($S_{MS}$) for Site Class D [Note: $S_{MS} = F_aS_S$] | 1.500g |
| Site Modified Spectral Acceleration for 1-Second Periods ($S_{M1}$) for Site Class D [Note: $S_{M1} = F_vS_1$] | 0.900g |
| Design Spectral Acceleration for Short Periods ($S_{DS}$) for Site Class D [Note: $S_{DS} = (^2/_3)S_{MS}$] | 1.000g |
| Design Spectral Acceleration for 1-Second Periods ($S_{D1}$) for Site Class D [Note: $S_{D1} = (^2/_3)S_{M1}$] | 0.600g |
| Mapped Risk Coefficient at 0.2 sec Spectral Response Period, $C_{RS}$ (per ASCE 7) | 1.060 |
| Mapped Risk Coefficient at 1 sec Spectral Response Period, $C_{R1}$ (per ASCE 7) | 1.036 |

* From USGS, 2017

Section 1803.5.12 of the 2016 CBC (per Section 11.8.3 of ASCE 7) states that the maximum considered earthquake geometric mean ($MCE_G$) Peak Ground Acceleration (PGA) should be used for liquefaction potential. The $PGA_M$ for the site is equal to 0.500g (USGS, 2017).

A deaggregation of the PGA based on a 2,475-year average return period indicates that an earthquake magnitude of 7.5 at a distance of approximately 16.5 km from the site would contribute the most to this ground motion (USGS, 2008).

## *4.0 FINDINGS AND CONCLUSIONS*

Based on the results of our geotechnical evaluation, it is our opinion that the proposed site development is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are incorporated into the site design, grading, and construction.

The following is a summary of the primary geotechnical factors, which may affect future development of the site.

- In general, our subsurface exploration indicates that the site primarily consists of undocumented fill overlying Qof deposits. The loose and compressible soils, including topsoil and undocumented artificial fill, are not considered suitable for the planned improvements in their present condition (refer to Section 5.1).
- Groundwater was not encountered to the maximum explored depth of approximately 27 feet below existing ground surface. The high groundwater level is estimated on the order of 96 feet below existing ground surface.
- The subject site is not located within an Alquist-Priolo Earthquake Fault Zone or within a fault zone as delineated by the City of Menifee and no faults were identified on the site during our site evaluation. The proposed development will likely be subjected to strong seismic ground shaking during its design life from one of the regional faults.
- The potential for liquefaction and liquefaction-induced settlement is considered very low due to the depth of groundwater. The site is not located within a mapped zone for liquefaction potential for the City of Menifee. The proposed grading will primarily consist of compacted fill over dense Qof deposits, producing conditions which are not considered susceptible to dynamic settlement.
- In general, easy to moderately difficult ripping utilizing heavy-duty excavation equipment should be anticipated for the undocumented fill and Qof located onsite.
- Generation of oversized material (material larger than 8 inches in maximum dimension) should be anticipated during site grading. Recommendations are provided for appropriate handling of oversized materials in Appendix C.
- Expansion Potential must be determined at the completion of grading.

## *5.0 RECOMMENDATIONS*

The following recommendations are to be considered preliminary, and should be confirmed upon completion of earthwork operations. In addition, they should be considered minimal from a geotechnical viewpoint, as there may be more restrictive requirements from the architect, structural engineer, building codes, governing agencies, or the City. It is the responsibility of the builder to ensure these recommendations are provided to the appropriate parties.

It should be noted that the following geotechnical recommendations are intended to provide sufficient information to develop the site in general accordance with the California Building Code (CBC) requirements. With regard to the potential occurrence of potentially catastrophic geotechnical hazards such as fault rupture, earthquake-induced landslides, liquefaction, etc. the following geotechnical recommendations should provide adequate protection for the proposed development to the extent required to reduce seismic risk to an "acceptable level." The "acceptable level" of risk is defined by the California Code of Regulations as "the level that provides reasonable protection of the public safety, though it does not necessarily ensure continued structural integrity and functionality of the project" [Section 3721(a)]. Therefore, repair and remedial work of the proposed improvement may be required after a significant seismic event. With regards to the potential for less significant geologic hazards to the proposed development, the recommendations contained herein are intended as a reasonable protection against the potential damaging effects of geotechnical phenomena such as expansive soils, fill settlement, groundwater seepage, etc. It should be understood, however, that although our recommendations are intended to maintain the structural integrity of the proposed development and structures given the site geotechnical conditions, they cannot preclude the potential for some cosmetic distress or nuisance issues to develop as a result of the site geotechnical conditions.

The geotechnical recommendations contained herein must be confirmed to be suitable or modified based on the actual exposed conditions.

### *5.1 Site Earthwork*

We anticipate that earthwork at the site will consist of remedial removals and fill placement. We understand that potential future development may include foundation construction and utility line installation and backfill. We recommend that earthwork onsite be performed in accordance with the following recommendations, City of Menifee/CBC requirements and the General Earthwork and Grading Specifications included in Appendix C. In case of conflict, the following recommendations shall supersede those included as part of Appendix C.

#### *5.1.1 Site Preparation*

Prior to grading of areas to receive structural fill, engineered structures or improvements, the area should be cleared of existing vegetation (shrubs, trees, grass, etc.), surface obstructions, existing debris and potentially compressible or otherwise unsuitable material. Vegetation and debris should be removed and properly disposed of off-site. Holes resulting from the removal of buried obstructions, which extend below proposed removal bottoms, should be replaced with suitable compacted fill material. Any abandoned utility lines should be completely removed and replaced with properly compacted fill.

### *5.1.2 Removal Depths*

Existing onsite fill materials should be removed to competent older alluvial material (Qof) and replaced as properly compacted fill. Prior to placement as compacted fill, any significant organic materials, construction debris or other unsuitable materials shall be removed and properly exported offsite.

The depth of removals is estimated to range from approximately 3 feet to 27 feet below existing grades. See Preliminary Geotechnical Map (Sheet 1) for approximate depths to Qof.

Local conditions may be encountered which could require additional removals beyond the estimated depths depicted on the map. The actual depth and lateral extents of removals should be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Please note that perched groundwater may be encountered at various localized areas during grading.

### *5.1.3 Removal Bottoms and Subgrade Preparation*

In general, subgrade areas, removal bottom areas, and any areas to receive compacted fill should be scarified to a minimum depth of 6 inches, brought to a near-optimum moisture condition, and re-compacted per project recommendations.

Removal bottoms and areas to receive fill should be observed and accepted by the geotechnical consultant prior to subsequent fill placement.

### *5.1.4 Material for Fill*

From a geotechnical perspective, the onsite soils are generally considered suitable for use as general compacted fill (i.e., non-retaining wall backfill), provided they are screened of organic materials, construction debris and any oversized material (8 inches in greatest dimension). Moisture conditioning of site soils should be anticipated as outlined in the section below.

Any required retaining wall backfill should consist of sandy soils with a maximum of 35 percent fines (passing the No. 200 sieve) per American Society for Testing and Materials (ASTM) Test Method D1140 (or ASTM D6913/D422) and a Very Low expansion potential (EI of 20 or less per ASTM D4829). Soils should also be screened of organic materials, construction debris and any material greater than 3 inches in maximum dimension.

As site development will require substantial import, it is anticipated that the imported material will vary greatly in composition. From a geotechnical viewpoint, “select” import soils would be preferable in the upper 15 feet of the finish surface of the area of proposed development. These soils should consist of clean, relatively granular soils of Very Low expansion potential (expansion index 20 or less based on ASTM D4829) and no particles larger than 3 inches in greatest dimension. Source samples of planned importation of select materials should be provided to the geotechnical consultant for laboratory testing a minimum of 3 working days prior to any planned importation for required laboratory testing.

Aggregate base (crushed aggregate base or crushed miscellaneous base) should conform to the requirements of Section 200-2 of the Standard Specifications for Public Works Construction ("Greenbook") for untreated base materials (except processed miscellaneous base) or Caltrans Class 2 aggregate base.

### *5.1.5 Fill Placement and Compaction*

Material to be placed as fill should be brought to near-optimum moisture content (generally at or about 2 percent above optimum moisture content) and recompacted to at least 90 percent relative compaction (per ASTM D1557). Soils are generally anticipated to require additional moisture in order to achieve the required compaction. Soils may also be present where drying and/or mixing very moist soils will be required prior to reusing the materials as compacted fill. The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in loose thickness. Each lift should be thoroughly compacted and accepted prior to subsequent lifts. Generally, placement and compaction of fill should be performed in accordance with local grading ordinances and with observation and testing by the geotechnical consultant. Recommendations are provided for appropriate handling of oversized materials in Appendix D.

Fill placed on any slopes greater than 5:1 (horizontal to vertical) should be properly keyed and benched into firm and competent soils as it is placed in lifts.

Aggregate base material should be compacted to a minimum of 95 percent relative compaction at or slightly above-optimum moisture content per ASTM D1557. Subgrade below aggregate base should be compacted to a minimum of 90 percent relative compaction per ASTM D1557 at or slightly above-optimum moisture content.

### *5.1.6 Trench and Retaining Wall Backfill and Compaction*

The onsite soils may generally be suitable as trench backfill, provided the soils are screened of rocks and other materials greater than 6 inches in diameter and organic matter. If trenches are shallow, or the use of conventional equipment may result in damage to the utilities, sand having a sand equivalent (SE) of 30 (per Caltrans Test Method 217) or greater may be used to bed and shade the pipes. Sand backfill within the pipe bedding zone may be densified by jetting or flooding and then tamping to ensure adequate compaction. Subsequent trench backfill should be compacted in uniform thin lifts by mechanical means to at least 90 percent relative compaction (per ASTM D1557).

Any required retaining wall backfill should consist of predominately granular, sandy soils as outlined in Section 5.1.4. The limits of select sandy backfill should extend at minimum ½ the height of the retaining wall or the width of the heel (if applicable), whichever is greater (Refer to Figure 2). Retaining wall backfill soils should be compacted in relatively uniform thin lifts to a minimum of 90 percent relative compaction (per ASTM D1557). Jetting or flooding of retaining wall backfill materials should not be permitted.

A representative from LGC Geotechnical should observe, probe, and test the backfill to verify compliance with the project recommendations.

## *5.2 Preliminary Foundation Recommendations*

Preliminary conventional and post-tensioned foundation recommendations are provided in the following sections. Allowable soil bearing and estimated static settlement are provided in Section 5.3. Please note that the following foundation recommendations are preliminary and must be confirmed by LGC Geotechnical based on finalized project plans (i.e., building loads, grading and site layout plans) as the as-graded condition of the site.

### *5.2.1 Preliminary Conventional Foundation Design Parameters*

Conventional foundations may be designed in accordance with Wire Reinforcement Institute (WRI) procedure for slab-on-ground foundations per Section 1808 of the 2016 CBC to resist expansive soils. The following preliminary soil parameters may be used:

- Effective Plasticity Index: 25
- Climatic Rating: Cw = 15
- Reinforcement: Per structural designer.
- Minimum Perimeter Footing Depth: 15 inches below lowest adjacent grade.
- Moisture condition (presoak) slab subgrade to 120% of optimum moisture content to a minimum depth of 18 inches prior to trenching.

The recommended moisture content should be maintained up to the time of concrete placement.

### *5.2.2 Preliminary Post-Tensioned Foundation Design Parameters*

The geotechnical parameters provided herein may be used for post-tensioned slab foundations with a deepened perimeter footing or a post-tensioned mat slab. These parameters have been determined in general accordance with the Post-Tensioning Institute (PTI) Standard Requirements for Design of Shallow Post-Tensioned Concrete Foundations on Expansive Soils, referenced in Chapter 18 of the 2016 CBC. In utilizing these parameters, the foundation engineer should design the foundation system in accordance with the allowable deflection criteria of applicable codes and the requirements of the structural designer/architect. Other types of stiff slabs may be used in place of the CBC post-tensioned slab design provided that, in the opinion of the foundation structural designer, the alternative type of slab is at least as stiff and strong as that designed by the CBC/PTI method.

Our design parameters are based on our experience with similar projects and the anticipated nature of the soil (with respect to expansion potential). Please note that implementation of our recommendations will not eliminate foundation movement (and related distress) should the moisture content of the subgrade soils fluctuate. It is the intent of these recommendations to help maintain the integrity of the proposed structures and reduce (not eliminate) movement, based upon the anticipated site soil conditions. Should future owners and/or property maintenance personnel not properly maintain the areas surrounding the foundation, for example by overwatering, then we anticipate for highly expansive soils the maximum differential movement of the perimeter of the foundation to the center of the foundation to be on the order of a couple of inches. Soils of lower expansion potential are anticipated to show less movement.

***TABLE 2***

***Preliminary Geotechnical Foundation Design Parameters***

| Parameter | PT Slab with Perimeter Footing | PT Mat with Thickened Edge |
|---|---|---|
| Expansion Index | Medium[1] | Medium[1] |
| Thornthwaite Moisture Index | -20 | -20 |
| Constant Soil Suction | PF 3.9 | PF 3.9 |
| Center Lift<br>Edge moisture variation distance, $e_m$<br>Center lift, $y_m$ | <br>9.0 feet<br>0.5 inch | <br>9.0 feet<br>0.6 inch |
| Edge Lift<br>Edge moisture variation distance, $e_m$<br>Edge lift, $y_m$ | <br>4.7 feet<br>1.1 inch | <br>4.7 feet<br>1.3 inch |
| Modulus of Subgrade Reaction, k (assuming presoaking as indicated below) | 150 pci | 150 pci |
| Minimum perimeter footing/thickened edge embedment below finish grade | 18 inches | 6 inches |

1. Assumed for preliminary design purposes. Further evaluation is needed at the completion of grading.
2. Recommendations for foundation reinforcement and slab thickness are ultimately the purview of the foundation engineer/structural engineer based upon geotechnical criteria and structural engineering considerations.
3. Recommendations for sand below slabs have traditionally been included with geotechnical foundation recommendations, although they are not the purview of the geotechnical consultant. The sand layer requirements are the purview of the foundation engineer/structural engineer, and should be provided in accordance with ACI Publication 302 "Guide for Concrete Floor and Slab Construction".
4. Recommendations for vapor retarders below slabs are also the purview of the foundation engineer/structural engineer and should be provided in accordance with applicable code requirements.
5. Moisture condition to 120% of optimum moisture content to a depth of 18 inches prior to trenching.

### *5.2.3 Foundation Subgrade Preparation and Maintenance*

Moisture conditioning of the subgrade soils is recommended prior to trenching the foundation. The recommendations, specific to anticipated site soil conditions, are presented herein. The subgrade moisture condition of the building pad soils should be maintained at the recommended moisture content up to the time of concrete placement. This moisture content should be maintained around the immediate perimeter of the slab during construction and up to occupancy of the building structures.

The geotechnical parameters provided herein assume that if the areas adjacent to the foundation are planted and irrigated, these areas will be designed with proper drainage and adequately maintained so that ponding, which causes significant moisture changes below the foundation, does not occur. Our recommendations do not account for excessive irrigation and/or incorrect landscape design. Plants should only be provided with sufficient irrigation for life and not overwatered to saturate subgrade soils. Sunken planters placed adjacent to the foundation should either be designed with an efficient drainage system or liners to prevent moisture infiltration below the foundation. Some lifting of the perimeter foundation beam should be expected even with properly constructed planters.

In addition to the factors mentioned above, future owners/property management personnel should be made aware of the potential negative influences of trees and/or other large vegetation. Roots that extend near the vicinity of foundations can cause distress to foundations. Future owners (and the owner's landscape architect) should not plant trees/large shrubs closer to the foundations than a distance equal to half the mature height of the tree or 20 feet, whichever is greater, unless specifically provided with root barriers to prevent root growth below the building foundation.

It is the owner's responsibility to perform periodic maintenance during hot and dry periods to ensure that adequate watering is provided to keep soil from separating or pulling back from the foundation. Future owners and property management personnel should be informed and educated regarding the importance of maintaining a constant level of soil-moisture. The owners should be made aware of the potential negative consequences of both excessive watering as well as allowing potentially expansive soils to become too dry. Expansive soils can undergo shrinkage during drying and swelling during the rainy winter season or when irrigation is resumed. This can result in distress to building structures and hardscape improvements.

### *5.2.4 Slab Underlayment Guidelines*

The following is for informational purposes only since slab underlayment (e.g., moisture retarder, sand or gravel layers for concrete curing and/or capillary break) is unrelated to the geotechnical performance of the foundation and thereby not the purview of the geotechnical consultant. Post-construction moisture migration should be expected below the foundation. The foundation engineer/architect should determine whether the use of a capillary break (sand or gravel layer), in conjunction with the vapor retarder, is necessary or required by code. Sand layer thickness and location (above and/or below vapor retarder) should also be determined by the foundation engineer/architect.

## *5.3 Allowable Soil Bearing and Lateral Resistance*

Provided our earthwork recommendations are implemented, the following minimum footing widths and embedments for isolated spread and continuous wall footings are recommended for the corresponding allowable bearing pressures.

***TABLE 3***

***Allowable Soil Bearing Pressures***

| Allowable Static Bearing Pressure (psf) | Minimum Footing Width (feet) | Minimum Footing Embedment* (feet) |
|---|---|---|
| 2,600 | 3 | 2 |
| 2,300 | 2 | 2 |
| 2,000 | 1.5 | 1.5 |

*Refers to minimum depth to the bottom of the footing below lowest adjacent finish grade.

These allowable bearing pressures are applicable for level (ground slope equal to or flatter than 5 horizontal feet to 1-foot vertical) conditions only. Bearing values indicated above are for total dead loads and live loads. The above vertical bearing may be increased by one-third for short durations of loading which will include the effect of wind or seismic loading.

Soil settlement is a function of footing dimensions and applied soil bearing pressure. In utilizing the above-mentioned allowable bearing capacity, assumed structural loads, and provided our earthwork recommendations are implemented, foundation settlement due to structural loads is anticipated to be on the order of 1-inch or less. Differential settlement should be anticipated between nearby columns or walls where a large differential loading condition exists. Settlement estimates should be evaluated by LGC Geotechnical when foundation plans are available.

Resistance to lateral loads can be provided by friction acting at the base of foundations and by passive earth pressure. For concrete/soil frictional resistance, an allowable coefficient of friction of 0.35 may be assumed with dead-load forces. An allowable passive lateral earth pressure of 220 psf per foot of depth (or pcf) to a maximum of 2,200 psf may be used for lateral resistance. This passive pressure is applicable for level (ground slope equal to or flatter than 5 horizontal feet to 1-foot vertical) conditions only. Frictional resistance and passive pressure may be used in combination without reduction. We recommend that the upper foot of passive resistance be neglected if finished grade will not be covered with concrete or asphalt concrete. The provided allowable passive pressure is based on a factor of safety of 1.5 and may be increased by one-third for short duration wind or seismic loading.

## *5.4 Lateral Earth Pressures for Retaining Walls*

The following preliminary lateral earth pressures may be used for any site retaining walls 6 feet or less. Lateral earth pressures are provided as equivalent fluid unit weights, in pound per square foot (psf) per foot of depth or pcf. These values do not contain an appreciable factor of safety, so the retaining wall designer should apply the applicable factors of safety and/or load factors during design.

The following lateral earth pressures are presented on Table 4 for approved select granular soils with a maximum of 35 percent fines (passing the No. 200 sieve per ASTM D-421/422) and Very Low expansion potential (EI of 20 or less per ASTM D4829). The wall designer should clearly indicate on the retaining wall plans the required sandy soil backfill criteria.

***TABLE 4***

***Lateral Earth Pressures – Approved Sandy Backfill***

| Conditions | Equivalent Fluid Unit Weight (pcf) |
|---|---|
| | Level Backfill |
| | Approved Soils |
| Active | 35 |
| At-Rest | 55 |

If the wall can yield enough to mobilize the full shear strength of the soil, it can be designed for "active" pressure. If the wall cannot yield under the applied load, the earth pressure will be higher. This would include 90-degree corners of retaining walls. Such walls should be designed for "at-rest." The equivalent fluid pressure values assume free-draining conditions. Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. Please note that waterproofing and outlet systems are not the purview of the geotechnical consultant. If conditions other than those assumed above are anticipated, the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical consultant.

Surcharge loading effects from any adjacent structures should be evaluated by the retaining wall designer. In general, structural loads within a 1:1 (horizontal to vertical) upward projection from the bottom of the proposed basement/retaining wall footing will surcharge the proposed retaining structure. In addition to the recommended earth pressure, retaining walls adjacent to streets should be designed to resist vehicular traffic if applicable. Typical vehicular traffic may be estimated as equivalent to 2 feet of compacted fill, a vertical pressure of 240 psf. The retaining wall designer should contact the geotechnical engineer for any required geotechnical input in estimating any applicable surcharge loads.

If required, the retaining wall designer may use a seismic lateral earth pressure increment of 5 pcf. This increment should be applied in addition to the provided static lateral earth pressure using a "normal" triangular distribution with the resultant acting at H/3 in relation to the base of the retaining structure (where H is the retained height). For the restrained, at-rest condition, the seismic increment may be added to the applicable active lateral earth pressure (in lieu of the at-rest lateral earth pressure) when analyzing short duration seismic loading. Per Section 1803.5.12 of the 2016 CBC, the seismic lateral earth pressure is applicable to structures assigned to Seismic Design Category D through F for retaining wall structures supporting more than 6 feet of backfill height. This seismic lateral earth pressure is estimated using the procedure outlined by the Structural Engineers Association of California (Lew, et al, 2010).

Soil bearing and lateral resistance (friction coefficient and passive resistance) are provided in Section 5.3. Earthwork considerations (temporary backcuts, backfill, compaction, etc.) for retaining walls are provided in Section 5.1 (Site Earthwork) and the subsequent earthwork related sub-sections.

## *5.5 Driveway and Parking Areas*

It is our understanding that the driveway and equipment parking areas will consist of compacted aggregate base over compacted subgrade and asphalt concrete paving is not desired. A minimum of 6 inches of compacted aggregate base over compacted subgrade is recommended.

This stated thickness is a minimum thickness. Increasing the thickness of the compacted aggregate base will increase the service life of the driveway and parking areas. The above recommendations are based on the assumption that proper maintenance and irrigation of the areas adjacent to the driveway and parking areas will occur through the design life. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the driveway and parking areas.

Earthwork recommendations regarding aggregate base and subgrade are provided in the previous section "Site Earthwork" and the related sub-sections of this report.

### *5.6 Soil Corrosivity*

Although not corrosion engineers (LGC Geotechnical is not a corrosion consultant), several governing agencies in Southern California require the geotechnical consultant to determine the corrosion potential of soils to buried concrete and metal facilities. However, as the subject site has yet to be graded and is likely to be graded using multiple sources of imported materials, existing soil conditions may not be representative of the completed soil conditions. Therefore, testing should be performed at the completion of grading.

### *5.7 Nonstructural Concrete Flatwork*

Nonstructural concrete flatwork (such as walkways, slabs, etc.) has a potential for cracking due to changes in soil volume related to soil-moisture fluctuations. To reduce the potential for excessive cracking and lifting, concrete should be designed in accordance with the guidelines outlined in Table 5. These guidelines will help reduce the potential for irregular cracking and promote cracking along construction joints, but will not eliminate all cracking or lifting. Thickening the concrete and/or adding additional reinforcement will further reduce cosmetic distress.

***TABLE 5***

***Nonstructural Concrete Flatwork for Medium Expansion***

| | Homeowner Sidewalks | Private Drives | Patios/Entryways | City Sidewalk Curb and Gutters |
|---|---|---|---|---|
| Minimum Thickness (in.) | 4 (nominal) | 5 (full) | 5 (full) | City/Agency Standard |
| Presaturation | Wet down | Presoak to 12 inches | Presoak to 12 inches | City/Agency Standard |
| Reinforcement | — | No. 3 at 24 inches on-centers | No. 3 at 24 inches on-centers | City/Agency Standard |
| Thickened Edge (in.) | — | 8 x 8 | — | City/Agency Standard |
| Crack Control Joints | Saw cut or deep open tool joint to a minimum of 1/3 the concrete thickness | Saw cut or deep open tool joint to a minimum of 1/3 the concrete thickness | Saw cut or deep open tool joint to a minimum of 1/3 the concrete thickness | City/Agency Standard |
| Maximum Joint Spacing | 5 feet | 10 feet or quarter cut whichever is closer | 6 feet | City/Agency Standard |
| Aggregate Base Thickness (in.) | — | — | 2 | City/Agency Standard |

To reduce the potential for driveways to separate from the garage slab, the builder may elect to install dowels to tie these two elements together. Similarly, future homeowners should consider the use of dowels to connect flatwork to the foundation.

## *5.8 Control of Surface Water and Drainage Control*

From a geotechnical perspective, we recommend that compacted finished grade soils adjacent to proposed structures be sloped away from the proposed structures and towards an approved drainage device or unobstructed swale. Drainage swales, wherever feasible, should not be constructed within 5 feet of buildings. Where lot and building geometry necessitates that drainage swales be routed closer than 5 feet to structural foundations, we recommend the use of area drains together with drainage swales. Drainage swales used in conjunction with area drains should be designed by the project civil engineer so that a properly constructed and maintained system will prevent ponding within 5 feet of the foundation. Code compliance of grades is not the purview of the geotechnical consultant.

Planters with open bottoms adjacent to buildings should be avoided. Planters should not be designed adjacent to buildings unless provisions for drainage, such as catch basins, liners, and/or area drains, are made. Overwatering must be avoided.

Area drain inlets should be maintained and kept clear of debris in order to properly function. Maintenance personnel should also be made aware that excessive irrigation of neighboring properties can cause seepage and moisture conditions on adjacent lots.

The impact of heavy irrigation or inadequate runoff gradients can create perched water conditions. This may result in seepage or shallow groundwater conditions where previously none existed. Maintaining adequate surface drainage and controlled irrigation will significantly reduce the potential for nuisance-type moisture problems. To reduce differential earth movements such as heaving and shrinkage due to the change in moisture content of foundation soils, which may cause distress to a residential structure and associated improvements, moisture content of the soils surrounding the structure should be kept as relatively constant as possible.

### *5.9 Subsurface Water Infiltration*

Recent regulatory changes have occurred that mandate that storm water be infiltrated below grade rather than collected in a conventional storm drain system. Typically, a combination of methods are implemented to reduce surface water runoff and increase infiltration including; permeable pavements/pavers for roadways and walkways, directing surface water runoff to grass-lined swales, retention areas, and/or drywells, etc.

It should be noted that collecting and concentrating surface water for the purpose of intentional infiltration below grade, conflicts with the geotechnical engineering objectives of directing surface water away from slopes, structures and other improvements. The geotechnical stability and integrity of a site is reliant upon appropriately handling surface water. In general, the vast majority of geotechnical distress issues are directly related to improper drainage. In general, distress in the form of movement of improvements could occur as a result of soil saturation and loss of soil support, expansion, internal soil erosion, collapse and/or settlement.

At the completion of grading, the site will primarily consist of compacted fill over dense Quaternary older alluvial fan deposits and therefore intentional infiltration of storm water is not considered feasible nor recommended from a geotechnical standpoint.

### *5.10 Geotechnical Plan Review*

Grading, foundation and any other improvement plans and final project drawings should be reviewed by this office prior to construction to verify that our geotechnical recommendations, provided herein, have been appropriately incorporated. Additional or modified geotechnical recommendations may be required based on the proposed design.

### *5.11 Geotechnical Observation and Testing During Construction*

The recommendations provided in this report are based on limited subsurface observations and geotechnical analysis. The interpolated subsurface conditions should be checked in the field during construction by a representative of LGC Geotechnical. Geotechnical observation and testing is required per Section 1705 of the 2016 California Building Code (CBC).

Geotechnical observation and/or testing should be performed by LGC Geotechnical at the following stages:

- During grading (removal bottoms, fill placement, etc);
- During utility trench and any retaining wall backfill and compaction;
- Preparation of pavement subgrade and placement of aggregate base;

- After building and wall footing excavation and prior to placing reinforcement and/or concrete; and
- When any unusual soil conditions are encountered during any construction operation subsequent to issuance of this report.

## *6.0 LIMITATIONS*

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report. The samples taken and submitted for laboratory testing, the observations made and the in-situ field testing performed are believed representative of the entire project; however, soil and geologic conditions revealed by excavation may be different than our preliminary findings. If this occurs, the changed conditions must be evaluated by the project soils engineer and geologist and design(s) adjusted as required or alternate design(s) recommended.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and/or project engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and/or subcontractor properly implements the recommendations in the field. The contractor and/or subcontractor should notify the owner if they consider any of the recommendations presented herein to be unsafe.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. Therefore, the findings, conclusions, and recommendations presented in this report can be relied upon only if LGC Geotechnical has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site.

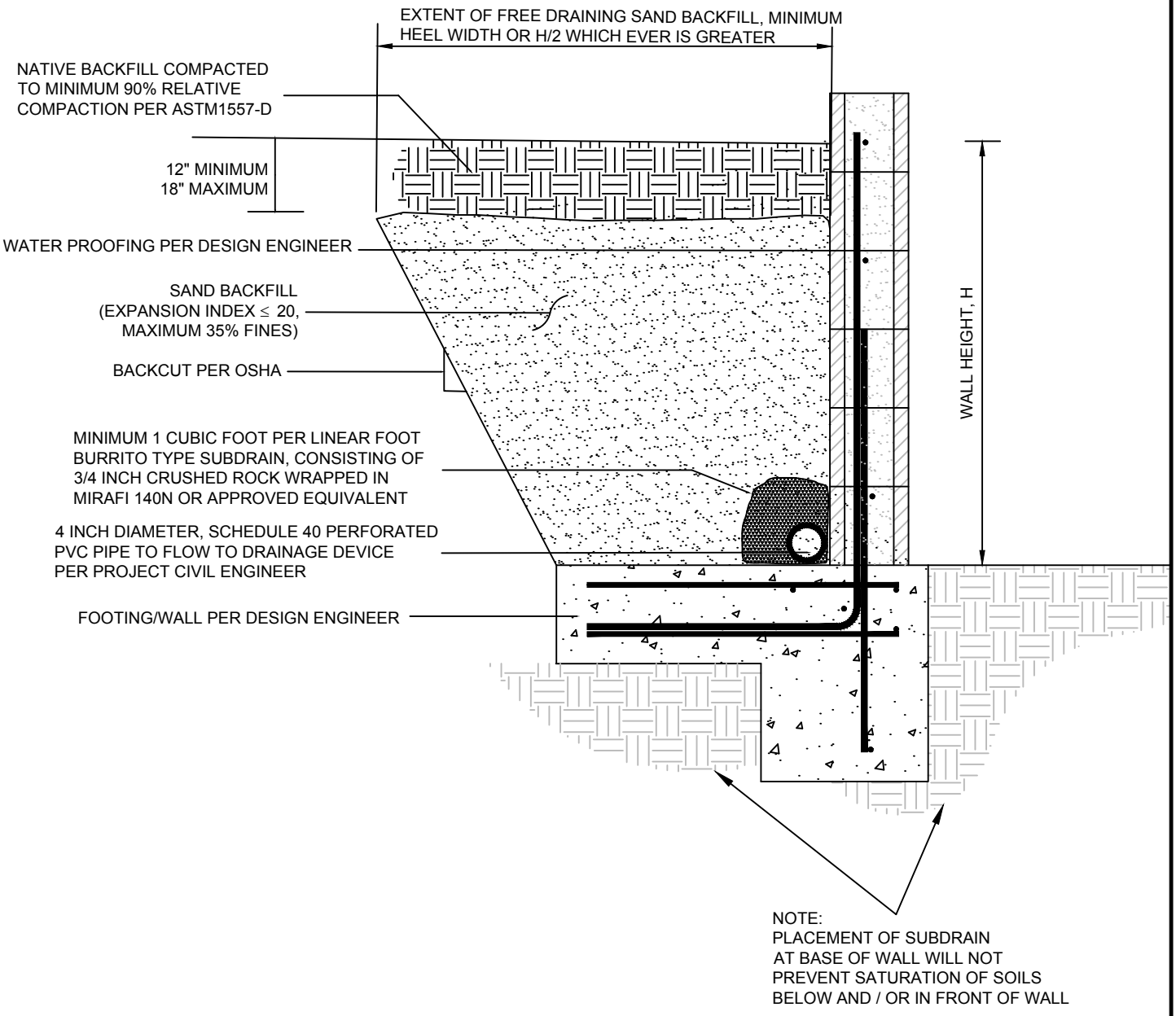
In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and modification, and should not be relied upon after a period of 3 years.




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**FIGURE 1**
**Site Location Map**

| | |
|---|---|
| PROJECT NAME | North Pacific Dev - 25630 Trumble Road |
| PROJECT NO. | 17172-01 |
| ENG. / GEOL. | BRG / KBC |
| SCALE | Not to Scale |
| DATE | January 2018 |




LGC Geotechnical, Inc.

**FIGURE 2**
***Retaining Wall Backfill Detail***

| | |
|---|---|
| PROJECT NAME | North Pacific Dev - 25630 Trumble Road |
| PROJECT NO. | 17172-01 |
| ENG. / GEOL | BRG / KBC |
| SCALE | Not to Scale |
| DATE | January 2018 |

# *Appendix A*
# *References*

## *APPENDIX A*

## ***References***


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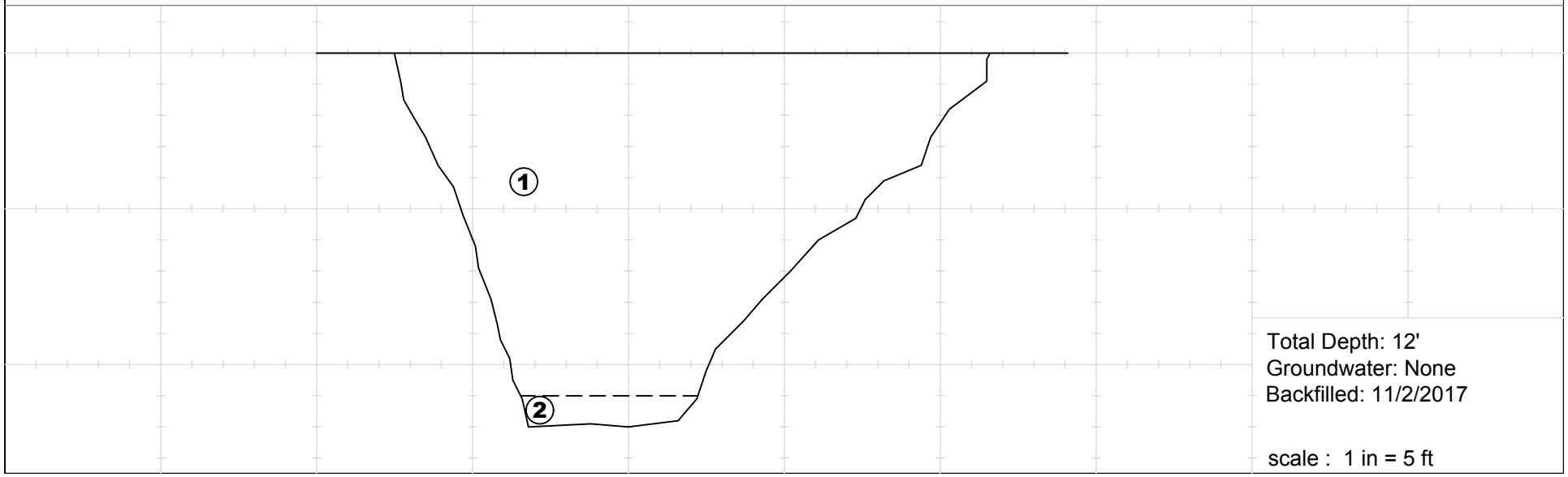
# *Appendix B*
# *Test Pit Logs*

| | | | |
|---|---|---|---|
| **Project Name: N Pacific Dev - Trumble Rd** | **Logged By: BPG** | **Trench No: TP-1** | |
| **Project Number : 17172-01** | **Date : 11/2/2017** | **Engineering Properties:** | |
| **Equipment: Excavator** | **Location: See Geotechnical Map** | | |

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| Geologic Attitudes | Unit | SOIL DESCRIPTION: | GEOLOGIC UNIT | USCS | SAMPLE No | MOISTURE (%) | DRY DENSITY (PCF) |
|---|---|---|---|---|---|---|---|
| | 1 | ***@ 0' to 11' Artificial Fill - Undocumented (Afu)***<br>**@ 0' to 11' Silty SAND: light brown, slightly moist, some gravels, visible uneven lifts, many roots throughout, some garbage** | **Afu** | **SM** | | | |
| | 2 | ***@ 11' to TD Quaternary older alluvial fan deposits (Qof)***<br>**@11' Silty SAND: red brown, slightly moist; slightly clayey, homogenous in appearance, lacks roots/rootlets** | **Qof** | **SM** | | | |

**GRAPHICAL REPRESENTATION BELOW:** **Elevation : 1406 ' MSL** **Surface Slope: 0 deg.** **Trend: EW**



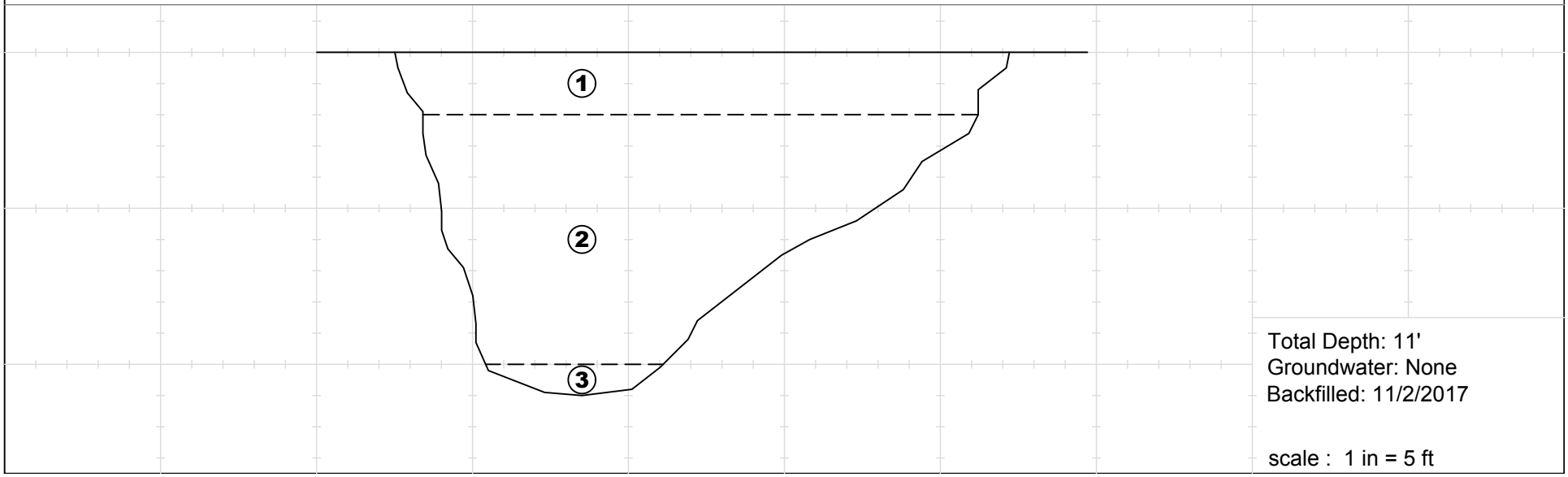

Last Edited: 1/10/2018

| | | | |
|---|---|---|---|
| **Project Name: N Pacific Dev - Trumble Rd** | **Logged By: BPG** | **Trench No: TP-2** | |
| **Project Number : 17172-01** | **Date : 11/2/2017** | **Engineering Properties:** | |
| **Equipment: Excavator** | **Location: See Geotechnical Map** | | |

LGC Geotechnical, Inc.

| Geologic Attitudes | Unit | SOIL DESCRIPTION: | GEOLOGIC UNIT | USCS | SAMPLE No | MOISTURE (%) | DRY DENSITY (PCF) |
|---|---|---|---|---|---|---|---|
| | 1 | ***@ 0' to 10' Artificial Fill - Undocumented (Afu)*** | Afu | SM | | | |
| | | **@ 0' to 2' Silty SAND: light brown and dark brown mottled, slightly moist; many fine to coarse gravels, lacks roots/rootlets** | | | | | |
| | 2 | **@ 2' to 10' Silty SAND with CLAY: medium brown, slightly moist; dense; many gravels, no caving, test pit holds up well** | | SM | | | |
| | 3 | ***@ 10' to TD Quaternary older alluvial fan deposits (Qof)*** | Qof | SM | | | |
| | | **@ 10' Silty SAND: red brown, slightly moist; homogenous appearance, abundant micas, slightly clayey, moderately indurated** | | | | | |

**GRAPHICAL REPRESENTATION BELOW:** **Elevation : 1382 ' MSL** **Surface Slope: 0 deg.** **Trend: NS**



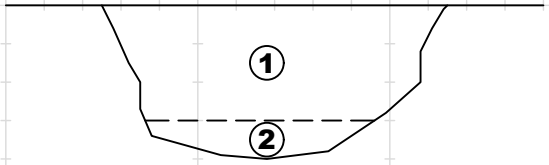

Last Edited: 1/10/2018

| | | | |
|---|---|---|---|
| **Project Name: N Pacific Dev - Trumble Rd** | **Logged By: BPG** | **Trench No: TP-3** | |
| **Project Number : 17172-01** | **Date : 11/2/2017** | **Engineering Properties:** | |
| **Equipment: Excavator** | **Location: See Geotechnical Map** | | |

LGC Geotechnical, Inc.

| Geologic Attitudes | Unit | SOIL DESCRIPTION: | GEOLOGIC UNIT | USCS | SAMPLE No | MOISTURE (%) | DRY DENSITY (PCF) |
|---|---|---|---|---|---|---|---|
| | 1 | ***@ 0' to 3' Artificial Fill - Undocumented (Afu)***<br>**@ 0' to 3' Silty SAND: light brown with dark brown mottling, dry, loose; some coarse to fine gravels, lacks roots/rootlets, slightly clayey** | **Afu** | **SM** | | | |
| | 2 | ***@ 3' to TD Quaternary older alluvial fan deposits (Qof)***<br>**@ 3' Silty SAND: red brown, slightly moist; homogenous appearance, abundant micas, slightly clayey, moderately indurated** | **Qof** | **SM** | | | |

**GRAPHICAL REPRESENTATION BELOW:** **Elevation : 1385 ' MSL** **Surface Slope: 0 deg.** **Trend: EW**




Total Depth: 4'
Groundwater: None
Backfilled: 11/2/2017

scale : 1 in = 5 ft

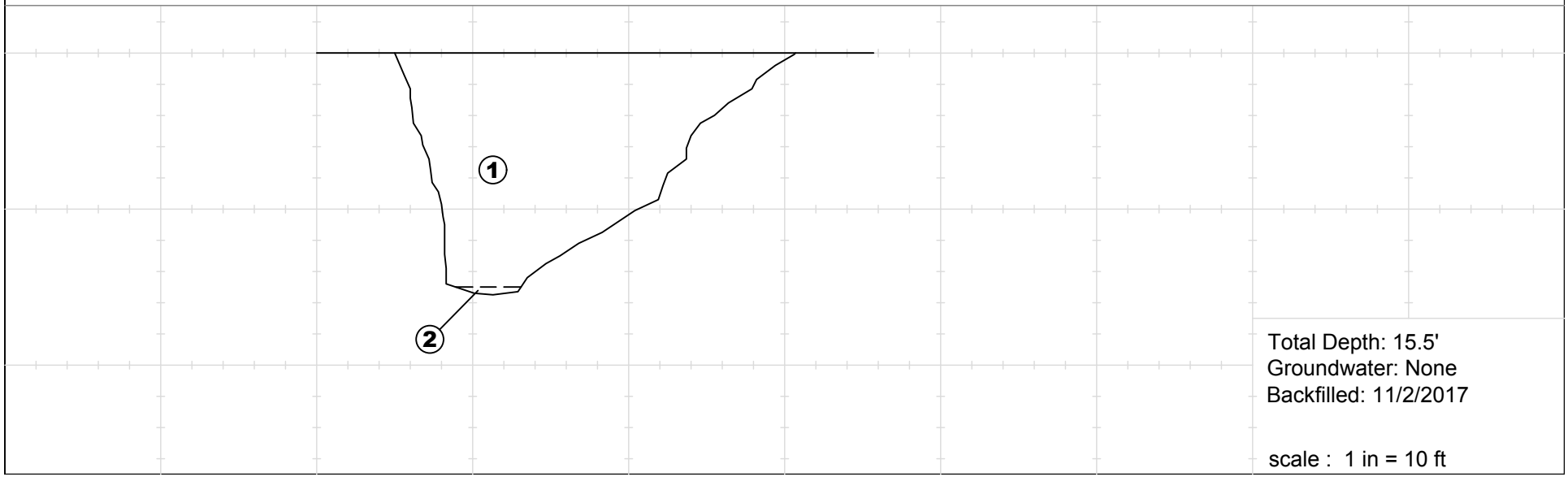
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| | | |
|---|---|---|
| **Project Name: N Pacific Dev - Trumble Rd** | **Logged By: BPG** | **Trench No: TP-4** |
| **Project Number : 17172-01** | **Date : 11/2/2017** | **Engineering Properties:** |
| **Equipment: Excavator** | **Location: See Geotechnical Map** | |

LGC Geotechnical, Inc.

| Geologic Attitudes | Unit | SOIL DESCRIPTION: | GEOLOGIC UNIT | USCS | SAMPLE No | MOISTURE (%) | DRY DENSITY (PCF) |
|---|---|---|---|---|---|---|---|
| | 1 | ***@ 0' to 15' Artificial Fill - Undocumented (Afu)*** **@ 0' to 15' Clayey Silty SAND: mottled brown, black, and gray, slightly moist, medium dense; many coarse to fine gravels, few pieces of garbage** | **Afu** | **SM** | | | |
| | 2 | ***@ 15' to TD Quaternary older alluvial fan deposits (Qof)*** **@ 15' Silty SAND: red brown, slightly moist, dense; harder excavating, homogenous appearance, slightly clayey** | **Qof** | **SM** | | | |

**GRAPHICAL REPRESENTATION BELOW:** **Elevation : 1387 ' MSL** **Surface Slope: 0 deg.** **Trend: N29E**

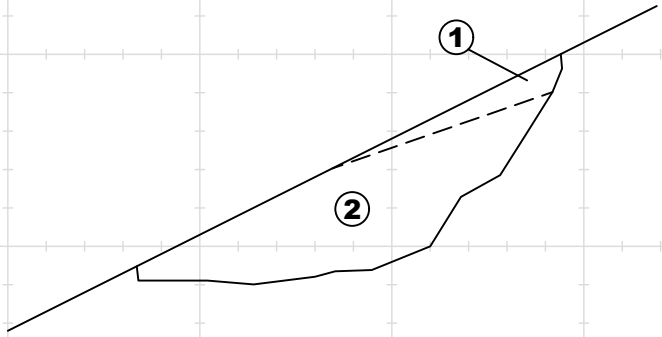



Last Edited: 1/10/2018

| | | | |
|---|---|---|---|
| **Project Name: N Pacific Dev - Trumble Rd** | **Logged By: BPG** | **Trench No: TP-5** | LGC Geotechnical, Inc. |
| **Project Number : 17172-01** | **Date : 11/2/2017** | **Engineering Properties:** | |
| **Equipment: Excavator** | **Location: See Geotechnical Map** | | |

| Geologic Attitudes | Unit | SOIL DESCRIPTION: | GEOLOGIC UNIT | USCS | SAMPLE No | MOISTURE (%) | DRY DENSITY (PCF) |
|---|---|---|---|---|---|---|---|
| | 1 | ***@ 0' to TD Quaternary older alluvial fan deposits (Qof)*** | Qof | SM | | | |
| | | **@ 0' to 1' Silty SAND: light brown to dark brown mottled, dry to slightly moist, loose to medium dense; slightly clayey, desiccated, many roots, topsoil material** | | | | | |
| | 2 | **@1' to 6' Silty SAND: red brown, slightly moist, dense; abundant micas, lacks roots, homogenous in appearance** | | SM | | | |

**GRAPHICAL REPRESENTATION BELOW:** **Elevation : 1405 ' MSL** **Surface Slope: 26.6 deg.** **Trend: N75W**




Total Depth: 6'
Groundwater: None
Backfilled: 11/2/2017

scale : 1 in = 5 ft

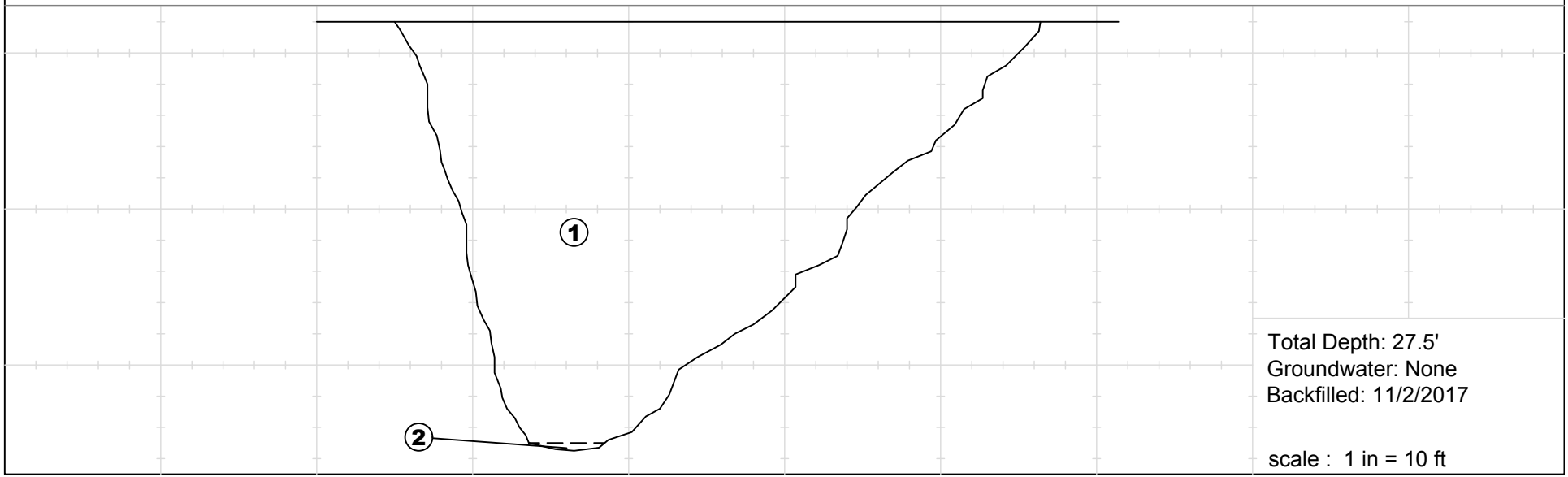
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| | | | |
|---|---|---|---|
| **Project Name: N Pacific Dev - Trumble Rd** | **Logged By: BPG** | **Trench No: TP-6** | |
| **Project Number : 17172-01** | **Date : 11/2/2017** | **Engineering Properties:** | |
| **Equipment: Excavator** | **Location: See Geotechnical Map** | | |

LGC Geotechnical, Inc.

| Geologic Attitudes | Unit | SOIL DESCRIPTION: | GEOLOGIC UNIT | USCS | SAMPLE No | MOISTURE (%) | DRY DENSITY (PCF) |
|---|---|---|---|---|---|---|---|
| | 1 | ***@ 0' to 27' Artificial Fill - Undocumented***<br>**@ 0' to 27' Silty SAND: light brown to dark brown mottled, dry, loose; many fine to coarse gravels, roots, garbage, significant caving of trench** | **Afu** | **SM** | | | |
| | 2 | ***@ 27' to TD Quaternary older alluvial fan deposits (Qof)***<br>**@27' Silty SAND: red brown, slightly moist, dense; abundant micas, more homogenous in appearance, difficult excavating** | **Qof** | **SM** | | | |

**GRAPHICAL REPRESENTATION BELOW:** **Elevation : 1407 ' MSL** **Surface Slope: 0 deg.** **Trend: N29E**

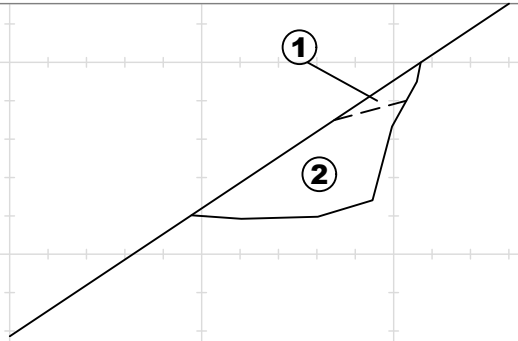



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| | | | |
|---|---|---|---|
| **Project Name: N Pacific Dev - Trumble Rd** | **Logged By: BPG** | **Trench No: TP-7** | |
| **Project Number : 17172-01** | **Date : 11/2/2017** | **Engineering Properties:** | |
| **Equipment: Excavator** | **Location: See Geotechnical Map** | | |

| Geologic Attitudes | Unit | SOIL DESCRIPTION: | GEOLOGIC UNIT | USCS | SAMPLE No | MOISTURE (%) | DRY DENSITY (PCF) |
|---|---|---|---|---|---|---|---|
| | 1 | ***@ 0' to TD Quaternary older alluvial fan deposits (Qof)*** | Afu | SM | | | |
| | | **@ 0' to 1' Silty SAND: mottled light brown and gray brown, dry to slightly moist, medium dense; slightly clayey many fine gravels, roots** | | | | | |
| | 2 | **@ 1' to 4' Silty SAND: red brown, dry to slightly moist, loose to medium dense, lacks roots, some micas** | Qof | SM | | | |

**GRAPHICAL REPRESENTATION BELOW:** **Elevation : 1420 ' MSL** **Surface Slope: 33.7 deg.** **Trend: N7E**




Total Depth: 4'
Groundwater: None
Backfilled: 11/2/2017

scale : 1 in = 5 ft

Last Edited: 1/10/2018

# *Appendix C*
# *General Earthwork and Grading Specifications*

# ***General Earthwork and Grading Specifications for Rough Grading***

## *1.0 General*

### *1.1 Intent*

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

### *1.2 The Geotechnical Consultant of Record*

Prior to commencement of work, the owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to confirm that the attained level of compaction is being accomplished as specified. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

### *1.3 The Earthwork Contractor*

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the project plans and specifications. The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of “equipment” of work and the estimated quantities of daily earthwork

contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the
Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified. It is the contractor's sole responsibility to provide proper fill compaction.

## *2.0 Preparation of Areas to be Filled*

### *2.1 Clearing and Grubbing*

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed. The contractor is responsible for all hazardous waste relating to his work. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Client should acquire the services of a qualified environmental assessor.

### *2.2 Processing*

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be over-excavated as specified in the following section. Scarification shall continue until soils are broken down and free of oversize material and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

### *2.3 Over-excavation*

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by the Geotechnical Consultant during grading.

### *2.4 Benching*

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

### *2.5 Evaluation/Acceptance of Fill Areas*

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

## *3.0 Fill Material*

### *3.1 General*

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

### *3.2 Oversize*

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

### *3.3 Import*

If importing of fill material is required for grading, proposed import material shall meet the requirements of the geotechnical consultant. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

## *4.0 Fill Placement and Compaction*

### *4.1 Fill Layers*

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

### *4.2 Fill Moisture Conditioning*

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

### *4.3 Compaction of Fill*

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

### *4.4 Compaction of Fill Slopes*

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

### *4.5 Compaction Testing*

Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

### *4.6 Frequency of Compaction Testing*

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

### *4.7 Compaction Test Locations*

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than
5 feet apart from potential test locations shall be provided.

## *5.0 Subdrain Installation*

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

## *6.0 Excavation*

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

## *7.0 Trench Backfills*

***7.1*** The Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

***7.2*** All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over

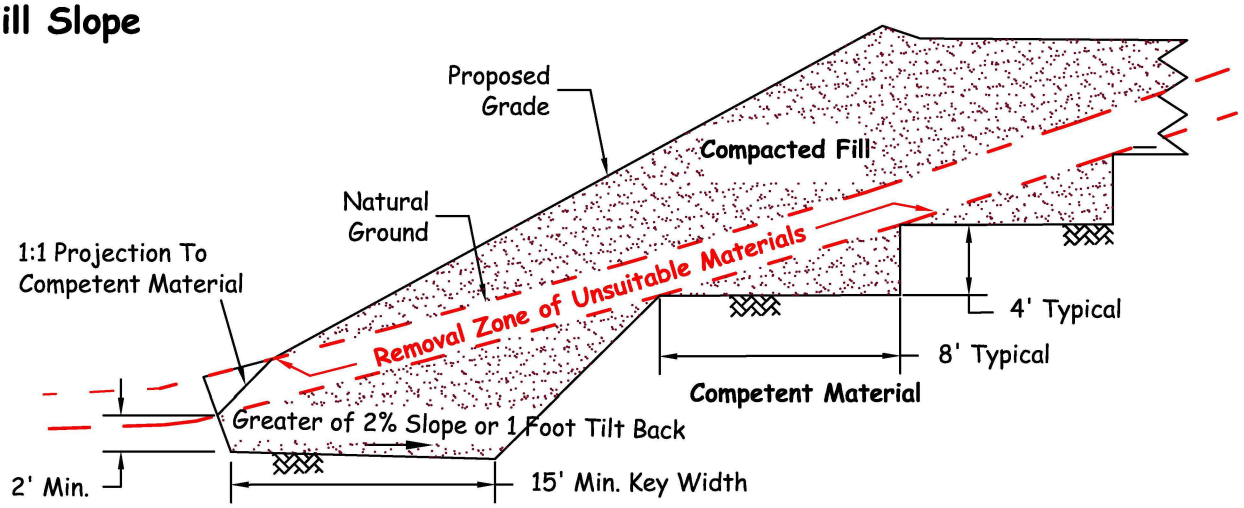
the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

***7.3*** The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

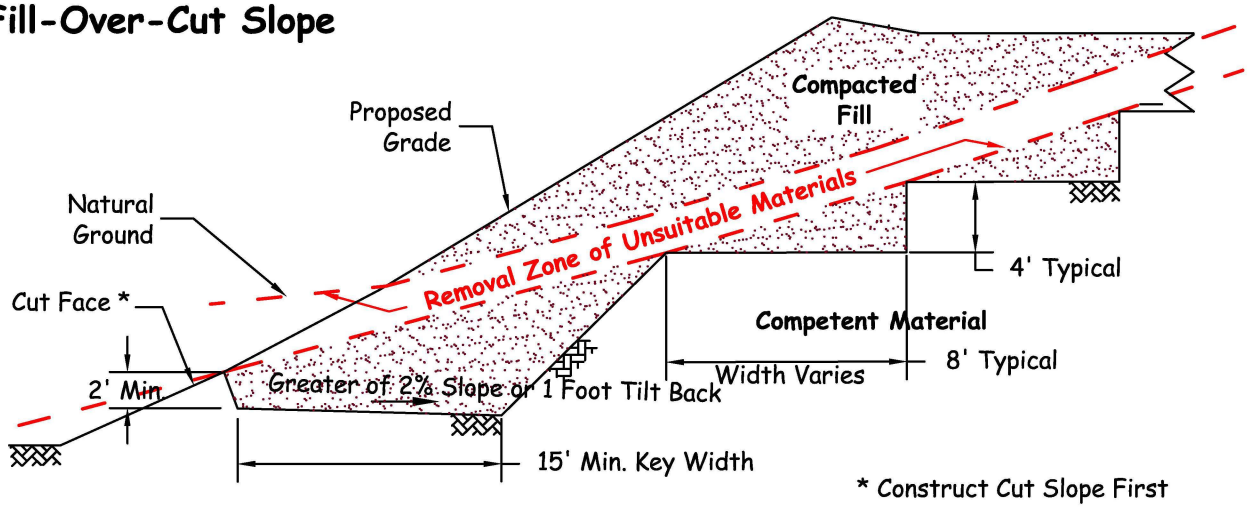
***7.4*** The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

***7.5*** Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

## Fill Slope

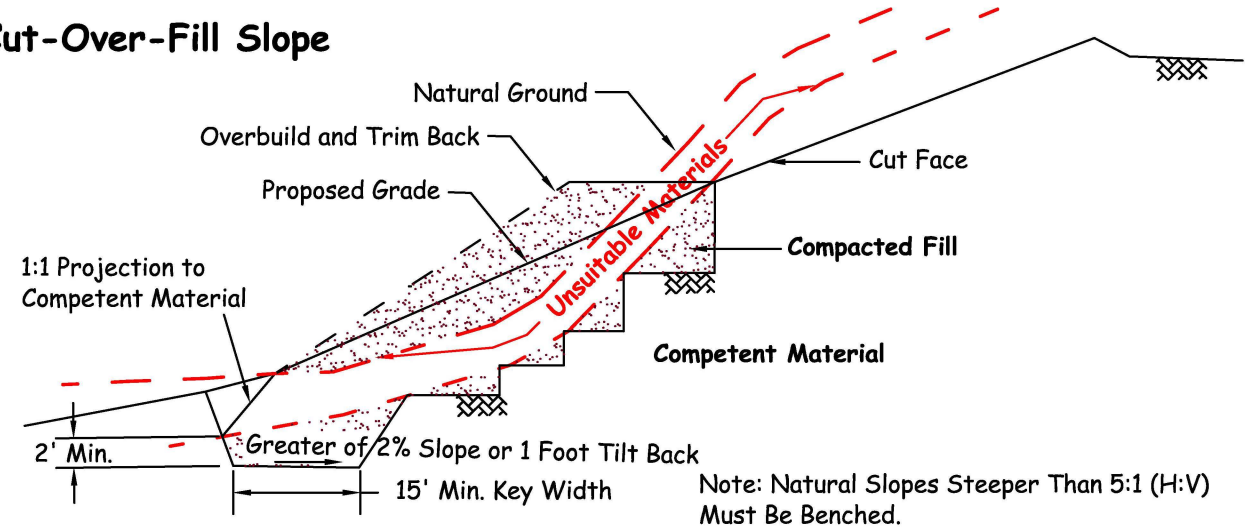



## Fill-Over-Cut Slope




* Construct Cut Slope First

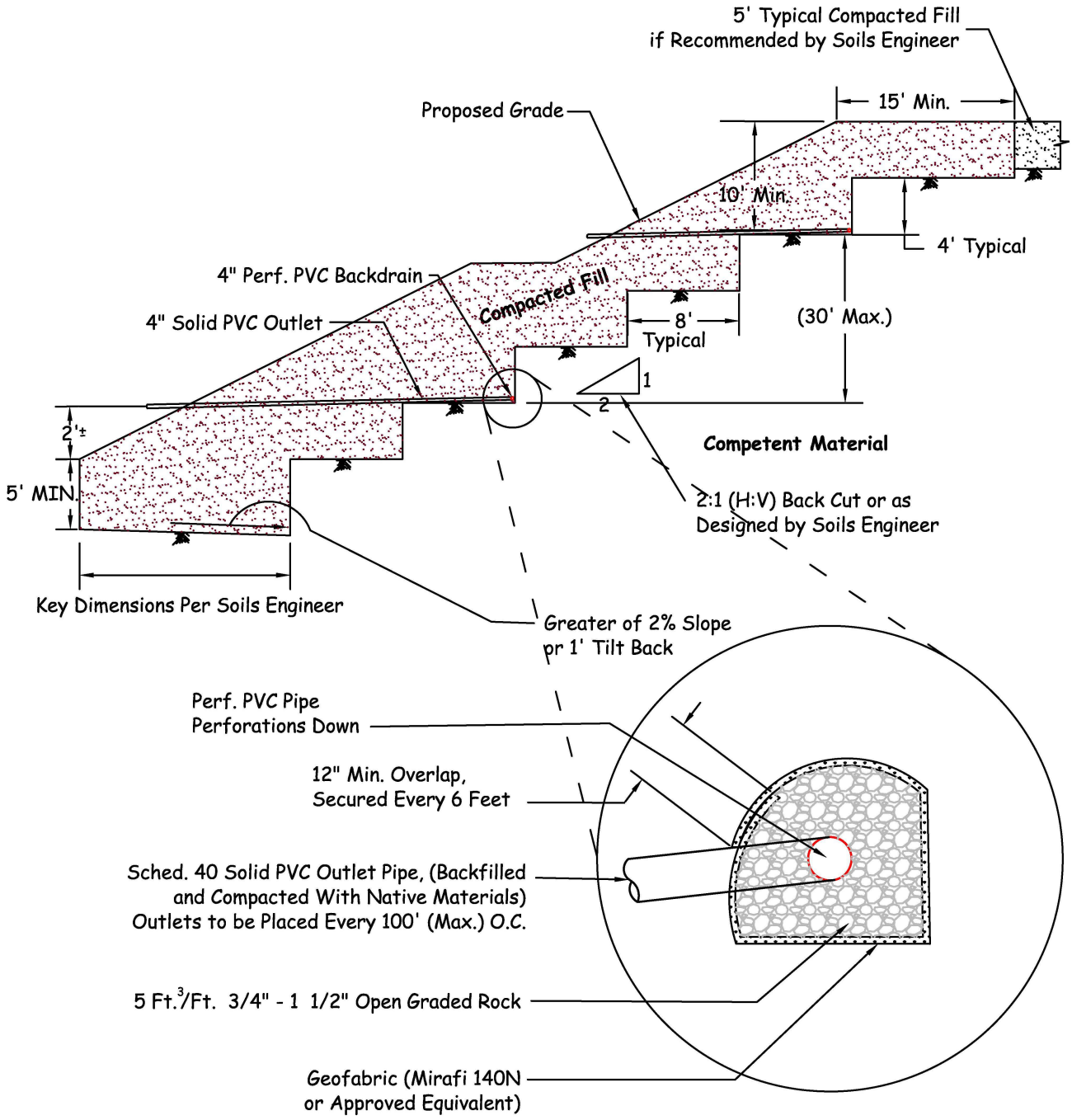
## Cut-Over-Fill Slope




Note: Natural Slopes Steeper Than 5:1 (H:V) Must Be Benched.

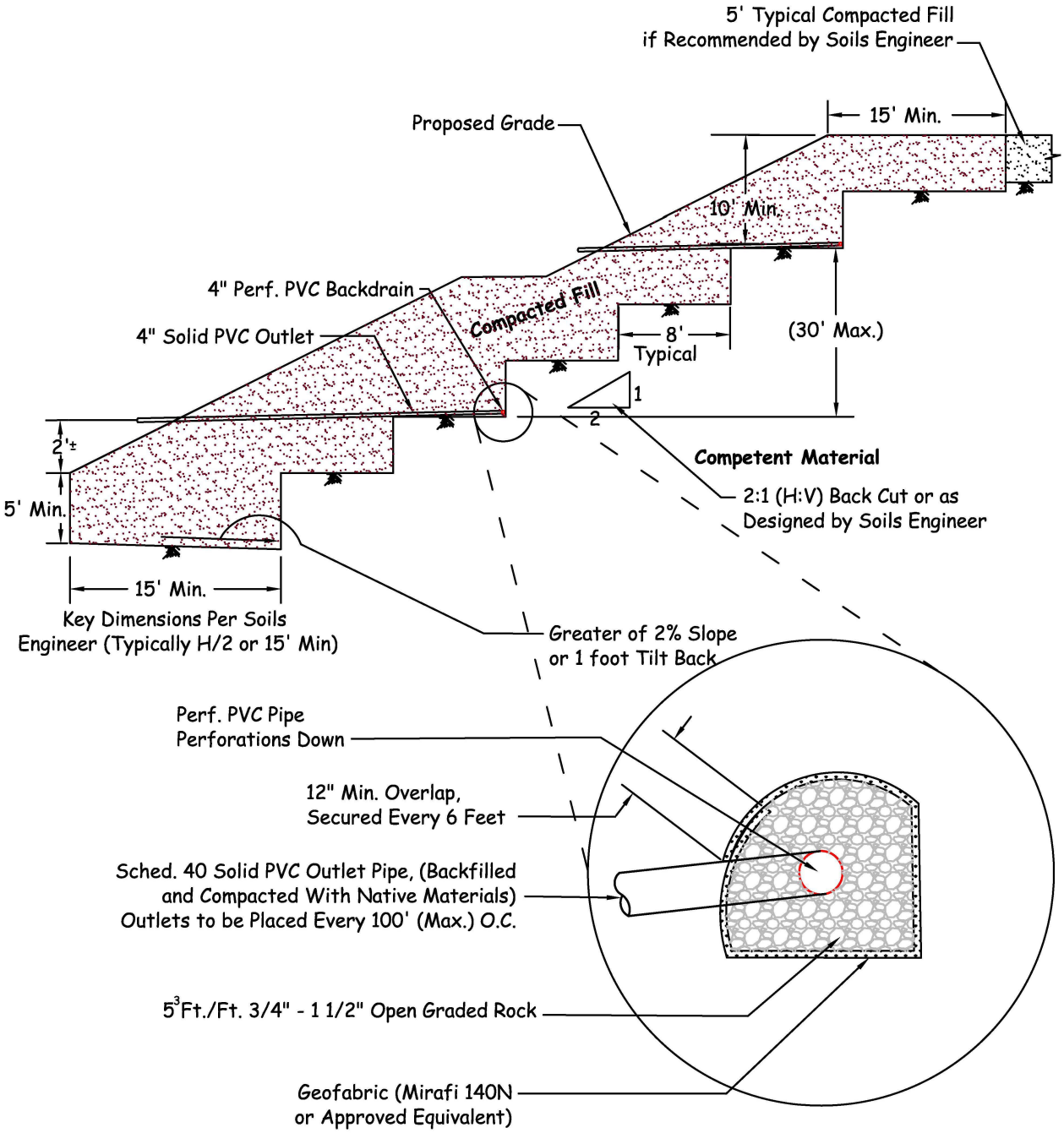
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# KEYING AND BENCHING




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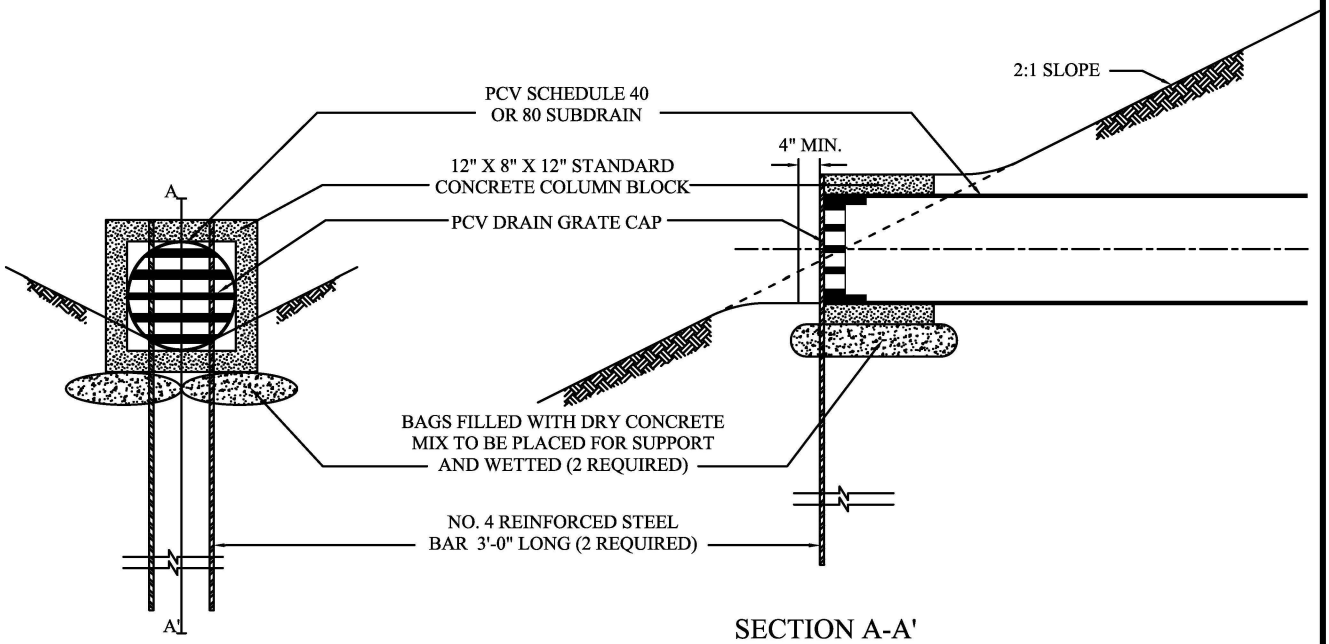
# TYPICAL BUTTRESS DETAIL




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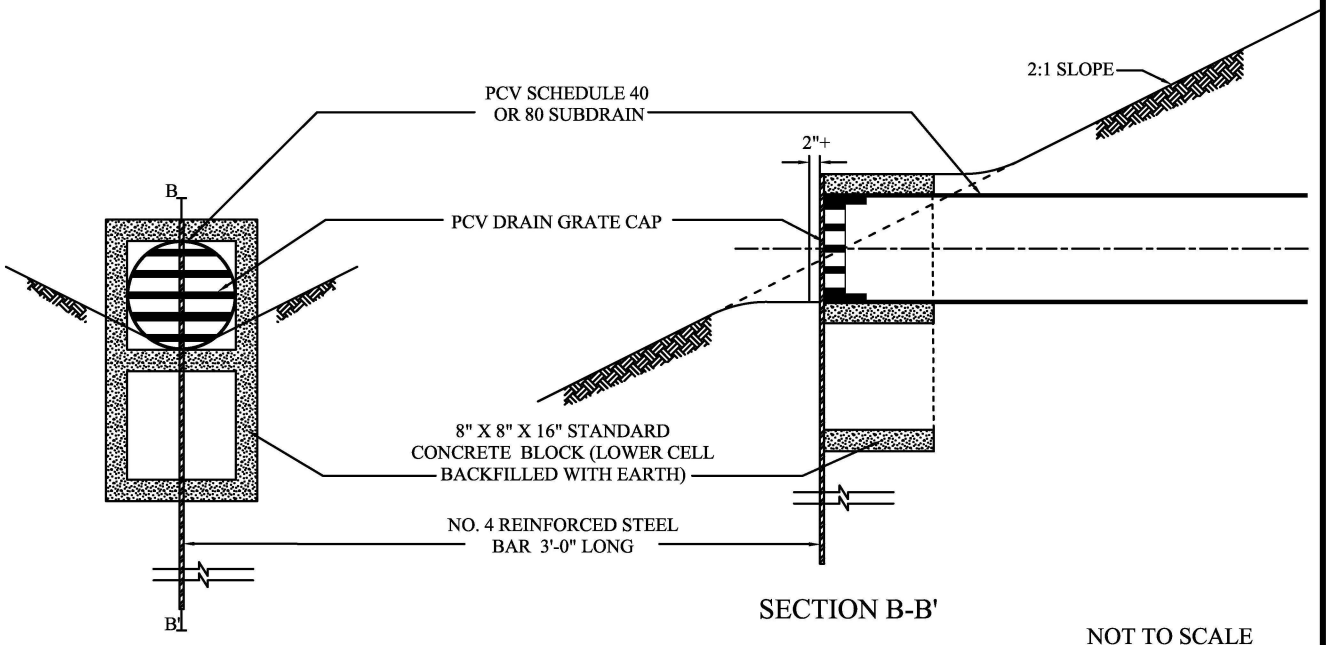
# TYPICAL STABILIZATION FILL DETAIL

# SUBDRAIN OUTLET MARKER -6" & 8" PIPE




SECTION A-A'

# SUBDRAIN OUTLET MARKER -4" PIPE



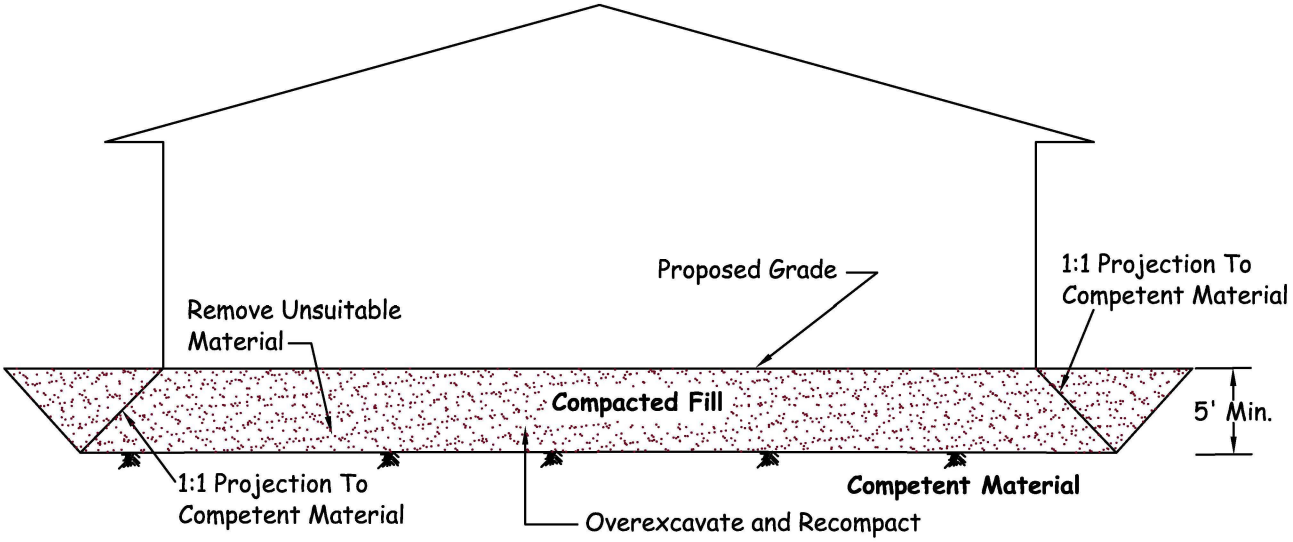

SECTION B-B'

NOT TO SCALE

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**SUBDRAIN OUTLET MARKER DETAIL**

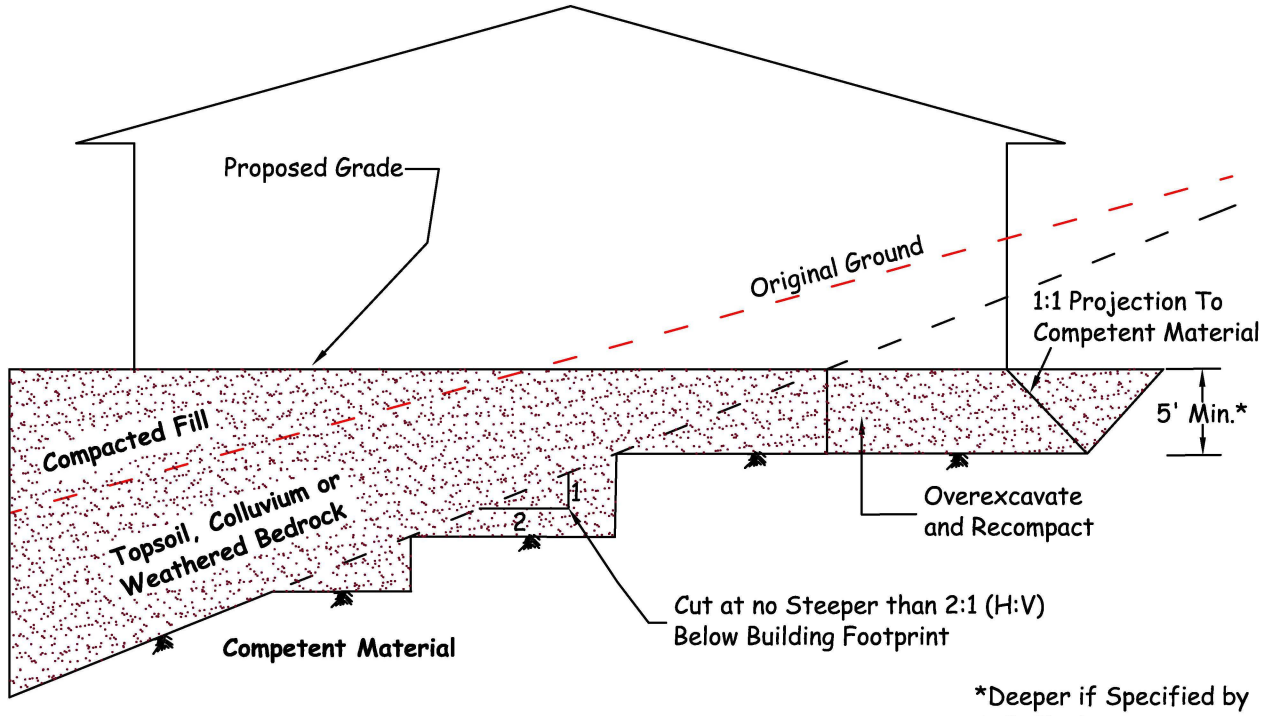
## Cut Lot
## (Exposing Unsuitable Soils at Design Grade)




Note 1: Removal Bottom Should be Graded With Minimum 2% Fall Towards Street or Other Suitable Area (as Determined by Soils Engineer) to Avoid Ponding Below Building

Note 2: Where Design Cut Lots are Excavated Entirely Into Competent Material, Overexcavation May Still be Required for Hard-Rock Conditions or for Materials With Variable Expansion Characteristics.

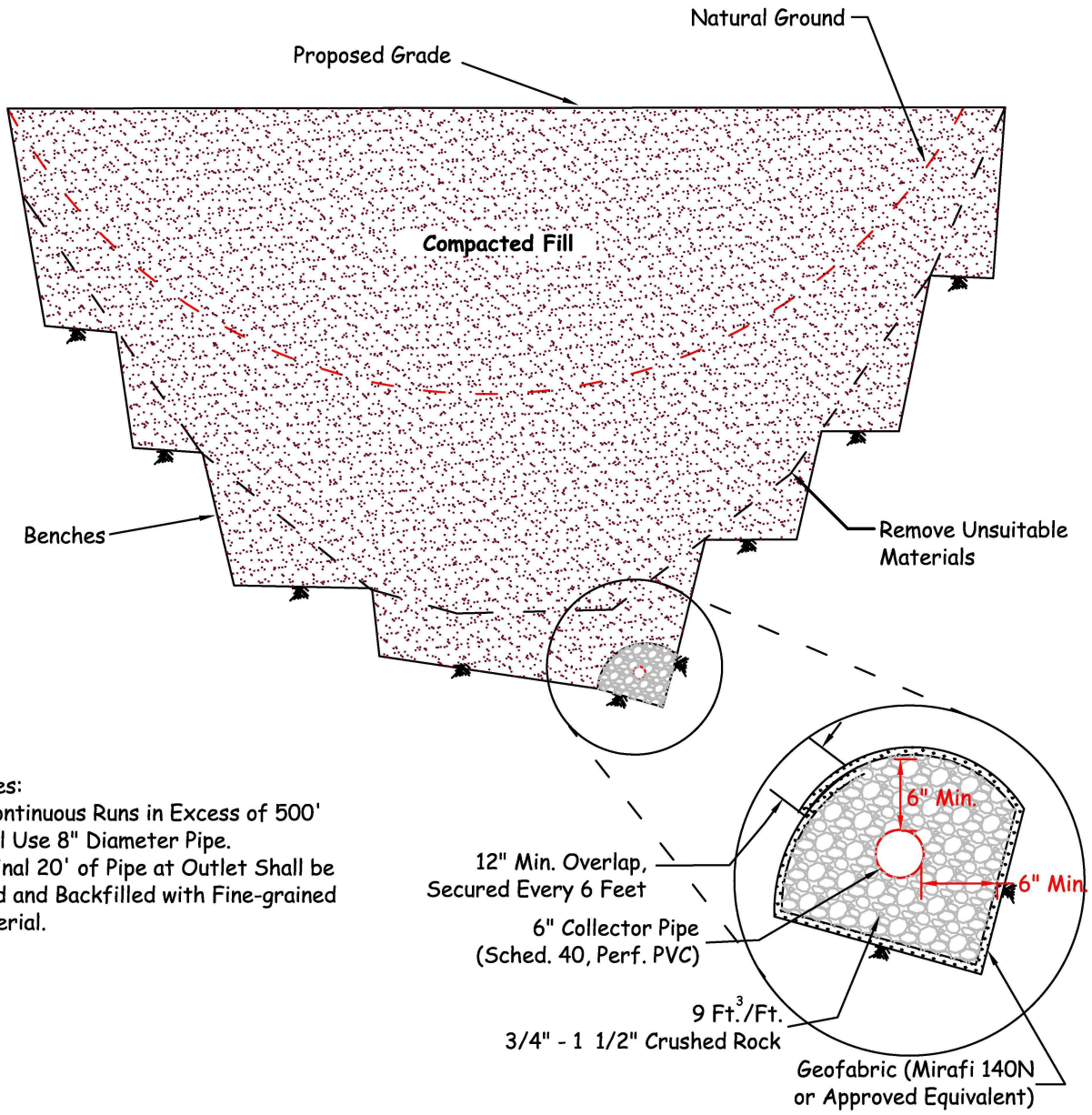
## Cut/Fill Transition Lot




*Deeper if Specified by Soils Engineer

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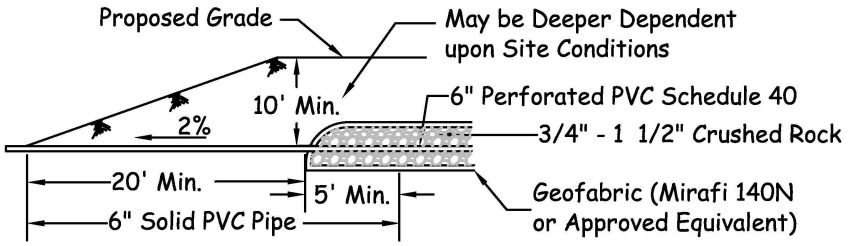
# CUT AND TRANSITION LOT OVEREXCAVATION DETAIL




Notes:
1) Continuous Runs in Excess of 500' Shall Use 8" Diameter Pipe.
2) Final 20' of Pipe at Outlet Shall be Solid and Backfilled with Fine-grained Material.

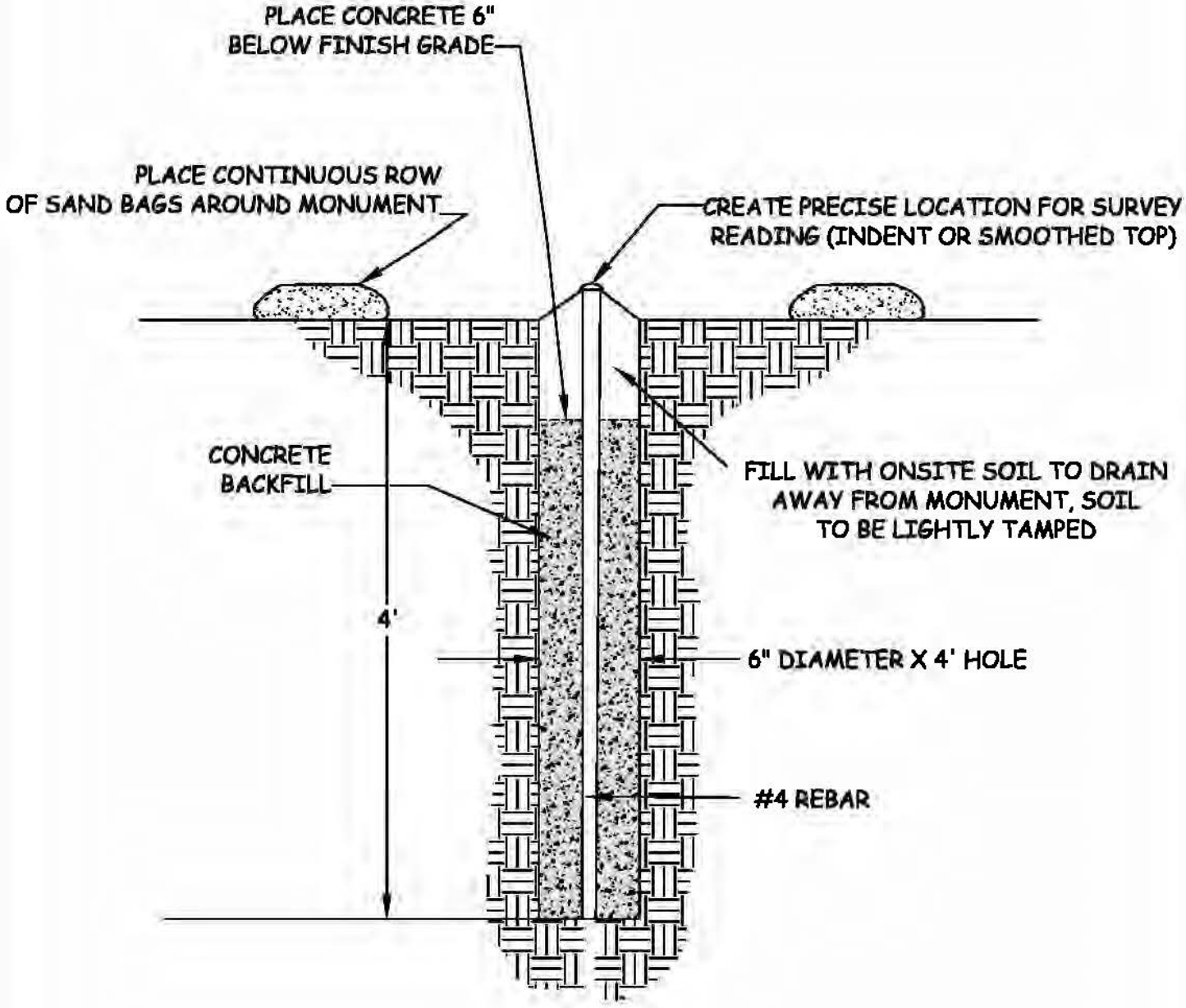



## Proposed Outlet Detail




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# CANYON SUBDRAINS

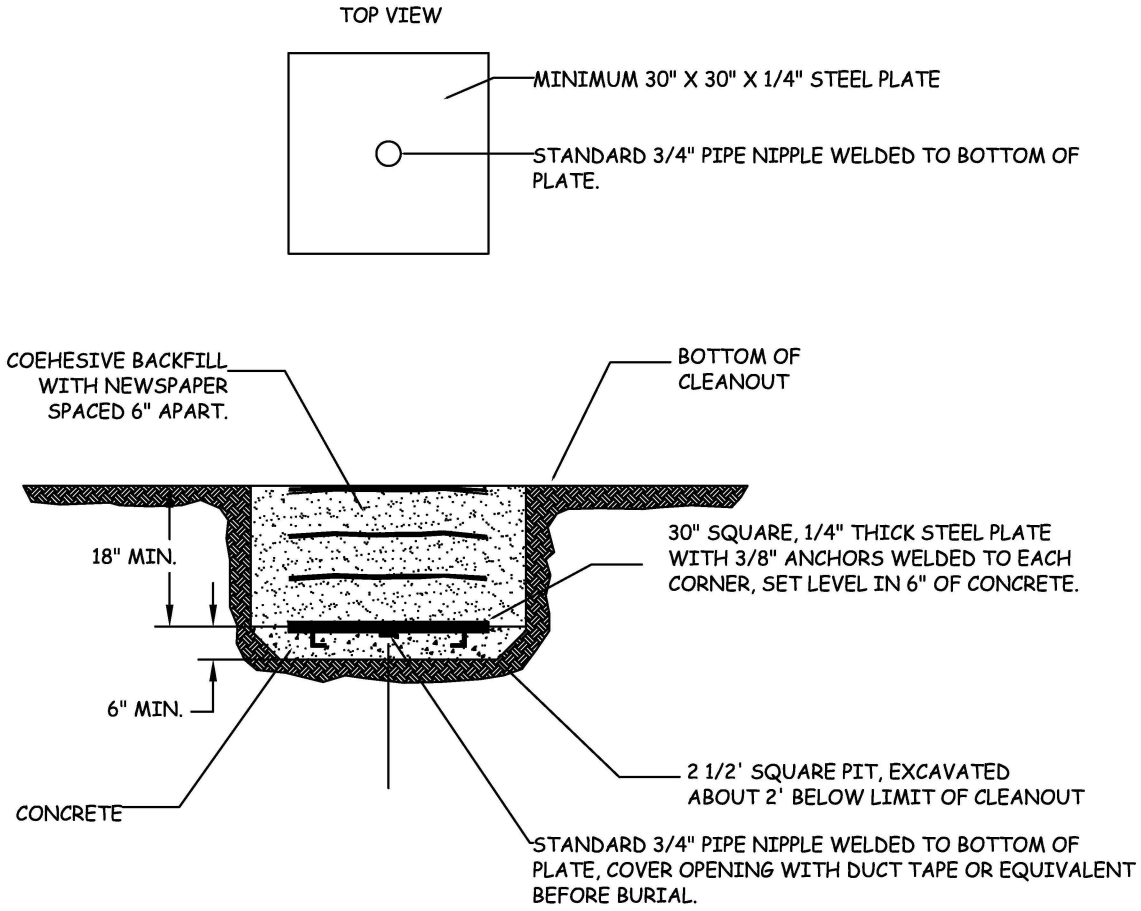



NO CONSTRUCTION EQUIPMENT WITHIN 25 FEET OF ANY INSTALLED SETTLEMENT MONUMENTS

Revised 11/15

LGC Geotechnical, Inc.

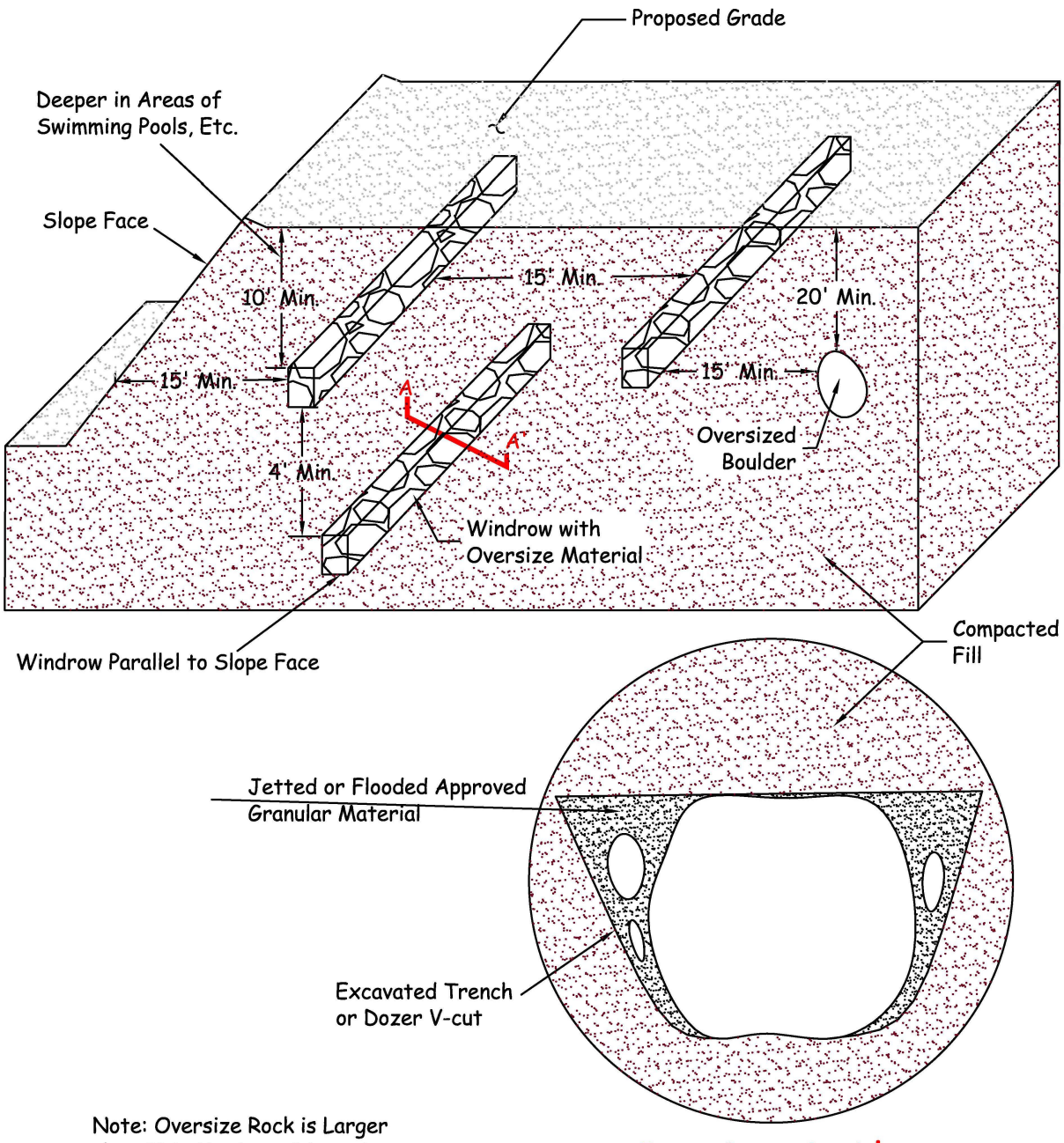
# TYPICAL SURFACE SETTLEMENT MONUMENT




1. SURVEY FOR HORIZONTAL AND VERTICAL LOCATION TO NEAREST .01 INCH PRIOR TO BACKFILL USING KNOW LOCATIONS THAT WILL REMAIN INTACT DURING THE DURATION OF THE MONITORING PROGRAM. KNOW POINTS EXPLICITELY NOT ALLOWED ARE THOSE LOCATED ON FILL OR THAT WILL BE DESTROYED DURING GRADING.
2. IN THE EVENT OF DAMAGE TO SETTLEMENT PLATE DURING GRADING, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE GEOTECHNICAL ENGINEER AND SHALL BE RESPONSIBLE FOR RESTORING THE SETTLEMENT PLATES TO WORKING ORDER.
3. DRILL TO RECOVER AND ATTACH RISER PIPE.

LGC Geotechnical, Inc.

# TYPICAL SETTLEMENT PLATE AND RISER

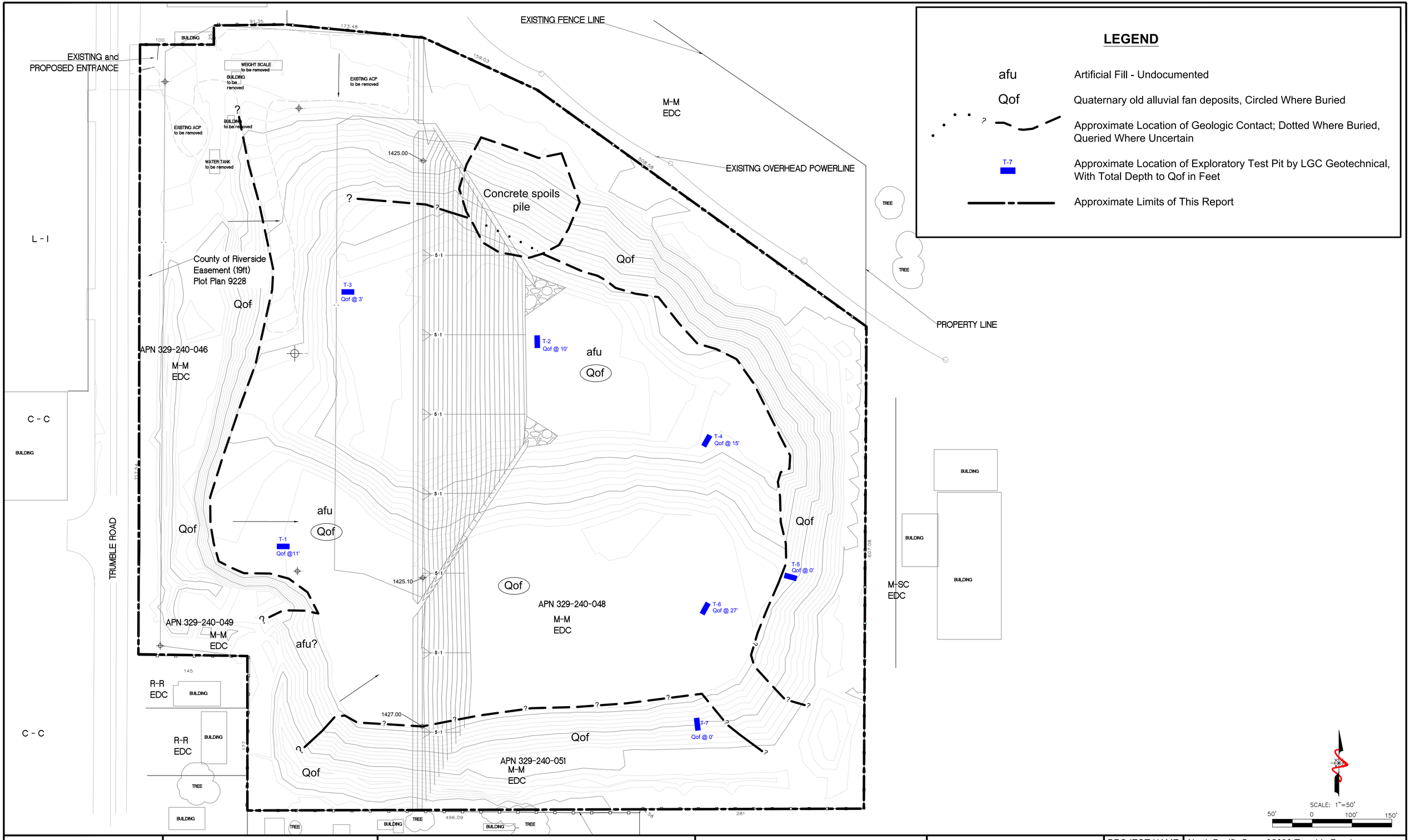



Note: Oversize Rock is Larger than 8" in Maximum Dimension.

Section A-A'

LGC Geotechnical, Inc.

# OVERSIZE ROCK DISPOSAL DETAIL




## LEGEND

| | |
|---|---|
| afu | Artificial Fill - Undocumented |
| Qof | Quaternary old alluvial fan deposits, Circled Where Buried |
| ? | Approximate Location of Geologic Contact; Dotted Where Buried, Queried Where Uncertain |
| T-7 | Approximate Location of Exploratory Test Pit by LGC Geotechnical, With Total Depth to Qof in Feet |
| | Approximate Limits of This Report |


LGC Geotechnical, Inc.

**LGC Geotechnical, Inc.**
**131 Calle Iglesia, Ste. 200**
**San Clemente, CA 92672**
**TEL (949) 369-6141 FAX (949) 369-6142**


# *Preliminary Geotechnical Map*

*CLIENT:*
North Pacific Developments, Inc.
20 Old Ranch Road
Laguna Niguel, CA 92677

*CIVIL ENGINEER:*
RDS and Associates

| | |
|---|---|
| *PROJECT NAME* | *North Pacific Dev - 25630 Trumble Road* |
| *PROJECT NO.* | *17172-01* |
| *ENG. / GEOL.* | *BRG / KBC* |
| *SCALE* | *1" = 50'* |
| *DATE* | *January 2018* |

***SHEET 1 of 1***

# Appendix 4:  Historical Site Conditions

*Phase I Environmental Site Assessment or Other Information on Past Site Use*

PARTNER
Engineering and Science, Inc.®



# PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

## 4 Parcels of Vacant Land

East of Trumble Road; North of Ethanac Road; West of Sherman Road
Menifee, California 92585

Report Date: March 28, 2022
Partner Project No. 21-347156.1



Prepared for:

**B&D Holdings Inc.**
67 Mountain Boulevard, Suite 201
Warren, New Jersey 07059

PARTNER
Engineering and Science, Inc.

March 28, 2022

Ms. Amy Repole
B&D Holdings Inc.
67 Mountain Boulevard, Suite 201
Warren, New Jersey 07059

Subject: Phase I Environmental Site Assessment
4 Parcels of Vacant Land
East of Trumble Road; North of Ethanac Road; West of Sherman Road
Menifee, California 92585
Partner Project No. 21-347156.1

Dear Ms. Repole:

Partner Engineering and Science, Inc. (Partner) is pleased to provide this *Phase I Environmental Site Assessment* (Phase I ESA) report of the abovementioned address (the "subject property"). This assessment was performed in conformance with the scope and limitations as detailed in the ASTM Practice E1527-13 and E1527-21 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process and Client Agreement.

This assessment included a site reconnaissance as well as research and interviews with representatives of the public, property ownership, site manager, and regulatory agencies. An assessment was made, conclusions stated, and recommendations outlined.

We appreciate your trust in Partner and the opportunity to provide environmental services to you. If you have any questions concerning this report, or if we can assist you in any other matter, please contact me at (443) 394 6590.

Sincerely,

**DRAFT**

Doreen Spinoso, CEM, EP
Principal/Managing Director

# EXECUTIVE SUMMARY

Partner Engineering and Science, Inc. (Partner) has performed a Phase I Environmental Site Assessment (ESA) in accordance with the scope of work and limitations of ASTM Standard Practice E1527-13 and E1527-21, the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (AAI) (40 CFR Part 312) and set forth by B&D Holdings Inc. for the property located at East of Trumble Road; North of Ethanac Road; West of Sherman Road in Menifee, Riverside County, California (the "subject property").

## Property Description

The subject property is located on the east side of Trumble Road, approximately 150 feet south of the intersection with Watson Road, within a mixed commercial, industrial, and residential area of Riverside County. Please refer to the table below for further description of the subject property:

| ***Subject Property Data*** | |
|---|---|
| **Address:** | East of Trumble Road; North of Ethanac Road; West of Sherman Road, Menifee, California |
| **Property Use:** | Vacant land and open pit |
| **Land Acreage (Ac):** | 17.82 |
| **Assessor's Parcel Number (APN):** | 329-240-046, 329-240-048, 329-240-049, and 329-240-051 |
| **Site Assessment Performed By:** | Joseph Kim of Partner |
| **Site Assessment Conducted On:** | March 15, 2022 |
| **Regulatory Radius Report Date:** | March 3, 2022 |
| **Lien Search Date:** | Not Applicable (N/A) |
| **Report Date:** | March 28, 2022 |
| **FOIAs Date:** | March 2022 |

The subject property is currently vacant land with an open pit. The subject property boundary was surrounded by a chain-linked fence with no permanent structures observed. Heavy equipment and associated tools were observed within the pit area, located in the eastern half of the subject property. The pit appeared to be approximately 25-30 feet from the ground level. According to Manuela (Key Site Manager), the pit area was being filled in and leveled. Additional improvements include an office trailer in the northern portion, an aboveground storage tank (AST) containing water in the northern portion, and an inactive AST formerly containing water in the southern portion.

According to available historical sources, the subject property appears to have been agricultural/fallow land from as early as 1938 through the 1950s and developed with a quarry (sand and gravel) by the early 1960s. Active quarry operations were reportedly conducted through the late 2000s. The subject property has remained vacant land with an open pit since then.

Quarry and pit operations consisting of sand and gravel were formerly conducted at the subject property from the early 1960s through the late 2000s. Quarry operations for sand and gravel requires the removal of virtually all natural vegetation, top soil and subsoil to reach the aggregate underneath. Quarries and pits disrupt the existing movement of surface water and groundwater. However, quarry/pit operations that extract sand and gravel are not generally known to cause subsurface contamination. In addition, there was no evidence of collieries, support structures, or large fuel tanks at the subject property.

Furthermore, Partner did not observe any features of environmental concern or signs of contamination during the site reconnaissance. Based on the above, the former quarry and pit operations extracting sand and gravel are not expected to represent a significant environmental concern.

The adjoining properties are tabulated below:

| ***Adjoining Properties*** | |
|---|---|
| **North:** | Industrial Machine & Weld (27235 Watson Road) |
| **East:** | JN Grease Services (25685 Sherman Road) |
| **South:** | Four dwellings (25710, 25720, 25750, and 25760 Trumble Road) and a hazardous waste treatment area operated by JN Grease Services |
| **West:** | Soil Retention Products (1765 Watson Road); Grove Construction Hardware (1794 Illinois Avenue); and vacant land across Trumble Road |

According to information obtained from topographic maps and GeoTracker (Report for the Abandonment of Three Groundwater Monitoring Wells [2011] at 25351 Trumble Road, located approximately 800 feet northwest of the subject property), the terrain at the subject property is sloping to the west with the depth to groundwater in the vicinity of the subject property inferred to be approximately 50 to 60 feet below ground surface (bgs) and groundwater flow is inferred to be to the west.

## Findings and Opinions

### *Recognized Environmental Condition*

A *recognized environmental condition (REC)* refers to the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; the likely presence of hazardous substances or petroleum products in, on, or at the subject property due to a release or likely release to the environment; or the presence of hazardous substances or petroleum products in, on, or at the subject property under conditions that pose a material threat of a future release to the environment.

- Partner did not identify any RECs during the course of this assessment.

### *Controlled Recognized Environmental Condition*

A *controlled recognized environmental condition (CREC)* refers to a REC affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls (for example, activity and use limitations or other property use limitations).

- Partner did not identify any CRECs during the course of this assessment.

### *Historical Recognized Environmental Condition*

A *historical recognized environmental condition (HREC)* refers to a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the subject property to any controls (for example, activity and use limitations or other property use limitations).

- Partner did not identify any HRECs during the course of this assessment.

### *Business Environmental Risk*

A *Business Environmental Risks (BER)* is a risk which can have a material environmental or environmentally driven impact on the business associated with the current or planned use of commercial real estate, not necessarily related to those environmental issues required to be investigated in this practice. The following was identified during the course of this assessment:

- At the time of Partner's March 2022 site reconnaissance, a hazardous waste treatment area, operated by JN Grease Services, was observed immediately to the south of the subject property. The area included standing water/pond with multiple 55-gallon drums, totes, aboveground storage tanks (ASTs), scrap metal, junk cars, and other miscellaneous equipment. A foul odor was present in the area as well. Partner did not identify apparent signs of contamination (stained soil or distressed vegetation) along the subject property boundary that abuts the hazardous waste treatment area. In addition, no related releases were reported. Based on the current use of the subject property (vacant land/open pit being filled in/leveled), lack of reported releases, and lack of apparent signs of contamination, no further action appears warranted at this time. However, during future development activities, any impacted soils encountered in the southern area of the subject property should be properly disposed of in accordance with applicable regulations.
- According to available historical sources, quarry and pit operations consisting of sand and gravel were formerly conducted at the subject property from the early 1960s through the late 2000s. Quarry operations for sand and gravel requires the removal of virtually all natural vegetation, top soil and subsoil to reach the aggregate underneath. Quarries and pits disrupt the existing movement of surface water and groundwater. However, quarry/pit operations that extract sand and gravel are not generally known to cause subsurface contamination. In addition, there was no evidence of collieries, support structures, or large fuel tanks at the subject property. Furthermore, Partner did not observe any features of environmental concern or signs of contamination during the site reconnaissance. Based on the above, the former quarry and pit operations extracting sand and gravel are not expected to represent a significant environmental concern.

### *Significant Data Gaps*

No significant data gaps affecting the ability of the Environmental Professional to identify a REC were encountered during this assessment.

## Conclusions and Recommendations

Partner has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-13 and E1527-21 of East of Trumble Road; North of Ethanac Road; West of Sherman Road in Menifee, Riverside County, California (the "subject property"). Any exceptions to, or deletions from, this practice are described in Section 1.5 of this report.

This assessment has revealed no evidence of RECs, CRECs, or HRECs in connection with the subject property; however, BERs were identified. Based on the conclusions of this assessment, Partner recommends no further investigation of the subject property at this time.

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# 1.0 INTRODUCTION

Partner Engineering and Science, Inc. (Partner) has performed a Phase I Environmental Site Assessment (ESA) in conformance with the scope and limitations of ASTM Standard Practice E1527-13 and E1527-21 and the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (AAI) (40 CFR Part 312) for the property located at East of Trumble Road; North of Ethanac Road; West of Sherman Road in Menifee, Riverside County, California (the "subject property"). Any exceptions to, or deletions from, this scope of work are described in the report.

## 1.1 Purpose

The purpose of this ESA is to identify existing or potential Recognized Environmental Conditions (as defined by ASTM Standard E1527-13 and E1527-21) affecting the subject property that: 1) constitute or result in a material violation or a potential material violation of any applicable environmental law; 2) impose any material constraints on the operation of the subject property or require a material change in the use thereof; 3) require clean-up, remedial action or other response with respect to Hazardous Substances or Petroleum Products on or affecting the subject property under any applicable environmental law; 4) may affect the value of the subject property; and 5) may require specific actions to be performed with regard to such conditions and circumstances. The information contained in the ESA Report will be used by Client to: 1) evaluate its legal and financial liabilities for transactions related to foreclosure, purchase, sale, loan origination, loan workout or seller financing; 2) evaluate the subject property's overall development potential, the associated market value and the impact of applicable laws that restrict financial and other types of assistance for the future development of the subject property; and/or 3) determine whether specific actions are required to be performed prior to the foreclosure, purchase, sale, loan origination, loan workout or seller financing of the subject property.

This ESA was performed to permit the *User* to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on scope of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. §9601) liability (hereinafter, the "*landowner liability protections*," or "*LLPs*"). ASTM Standard E1527-13 constitutes "*all appropriate inquiry* into the previous ownership and uses of the *property* consistent with good commercial or customary practice" as defined at 42 U.S.C. §9601(35)(B).

## 1.2 Scope of Work

The scope of work for this ESA is in accordance with and to the extent necessary to achieve the goal of the requirements set forth in the ASTM Standard E1527-13 and E1527-21. This assessment included: 1) a property and adjoining site reconnaissance; 2) interviews with key personnel; 3) a review of historical sources; 4) a review of regulatory agency records; and 5) a review of a regulatory database report provided by a third-party vendor. Partner contacted local agencies, such as environmental health departments, fire departments and building departments to obtain readily ascertainable information to determine any current and/or former hazardous substances usage, storage and/or releases of hazardous substances on the subject property. Additionally, Partner researched readily available information on the presence of activity and use limitations (AULs) at these agencies. As defined by ASTM E1527-21, AULs include both legal (that is, institutional) and physical (that is, engineering) controls that may include legal

or physical restrictions or limitations on the use of, or access to, a site or facility: 1) to reduce or eliminate potential exposure to hazardous substances or petroleum products in the soil, soil vapor, groundwater, or surface water on the subject property; or 2) to prevent activities that could interfere with the effectiveness of a response action, in order to ensure maintenance of a condition of no significant risk to public health or the environment. These legal or physical restrictions, which may include institutional and/or engineering controls (IC/ECs), are intended to prevent adverse impacts to individuals or populations that may be exposed to hazardous substances and petroleum products in the soil, soil vapor, groundwater, and/or surface water on a property.

If requested by Client, this report may also include the identification, discussion of, and/or limited sampling of asbestos-containing materials (ACMs), lead-based paint (LBP), mold, and/or radon.

### 1.3 Limitations

Partner warrants that the findings and conclusions contained herein were accomplished in accordance with the methodologies set forth in the Scope of Work. These methodologies are described as representing good commercial and customary practice for conducting an ESA of a property for the purpose of identifying recognized environmental conditions. There is a possibility that even with the proper application of these methodologies there may exist on the subject property conditions that could not be identified within the scope of the assessment or which were not reasonably identifiable from the available information. Partner believes that the information obtained from the record review and the interviews concerning the subject property is reliable. However, Partner cannot and does not warrant or guarantee that the information provided by these other sources is accurate or complete. The conclusions and findings set forth in this report are strictly limited in time and scope to the date of the evaluations. The conclusions presented in the report are based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of agreed-upon services or the time and budgeting restraints imposed by the Client. No other warranties are implied or expressed.

Some of the information provided in this report is based upon personal interviews, and research of available documents, records, and maps held by the appropriate government and private agencies. This report is subject to the limitations of historical documentation, availability, and accuracy of pertinent records, and the personal recollections of those persons contacted.

This practice does not address requirements of any state or local laws or of any federal laws other than the all appropriate inquiry provisions of the LLPs. Further, this report does not intend to address all of the compliance and safety concerns, if any, associated with the subject property.

Environmental concerns, which are beyond the scope of a Phase I ESA as defined by ASTM include the following: ACMs, LBP, radon, and lead in drinking water. These issues may affect environmental risk at the subject property and may warrant discussion and/or assessment; however, are considered non-scope issues. If specifically requested by the Client, these non-scope issues are discussed in Section 6.3.

### 1.4 User Reliance

B&D Holdings Inc. engaged Partner to perform this assessment in accordance with an agreement governing the nature, scope and purpose of the work as well as other matters critical to the engagement. All reports, both verbal and written, are for the sole use and benefit of B&D Holdings Inc. Either verbally

or in writing, third parties may come into possession of this report or all or part of the information generated as a result of this work. In the absence of a written agreement with Partner granting such rights, no third parties shall have rights of recourse or recovery whatsoever under any course of action against Partner, its officers, employees, vendors, successors or assigns. Any such unauthorized user shall be responsible to protect, indemnify and hold Partner, Client and their respective officers, employees, vendors, successors and assigns harmless from any and all claims, damages, losses, liabilities, expenses (including reasonable attorneys' fees) and costs attributable to such Use. Unauthorized use of this report shall constitute acceptance of and commitment to these responsibilities, which shall be irrevocable and shall apply regardless of the cause of action or legal theory pled or asserted. Additional legal penalties may apply.

## 1.5 Limiting Conditions

The findings and conclusions contain all of the limitations inherent in these methodologies that are referred to in ASTM E1527-13 and E1527-21.

Specific limitations and exceptions to this ESA are more specifically set forth below:

- Interviews with past or current owners, operators and occupants were not reasonably ascertainable and thus constitute a data gap. Based on information obtained from other historical sources (as discussed in Section 3.0), this data gap is not expected to alter the findings of this assessment.
- Partner requested information relative to deed restrictions and environmental liens, a title search, and completion of the AAI User Questionnaire from the Report User. This information was not provided at the time of the assessment.
- Partner was unable to determine the property use at 5-year intervals, which constitutes a data gap. Information concerning historical use of the subject property was unavailable. Except for property tax files and recorded land title records, which were not considered to be sufficiently useful, Partner reviewed all standard historical sources and conducted appropriate interviews.

# 2.0 SITE DESCRIPTION

## 2.1 Site Location and Legal Description

The subject property at East of Trumble Road; North of Ethanac Road; West of Sherman Road in Menifee, California is located on the east side of Trumble Road, approximately 150 feet south of the intersection with Watson Road. According to the Riverside County Assessor, the subject property is legally described as APNs: 329-240-046, 329-240-048, 329-240-049, and 329-240-051, and ownership is currently vested in North Pacific Dev Inc.

Please refer to Figure 1: Site Location Map, Figure 2: Site Plan, Figure 3: Topographic Map, and Appendix A: Site Photographs for the location and site characteristics of the subject property.

## 2.2 Current Property Use

The subject property is currently vacant land with an open pit. At the time of Partner's March 2022 site reconnaissance, the subject property boundary was surrounded by a chain-linked fence with no permanent structures observed. Heavy equipment and associated tools were observed within the pit area, located in the eastern half of the subject property. The pit appeared to be approximately 25-30 feet from the ground level. According to Manuela (Key Site Manager), the pit area was being filled in and leveled. Additional improvements include an office trailer in the northern portion, an aboveground storage tank (AST) containing water in the northern portion, and an inactive AST formerly containing water in the southern portion.

The subject property is designated for commercial development (EDC-NG, Economic Development Corridor – Northern Gateway) by the City of Menifee.

The subject property was identified as a MINE site in the regulatory database report, as further discussed in Section 4.2.

## 2.3 Current Use of Adjoining Properties

The subject property is located within a mixed commercial, industrial, and residential area of Riverside County. During the vicinity reconnaissance, Partner observed the land uses on adjoining properties as defined in ASTM E1527-13 and E1527-21 as any real property or properties the border of which is contiguous or partially contiguous with that of the property, or that would be contiguous or partially contiguous with that of the property but for a street, road, or other public thoroughfare separating them. The adjoining properties are tabulated below:

| ***Adjoining Properties*** | |
|---|---|
| **North:** | Industrial Machine & Weld (27235 Watson Road) |
| **East:** | JN Grease Services (25685 Sherman Road) |
| **South:** | Four dwellings (25710, 25720, 25750, and 25760 Trumble Road) and a hazardous waste treatment area operated by JN Grease Services |
| **West:** | Soil Retention Products (1765 Watson Road); Grove Construction Hardware (1794 Illinois Avenue); and vacant land across Trumble Road |

The adjoining property to the east was identified as a California Environmental Reporting System (CERS) HAZ, Facility Registry Service/Facility Index (FINDS/FRS), Haznet, Hazardous Waste Generator (HWG)

Riverside, HZH Riverside, and a Resource Conservation and Recovery Act Non-Generator (RCRA Non-Gen) site in the regulatory database report, as further discussed in Section 4.2.

The adjoining properties to the west were identified as a CERS HAZ, HWG Riverside, HZH Riverside, and a RCRA Non-Gen site in the regulatory database report, as further discussed in Section 4.2.

## 2.4 Physical Setting Sources

### *2.4.1 Topography*

The 2015 United States Geological Survey (USGS) *Perris, California* Quadrangle 7.5-minute series topographic map was reviewed for this ESA. According to the contour lines on the topographic map, the subject property is located at approximately 1,430 feet above mean sea level (MSL). The contour lines in the area of the subject property indicate the area is sloping gently to the west.

### *2.4.2 Hydrology*

While under natural and undisturbed conditions shallow groundwater flow most frequently follows the topography of the land surface, natural or man-made features can affect flow direction, and the presumed flow may not match the actual flow directions at the subject property and vicinity.

According to information obtained from topographic maps and GeoTracker (Report for the Abandonment of Three Groundwater Monitoring Wells [2011] at 25351 Trumble Road, located approximately 800 feet northwest of the subject property), the terrain at the subject property is sloping to the west with the depth to groundwater in the vicinity of the subject property inferred to be approximately 50 to 60 feet below ground surface (bgs) and groundwater flow is inferred to be toward the west.

No surface water features are located in the vicinity of the subject property. No settling ponds, lagoons, surface impoundments, wetlands or natural catch basins were observed at the subject property during this assessment.

The subject property is not currently serviced by a public water system. According to available information, a public water system operated by the Eastern Municipal Water District (EMWD) serves the subject property vicinity.

### *2.4.3 Geology/Soils*

Based on information obtained from the United States Department of Agriculture (USDA) Natural Resources Conservation Service Web Soil Survey online database, the subject property is mapped as Madera fine sandy loam. The Madera series consists of moderately well drained soils with 0 to 2 percent slopes.

The subject property is located within the Peninsular Ranges Geomorphic Province in Southern California. This region is underlain by a basement complex of Lake Cretaceous undifferentiated granitic rocks of the Southern California Batholith and Jurassic pre-batholithic metavolcanic rocks. More specifically, the subject property is situated within the Perris Block, an eroded mass of Cretaceous and older crystalline and volcanic rocks. The Perris Block, approximately 20 miles by 50 miles in extent, is bounded by the San Jacinto Fault Zone to the northeast, the Elsinore Fault Zone to the south, the Cucamonga Fault Zone to

the northwest, and the Temecula Basin to the southeast. Thin sedimentary and volcanic materials locally mantle the crystalline bedrock. Alluvial and colluvial deposits fill the lower valley area.

### *2.4.4 Flood Zone Information*

Partner performed a review of the Flood Insurance Rate Map (FIRM), published by the Federal Emergency Management Agency (FEMA). According to Community Panel Number 06065C2060H, dated August 18, 2014, the subject property appears to be located in Zone X (unshaded), an area located outside of the 100-year and 500-year flood plains.

# 3.0 HISTORICAL INFORMATION

Partner obtained historical use information about the subject property from a variety of sources. A chronological listing of the historical data found is summarized in the table below:

| *Historical Use Information* | | |
|---|---|---|
| **Years** | **Resource** | **Description/Use** |
| 1938-1953 | Aerial Photographs, Topographic Maps | Agricultural/fallow land |
| 1962-Late 2000s | Aerial Photographs, City Directories, Interviews, Prior Report, Topographic Maps | Quarry (sand and gravel) |
| Late 2000s-Present | Aerial Photographs, Assessor Records, City Directories, Interviews, Onsite Observation, Prior Report, Topographic Maps | Vacant land with an open pit |

According to available historical sources, the subject property appears to have been agricultural/fallow land from as early as 1938 through the 1950s and developed as a quarry (sand and gravel) by the early 1960s. Active quarry operations were reportedly conducted through the late 2000s. The subject property has remained vacant land with an open pit since then.

Quarry/pit operations (sand and gravel) were formerly conducted at the subject property from the early 1960s through the late 2000s. Quarry operations for sand and gravel requires the removal of virtually all natural vegetation, top soil and subsoil to reach the aggregate underneath. Also, quarries and pits disrupt the existing movement of surface water and groundwater. However, quarry/pit operations to extract sand and gravel are not generally known to cause subsurface contamination. In addition, there was no evidence of collieries, support structures, or large fuel tanks at the subject property. Furthermore, Partner did not observe any features of environmental concern or signs of contamination during the site reconnaissance. Based on the above, the former quarry/pit operations extracting sand and gravel are not considered a REC and no further action is recommended.

## 3.1 Aerial Photograph Review

Partner obtained available aerial photographs of the subject property and surrounding area from Environmental Risk Information Services (ERIS). The inferred uses of the subject property and adjoining properties as interpreted from the aerial photographs in Appendix B are tabulated below:

| *Date: 1938, 1953* | *Scale: 1"=500'* |
|---|---|
| **Subject Property:** | Appears to be agricultural/fallow land |
| **North:** | Appears to be agricultural/fallow land |
| **East:** | Appears to be agricultural/fallow land with a dwelling |
| **South:** | Appears to be agricultural/fallow land with a dwelling |
| **West:** | Appears to be agricultural/fallow land |

| *Date: 1962, 1967, 1976, 1985* | *Scale: 1"=500'* |
|---|---|
| **Subject Property:** | Appears to be developed as an open pit |
| **North:** | Appears to be graded, vacant land |
| **East:** | Appears to be vacant land with a dwelling |
| **South:** | Appears to be vacant land with several dwellings |
| **West:** | Trumble Road appears to the west |

| ***Date: 1994*** | | ***Scale: 1"=500'*** |
|---|---|---|
| **Subject Property:** | No significant changes are visible | |
| **North:** | Appears to be developed with an industrial building | |
| **East:** | Appears to be vacant land; the dwelling is no longer depicted | |
| **South:** | No significant changes are visible | |
| **West:** | Appears to be vacant land, across Trumble Road | |

| ***Date: 2002*** | | ***Scale: 1"=500'*** |
|---|---|---|
| **Subject Property:** | No significant changes are visible | |
| **North:** | No significant changes are visible | |
| **East:** | Appears to be undergoing construction | |
| **South:** | No significant changes are visible | |
| **West:** | Appears to be developed with an industrial building, across Trumble Road | |

| ***Date: 2004, 2006*** | | ***Scale: 1"=500'*** |
|---|---|---|
| **Subject Property:** | No significant changes are visible | |
| **North:** | No significant changes are visible | |
| **East:** | Appears to be developed with an industrial building and support structures | |
| **South:** | No significant changes are visible | |
| **West:** | No significant changes are visible. | |

| ***Date: 2010, 2012, 2014, 2016*** | | ***Scale: 1"=500'*** |
|---|---|---|
| **Subject Property:** | No significant changes are visible | |
| **North:** | No significant changes are visible | |
| **East:** | No significant changes are visible | |
| **South:** | No significant changes are visible | |
| **West:** | An additional commercial structure appears, across Trumble Road | |

| ***Date: 2018, 2020*** | | ***Scale: 1"=500'*** |
|---|---|---|
| **Subject Property:** | No significant changes are visible | |
| **North:** | No significant changes are visible | |
| **East:** | No significant changes are visible | |
| **South:** | A hazardous waste treatment area appears to the south | |
| **West:** | No significant changes are visible | |

Copies of select aerial photographs are included in Appendix B of this report.

### 3.2 Fire Insurance Maps

Partner requested the collection of Fire Insurance Maps (FIMs) from ERIS. FIM coverage was not available for the subject property.

### 3.3 City Directories

Partner reviewed historical city directories obtained from ERIS for past names and businesses that were listed for the adjoining properties. City directories were not available for the subject property. The findings are tabulated below:

***City Directory Search for West Adjoining Properties (1794 Illinois Avenue)***

| Year(s) | Occupant Listed |
|---|---|
| 2016-2020 | Top Promotional Products |

***City Directory Search for South Adjoining Properties (25710-25760 Trumble Road)***

| Year(s) | Occupant Listed |
|---|---|
| 2008-2020 | Residential |

Based on the city directory review, no environmentally sensitive listings were identified for the adjoining property addresses.

Copies of reviewed city directories are included in Appendix B of this report.

## 3.4 Historical Topographic Maps

Partner reviewed historical topographic maps obtained from ERIS. The following inferred uses of the subject property and adjoining properties interpreted from topographic maps in Appendix B and are tabulated below:

***Date: 1942, 1943***

| | |
|---|---|
| **Subject Property:** | Depicted as unimproved land with roadways in the eastern portion |
| **North:** | Depicted as unimproved land |
| **East:** | Depicted as unimproved land with roadways |
| **South:** | Depicted as unimproved land with a structure |
| **West:** | Depicted as unimproved land |

***Date: 1953, 1973***

| | |
|---|---|
| **Subject Property:** | Depicted as unimproved land |
| **North:** | Depicted as unimproved land |
| **East:** | Depicted as unimproved land with multiple structures |
| **South:** | Depicted as unimproved land with multiple structures |
| **West:** | Depicted as unimproved land, across Trumble Road |

***Date: 1979***

| | |
|---|---|
| **Subject Property:** | Depicted with a dirt roadway surrounding the subject property boundary, indicating the use as a pit |
| **North:** | No significant changes depicted |
| **East:** | No significant changes depicted |
| **South:** | Depicted as unimproved land with an additional structure |
| **West:** | No significant changes depicted |

***Date: 2015***

| | |
|---|---|
| **Subject Property:** | Depicted as located within an urban setting with a network of roadways. |
| **North:** | Depicted as located within an urban setting with a network of roadways |
| **East:** | Depicted as located within an urban setting with a network of roadways |
| **South:** | Depicted as located within an urban setting with a network of roadways |
| **West:** | Depicted as located within an urban setting with a network of roadways |

Copies of reviewed topographic maps are included in Appendix B of this report.

# 4.0 REGULATORY RECORDS REVIEW

## 4.1 Regulatory Agencies

### *4.1.1 State Department*

| *Regulatory Agency Data* | |
|---|---|
| **Name of Agency:** | California Environmental Protection Agency (CalEPA) |
| **Source:** | CalEPA Regulated Sites Portal<br>https://siteportal.calepa.ca.gov/nsite/ |
| **Agency Phone Number:** | (916) 323-2514 |
| **Date of Contact:** | March 2022 |
| **Method of Communication:** | Online |

**Summary of Communication:**

Menifee Pit at 25630 Trumble Road. is listed in Industrial Storm Water Compliance Evaluation database. According to the records reviewed, there was no construction at the subject property in 2018 and no violations were noted. No other records regarding hazardous substance use, storage or releases, or the presence of USTs and AULs on the subject property were on file with the CalEPA.

### *4.1.2 Health Department*

| *Regulatory Agency Data* | |
|---|---|
| **Name of Agency:** | Riverside County Department of Environmental Health (RCDEH) |
| **Source:** | https://www.rivcoeh.org/PublicInformation/PublicRecords |
| **Agency Phone Number:** | (951) 358-5172 |
| **Date of Contact:** | March 2022 |
| **Method of Communication:** | Email |

**Summary of Communication:**

No records regarding hazardous substance use, storage or releases, or the presence of USTs and AULs on the subject property were on file with the RCDEH.

### *4.1.3 Air Pollution Control Agency*

| *Regulatory Agency Data* | |
|---|---|
| **Name of Agency:** | South Coast Air Quality Management District (AQMD) |
| **Source:** | http://www3.aqmd.gov/webappl/fim/prog/search.aspx |
| **Agency Phone Number:** | (909) 396-2000 |
| **Date of Contact:** | March 2022 |
| **Method of Communication:** | Online |

**Summary of Communication:**

No Permits to Operate (PTO), Notices of Violation (NOV), or Notices to Comply (NTC) or the presence of AULs, dry cleaning machines, or USTs were on file for the subject property with the AQMD.

### 4.1.4 Regional Water Quality Agency

| *Regulatory Agency Data* | |
|---|---|
| **Name of Agency:** | California State Water Resources Control Board (SWRCB) |
| **Source:** | SWRCB GeoTracker Database<br>http://geotracker.waterboards.ca.gov/<br>http://geotracker.waterboards.ca.gov/historical_ust_facilities |
| **Agency Phone Number:** | (916) 341-5250 |
| **Date of Contact:** | March 2022 |
| **Method of Communication:** | Online |

**Summary of Communication:**

No records regarding hazardous substance use, storage or releases, or the presence of USTs and AULs on the subject property were on file with the RWQCB.

### 4.1.5 Department of Toxic Substances Control

| *Regulatory Agency Data* | |
|---|---|
| **Name of Agency:** | California Department of Toxic Substances Control (DTSC) |
| **Source:** | DTSC EnviroStor and Hazardous Waste Tracking System Databases<br>http://www.envirostor.dtsc.ca.gov/public/<br>http://hwts.dtsc.ca.gov/report_search.cfm?id=5 |
| **Agency Phone Number:** | (916) 324-1826 |
| **Date of Contact:** | March 2022 |
| **Method of Communication:** | Online |

**Summary of Communication:**

No records regarding hazardous substance use, storage or releases, or the presence of USTs or AULs on the subject property were on file with the DTSC.

### 4.1.6 Building Department

| *Regulatory Agency Data* | |
|---|---|
| **Name of Agency:** | Menifee Building & Safety Department (MBSD) |
| **Source:** | https://www.cityofmenifee.us/96/Building-Safety |
| **Agency Phone Number:** | (951) 672-6777 |
| **Date of Contact:** | March 2022 |
| **Method of Communication:** | Email |

**Summary of Communication:**

Partner contacted the Menifee Building & Safety Division (MBSD) to obtain historical building records of the subject property. No responsive records were identified by the MBSD.

### 4.1.7 Planning Department

| *Regulatory Agency Data* | |
|---|---|
| **Name of Agency:** | Menifee Planning Commission (MPC) |
| **Source:** | https://www.cityofmenifee.us/160/Planning-Commission |
| **Agency Phone Number:** | (951) 672-6777 |
| **Date of Contact:** | March 2022 |
| **Method of Communication:** | Online |

**Summary of Communication:**

According to records reviewed, the subject property is zoned EDC-NG (Economic Development Corridor – Northern Gateway) for commercial development by the City of Menifee.

### 4.1.8 Oil & Gas Exploration

| *Regulatory Agency Data* | |
|---|---|
| **Name of Agency:** | California Geologic Energy Management Division (CalGEM) |
| **Source:** | CalGEM Well Finder Mapping Application<br>https://maps.conservation.ca.gov/doggr/wellfinder/#close |
| **Agency Phone Number:** | (916) 322-1080 |
| **Date of Contact:** | March 2022 |
| **Method of Communication:** | Online |

**Summary of Communication:**

According to CalGEM, no oil or gas wells are located on or adjoining to the subject property.

### 4.1.9 Assessor's Office

| *Regulatory Agency Data* | |
|---|---|
| **Name of Agency:** | Riverside County Assessor (RCA) |
| **Source:** | https://www.asrclkrec.com/ |
| **Agency Phone Number:** | (951) 955-6200 |
| **Date of Contact:** | March 2022 |
| **Method of Communication:** | Online |

**Summary of Communication:**

According to records reviewed, the subject property is identified by Assessor Parcel Numbers (APNs) 329-240-046, 329-240-048, 329-240-049, and 329-240-051. The combined acreage of the subject property is 17.82 acres.

Copies of pertinent documents are included in Appendix B of this report.

## 4.2 Mapped Database Records Search

The regulatory database report provided by ERIS documents the listing of sites identified on federal, state, county, city, and tribal (when applicable) standard source environmental databases within the approximate minimum search distance (AMSD) specified by ASTM E1527-13 and E1527-21. The data from these sources are updated as these data are released and integrated into one database. The information contained in this report was compiled from publicly available sources.

The environmental database information is used to identify environmental concerns in connection with the subject property. The listings also serve to identify the known indications of the storage, use, generation, disposal, or release of hazardous substance at the subject property and the potential for contaminants to migrate onto the subject property from off-site sources in groundwater or soil in the form of liquids or vapor.

Using the ASTM definition of migration, Partner considers the migration of hazardous substances or petroleum products in any form onto the subject property during the evaluation of each site listed on the radius report, which includes solid, liquid, and vapor.

### 4.2.1 Regulatory Database Summary

The following table lists the number of sites as categorized by the regulatory database within the prescribed AMSD. The locations of the sites are plotted utilizing a geographic information system, which geocodes the site addresses. The accuracy of the geocoded locations is approximately +/-300 feet.

| *Radius Report Data* | | | | |
|---|---|---|---|---|
| **Database** | **AMSD Radius (mile)** | **Listings Identified** | | **Surrounding Area Sites of Concern** |
| | | **Subject Property** | **Adjoining Properties** | |
| Federal NPL | 1.00 | N | N | N |
| Delisted NPL Site | 0.50 | N | N | N |
| Federal SEMS Site | 0.50 | N | N | N |
| Federal SEMS-ARCHIVE | 0.50 | N | N | N |
| Federal RCRA CORRACTS Facility | 1.00 | N | N | N |
| Federal RCRA TSDF Facility | 0.50 | N | N | N |
| Federal RCRA Generators Site (LQG, SQG, VSQG, CESQG, Non-Gen) | Subject and Adjoining | N | **Y** | N |
| Federal IC/EC Registries | Subject Property | N | N/A | N/A |
| Federal ERNS Site | Subject Property | N | N/A | N/A |
| State/Tribal Equivalent NPL | 1.00 | N | N | N |
| State/Tribal Equivalent CERCLIS | 1.00 | N | N | N |
| State/Tribal Landfill/Solid Waste Disposal Site | 0.50 | N | N | N |
| State/Tribal Leaking Storage Tank Site (LUST/LPST) | 0.50 | N | N | N |
| State/Tribal Registered Storage Tank Sites (UST/AST) | Subject and Adjoining | N | N | N/A |
| State/Tribal IC/EC Registries | Subject and Adjoining | N | N | N/A |
| State/Tribal Voluntary Cleanup Sites (VCP) | 0.50 | N | N | N |
| State/Tribal Spills | 0.50 | N | N | N |
| Federal Brownfield Sites | 0.50 | N | N | N |
| State Brownfield Sites | 0.50 | N | N | N |
| Mines | Varies | Y | | N |
| CERS HAZ/Haznet | Varies | N | **Y** | N |
| FINDS/FRS | Varies | N | **Y** | N |
| HWG Riverside, HZH Riverside | Varies | **Y** | **Y** | N |

### *4.2.2 Subject Property Listings*

The subject property was identified as a MINE site in the regulatory database report, as discussed below:

- The subject property identified as Romaland in Sun City (no address provided) is listed in MINE database as Mine ID 91-33-0087. The operator is listed as "Asphalt & Concrete Recycling, Inc." and the facility status is listed as "Closed – Never Operated." The facility type is listed as "Open Pit" and the product is listed as "Sand and Gravel." This listing appears to be associated with the open pit operations conducted at the subject property. No related violations or releases were reported. Based on the regulatory status, type of pit operations (sand and gravel), and lack of reported violations or releases, this listing is not considered a significant environmental concern.

### *4.2.3 Adjoining Property Listings*

The adjoining property to the east was identified as a CERS HAZ, FINDS/FRS, Haznet, HWG Riverside, HZH Riverside, and a RCRA Non-Gen site in the regulatory database report, as discussed below:

- JN Grease Services Inc/International Environmental Solutions at 25685 Sherman Road, is located adjoining to the east, hydrologically up-gradient, of the subject property. The site is listed in HZH Riverside, HWG Riverside, HAZNET, FINDS/FRS, CERS HAZ, and RCRA non-gen databases. These listings are due to grease/waste recycling operations, compliance inspections, and the generation of hazardous waste (used oil). Numerous violations, some significant, were issued between 2014 and 2020, which all achieved compliance. Violations included waste oil pooled on top of the waste oil tanks and on the ground, and improper storage of 50-100 empty 55-gallon drums throughout the facility. The drums were stored in the back corner of the facility in the area where water had accumulated from recent heavy rains. Multiple drums were rusted, dented, and in poor condition. The site has been a registered Non-Generator since 2019. The FINDS database is a computerized inventory of all facilities that are regulated or tracked by the USEPA. These facilities are assigned an identification number that serves as a cross-reference for other databases in the USEPA's program system. The FINDS database does not indicate any releases or violations associated with the subject property. At the time of Partner's March 2022 site reconnaissance, a hazardous waste treatment area, operated by JN Grease Services, was observed immediately to the south of the subject property. The area included standing water/pond with multiple 55-gallon drums, totes, aboveground storage tanks (ASTs), scrap metal, junk cars, and other miscellaneous equipment. A foul odor was present in the area as well. Partner did not identify apparent signs of contamination (stained soil or distressed vegetation) along the subject property boundary that abuts the hazardous waste treatment area. In addition, no related releases were reported. Based on the current use of the subject property (vacant land/open pit being filled in/leveled), lack of reported releases, and lack of apparent signs of contamination, these listings are not considered a significant environmental concern and it is unlikely that a regulatory file review for this site would alter the findings of this assessment. As such, no further action appears warranted at this time.

The adjoining properties to the west were identified as a CERS HAZ, HWG Riverside, HZH Riverside, and a RCRA Non-Gen site in the regulatory database report, as discussed below:

- Top Promotional Products at 1794 Illinois Avenue, is located adjoining to the west, hydrologically down-gradient, of the subject property. The site is identified on the RCRA Non-Gen database under EPA ID CAL000374619 since 2012. No related violations or releases were reported. Based on the relative distance, down-gradient location, and lack of reported violations or releases, this listing is not considered a significant environmental concern.
- Soil Retention Products at 1765 Watson Road, is located adjoining to the west, hydrologically down-gradient, of the subject property. The site is listed in HZH Riverside, HWG Riverside, RCRA Non-Gen, and CES HAZ databases. These listings are due to concrete manufacturing operations, compliance inspections, and the generation of hazardous waste (used oil and used antifreeze). Multiple violations were issued between 2016 and 2019, which all subsequently achieved compliance. No related releases were reported. The site has been verified as a non-generator

under EPA ID CAL000192061 since 2000. Based on the intervening distance, down-gradient location, regulatory compliance, and lack of reported releases, these listings are not considered a significant environmental concern.

Based on the findings, vapor migration is not expected to represent a significant environmental concern at this time.

### *4.2.4 Surrounding Area Listings of Concern to Subject Property*

No sites of concern are identified in the regulatory database report.

Based on the findings, vapor migration is not expected to represent a significant environmental concern at this time.

### *4.2.5 Unplottable Listings*

No unplottable listings are identified in the regulatory database report.

A copy of the regulatory database report is included in Appendix C of this report.

# 5.0 USER PROVIDED INFORMATION AND INTERVIEWS

In order to qualify for one of the *Landowner Liability Protections (LLPs)* offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the *Brownfields Amendments*), the *User* must conduct the following inquiries required by 40 CFR 312.25, 312.28, 312.29, 312.30, and 312.31. The *User* should provide the following information to the *environmental professional*. Failure to provide this information could result in a determination that *all appropriate inquiries* is not complete. The *User* is asked to provide information or knowledge of the following:

- Review Title and Judicial Records for Environmental Liens and AULs
- Specialized Knowledge or Experience of the User
- Actual Knowledge of the User
- Reason for Significantly Lower Purchase Price
- Commonly Known or *Reasonably Ascertainable* information
- Degree of Obviousness
- Reason for Preparation of this Phase I ESA

Fulfillment of these user responsibilities is key to qualification for the identified defenses to CERCLA liability. Partner requested our Client to provide information to satisfy User Responsibilities as identified in Section 6 of the ASTM guidance.

Pursuant to ASTM E1527-13 and E1527-21, Partner requested the following site information from B&D Holdings Inc. (User of this report).

| ***User Responsibilities*** | | |
|---|---|---|
| **Item** | **Provided By User** | **Not Provided By User** |
| AAI User Questionnaire | | **X** |
| Title Records, Environmental Liens, and AULs | | **X** |
| Specialized Knowledge | **X** | |
| Actual Knowledge | | **X** |
| Valuation Reduction for Environmental Issues | | **X** |
| Identification of Key Site Manager | **Section 5.1.3** | |
| Reason for Performing Phase I ESA | **Section 1.1** | |
| Prior Environmental Reports | **X** | |
| Other | | **X** |

## 5.1 Interviews

### *5.1.1 Interview with Owner*

Mr. Ron Burek, subject property owner, was not aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the subject property; any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or any notices from a governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

Mr. Burek provided a completed Environmental Site Assessment Questionnaire and a prior Phase I ESA report that are further discussed in Section 5.2.6. According to Mr. Burek, the subject property is currently addressed as East of Trumble Road; North of Ethanac Road; West of Sherman Road.

### *5.1.2 Interview with Report User*

Please refer to Section 5.2 below for information requested from the Report User. The information requested was not received prior to the issuance of this report. The lack of this information is not considered to represent a significant data gap.

### *5.1.3 Interview with Key Site Manager*

Ms. Manuela (last name withheld), key site manager, indicated that she had no information pertaining to any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the subject property; any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or any notices from a governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

Ms. Manuela was not aware of USTs, clarifiers, oil/water separators, or groundwater monitoring wells on the subject property to the best of her knowledge. She reported that two ASTs (both containing water) are located on the subject property, one in the northern portion (active) and the other in the southern portion (inactive).

### *5.1.4 Interviews with Past Owners, Operators, and Occupants*

Interviews with past owners, operators and occupants were not conducted since information regarding the potential for contamination at the subject property was obtained from other sources.

## 5.2 User Provided Information

### *5.2.1 Title Records, Environmental Liens, and AULs*

Partner was not provided with title records or environmental lien and AUL information for review as part of this assessment.

### *5.2.2 Specialized Knowledge*

The User did not have specialized knowledge of environmental conditions associated with the subject property at the time of the assessment. The User indicated the subject property was formerly used as an earth quarry.

### *5.2.3 Actual Knowledge of the User*

The User was not aware of environmental liens and/or AULs encumbering the subject property or in connection with the subject property at the time of the assessment.

### *5.2.4 Valuation Reduction for Environmental Issues*

The User was not aware of reductions in property value due to environmental issues.

### 5.2.5 Commonly Known or Reasonably Ascertainable Information

Refer to Section 5.1.1 for a discussion of commonly known or *reasonably ascertainable* within the local community about the subject property provided by the User.

### 5.2.6 Previous Reports and Other Provided Documentation

The following information was provided to Partner for review during the course of this assessment:

***Phase I Environmental Site Assessment, Mining Property APN 329-240-046, 329-240-048, 329-240-049 and 329-240-051,* prepared by Earth Strata Geotechnical Services Inc. (December 27, 2017).**

Earth Strata Geotechnical Services Inc. (ESGS) prepared this report on behalf of North Pacific Developments. The assessment stated it was performed in accordance with ASTM Standard E1527-13. The assessment consisted of a site reconnaissance, interviews with knowledgeable personnel, review of historical information, and a review of federal, state and local regulatory databases. Pertinent information contained in this report is summarized below:

- At the time of the 2017 assessment, the subject property was an open pit gravel and sand mine that was no longer in use. Several pieces of heavy equipment were stored on the subject property.
- ESGS reported that the subject property was used primarily for open pit mining until the late 2000s.
- No regulatory database listings of potential concern were identified associated with the subject property or off-site properties.
- ESGS's site reconnaissance did not reveal any items of significant environmental concerns.
- ESGS 's assessment revealed no evidence of RECs or significant issues in connection with the subject property. ESGS concluded that no further investigation was recommended.

Based on the information from previous documents a VEC can be ruled out at this time.

Copies of pertinent pages reviewed are included in Appendix B of this report

# 6.0 SITE RECONNAISSANCE

The weather at the time of the site visit was sunny and clear. Refer to Section 1.5 for limitations encountered during the field reconnaissance and Sections 2.1 and 2.2 for subject property operations. The table below provides the site assessment details:

| ***Site Assessment Data*** | |
|---|---|
| **Site Assessment Performed By:** | Joseph Kim |
| **Site Assessment Conducted On:** | March 15, 2022 |

The table below provides the subject property personnel interviewed during the field reconnaissance:

| ***Site Visit Personnel for East of Trumble Road; North of Ethanac Road; West of Sherman Road (Subject Property)*** | | | |
|---|---|---|---|
| **Name** | **Title/Role** | **Contact Number** | **Site Walk* Yes/No** |
| Manuela | Staff/Key Site Manager | N/A | No |

No environmental concerns were identified during the onsite reconnaissance.

## 6.1 General Site Characteristics

### *6.1.1 Solid Waste Disposal*

Solid waste is not currently generated at the subject property. No evidence of illegal dumping of solid waste was observed during the Partner site reconnaissance.

### *6.1.2 Sewage Discharge and Disposal*

The subject property is not currently serviced by a sanitary sewer system. No wastewater treatment facilities or septic systems were observed or reported on the subject property at this time.

### *6.1.3 Stormwater and Surface Water Drainage*

Stormwater is removed from the subject property primarily by percolation.

### *6.1.4 Source of Heating and Cooling*

No heating or cooling equipment was observed on the subject property. Local utility providers include Southern California Edison (SCE) and Southern California Gas Company.

### *6.1.5 Wells and Cisterns*

No aboveground evidence of wells or cisterns was observed during the site reconnaissance.

### *6.1.6 Wastewater*

Domestic wastewater is not currently generated at the subject property. No industrial wastewater streams were identified at the subject property.

### *6.1.7 Septic Systems*

No septic systems were observed or reported on the subject property.

### 6.1.8 Additional Site Observations

No additional general site characteristics were observed during the site reconnaissance.

## 6.2 Potential Environmental Hazards

### 6.2.1 Hazardous Substances and Petroleum Products Used or Stored at the Site

No hazardous substances or petroleum products were observed on the subject property during the site reconnaissance.

### 6.2.2 Aboveground & Underground Hazardous Substance or Petroleum Product Storage Tanks (ASTs/USTs)

No evidence of current or former ASTs or USTs was observed during the site reconnaissance, other than a water AST located in the northern portion. An additional water AST, reportedly inactive, is located in the southern portion.

### 6.2.3 Evidence of Releases

No spills, stains or other indications that a surficial release has occurred at the subject property were observed.

### 6.2.4 Polychlorinated Biphenyls (PCBs)-Containing Items

No potential PCB-containing equipment (transformers, oil-filled switches, hoists, lifts, dock levelers, hydraulic elevators, etc.) was observed on the subject property during Partner's reconnaissance.

### 6.2.5 Strong, Pungent, or Noxious Odors

A foul odor was evident near the hazardous waste treatment area along the subject property's southern boundary.

### 6.2.6 Pools of Liquid

No pools of liquid were observed on the subject property during the site reconnaissance.

### 6.2.7 Drains, Sumps, and Clarifiers

No drains, sumps, or clarifiers were observed on the subject property during the site reconnaissance.

### 6.2.8 Pits, Ponds, and Lagoons

No pits, ponds or lagoons were observed on the subject property.

### 6.2.9 Stressed Vegetation

No stressed vegetation was observed on the subject property.

### 6.2.10 Additional Potential Environmental Hazards

No additional environmental hazards, including landfill activities or radiological hazards, were observed.

## 6.3 Non-Scope ASTM Considerations

### *6.3.1 Asbestos-Containing Materials (ACMs)*

Asbestos is the name given to a number of naturally occurring, fibrous silicate minerals mined for their useful properties such as thermal insulation, chemical and thermal stability, and high tensile strength. The Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1926.1101 requires certain construction materials to be presumed to contain asbestos, for purposes of this regulation. All thermal system insulation (TSI), surfacing material, and asphalt/vinyl flooring that are present in a building that have not been appropriately tested are "presumed asbestos-containing material" (PACM).

No structures are located on the subject property. As such, an asbestos evaluation was not required by the scope of services.

### *6.3.2 Lead-Based Paint (LBP)*

Lead is a highly toxic metal that affects virtually every system of the body. LBP is defined as any paint, varnish, stain, or other applied coating that has 1 $mg/cm^2$ (or 5,000 ug/g or 0.5% by weight) or more of lead. Congress passed the Residential Lead-Based Paint Hazard Reduction Act of 1992, also known as "Title X", to protect families from exposure to lead from paint, dust, and soil. Under Section 1017 of Title X, intact LBP on most walls and ceilings is not considered a "hazard," although the condition of the paint should be monitored and maintained to ensure that it does not become deteriorated. Further, Section 1018 of this law directed the Housing and Urban Development (HUD) and the US EPA to require the disclosure of known information on LBP and LBP hazards before the sale or lease of most housing built before 1978.

No structures are located on the subject property. As such, an LBP evaluation was not required by the scope of services.

### *6.3.3 Radon*

Radon is a colorless, odorless, naturally occurring, radioactive, inert, gaseous element formed by radioactive decay of radium (Ra) atoms. The US EPA has prepared a map to assist National, State, and local organizations to target their resources and to implement radon-resistant building codes. The map divides the country into three Radon Zones, according to the table below:

| ***EPA Radon Zones*** | | |
|---|---|---|
| **EPA Zones** | **Average Predicted Radon Levels** | **Potential** |
| Zone 1 | Exceed 4.0 pCi/L | Highest |
| Zone 2 | Between 2.0 and 4.0 pCi/L | Moderate |
| Zone 3 | Less than 2.0 pCi/L | Low |

It is important to note that the EPA has found homes with elevated levels of radon in all three zones, and the US EPA recommends site-specific testing in order to determine radon levels at a specific location. However, the map does give a valuable indication of the propensity of radon gas accumulation in structures.

Radon sampling was not conducted as part of this assessment. Review of the US EPA Map of Radon Zones places the subject property in Zone 2. Based upon the radon zone classification, radon is not considered to be a significant environmental concern.

### *6.3.4 Lead in Drinking Water*

The subject property is not currently serviced by a public water system. According to available information, a public water system operated by the Eastern Municipal Water District (EMWD) serves the subject property vicinity. According to the 2020 Annual Water Quality Report, water supplied by the EMWD is in compliance with State and Federal regulations pertaining to drinking water standards, including lead and copper.

### *6.3.5 Mold*

Molds are microscopic organisms found virtually everywhere, indoors and outdoors. Mold will grow and multiply under the right conditions, needing only sufficient moisture (e.g. in the form of very high humidity, condensation, or water from a leaking pipe, etc.) and organic material (e.g., ceiling tile, drywall, paper, or natural fiber carpet padding).

No structures are located on the subject property. As such, a mold evaluation was not required by the scope of services.

### *6.3.6 Wetlands*

The subject property does not appear to be a designated wetland area, based on information obtained from the United States Fish & Wildlife Service; however, a comprehensive wetlands survey would be required in order to formally determine actual wetlands on the subject property. No surface impoundments, wetlands, natural catch basins, settling ponds, or lagoons are located on the subject property.

## 6.4 Adjoining Property Reconnaissance

The adjoining property reconnaissance consisted of observing the adjoining properties from the subject property premises. No items of environmental concern were identified on the adjoining properties during the site assessment, including hazardous substances, petroleum products, ASTs, USTs, evidence of releases, PCBs, strong or noxious odors, pools of liquids, sumps or clarifiers, pits or lagoons, stressed vegetation, or any other potential environmental hazards, except for the hazardous waste treatment area located to the south (further discussed in applicable sections of this report).

# 7.0 VAPOR ENCROACHMENT CONDITIONS

Partner conducted a limited non-intrusive vapor screening on the subject property to identify, to the extent feasible, the potential for vapor encroachment conditions (VECs) in connection with the subject property. This included consideration of chemicals of concern (COC) that may migrate as vapors into the subsurface of the subject property as a result of contaminated soil and groundwater on or near the property.

This screening utilized readily available data sources previously discussed in this Phase I ESA that includes:

- the physical setting of the subject property (Section 2.4),
- standard historical sources for the subject property, adjoining, and surrounding area (Section 3.0),
- known or potentially contaminated sites as identified from information from regulatory agencies and sites on Federal, State, tribal and local databases (Section 4.0), and
- information from the site reconnaissance (Section 6.0) of the subject property and observations of the surrounding properties.

The results of our data collection, reconnaissance, and analysis are tabulated below:

| *Potential for Vapor Encroachment to Impact the Subject Property* | |
|---|---|
| **Area of Concern** | **Likely or Known VEC to Subject Property** |
| Subject Property Existing Operations or Conditions | None identified that impact the subject property. |
| Historical Uses of the Subject Property | None identified that impact the subject property. |
| Adjoining Property Operations or Existing Conditions | None identified that impact the subject property. |
| Historical Uses of Adjoining Properties or Nearby Properties | None identified that impact the subject property. |
| Regulatory Review of sites identified on Federal, State, tribal and Local Environmental Databases which were located in the AMSD | None identified that impact the subject property. |

# 8.0 FINDINGS AND CONCLUSIONS

## Findings and Opinions

### *Recognized Environmental Condition*

A *recognized environmental condition (REC)* refers to the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; the likely presence of hazardous substances or petroleum products in, on, or at the subject property due to a release or likely release to the environment; or the presence of hazardous substances or petroleum products in, on, or at the subject property under conditions that pose a material threat of a future release to the environment.

- Partner did not identify any RECs during the course of this assessment.

### *Controlled Recognized Environmental Condition*

A *controlled recognized environmental condition (CREC)* refers to a REC affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls (for example, activity and use limitations or other property use limitations).

- Partner did not identify any CRECs during the course of this assessment.

### *Historical Recognized Environmental Condition*

A *historical recognized environmental condition (HREC)* refers to a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the subject property to any controls (for example, activity and use limitations or other property use limitations).

- Partner did not identify any HRECs during the course of this assessment.

### *Business Environmental Risk*

A *Business Environmental Risks (BER)* is a risk which can have a material environmental or environmentally driven impact on the business associated with the current or planned use of commercial real estate, not necessarily related to those environmental issues required to be investigated in this practice. The following was identified during the course of this assessment:

- At the time of Partner's March 2022 site reconnaissance, a hazardous waste treatment area, operated by JN Grease Services, was observed immediately to the south of the subject property. The area included standing water/pond with multiple 55-gallon drums, totes, aboveground storage tanks (ASTs), scrap metal, junk cars, and other miscellaneous equipment. A foul odor was present in the area as well. Partner did not identify apparent signs of contamination (stained soil or distressed vegetation) along the subject property boundary that abuts the hazardous waste treatment area. In addition, no related releases were reported. Based on the current use of the subject property (vacant land/open pit being filled in/leveled), lack of reported releases, and lack of apparent signs of contamination, no further action appears warranted at this time. However,

during future development activities, any impacted soils encountered in the southern area of the subject property should be properly disposed of in accordance with applicable regulations.

- According to available historical sources, quarry and pit operations consisting of sand and gravel were formerly conducted at the subject property from the early 1960s through the late 2000s. Quarry operations for sand and gravel requires the removal of virtually all natural vegetation, top soil and subsoil to reach the aggregate underneath. Quarries and pits disrupt the existing movement of surface water and groundwater. However, quarry/pit operations that extract sand and gravel are not generally known to cause subsurface contamination. In addition, there was no evidence of collieries, support structures, or large fuel tanks at the subject property. Furthermore, Partner did not observe any features of environmental concern or signs of contamination during the site reconnaissance. Based on the above, the former quarry and pit operations extracting sand and gravel are not expected to represent a significant environmental concern.

### *Significant Data Gaps*

No significant data gaps affecting the ability of the Environmental Professional to identify a REC were encountered during this assessment.

## Conclusions and Recommendations

Partner has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-13 and E1527-21 of East of Trumble Road; North of Ethanac Road; West of Sherman Road in Menifee, Riverside County, California (the "subject property"). Any exceptions to, or deletions from, this practice are described in Section 1.5 of this report.

This assessment has revealed no evidence of RECs, CRECs, or HRECs in connection with the subject property; however, BERs were identified. Based on the conclusions of this assessment, Partner recommends no further investigation of the subject property at this time.

## 9.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Partner has performed a Phase I Environmental Site Assessment of the property located at East of Trumble Road; North of Ethanac Road; West of Sherman Road in Menifee, Riverside County, California in conformance with the scope and limitations of the protocol and the limitations stated earlier in this report. Exceptions to or deletions from this protocol are discussed earlier in this report.

By signing below, Partner declares that, to the best of our professional knowledge and belief, we meet the definition of *Environmental Professional* as defined in §312.10 of 40 CFR §312. Partner has the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the subject *property*. Partner has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Prepared By:

**DRAFT**

Joseph Kim, CEM, CHMM
Environmental Professional

Reviewed By:

**DRAFT**

Candice McCann
Senior Author

# 10.0 REFERENCES

**Reference Documents**

American Society for Testing and Materials, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, ASTM Designation: E1527-13 and E1527-21.

Environmental Risk Information Services (ERIS), Database Report, March 2022

ERIS, City Directory, March 2022

ERIS, Fire Insurance Maps, March 2022

ERIS, Historical Aerials, March 2022

ERIS, Topographic Maps, March 2022

Federal Emergency Management Agency, Federal Insurance Administration, National Flood Insurance Program, Flood Insurance Map, accessed via the internet, March 2022

United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey, accessed via the internet, March 2022

United States Environmental Protection Agency, EPA Map of Radon Zones (Document EPA-402-R-93-071), accessed via the internet, March 2022

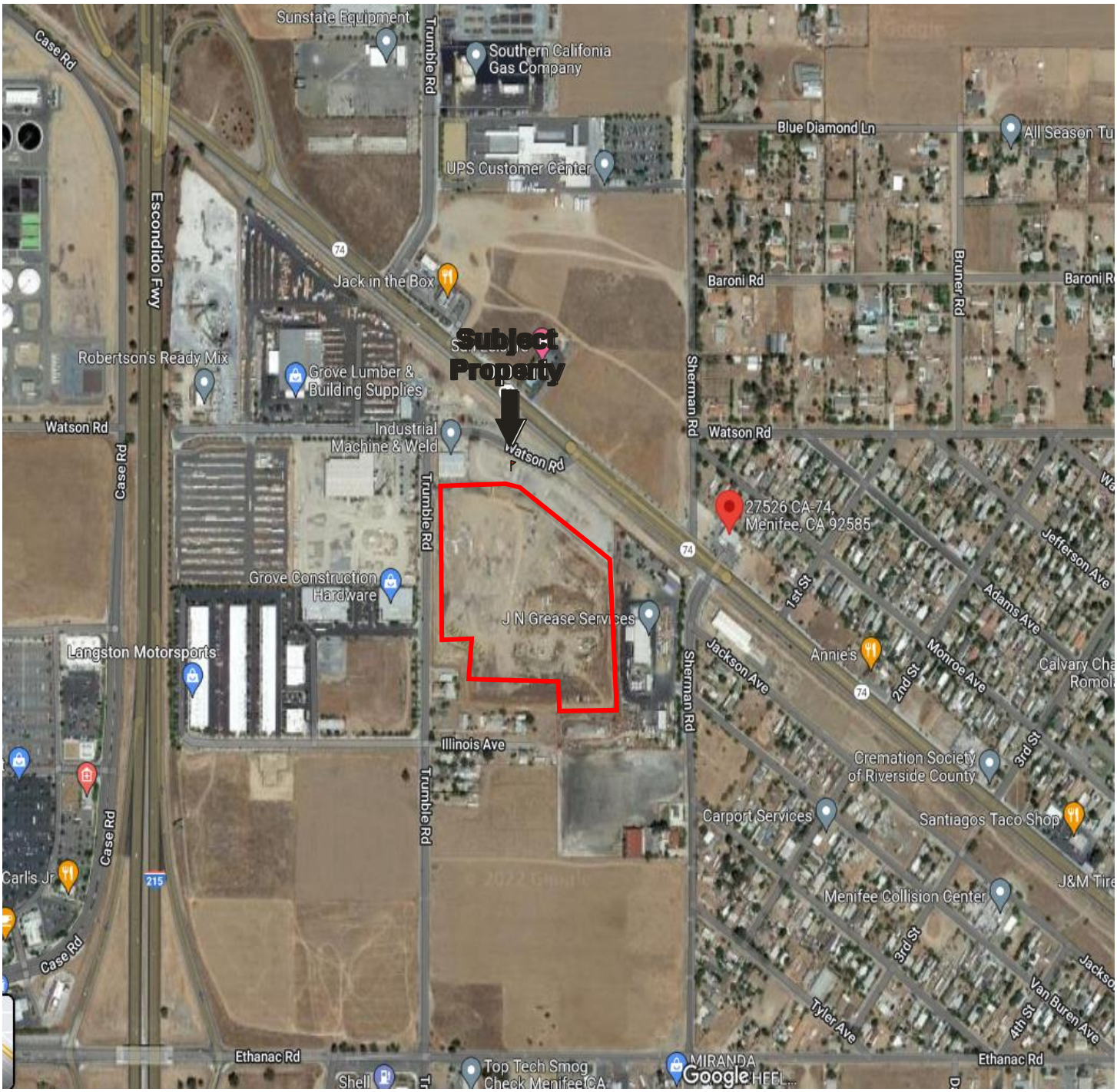
United States Geological Survey, accessed via the Internet, March 2022

# FIGURES

1 SITE LOCATION MAP

2 SITE PLAN

3 TOPOGRAPHIC MAP




N

Drawing Not To Scale

KEY:
Subject Property

**FIGURE 1: SITE LOCATION MAP**
**Project No. 21-347156.1**

PARTNER



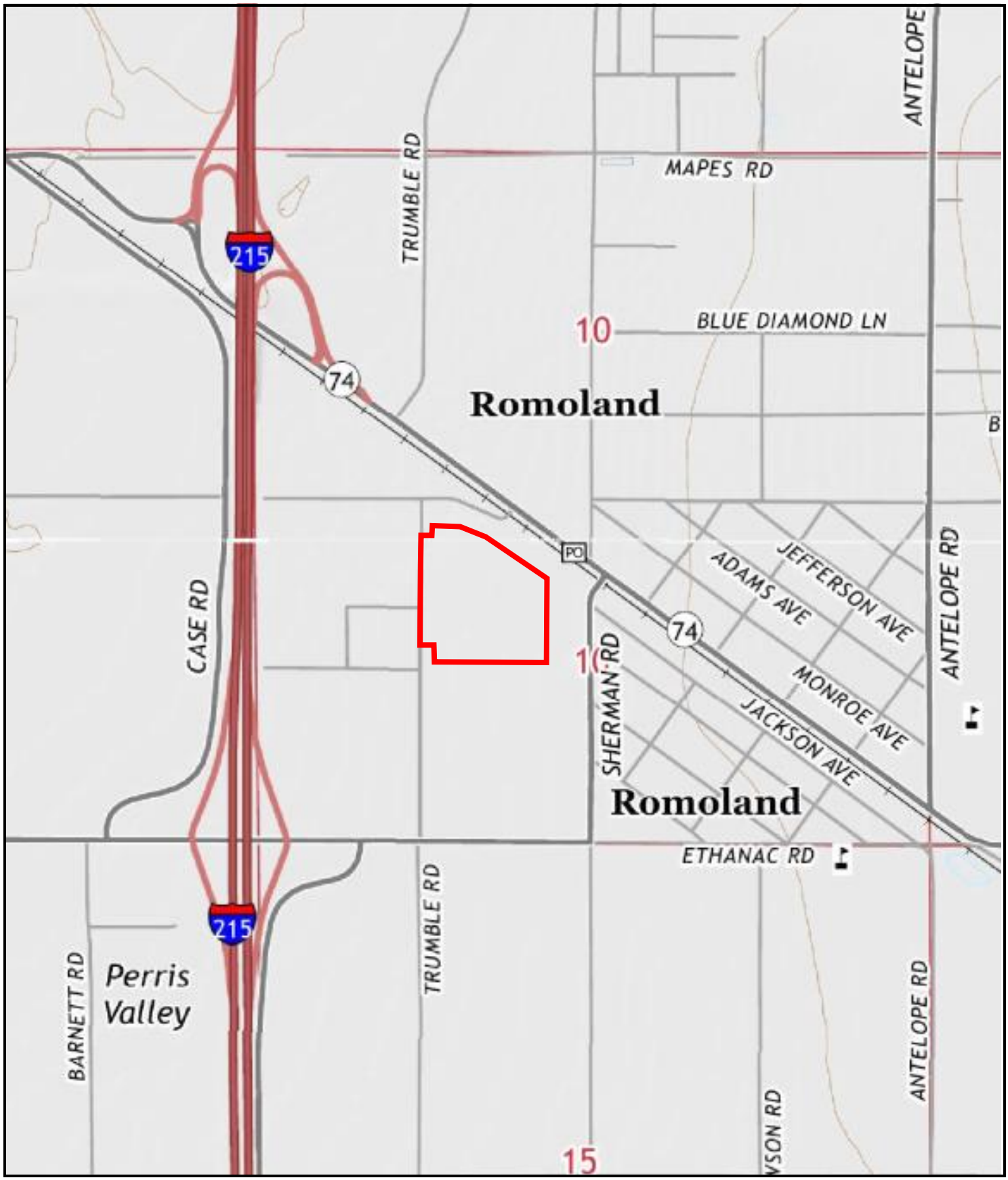

N

**GROUNDWATER FLOW**

KEY:
Subject Property

**FIGURE 2: SITE PLAN**
**Project No. 21-347156.1**

PARTNER




N

USGS 7.5 Minute *Perris, California* Quadrangle
Created: 2015

KEY:
Subject Property

**FIGURE 3: TOPOGRAPHIC MAP**
**Project No. 21-347156.1**

PARTNER

# APPENDIX A: SITE PHOTOGRAPHS



1. Office trailer in the northwestern portion.



2. Northern portion of the subject property looking east.



3. Northern portion of the subject property looking west.



4. Water AST in the northern portion.



5. Western portion of the subject property looking south.



6. Western portion of the subject property looking north.



7. Southern portion of the subject property looking west.



8. Water AST (inactive) in the southern portion.



9. Eastern portion of the subject property looking north.



10. Eastern portion of the subject property looking south.



11. Pit area looking east.



12. Pit area looking south.



13. Pit area looking northwest.



14. Heavy equipment and tools in the pit area.



15. Heavy equipment and tools in the pit area.



16. Heavy equipment and tools in the pit area.



17. Adjoining property to the north (Industrial Machine & Weld).



18. Adjoining property to the east (JN Grease Services).



19. Adjoining property to the south (hazardous waste treatment area).




20. Adjoining property to the south (hazardous waste treatment area).



21. Adjoining property to the south (hazardous waste treatment area).



22. Adjoining property to the south (hazardous waste treatment area).



23. Adjoining properties to the south (dwellings).



24. Adjoining property to the west (Soil Retention Products).



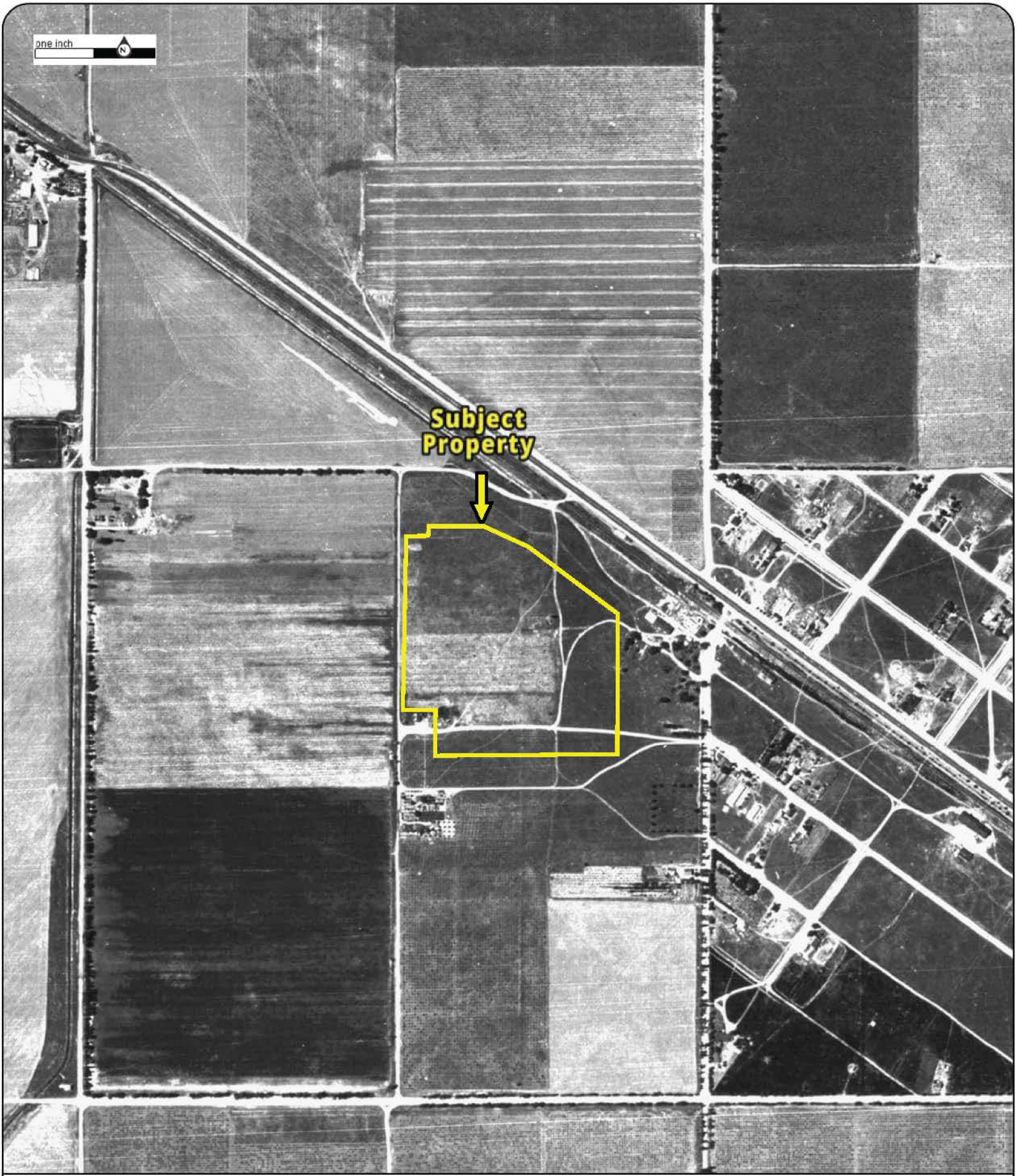
25. Adjoining property to the west (Grove Construction Hardware).



26. Adjoining property to the west (vacant land).

# APPENDIX B: HISTORICAL/REGULATORY DOCUMENTATION

PARTNER

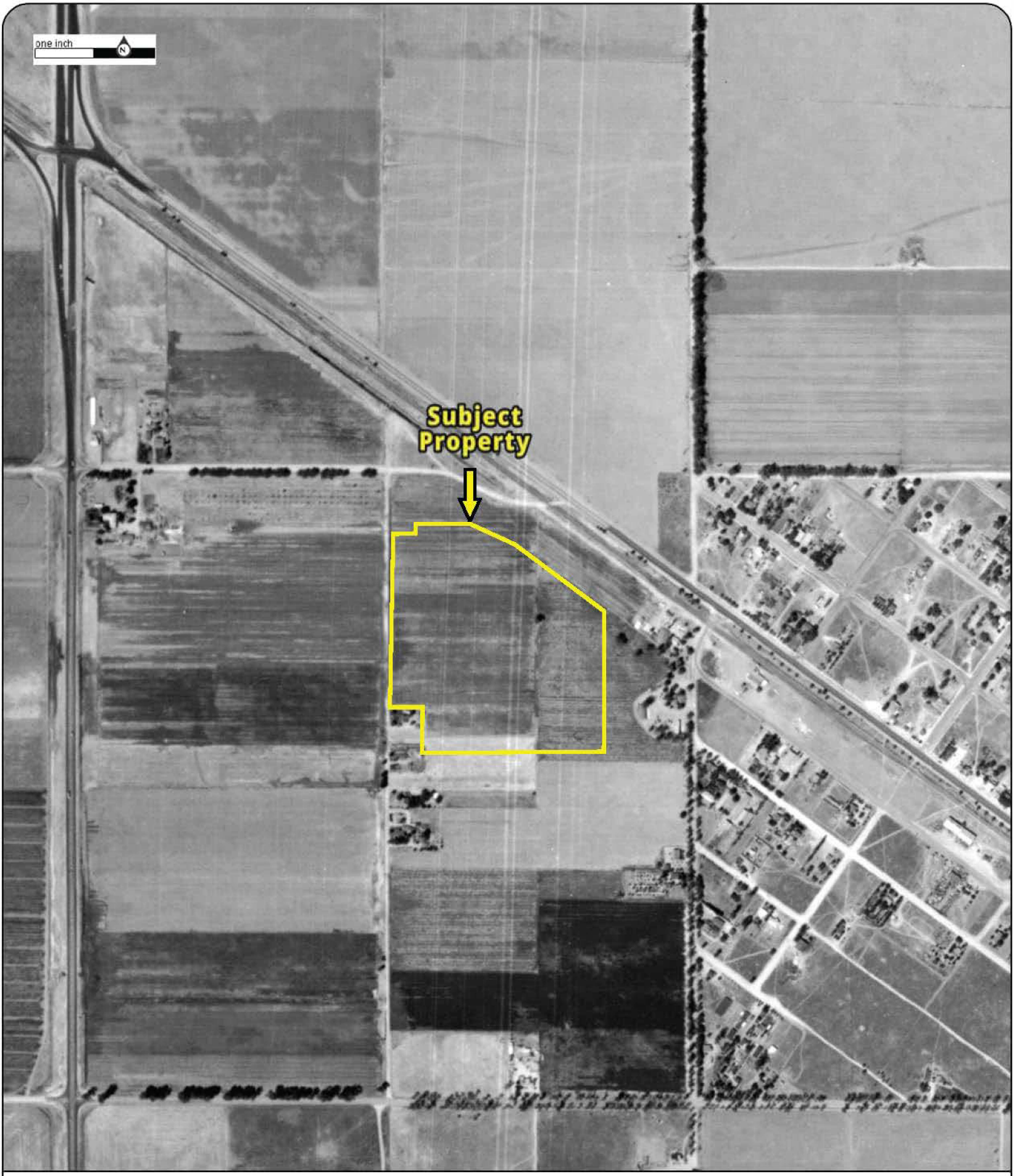



Year: 1938
Source: ASCS
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 1953
Source: ASCS
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 1962
Source: FAIRCHILD
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 1967
Source: ASCS
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 1976
Source: PRIVATE
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 1985
Source: USGS
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 1994
Source: USGS
Scale: 1" = 500'
Comment: Best Copy Available

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 2002
Source: USGS
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 2004
Source: USDA
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 2006
Source: USDA
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 2010
Source: USDA
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 2012
Source: USDA
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 2014
Source: USDA
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 2016
Source: USDA
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER

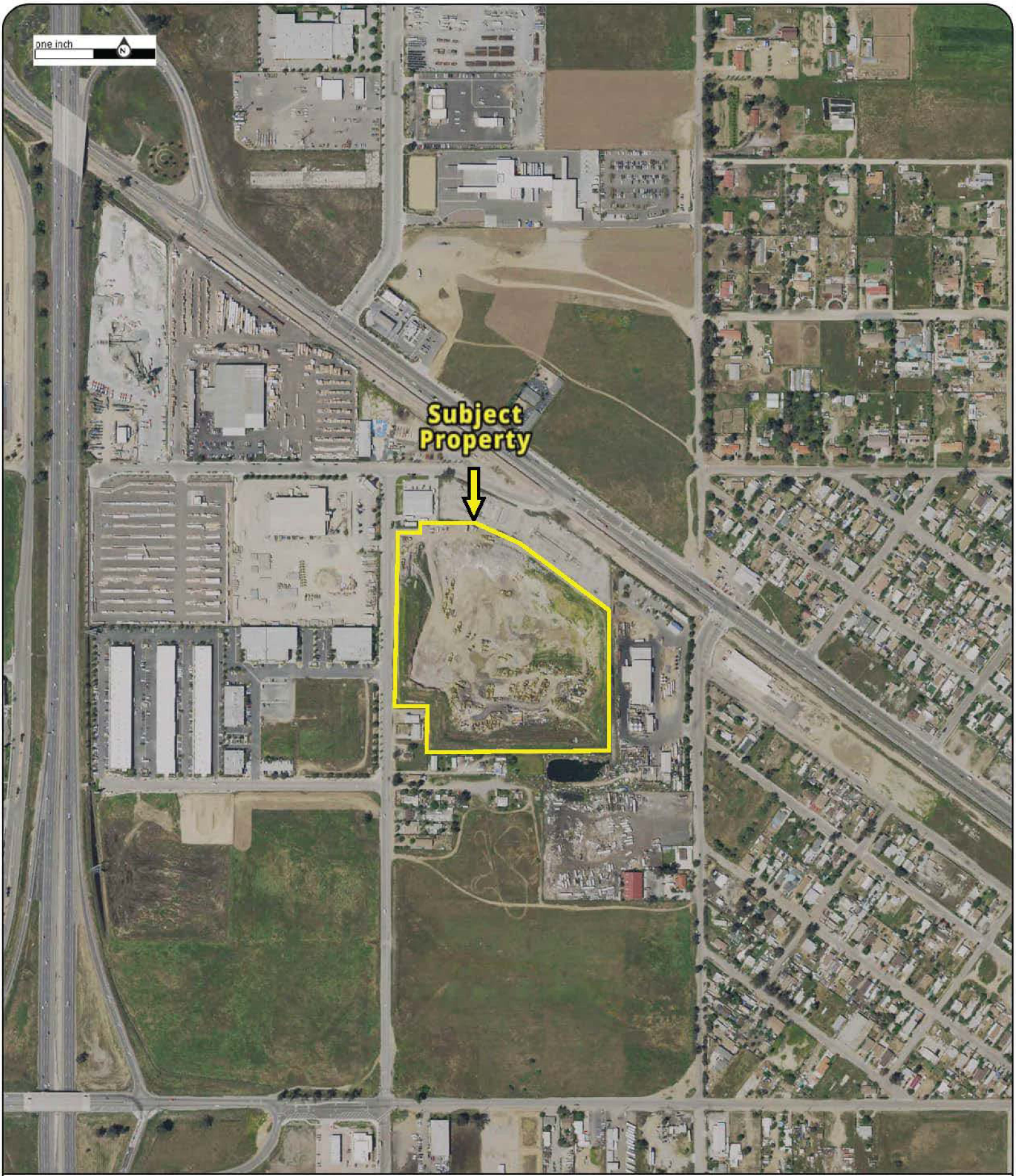



Year: 2018
Source: USDA
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER




Year: 2020
Source: USDA
Scale: 1" = 500'
Comment:

Address: East of Trumble Rd; North of Ethanac Rd; West of Sherman Rd, MENIFEE, CA
Approx Center: -117.18319605,33.74816091

Order No: 22030200596

PARTNER

# Appendix 5: LID Infeasibility

*LID Technical Infeasibility Analysis (NOT APPLICABLE)*

# Appendix 6: BMP Design Details

*BMP Sizing, Design Details and other Supporting Documentation*

Riverside County SWCT²

# Stormwater & Water Conservation Tracking Tool

Choose search item from list | Enter Value | Locate | Clear Results

33.7490,-117.1780 Zoom: 14.5

WQMP report is only available at zoom level 16 or greater.

Toggle Legend | Clear Layers | Metadata | Map Tutorial

- **Base Data**
- **Stormwater Data**
  - Hydromodification Susceptibility Mapping
  - 2010 - 303d/TMDL
  - Hydromodification Exemption Areas
  - District Facilities
  - Permit Areas
  - Hydrologic Unit Codes(HUC)
  - Topographic Drainage Boundary
  - Drainage Area Boundaries
  - City Storm Drains
  - WQMP 85% Design Isohyetal Map
    - Rain Gauges
    - Isohyetal Minor Contours
    - Isohyetal Major Contours
  - CRP (Control Release Point)
  - FEMA Floodplain
  - Flood Plain - Other Special Studies
  - As-Built Plans
- **Groundwater Data**
- **U.S. Fish and Wildlife Critical Habitat**
- **WRMSHCP Potential Survey Areas**
- **SKRHCP**
- **CVMSHCP Survey Data and Conservation Areas**

**Identified Features**

329240048 (Riverside County Parc

500 m
1000 ft

Streets

## Santa Ana Watershed - BMP Design Volume, $V_{BMP}$

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

| | | | |
|---|---|---|---|
| Company Name | Thienes Engineering, Inc. | Date | 6/24/2022 |
| Designed by | Luis Prado | Case No | |
| Company Project Number/Name | Lovett 215 (TEI 4100) / Trumble Road (DMA A) | | |

### BMP Identification

BMP NAME / ID: STC/MWS "A"

*Must match Name/ID used on BMP Design Calculation Sheet*

### Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

$D_{85}$= 0.610 inches

### Drainage Management Area Tabulation

*Insert additional rows if needed to accommodate all DMAs draining to the BMP*

| DMA Type/ID | DMA Area (square feet) | Post-Project Surface Type | Effective Imperivous Fraction, $I_f$ | DMA Runoff Factor | DMA Areas x Runoff Factor | Design Storm Depth (in) | Design Capture Volume, $V_{BMP}$ (cubic feet) | Proposed Volume on Plans (cubic feet) |
|---|---|---|---|---|---|---|---|---|
| A1 | 427,890 | Concrete or Asphalt | 1 | 0.89 | 381677.8 | | | |
| A2 | 22,521 | Ornamental Landscaping | 0.1 | 0.11 | 2487.6 | | | |
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| | | | | | | | | |
| | 450410.4 | Total | | | 384165.4 | 0.610 | 19528.4 | 20,230 |

Notes:

Total tributary area = 10.34 acres

The underground chambers will be utilized to store the DCV plus the HCOC mitigation volume. The DCV is met at approximately 3.33 feet above the bottom of stone. The volume above this depth will be released via a flow-control orifice.

# WETLANDMod VOLUME BASED SIZING SHEET

## Project Location

| | |
|---|---|
| **Project Name** | Lovett 215 (DMA A) |
| **City/Town** | Menifee, CA |
| **State** | CA |
| **Zip Code** | 92571 |



**Horizontal Flow Biofiltration System**

| SIZING CALCULATIONS | Inputs | Units | Notes/References |
|---|---|---|---|
| **Impervious Area** | | | |
| **BMP Drainage Area** (not required - manual entry - not part of formula) | 10.34 | Acres | This includes all areas that will contribute runoff to the proposed BMP, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP. |
| **Watershed Impervious Ratio** (not required - manual entry - not part of formula) | | | Watershed Imperviousness Ratio", is equal to the percent of total impervious area in the "BMP Drainage Area" divided by 100 |
| **Runoff Coefficient "C"** (not required - manual entry - not part of formula) | | | |
| **Water Quality Volume** (required) | 19529 | cubic feet | Use sizing procedures provided by state or local agencies to determine the appropriate Water Quality Volume. Intensities and design storms vary widely by region and method. |
| **Design Storm Duration** | 0 | hours | Varies depending on geographical region. Set at 0 for pump system set up. LA County 3 hours. Call for details. |
| **MWS Sizing** | | | |
| **WetlandMod Model Number** (from matrix) | MWS-L-8-12 | | Please choose size from "Model Size Matrix" Tab |
| **HGL** | 3.4 | | Treatment Hydraulic Grade Line |
| **# Of Units** | 1 | quantity | Select the number of systems required to treat the water quality volume. Will very depending on drain down time regulaitons. |
| **Discharge Rate** (from matrix) | 39.25 | gallons/minute | Loading Rate of 0.025 gpm/sq ft or 2.5 in/hr. Field Verified. |
| **Volume Treated During Event** | | | |
| **Processed through MWS - Linear** | 0 | cubic feet | **39.2496** gals/minute |
| **Volume Treated Following Event** | | | |
| **MWS Static Capacity** (from matrix) | 187.14 | cubic feet | |
| **Volume Needed in *Pre-Storage*** | 19342 | cubic feet | Set at zero to start. Size pre-storage system to hold this volume |
| | | | Sizing complete when eqaul to value of zero. |
| **TOTAL STORMWATER TREATED** | 19529 | cubic feet | Note: This amount should be equal to the "Water Quality Volume" |
| **Drain Down Time** | 62.19 | hours | Drain down time must be equal to or less than requirement of local juristiction. Default 48 hours. |

**Feel free to fax or email proposed sizing calculations to Modular Wetlands Systems, Inc. for assistance with sizing, compliance, and design.**

**Phone: 760.433.7640**
**Fax: 760.433.3176**
**Email: Info@modularwetlands.com**

BioClean
A Forterra Company

StormTech
Detention • Retention • Recharge
Subsurface Stormwater Management℠

# MC-3500 Site Calculator

**Project Information:**

| | |
|---|---|
| Project Name: | Lovett 215 (DMA A) |
| Location: | Trumble Road, Menifee, CA |
| Date: | 22-Jun |
| Engineer: | Thienes Engineering, Inc. |
| StormTech RPM: | |

## System Requirements

| | | | |
|---|---|---|---|
| Units | | Imperial | |
| Required Storage Volume | | 58587 | CF |
| Stone Porosity (Industry Standard = 40%) | | 40 | % |
| Stone Above Chambers | (12 inch min.) | 12 | inches |
| Stone Foundation Depth | (9 inch min.) | 36 | inches |
| Average Cover over Chambers | (24 inch min.) | 24 | inches |
| Bed size controlled by WIDTH or LENGTH? | | WIDTH | |
| Limiting WIDTH or LENGTH dimension | | 65 | feet |
| Storage Volume per Chamber | | 225.1 | CF |
| Storage Volume per End Cap | | 62.3 | CF |

## System Sizing

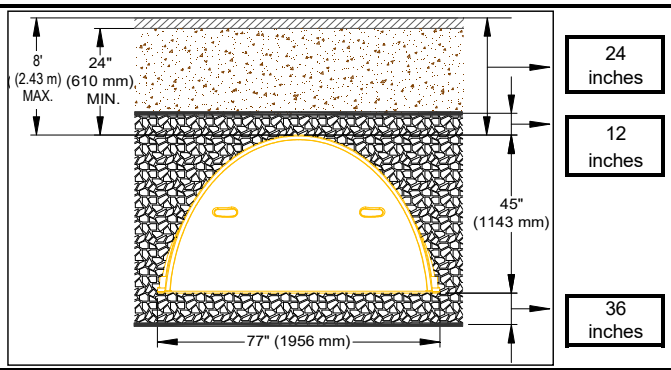
| | | |
|---|---|---|
| Number of Chambers Required | 256 | each |
| Number of End Caps Required | 16 | each |
| Bed Size (including perimeter stone) | 13,716 | square feet |
| Stone Required (including perimeter stone) | 4049 | tons |
| Volume of Excavation | 3937 | cubic yards |
| Non-woven Filter Fabric Required (20% Safety Factor) | 4262 | square yards |
| Length of Isolator Row | 234.1 | feet |
| Non-woven Isolator Row Fabric (20% Safety Factor) | 406 | square yards |
| Woven Isolator Row Fabric (20% Safety Factor) | 515 | square yards |
| Installed Storage Volume | 58,622 | cubic feet |

## Controlled by Width (Rows)

| | | |
|---|---|---|
| Maximum Width = | 65 | feet |

8 rows of 32 chambers

| | | |
|---|---|---|
| Maximum Length = | 234.11 | feet |
| Maximum Width = | 58.59 | feet |




*This represents the estimated material and site work costs (US dollars) for the project. Materials excluded from this estimate are conveyance pipe, pavement design, etc. It is always advisable to seek detailed construction costs from local installers. Please contact STORMTECH at 888-892-2694 for additional cost information.

## Santa Ana Watershed - BMP Design Volume, $V_{BMP}$

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

| | | | |
|---|---|---|---|
| Company Name | Thienes Engineering, Inc. | Date | 6/24/2022 |
| Designed by | Luis Prado | Case No | |
| Company Project Number/Name | Lovett 215 (TEI 4100) / Trumble Road (DMA B) | | |

### BMP Identification

BMP NAME / ID: STC/MWS "B"

*Must match Name/ID used on BMP Design Calculation Sheet*

### Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

$D_{85}$= 0.610 inches

### Drainage Management Area Tabulation

*Insert additional rows if needed to accommodate all DMAs draining to the BMP*

| DMA Type/ID | DMA Area (square feet) | Post-Project Surface Type | Effective Imperivous Fraction, $I_f$ | DMA Runoff Factor | DMA Areas x Runoff Factor | *Design Storm Depth (in)* | *Design Capture Volume, $V_{BMP}$ (cubic feet)* | *Proposed Volume on Plans (cubic feet)* |
|---|---|---|---|---|---|---|---|---|
| *B1* | *297,123* | *Concrete or Asphalt* | *1* | *0.89* | *265033.5* | | | |
| *B2* | *15,638* | *Ornamental Landscaping* | *0.1* | *0.11* | *1727.3* | | | |
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| | **312760.8** | | ***Total*** | | **266760.8** | **0.610** | ***13560.3*** | ***14,099*** |

Notes:

Total tributary area = 7.18 acres

The underground chambers will be utilized to store the DCV plus the HCOC mitigation volume. The DCV is met at approximately 3.33 feet above the bottom of stone. The volume above this depth will be released via a flow-control orifice.

# WETLANDMod VOLUME BASED SIZING SHEET

## Project Location

| | |
|---|---|
| **Project Name** | Lovett 215 (DMA B) |
| **City/Town** | Menifee, CA |
| **State** | CA |
| **Zip Code** | 92571 |



**Horizontal Flow Biofiltration System**

| SIZING CALCULATIONS | Inputs | Units | Notes/References |
|---|---|---|---|
| **Impervious Area** | | | |
| **BMP Drainage Area** (not required - manual entry - not part of formula) | 7.18 | Acres | This includes all areas that will contribute runoff to the proposed BMP, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP. |
| **Watershed Impervious Ratio** (not reguired - manual entry - not part of formula) | | | Watershed Imperviousness Ratio", is equal to the percent of total impervious area in the "BMP Drainage Area" divided by 100 |
| **Runoff Coefficient "C"** (not required - manual entry - not part of formula) | | | |
| **Water Quality Volume** (required) | 13561 | cubic feet | Use sizing procedures provided by state or local agencies to determine the appropriate Water Quality Volume. Intensities and design storms vary widely by region and method. |
| **Design Storm Duration** | 0 | hours | Varies depending on geographical region. Set at 0 for pump system set up. LA County 3 hours. Call for details. |
| **MWS Sizing** | | | |
| **WetlandMod Model Number** (from matrix) | MWS-L-4-19 | | Please choose size from "Model Size Matrix" Tab |
| **HGL** | 3.4 | | Treatment Hydraulic Grade Line |
| **# Of Units** | 1 | quantity | Select the number of systems required to treat the water quality volume. Will very depending on drain down time regulaitons. |
| **Discharge Rate** (from matrix) | 26.87 | gallons/minute | Loading Rate of 0.025 gpm/sq ft or 2.5 in/hr. Field Verified. |
| **Volume Treated During Event** | | | |
| **Processed through MWS - Linear** | 0 | cubic feet | 26.8736 gals/minute |
| **Volume Treated Following Event** | | | |
| **MWS Static Capacity** (from matrix) | 131.10 | cubic feet | |
| **Volume Needed in *Pre-Storage*** | 13430 | cubic feet | Set at zero to start. Size pre-storage system to hold this volume |
| | | | Sizing complete when eqaul to value of zero. |
| **TOTAL STORMWATER TREATED** | 13561 | cubic feet | Note: This amount should be equal to the "Water Quality Volume" |
| **Drain Down Time** | 63.08 | hours | Drain down time must be equal to or less than requirement of local juristiction. Default 48 hours. |

**Feel free to fax or email proposed sizing calculations to Modular Wetlands Systems, Inc. for assistance with sizing, compliance, and design.**

**Phone: 760.433.7640**
**Fax: 760.433.3176**
**Email: Info@modularwetlands.com**

BioClean
A Forterra Company

StormTech
Detention • Retention • Recharge
Subsurface Stormwater Management℠

# MC-3500 Site Calculator

**Project Information:**

| | |
|---|---|
| Project Name: | Lovett 215 (DMA B) |
| Location: | Trumble Road, Menifee, CA |
| Date: | 22-Jun |
| Engineer: | Thienes Engineering, Inc. |
| StormTech RPM: | |

## System Requirements

| | | | |
|---|---|---|---|
| Units | | Imperial | |
| Required Storage Volume | | 40683 | CF |
| Stone Porosity (Industry Standard = 40%) | | 40 | % |
| Stone Above Chambers | (12 inch min.) | 12 | inches |
| Stone Foundation Depth | (9 inch min.) | 36 | inches |
| Average Cover over Chambers | (24 inch min.) | 24 | inches |
| Bed size controlled by WIDTH or LENGTH? | | WIDTH | |
| Limiting WIDTH or LENGTH dimension | | 26 | feet |
| Storage Volume per Chamber | | 225.1 | CF |
| Storage Volume per End Cap | | 62.3 | CF |

## System Sizing

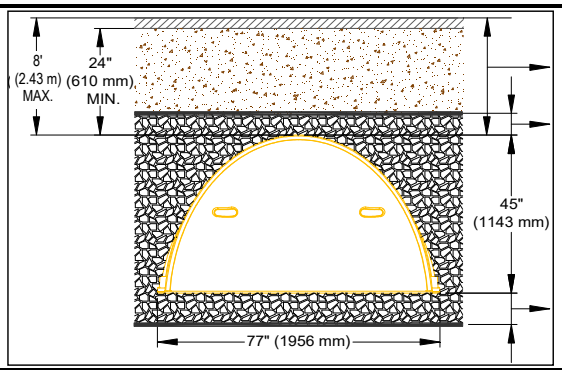
| | | |
|---|---|---|
| Number of Chambers Required | 180 | each |
| Number of End Caps Required | 6 | each |
| Bed Size (including perimeter stone) | 9,892 | square feet |
| Stone Required (including perimeter stone) | 2952 | tons |
| Volume of Excavation | 2839 | cubic yards |
| Non-woven Filter Fabric Required (20% Safety Factor) | 3583 | square yards |
| Length of Isolator Row | 434.8 | feet |
| Non-woven Isolator Row Fabric (20% Safety Factor) | 754 | square yards |
| Woven Isolator Row Fabric (20% Safety Factor) | 957 | square yards |
| Installed Storage Volume | 40,892 | cubic feet |

## Controlled by Width (Rows)

| | | |
|---|---|---|
| Maximum Width = | 26 | feet |

3 rows of 60 chambers

| | | |
|---|---|---|
| Maximum Length = | 434.79 | feet |
| Maximum Width = | 22.75 | feet |




*This represents the estimated material and site work costs (US dollars) for the project. Materials excluded from this estimate are conveyance pipe, pavement design, etc. It is always advisable to seek detailed construction costs from local installers. Please contact STORMTECH at 888-892-2694 for additional cost information.

# Appendix 7: Hydromodification

*Supporting Detail Relating to Hydrologic Conditions of Concern*

# HCOC MAP

Trumble Road, Menifee

**Legend**

- Not Susceptible
- Potentially Susceptible

W 4th St
Perris
E 4th St
74
Goetz Rd
215
Menifee Rd
Murrieta Rd
Ethanac Rd
ROMOLAND
74
Case Rd
Menifee Rd
215
N
Google Earth
1 mi

# Appendix 8:  Source Control

*Pollutant Sources/Source Control Checklist*

# STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

| IF THESE SOURCES WILL BE ON THE PROJECT SITE ... | ... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE | | |
|---|---|---|---|
| 1<br>Potential Sources of Runoff Pollutants | 2<br>Permanent Controls—Show on WQMP Drawings | 3<br>Permanent Controls—List in WQMP Table and Narrative | 4<br>Operational BMPs—Include in WQMP Table and Narrative |
| ☒ A. **On-site storm drain inlets** | ☒ **Locations of inlets.** | ☒ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.** | ☒ **Maintain and periodically repaint or replace inlet markings.**<br>☒ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.**<br>☒ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**<br>☒ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."** |
| ☒ B. **Interior floor drains and elevator shaft sump pumps** | | ☒ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.** | ☒ **Inspect and maintain drains to prevent blockages and overflow.** |
| ☐ C. **Interior parking garages** | | ☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.** | ☐ **Inspect and maintain drains to prevent blockages and overflow.** |

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| ❑ D1. **Need for future indoor & structural pest control** | | ❑ **Note building design features that discourage entry of pests.** | ❑ **Provide Integrated Pest Management information to owners, lessees, and operators.** |
| ☒ D2. **Landscape/ Outdoor Pesticide Use** | ❑ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.**<br>☒ **Show self-retaining landscape areas, if any.**<br>❑ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)** | **State that final landscape plans will accomplish all of the following.**<br>❑ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.**<br>☒ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.**<br>☒ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.**<br>☒ **Consider using pest-resistant plants, especially adjacent to hardscape.**<br>**To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.** | ☒ **Maintain landscaping using minimum or no pesticides.**<br>☒ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.**<br>☒ **Provide IPM information to new owners, lessees and operators.** |

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| ❑ E. **Pools, spas, ponds, decorative fountains, and other water features.** | ❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)** | **If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.** | ❑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/ |
| ❑ F. **Food service** | ❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.**<br>❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.** | ❑ **Describe the location and features of the designated cleaning area.**<br>❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.** | ❑ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/<br>**Provide this brochure to new site owners, lessees, and operators.** |
| ☒ G. **Refuse areas** | ☒ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.**<br>☒ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.**<br>❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.** | ☒ **State how site refuse will be handled and provide supporting detail to what is shown on plans.**<br>☒ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.** | ☒ **State how the following will be implemented:**<br>**Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** |

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| ☒ H. **Industrial processes.** | ☐ **Show process area.** | ☒ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."** | ☒ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**<br>See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/ |

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| ❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)** | ❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.**<br>❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.**<br>❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.** | **Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.**<br>**Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:**<br>▪ **Hazardous Waste Generation**<br>▪ **Hazardous Materials Release Response and Inventory**<br>▪ **California Accidental Release (CalARP)**<br>▪ **Aboveground Storage Tank**<br>▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991**<br>▪ **Underground Storage Tank**<br>**www.cchealth.org/groups/hazmat/** | ❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** |

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| ❑ J. **Vehicle and Equipment Cleaning** | ❑ **Show on drawings as appropriate:**<br>**(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.**<br>**(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).**<br>**(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.**<br>**(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.** | ❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.** | **Describe operational measures to implement the following (if applicable):**<br>❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/<br>❑ **Car dealerships and similar may rinse cars with water only.** |

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| ❑ K. **Vehicle/Equipment Repair and Maintenance** | ❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.**<br>❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.**<br>❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.** | ❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.**<br>❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**<br>❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** | **In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:**<br>❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.**<br>❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.**<br>❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.**<br>Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/<br>Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ |

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| ❑ L. **Fuel Dispensing Areas** | ❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.**<br>❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.** | | ❑ **The property owner shall dry sweep the fueling area routinely.**<br>❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** |

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

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| ☒ M. **Loading Docks** | ☒ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.**<br>❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.**<br>❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.** | | ☒ **Move loaded and unloaded items indoors as soon as possible.**<br>☒ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** |

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| ☐ N. **Fire Sprinkler Test Water** | | ☐ **Provide a means to drain fire sprinkler test water to the sanitary sewer.** | ☐ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** |
| O. **Miscellaneous Drain or Wash Water or Other Sources**<br>☐ **Boiler drain lines**<br>☐ **Condensate drain lines**<br>☐ **Rooftop equipment**<br>☒ **Drainage sumps**<br>☐ **Roofing, gutters, and trim.**<br>☐ **Other sources** | | ☐ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.**<br>☐ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.**<br>☐ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.**<br>☒ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.**<br>☐ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.**<br>**Include controls for other sources as specified by local reviewer.** | |

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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| ☒ P. **Plazas, sidewalks, and parking lots.** | | | ☒ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.** |

# Appendix 9: O&M

*Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms*

# Operation and Maintenance Plan

**Project Title:** Lovett 215

**Original Date Prepared**: June 24, 2022

**Revision Date(s)**: _____

**Revision Date(s)**: _____

**Revision Date(s)**: _____

**Revision Date(s)**: _____

**Contact Information:**

**Prepared for:**
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Contact: Al Dang

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Job No. 4100

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Appendix 4: Training Records
Appendix 5: Site Plan and Details
Appendix 6: "As-Built" Drawings
Appendix 7: Manufacturer Information
Appendix 8: Service Agreement Information

# I. Inspection and Maintenance Log

| Date | Observations/Actions | Inspector |
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Additional inspection and maintenance logs to be included in Appendix 1 of this O&M Plan.

# II. Updates, Revisions, and Errata

| Revision Number | Date | Brief Description of Update/Revision/Errata, include section and page number | Prepared and Approved By |
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Additional updates, revisions, and errata to be include in Appendix 2 of this O&M Plan.

# III. Introduction

Existing Site:
The site is currently a rough graded, undeveloped open pit. Runoff from most of the site sheet flows easterly into the open pit and is detained onsite.

Runoff from a portion of the site along Trumble Road and the southerly property line sheet flows southerly through the site and sits in a low spot along the southerly property line. A temporary solid fence prevents runoff from entering the residential houses to the south of the site.

Runoff from a portion of the northerly adjacent site sheet flows westerly onto the project site. These flows comingle with onsite runoff and are similarly detained onsite.

Hydrology:
Runoff from the easterly half of the proposed building, the truck yard, a portion of the northerly drive aisle and the southerly drive aisle will drain to catch basins located in the truck yard area drive aisle. Runoff will then be conveyed westerly across the southerly drive aisle via a proposed onsite storm drain.

Runoff from the westerly half of the proposed building, the westerly vehicular parking lot, the remaining portions of the northerly and southerly drive aisles will drain to catch basins located in the vehicular parking lot and southerly drive aisle. Runoff will then connect to the previously mentioned storm drain via two separate storm drain pipes. Ultimately, the project proposes to connect into an existing Caltrans RCB (that runs underneath Interstate 215) via a proposed 30" RCP public storm drain system in Trumble Road and Illinois Avenue.

Prior to runoff discharging offsite, diversion structures will be utilized to direct the DCV into the underground detention systems (STC-A and STC-B) and then slowly pumping the treatment flowrate through the proprietary biotreatment units (MWS-A and MWS-B). Proposed pumps will be utilized to pump treated flows back into the proposed storm drain systems.

The underground detention systems will also be utilized to mitigate the HCOC volume. A secondary outlet in the underground detention systems, located above the DCV depth, will discharge the HCOC volume into pumps that are designed to limit the discharge to a flowrate not greater than 110% of the pre-development 2-year peak flowrate.

The northerly offsite run-on will be captured in a v-gutter along the northerly property line and conveyed southerly through the site. Flows will ultimately discharge into the onsite storm drain past the water quality "bleed off" point.

The proposed pumps will be 1 HP, 460 V, 3 PH FLA, and 1.8 AMP. Pump specific details will be provided in final design.

Public Storm Drain:
There is an existing public storm drain, Line "A", that runs southerly in Trumble Road and continues westerly in Illinois Avenue. This storm drain system, designed by Albert A. Webb Associates (City File No. P8-921), discharges into an existing 6'x5' Caltrans RCB that runs underneath the Interstate 215 Freeway. However, though the site is tabled to the Caltrans RCB, it appears that the project site was not intended to discharge into Line "A". The existing pipe is also full, therefore, any additional flow added to the pipe will cause negative downstream hydraulic impacts.

Instead, the project site will drain to the existing Caltrans RCB via a proposed 30” RCP public storm drain system. The onsite storm drain system will “bubble out” into the public storm drain system. Once sufficient head is lost, a proposed pump will dry the pipe. The storm drain will convey flows southerly in Trumble Road then westerly in Illinois Avenue, running parallel to the existing storm drain. A proposed headwall structure will allow for both Line “A” and the proposed RCP to connect to the RCB.

# IV. Responsibility for Maintenance

## IV.A General

Funding will be provided by the owner:

Lovett Industrial
1902 Washington Avenue, Suite A
Houston, Texas 77007
Phone: (713) 212-1560
Contact: Al Dang

A copy of the Covenant Agreement will be attached in Appendix 3 of this O&M Plan.

## IV.B Staff Training Program

Staff training records and descriptions will be inserted in Appendix 4 of this O&M Plan.

## IV.C Records

Maintenance records are to be inserted chronologically in Appendix 1 of this O&M Plan.

## IV.D Safety

All maintenance procedures shall comply with the latest OSHA standards.

# V. Summary of Drainage Management Areas and Stormwater BMPs

## V.A Drainage Areas

See Appendix 5 of this O&M Plan for WQMP site map.

| DMA Name or ID | Surface Type(s)[1] | Area (Sq. Ft.) | Area (Acres) | DMA Type |
|---|---|---|---|---|
| A1 | Roofs/Conc/Asphalt | 427,890 | 9.82 | Type D |
| A2 | Ornamental Landscaping | 22,521 | 0.52 | Type D |
| B1 | Roofs/Conc/Asphalt | 297,123 | 6.82 | Type D |
| B2 | Ornamental Landscaping | 15,638 | 0.36 | Type D |

Geo-location of the BMPs using latitude and longitude coordinates

| BMP No. or ID | BMP Identifier and Description | Corresponding Plan Sheet(s) | Latitude | Longitude |
|---|---|---|---|---|
| A | On-site storm drain inlets | WQMP Site Map | --- | --- |
| B | Interior floor drains and elevator shaft sump pumps | N/A | --- | --- |
| D2 | Landscape / Outdoor Pesticide Use | On-Site Landscape Improvement Plans | --- | --- |
| G | Refuse Areas | WQMP Site Map | --- | --- |
| H | Industrial processes | WQMP Site Map | --- | --- |
| M | Loading Docks | WQMP Site Map | --- | --- |
| P | Plazas, sidewalks, and parking lots | WQMP Site Map | --- | --- |
| MWS-A | Modular Wetlands System | WQMP Site Map | 33.747242 | -117.181840 |
| STC-A | Underground Detention System | WQMP Site Map | 33.747601 | -117.182002 |
| MWS-B | Modular Wetlands System | WQMP Site Map | 33.747665 | -117.184421 |
| STC-B | Underground Detention System | WQMP Site Map | 33.747954<br>33.748780 | -117.184299<br>-117.184297 |

## V.B Structural Post-Construction BMPs

See Appendix 5 of this O&M Plan for WQMP site map.

Additional BMP details are available in Appendix 10 of the WQMP.

## V.C Self-Retaining Areas or Other

No self-retaining areas proposed.

# VI. Stormwater BMP Design Documentation

## VI.A "As-Built" Drawings of each Stormwater BMP

See Appendix 6 of this O&M Plan for "as-built" drawings.

## VI.B Manufacturer's Data, Manuals, and Maintenance Requirements

Not applicable, there are no manufactured stormwater BMPs.

## VI.C Specific Operation and Maintenance Concerns and Troubleshooting

Not applicable.

# VII. Maintenance Schedule or Matrix

## VII.A Maintenance Schedule

| Schedule (Underground Detention Chamber) | Inspection and Maintenance Activity (Underground Detention Chambers) |
|---|---|
| The isolator row shall be inspected semi-annually (by October 1st and February 1st) and cleaned by water-flush and vacuum when solids accumulate to 3" depth. Maintenance to be conducted through service contract with the vendor or equally qualified contractor. | • The isolator row 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. Inspection ports should be checked 48 hours after storm events to see that the water is draining down, at least once each rainy season, following a major storm event. Records shall be maintained by owner to document inspections. |

| Schedule (Proprietary Biotreatment) | Inspection and Maintenance Activity (Proprietary Biotreatment) |
|---|---|
| Average maintenance interval of 6 to 12 months for removing trash from Screening Device. Average interval of 12 to 24 months for removing sediment, replacing Cartridge Filter Media, replacing Drain Down Filter Media and trimming vegetation. | • Remove trash from Screening Device, sediment from Separation Chamber and replace cartridge Filter Media, and Drain Down Filter Media. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements. |

## VII.B Service Agreement Information

See Appendix 8 of this O&M Plan for service agreement information with any contractors regarding the O&M of BMPs at the site, if any.

# Appendix 1: Inspection and Maintenance Logs

*Insert Additional Inspection or Maintenance Logs Here*

| Date | Observations/Actions | Inspector |
|---|---|---|
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# Appendix 2: Updates, Revisions, and Errata

*Insert Additional Updates, Revisions, and Errata Logs Here*

| Revision Number | Date | Brief Description of Update/Revision/Errata, include section and page number | Prepared and Approved By |
|---|---|---|---|
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# Appendix 3: Maintenance Mechanism

*Copy of Covenant Agreement*
*Establishing Notification Process And Responsibility*
*For Water Quality Management Plan Implementation And Maintenance*

## Notification Process and Responsibility

1. **Name:** _____
   Title: _____
   Phone No.: _____

   WQMP Responsibilities, Duties, and Activities:
   (1) Routine inspections to evaluate BMP effectiveness.
   (2) Identifying when BMPs require maintenance.
   (3) Working with qualified contractors to maintain the BMP.
   (4) Recordkeeping of inspections and maintenance activities.

2. **Name:** _____
   Title: _____
   Phone No.: _____

   WQMP Responsibilities, Duties, and Activities:
   (1) Cleaning, repairing, servicing, and maintenance of BMP.

3. **Name:** _____
   Title: _____
   Phone No.: _____

   WQMP Responsibilities, Duties, and Activities:
   (1) In event of failure, and with City Engineer's authorization, modify or replace with an upgraded BMP to prevent future failure.
   (2) Notify successors of BMPs and maintenance requirements.

**RECORDING REQUESTED BY:**

CITY OF MENIFEE

**AND WHEN RECORDED MAIL TO:**

CITY OF MENIFEE
CITY CLERK
29844 HAUN ROAD
MENIFEE, CA 92586-6540

SPACE ABOVE THIS LINE FOR RECORDER'S USE

# WATER QUALITY MANAGEMENT PLAN AND STORMWATER BEST MANAGEMENT PRACTICES OPERATION, TRANSFER, MAINTENANCE AND RIGHT OF ENTRY AGREEMENT

**PROJECT NAME:** Lovett 215

**PROPERTY OWNER NAME:** Lovett Industrial

**PROPERTY ADDRESS:** Trumble Road

Menifee, California 92585

**APN:** 329-240-046, -048 and -051

**THIS AGREEMENT** is made and entered into in

_____, California, this_____day of

_____, 20____, by and between

Lovett Industrial _____, herein after

referred to as "Owner", and the CITY OF MENIFEE, a municipal corporation, located in the County of Riverside, State of California hereinafter referred to as "CITY";

**WHEREAS**, the City is a Co-Permittee for discharging stormwater from its MS4 facilities pursuant to the Santa Ana Regional Water Quality Control Board Order No. R8-2010-0033, MS4 NPDES Permit No. CAS 618033. Under the terms of the permit the City is required to enforce the provisions of the permit within its jurisdiction. The requirements contained in this agreement are intended to achieve the goals of the MS4 permit;

**WHEREAS**, the Owner owns real property ("Property) in the City of Menifee, County of Riverside, State of California, more specifically described in Exhibit "A" and depicted in Exhibit "B", each of which exhibits is attached hereto and incorporated herein by this reference;

**WHEREAS**, at the time of initial approval of development project known as:

Lovett 215 within the Property described herein, the City required the project to employ Best Management Practices, hereinafter referred to as "BMPs," to minimize pollutants in urban runoff;

**WHEREAS**, the Owner has chosen to install and/or implement BMPs as described in the Water Quality Management Plan, on file with the City, hereinafter referred to as "WQMP," to minimize pollutants in urban runoff and to minimize other adverse impacts of urban runoff;

**WHEREAS**, said WQMP has been certified by the Owner and reviewed and accepted by the City;

**WHEREAS**, said BMPs, with installation and/or implementation on private property and draining only private property, are part of a private facility with all maintenance or replacement, therefore, the sole responsibility of the Owner in accordance with the terms of this Agreement;

**WHEREAS,** the Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of all BMPs in the WQMP and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws and regulations, including those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs;

**NOW THEREFORE**, it is mutually stipulated and agreed as follows:

1. Right of Access: Owner hereby provides the City of Menifee designee complete access, of any duration, to the BMPs and their immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by the City's Engineer, no advance notice, for the purpose of inspection, sampling, testing of the Device, and in case of emergency to direct all necessary repairs or other preventative measures at owner's expense in accordance with the procedures set forth in paragraph 3 below. City shall make every effort at all times to minimize or avoid interference with Owner's use of the Property.

2. Responsibility for Operation and Maintenance of BMPs: Owner shall use its best efforts diligently to maintain all BMPs in a manner assuring peak performance at all times. All reasonable precautions shall be exercised by Owner and Owner's representative or contractor in the removal and extraction of any material(s) from the BMPs and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the City, the Owner shall provide the City with documentation identifying the material(s) removed, the quantity, and disposal destination.

3. City Maintenance at Owner's Expense: In the event Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this

Agreement, the City may cause such maintenance to be conducted on Owner's Property at Owner's expense if Owner does not commence and diligently work to perform the maintenance within five (5) days of receiving written notice from the City, in accordance with paragraph 10 below, of Owner's failure to comply with the terms of this Agreement. The City may charge the entire cost and expense of any maintenance undertaken by the City, whether performed as a response to an emergency situation or following five (5) day written notice by the City, to the Owner or Owner's successors or assigns, including administrative costs, attorney's fees and interest thereon at the maximum rate authorized by the Civil Code from the Date of the notice of expense until paid in full. The City, at its sole election, may take these costs to be a lien upon the property that may be collected at the same time and in the same manner as ordinary municipal taxes as provided in Government Code section 38773.5. Nothing in this section or this Agreement creates an obligation by the City to maintain or repair any BMP, nor does this section prohibit the City from pursuing other legal recourse against Owner.

4. Surety Bond: The City may require the owner to post security in form and for a time period satisfactory to the City to guarantee the performance of the obligations stated herein. Should the Owner fail to perform the obligations under the Agreement, the City may, in the case of a cash bond, act for the Owner using the proceeds from it, or in the case of a surety bond, require the sureties to perform the obligations of the Agreement. As an additional remedy, the City's Engineer may withdraw any previous stormwater-related approval with respect to the property on which BMPs have been installed and/or implemented until such time as Owner repays to City its reasonable costs incurred in accordance with paragraph 3 above.

5. Recording: This agreement shall be recorded in the Office of the Recorder of Riverside County, California, at the expense of the Owner and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the City, including interest as herein above set forth, subject to foreclosure in event of default in payment.

6. Attorney's Fees: In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, then the Owner and its successors or assigns agree(s) to pay all costs incurred by the City in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

7. Covenant: It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien there against.

8. Binding on Successors: The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. Owner shall provide such notice prior to such successor obtaining an interest in all or part of the Property. Owner shall provide a copy of such notice to the City at the same time such notice is provided to the successor.

9. Time of the Essence: Time is of the essence in the performance of this Agreement.

10. Notice: Any notice to a party required or called for in this Agreement shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

**IN WITNESS THEREOF,** the parties hereto have affixed their signatures as of the date first written above.

**IF TO CITY:**

City of Menifee

29844 Haun Road

Menifee, CA 92586-6540

**IF TO OWNER:**

Lovett Industrial

TBD

1902 Washington Avenue, Suite A

Houston, Texas 77007

**CITY:**

By: _____
Armando G. Villa,
City Manager

**APPROVED AS TO FORM:**

_____
Jeffery T. Melching, City Attorney

**ATTEST:**

_____
Sarah A. Manwaring, City Clerk

**OWNER:**

By: TBD
NAME

Title: _____

**OWNER:**

By: _____
NAME

Title: _____

**NOTARY ACKNOWLEDGEMENTS ON FOLLOWING PAGE**

**EXHIBIT A**
***(Legal Description)***

**EXHIBIT B**
***(Map/Illustration)***

# Appendix 4: Training Records

*Insert Training Records with Brief Discussion Here*

# Appendix 5: Site Plan and Details

*WQMP Site Map and BMP Details*

# Appendix 6: “As-Built” Drawings

*Insert “As-Builts” Here When Available*

# Appendix 7: Manufacturer Information

*Brochures, Manuals, and Maintenance Requirements*

# Appendix 8: Service Agreement Information

*Insert Contractor Information (if any)*

# Appendix 10: Educational Materials

*BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information*


WHEN IT RAINS
IT DRAINS
After the Storm
For more information contact:
or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps
EPA United States Environmental Protection Agency
EPA 833-B-03-002
January 2003
Internet Address (URL) • HTTP://www.epa.gov
Recycled/Recyclable • Printed With Vegetable
Oil Based Inks on 100% Postconsumer,
Process Chlorine Free Recycled Paper
THE YEAR OF CLEAN WATER
Celebration of Recommitment
A Citizen's Guide to
Understanding Stormwater
WHEN IT RAINS
IT DRAINS

## What is stormwater runoff?



Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

## Why is stormwater runoff a problem?



Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

## The effects of pollution



Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.



- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.



# Stormwater Pollution Solutions




*Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.*

## Residential





*Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.*

### Auto care




Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

### Lawn care



Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

### Septic systems



Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

### Pet waste



Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

### Residential landscaping

**Permeable Pavement**—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

**Rain Barrels**—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.



**Rain Gardens and Grassy Swales**—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.



**Vegetated Filter Strips**—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

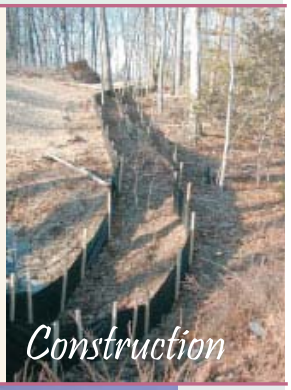
## Commercial



Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

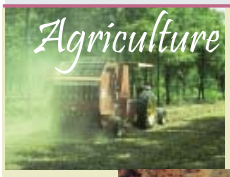
## Construction



Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.

## Agriculture

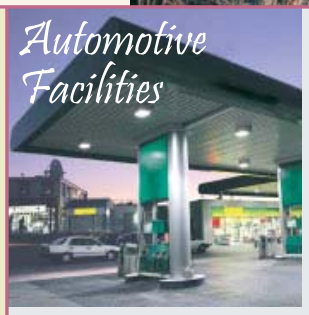


Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.



- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

## Automotive Facilities



Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

## Forestry



Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.

## For Information:

For more information on the General Industrial Storm Water Permit contact:

State Water Resources Control Board (SWRCB)
(916) 657-1146 or www.swrcb.ca.gov/ or, at your Regional Water Quality Control Board (RWQCB).

Santa Ana Region (8)
California Tower
3737 Main Street, Ste. 500
Riverside, CA 92501-3339
(909) 782-4130

San Diego Region (9)
9771 Clairemont Mesa Blvd., Ste. A
San Diego, CA 92124
(619) 467-2952

Colorado River Basin Region (7)
73-720 Fred Waring Dr., Ste. 100
Palm Desert, CA 92260
(760) 346-7491

**SPILL RESPONSE AGENCY:**
HAZ-MAT: (909) 358-5055
**HAZARDOUS WASTE DISPOSAL:** (909) 358-5055
**RECYCLING INFORMATION:** 1-800-366-SAVE
**TO REPORT ILLEGAL DUMPING OR A CLOGGED STORM DRAIN:** 1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, call: (909) 955-1111.

StormWater CleanWater PROTECTION PROGRAM

Riverside County gratefully acknowledges the State Water Quality Control Board and the American Public Works Association, Storm Water Quality Task Force for the information provided in this brochure.

# DID YOU KNOW . . .

## YOUR FACILITY MAY NEED A STORM WATER PERMIT?



*Many industrial facilities and manufacturing operations must obtain coverage under the Industrial Activities Storm Water General Permit*

**FIND OUT**
**IF YOUR FACILITY MUST OBTAIN A PERMIT**

## StormWater Pollution . . . What you should know

Riverside County has two drainage systems - sanitary sewers and storm drains. The storm drain system is designed to help prevent flooding by carrying excess rainwater away from streets. Since the storm drain system does not provide for water treatment, it also serves the *unintended* function of transporting pollutants directly to our waterways.

*Unlike sanitary sewers, storm drains are not connected to a treatment plant - they flow directly to our local streams, rivers and lakes.*



In recent years, awareness of the need to protect water quality has increased. As a result, federal, state, and local programs have been established to reduce polluted stormwater discharges to our waterways. The emphasis of these programs is to prevent stormwater pollution since it's much easier, and less costly, than cleaning up "after the fact."

## National Pollutant Discharge Elimination System (NPDES)

In 1987, the Federal Clean Water Act was amended to establish a framework for regulating industrial stormwater discharges under the NPDES permit program. In California, NPDES permits are issued by the State Water Resources Control Board (SWRCB) and the nine (9) Regional Water Quality Control Boards (RWQCB). In general, certain industrial facilities and manufacturing operations must obtain coverage under the Industrial Activities Storm Water General Permit if the type of facilities or operations falls into one of the several categories described in this brochure.

# How Do I Know If I Need A Permit?

Following are ***general descriptions*** of the industry categories types that are regulated by the Industrial Activities Storm Water General Permit. Contact your local Region Water Quality Control Board to determine if your facility/operation requires coverage under the Permit.

➜ Facilities such as cement manufacturing; feedlots; fertilizer manufacturing; petroleum refining; phosphate manufacturing; steam electric power generation; coal mining; mineral mining and processing; ore mining and dressing; and asphalt emulsion;

➜ Facilities classified as lumber and wood products (except wood kitchen cabinets); pulp, paper, and paperboard mills; chemical producers (except some pharmaceutical and biological products); petroleum and coal products; leather production and products; stone, clay and glass products; primary metal industries; fabricated structural metal; ship and boat building and repairing;

➜ Active or inactive mining operations and oil and gas exploration, production, processing, or treatment operations;

➜ Hazardous waste treatment, storage, or disposal facilities;

➜ Landfills, land application sites and open dumps that receive or have received any industrial waste; unless there is a new overlying land use such as a golf course, park, etc., and there is no discharge associated with the landfill;

➜ Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards;

➜ Steam electric power generating facilities, facilities that generate steam for electric power by combustion;

➜ Transportation facilities that have vehicle maintenance shops, fueling facilities, equipment cleaning operations, or airport deicing operations. This includes school bus maintenance facilities operated by a school district;

➜ Sewage treatment facilities;

➜ Facilities that have areas where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water.

## How do I obtain coverage under the Industrial Activities Storm Water General Permit?

Obtain a permit application package from your local Regional Water Quality Control Board listed on the back of this brochure or the State Water Resources Control Board (SWRCB). Submit a completed Notice of Intent (NOI) form, site map and the appropriate fee ($250 or $500) to the SWRCB. Facilities must submit an NOI thirty (30) days prior to beginning operation. Once you submit the NOI, the State Board will send you a letter acknowledging receipt of your NOI and will assign your facility a waste discharge identification number (WDID No.). You will also receive an annual fee billing. These billings should roughly coincide with the date the State Board processed your original NOI submittal.

# What are the requirements of the Industrial Activities Storm Water General Permit?

The basic requirements of the Permit are:

1. The facility must eliminate any non-stormwater discharges or obtain a separate permit for such discharges.

2. The facility must develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must identify sources of pollutants that may be exposed to stormwater. Once the sources of pollutants have been identified, the facility operator must develop and implement Best Management Practices (BMPs) to minimize or prevent polluted runoff.

   *Guidance in preparing a SWPPP is available from a document prepared by the California Storm Water Quality Task Force called the California Storm Water Best Management Practice Handbook.*

3. The facility must develop and implement a Monitoring Program that includes conducting visual observations and collecting samples of the facility's storm water discharges associated with industrial activity. The General Permit requires that the analysis be conducted by a laboratory that is certified by the State of California.

4. The facility must submit to the Regional Board, every July 1, an annual report that includes the results of its monitoring program.

***A Non-Storm Water Discharge is...*** *any discharge to a storm drain system that is not composed entirely of storm water. The following non-storm water discharges are authorized by the General Permit: fire hydrant flushing; potable water sources, including potable water related to the operation, maintenance, or testing of potable water systems; drinking fountain water; atmospheric condensates including refrigeration, air conditioning, and compressor condensate; irrigation drainage; landscape watering; springs; non-contaminated ground water; foundation or footing drainage; and sea water infiltration where the sea waters are discharged back into the sea water source.*

***A BMP is . . .*** *a technique, process, activity, or structure used to reduce the pollutant content of a storm water discharge. BMPs may include simple, non-structural methods such as good housekeeping, staff training and preventive maintenance. Additionally, BMPs may include structural modifications such as the installation of berms, canopies or treatment control (e.g. setting basins, oil/water separators, etc.)*



***WARNING****: There are significant penalties for non-compliance: a minimum fine of $5,000 for failing to obtain permit coverage, and, up to $10,000 per day, per violation plus $10 per gallon of discharge in excess of 1,000 gallons.*

# Stormwater Pollution

*What you should know for...*

# Industrial & Commercial Facilities

## Riverside County Stormwater Program Members

City of Banning
(951) 922-3105

City of Beaumont
(951) 769-8520

City of Calimesa
(909) 795-9801

City of Canyon Lake
(951) 244-2955

City of Cathedral City
(760) 770-0340

City of Coachella
(760) 398-3502

City of Corona
(951) 736-2447

City of Desert Hot Springs
(760) 329-6411

City of Eastvale
(951) 361-0900

City of Hemet
(951) 765-2300

City of Indian Wells
(760) 346-2489

City of Indio
(760) 391-4000

City of Jurupa Valley
(951) 332-6464

City of Lake Elsinore
(951) 674-3124

City of La Quinta
(760) 777-7000

City of Menifee
(951) 672-6777

City of Moreno Valley
(951) 413-3000

City of Murrieta
(951) 304-2489

City of Norco
(951) 270-5607

City of Palm Desert
(760) 346-0611

City of Palm Springs
(760) 323-8299

City of Perris
(951) 943-6100

City of Rancho Mirage
(760) 324-4511

City of Riverside
(951) 826-5311

City of San Jacinto
(951) 487-7330

City of Temecula
(951) 694-6444

City of Wildomar
(951) 677-7751

Coachella Valley Water District
(760) 398-2651

County of Riverside
(951) 955-1000

Riverside County Flood Control District
(951) 955-1200

## Best Management Practices (BMPS) for:

- Industrial Facilities
- Commercial Facilities



# YOU can prevent Stormwater Pollution following these practices...

## *Industrial and Commercial Facilities*

The Riverside County Stormwater Program has identified a number of Best Management Practices (BMPs) for Industrial and Commercial Facilities. These BMPs control and reduce stormwater pollutants from reaching our storm drain system and ultimately our local water bodies. City and County ordinances require businesses to use these BMPs to protect our water quality. Local cities and the County are required to verify implementation of these BMPs by performing regular facility inspections.

## *Prohibited Discharges*

Discontinue all non-stormwater discharges to the storm drain system. It is *prohibited* to discharge any chemicals, paints, debris, wastes or wastewater into the gutter, street or storm drain.

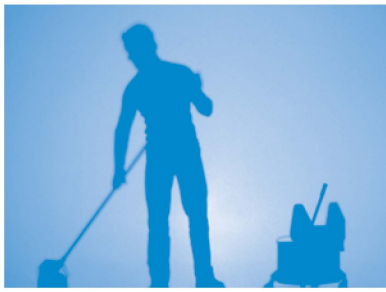
## *Outdoor Storage BMPs*

- Install covers and secondary containment areas for all hazardous materials and wastes stored outdoors in accordance with County and/or City standards.
- Keep all temporary waste containers covered, at all times when not in use.
- Sweep outdoor areas instead of using a hose or pressure washer.
- Move all process operations including vehicle/equipment maintenance inside of the building or under a covered and contained area.
- Wash equipment and vehicles in a contained and covered wash bay which is closed-loop or connected to a clarifier sized to local standards and discharged to a sanitary sewer or take them to a commercial car wash.




## *Spills and Clean Up BMPs*

- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep up the area.
- Clean up spills immediately when they occur, using dry clean up methods such as absorbent materials or sweep followed by proper disposal of materials.
- Always have a spill kit available near chemical loading dock doors and vehicle maintenance and fueling areas.
- Follow your Business Emergency Plan, as filed with the local Fire Department.
- Report all prohibited discharges and non-implementation of BMPs to your local Stormwater Coordinator as listed on the back of this pamphlet.



- Report hazardous materials spills to 951-358-5055 or call after hours to 951-782-2973 or, if an emergency, call the Fire Department's Haz Mat Team at 911.

## *Plastic Manufacturing Facilities BMPs*

AB 258 requires plastic product manufacturers to use BMPs, such as safe storage and clean-up procedures to prevent plastic pellets (nurdles) from entering the waterway. The plastic pellets are released into the environment during transporting, packaging and processing and migrate to waterways through the storm drain system. AB 258 will help protect fish and wildlife from the hazards of plastic pollution.

## *Training BMPs*

As prescribed by your City and County Stormwater Ordinance(s), train employees in spill procedures and prohibit non-stormwater discharges to the storm drain system. Applicable BMP examples can be found at www.cabmphandbooks.com.

## *Permitting*

Stormwater discharges associated with specific categories for industrial facilities are regulated by the State Water Resources Control Board through an Industrial Stormwater General Permit. A copy of this General Permit and application forms are available at: www.waterboards.ca.gov, select stormwater then the industrial quick link.

**To report illegal dumping or for more information on stormwater pollution prevention call: 1-800-506-2555 or e-mail us at: fcnpdes@rcflood.org.**

## Helpful telephone numbers and links:

**Riverside County Stormwater Protection Partners**

| | |
|---|---|
| Flood Control District | (951) 955-1200 |
| County of Riverside | (951) 955-1000 |
| City of Banning | (951) 922-3105 |
| City of Beaumont | (951) 769-8520 |
| City of Calimesa | (909) 795-9801 |
| City of Canyon Lake | (951) 244-2955 |
| Cathedral City | (760) 770-0327 |
| City of Coachella | (760) 398-4978 |
| City of Corona | (951) 736-2447 |
| City of Desert Hot Springs | (760) 329-6411 |
| City of Eastvale | (951) 361-0900 |
| City of Hemet | (951) 765-2300 |
| City of Indian Wells | (760) 346-2489 |
| City of Indio | (760) 391-4000 |
| City of Lake Elsinore | (951) 674-3124 |
| City of La Quinta | (760) 777-7000 |
| City of Menifee | (951) 672-6777 |
| City of Moreno Valley | (951) 413-3000 |
| City of Murrieta | (951) 304-2489 |
| City of Norco | (951) 270-5607 |
| City of Palm Desert | (760) 346-0611 |
| City of Palm Springs | (760) 323-8299 |
| City of Perris | (951) 943-6100 |
| City of Rancho Mirage | (760) 324-4511 |
| City of Riverside | (951) 361-0900 |
| City of San Jacinto | (951) 654-7337 |
| City of Temecula | (951) 694-6444 |
| City of Wildomar | (951) 677-7751 |

**REPORT ILLEGAL STORM DRAIN DISPOSAL**
**1-800-506-2555 or e-mail us at**
**fcnpdes@rcflood.org**

- Riverside County Flood Control and Water Conservation District
  **www.rcflood.org**

**Online resources include:**

- California Storm Water Quality Association
  **www.casqa.org**
- State Water Resources Control Board
  **www.waterboards.ca.gov**
- Power Washers of North America
  **www.thepwna.org**

# Stormwater Pollution

*What you should know for...*

## Outdoor Cleaning Activities and Professional Mobile Service Providers



### Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

## Do you know where street flows actually go?

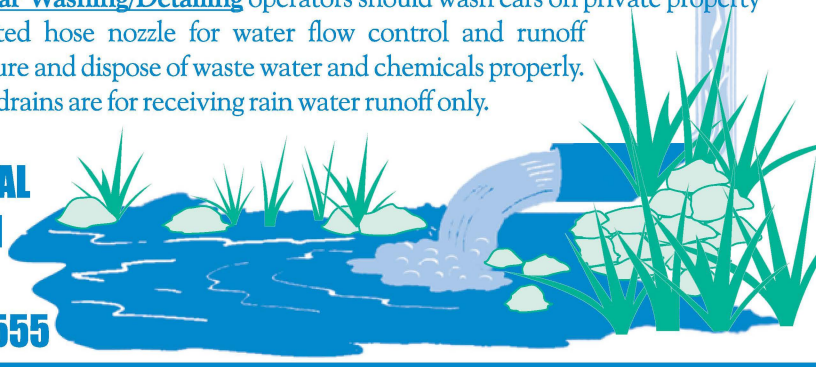
### Storm drains are NOT connected to sanitary sewer systems and treatment plants!




The primary purpose of storm drains is to carry *rain* water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

**REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555**



# Help Protect Our Waterways!

## Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

**Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?**

## Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep stormwater clean by using the suggested BMPs below:

## Simple solutions for both light and heavy duty jobs:

**Do...**consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

**Do...**prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

**Do...**use vacuums or other machines to remove and collect loose debris or litter before applying water.

**Do...**obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

**Do...**check your local sanitary sewer agency's policies on wash water disposal regulations before disposing of wash water into the sewer. (See list on reverse side)

**Do...**be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

**Do...**check to see if local ordinances prevent certain activities.

**Do not let...**wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.




**Report illegal storm drain disposal**
**Call Toll Free**
**1-800-506-2555**

## Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them with being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.



When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

## Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

## Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

## Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

## Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlets by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.




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

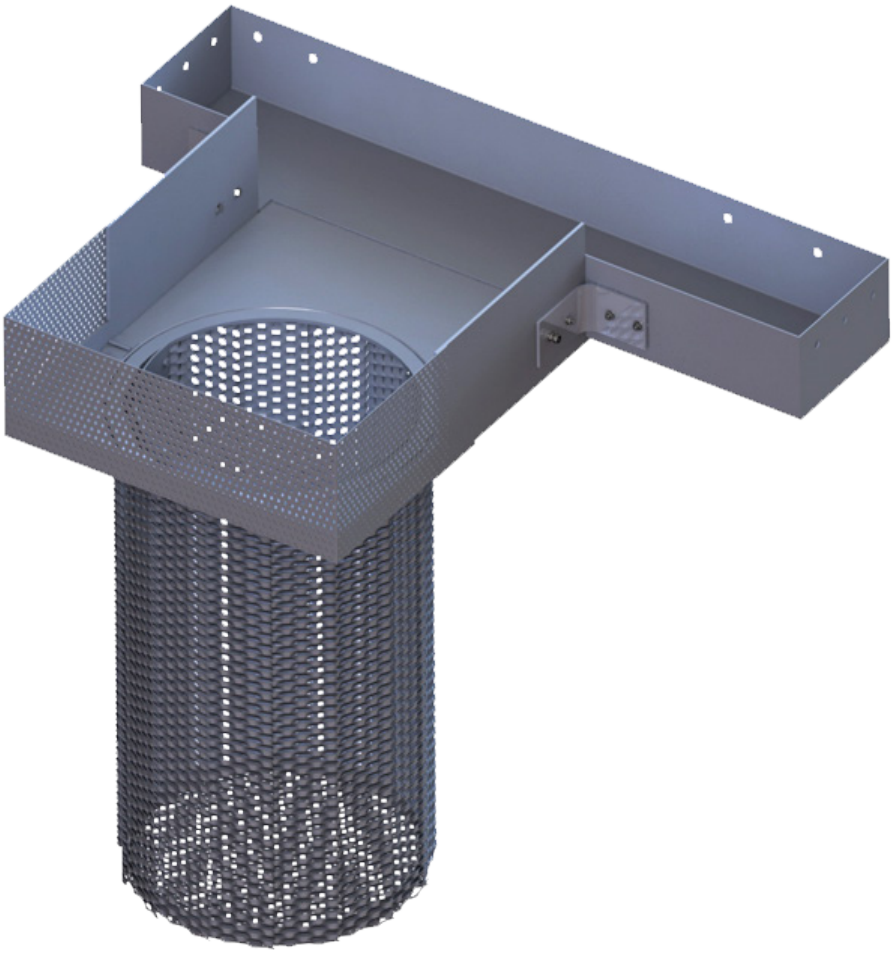
SAMPLE STENCIL

PER BMP SD-13

# Curb Inlet Filter

Bio Clean
A Forterra Company

# OPERATION & MAINTENANCE



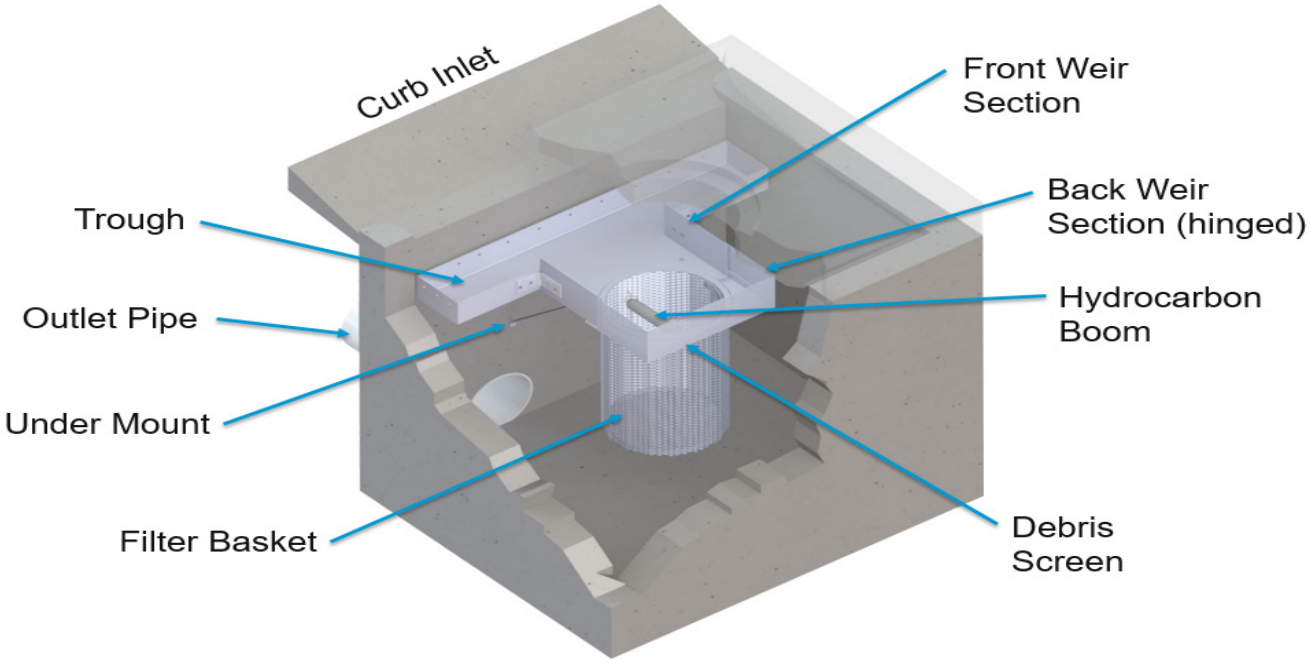
Bio Clean Environmental Services, Inc.
398 Via El Centro
Oceanside, CA 92058

www.BioCleanEnvironmental.com
p: 760.433.7640
f: 760.433.3176

# OPERATION & MAINTENANCE

The Bio Clean Curb Inlet Filter is a stormwater device designed to remove high levels of trash, debris, sediments and hydrocarbons. The filter is available in several configurations including trash full capture, multi-level screening, Kraken membrane filter and media filter variations. This manual covers maintenance procedures of the trash full capture and multi-level screening configurations. A supplemental manual is available for the Kraken and media filter variations. The innovative trough & weir system is mounted along the curb face and directs incoming stormwater toward the filter basket which is positioned "directly" under the manhole access opening regardless of its location in the catch basin. This innovative design allows the filter to be cleaned from finish surface without access into the catch basin, therefore drastically reducing maintenance time and eliminating confined space entry. The filter has a lifting handle allowing for the filter to be removed easily through the manhole. The weir also folds up to allow for unimpeded access into the basin for routine maintenance or pipe jetting.

As with all stormwater BMPs, inspection and maintenance on the Curb Inlet Filter is necessary. Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess site-specific loading conditions. This is recommended because pollutant loading can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding of roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years. Without appropriate maintenance a BMP can exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.




*System Diagram:*

*Inspection Equipment*

Following is a list of equipment to allow for simple and effective inspection of the Curb Inlet Filter:

- Bio Clean Environmental Inspection Form (contained within this manual).
- Manhole hook or appropriate tools to remove access hatches and covers.
- Appropriate traffic control signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections or maintenance of the system.



*Inspection Steps*

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the Curb Inlet Fitler are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long-term inspection and maintenance interval requirements.

The Curb Inlet Filter can be inspected though visual observation without entry into the catch basin. All necessary pre-inspection steps must be carried out before inspection occurs, such as safety measures to protect the inspector and nearby pedestrians from any dangers associated with an open access hatch or manhole. Once the manhole has been safely opened the inspection process can proceed:

- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other info (see inspection form).
- Observe the inside of the catch basin through the manhole. If minimal light is available and vision into the unit is impaired utilize a flashlight to see inside the catch basin.
- Look for any out of the ordinary obstructions in the catch basin, trough, weir, filter basket, basin floor our outlet pipe. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, foliage and sediment accumulated inside the filter basket. Record this information on the inspection form.
- Observe the condition and color of the hydrocarbon boom. Record this information on the inspection form.

- Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.

*Maintenance Indicators*

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components.
- Obstructions in the trough, weir, filter basket or catch basin.
- Excessive accumulation of trash, foliage and sediment in the filter basket and/or trough and weir sections. Maintenance is required when the basket is greater than half-full.
- The following chart shows the 50% and 100% storage capacity of each filter height:

| Model | Filter Basket Diameter (in) | Filter Basket Height (in) | 50% Storage Capacity (cu ft) | 100% Storage Capacity (cu ft) |
|---|---|---|---|---|
| **BC-CURB-30** | 18 | 30 | 2.21 | 4.42 |
| **BC-CURB-24** | 18 | 24 | 1.77 | 3.53 |
| **BC-CURB-18** | 18 | 18 | 1.33 | 2.65 |
| **BC-CURB-12** | 18 | 12 | 0.88 | 1.77 |

*Maintenance Equipment*

It is recommended that a vacuum truck be utilized to minimize the time required to maintain the Curb Inlet Filter though it can easily cleaned by hand:

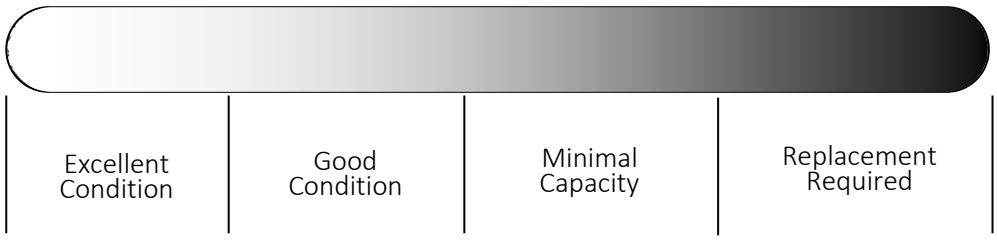
- Bio Clean Environmental Maintenance Form (contained in O&M Manual).
- Manhole hook or appropriate tools to access hatches and covers.
- Appropriate safety signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine maintenance of the system. Small or large vacuum truck (with pressure washer attachment preferred).

*Maintenance Procedures*

It is recommended that maintenance occurs at least two days after the most recent rain event to allow debris and sediments to dry out. Maintaining the system while flows are still entering it will increase the time and complexity required for maintenance. Cleaning of the Curb Inlet Filter can be performed from finish surface without entry into catch basin utilizing a vacuum truck. Some unique

and custom configurations may create conditions which would require entry for some or all of the maintenance procedures. Once all safety measures have been set up cleaning of the Curb Inlet Filter can proceed as followed:

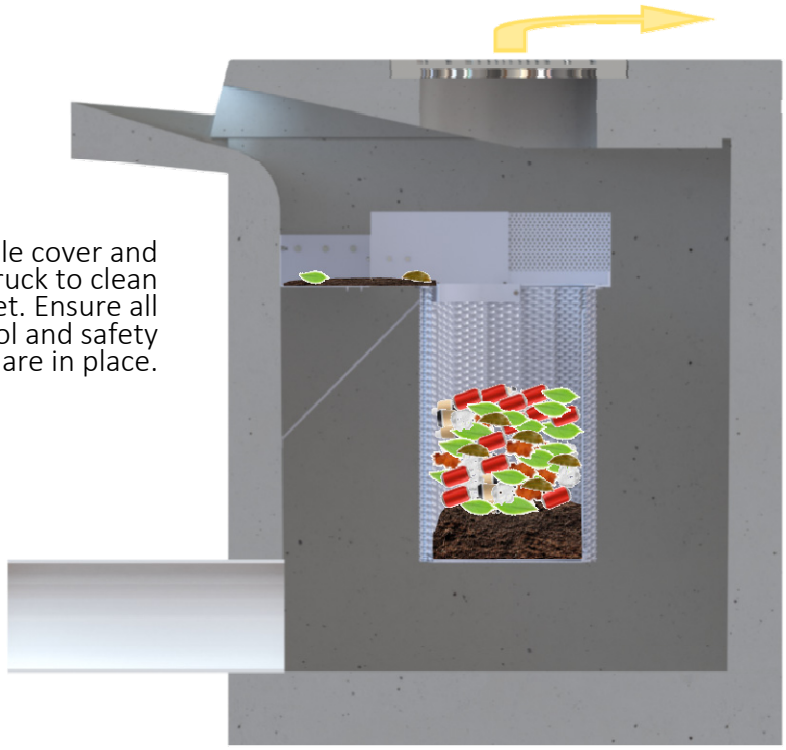
- Remove all manhole cover or access hatches (traffic control and safety measures to be completed prior).
- Using an extension on a vacuum truck position the hose over the opened manhole or hatch opening. Insert the vacuum hose down into the filter basket and suck out trash, foliage and sediment. A pressure wash is recommended and will assist in spraying of any debris stuck on the side or bottom of the filter basket. If the filter basket is full, trash, sediment, and debris will accumulate inside the trough and weir sections of the system. Once the filter basket is clean power wash the weir and trough pushing these debris into the filter basket (leave the hose in the filter basket during this process so entering debris will be sucked out). Power wash off the trough, weir, debris screen, and filter basket sides and bottom.
- Next remove the hydrocarbon boom that is attached to the inside of the filter basket. The hydrocarbon boom is fastened to rails on two opposite sides of the basket (vertical rails). Assess the color and condition of the boom using the following information in the next bullet point. If replacement is required install and fasten on a new hydrocarbon boom. Booms can be ordered directly from the manufacturer.
- Follow is a replacement indication color chart for the hydrocarbon booms:




- The last step is to close up and replace the manhole or hatch and remove all traffic control.
- All removed debris and pollutants shall be disposed of following local and state requirements.
- Disposal requirements for recovered pollutants may vary depending on local guidelines. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.
- In the case of damaged components, replacement parts can be ordered from the manufacturer. Hydrocarbon booms can also be ordered directly from the manufacturer as previously noted.

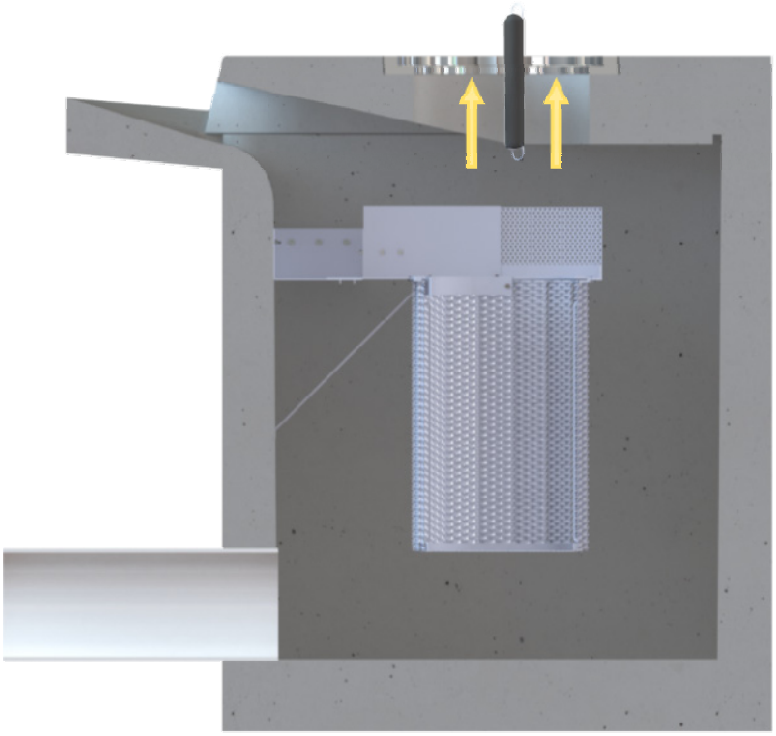
*Maintenance Sequence*

Remove manhole cover and set up vacuum truck to clean the filter basket. Ensure all traffic control and safety measures are in place.



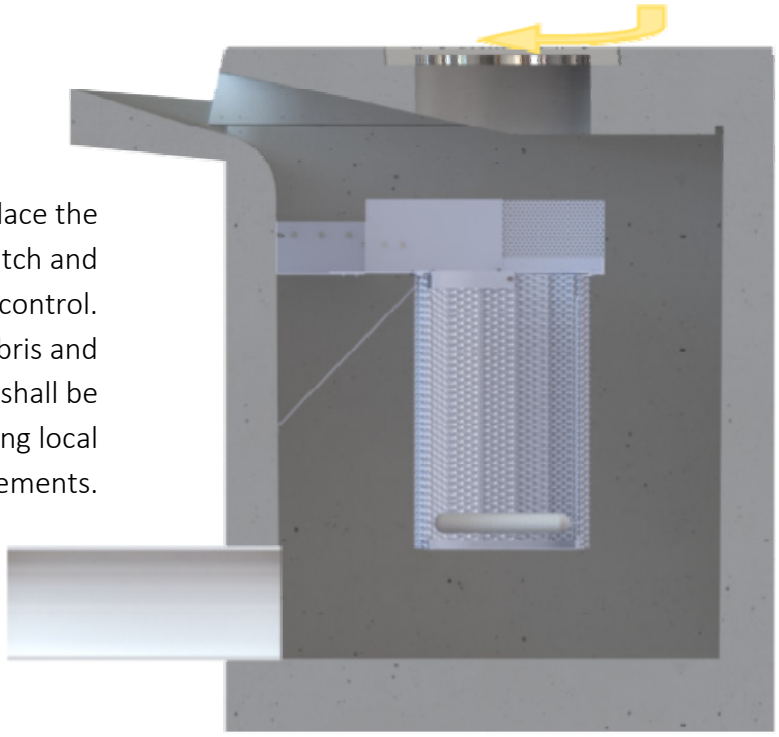


Insert the vacuum hose down into the filter basket and suck out debris. Use a pressure washer to assist in vacuum removal. Pressure wash off the weir and trough and vacuum out any remaining debris.



Remove the hydrocarbon boom that is attached to the inside of the filter basket. The hydrocarbon boom is fastened to rails on two opposite sides of the basket (vertical rails). Assess the color and condition of the boom using the following information in the next bullet point. If replacement is required install and fasten on a new hydrocarbon boom.

Close up and replace the manhole or hatch and remove all traffic control. All removed debris and pollutants shall be disposed of following local and state requirements.



For Maintenance Services or Information Please Contact Us At:
760-433-7640
Or Email: info@biocleanenvironmental.com

Bio Clean
A Forterra Company

# Inspection and Maintenance Report
# Catch Basin Only

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

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

Type of Inspection ☐ Routine ☐ollow Up ☐omplaint ☐torm Storm Event in Last 72-hours? ☐ ☐s

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 | Catch Basin Size | Evidence of Illicit Discharge? | Trash Accumulation | Foliage Accumulation | Sediment Accumulation | Signs of Structural Damage? | Functioning Properly or Maintenance Needed? |
|---|---|---|---|---|---|---|---|---|
| 1 | Lat:<br>Long: | | | | | | | |
| 2 | Lat:<br>Long: | | | | | | | |
| 3 | Lat:<br>Long: | | | | | | | |
| 4 | Lat:<br>Long: | | | | | | | |
| 5 | Lat:<br>Long: | | | | | | | |
| 6 | Lat:<br>Long: | | | | | | | |
| 7 | Lat:<br>Long: | | | | | | | |
| 8 | Lat:<br>Long: | | | | | | | |
| 10 | Lat:<br>Long: | | | | | | | |
| 11 | Lat:<br>Long: | | | | | | | |
| 12 | Lat:<br>Long: | | | | | | | |

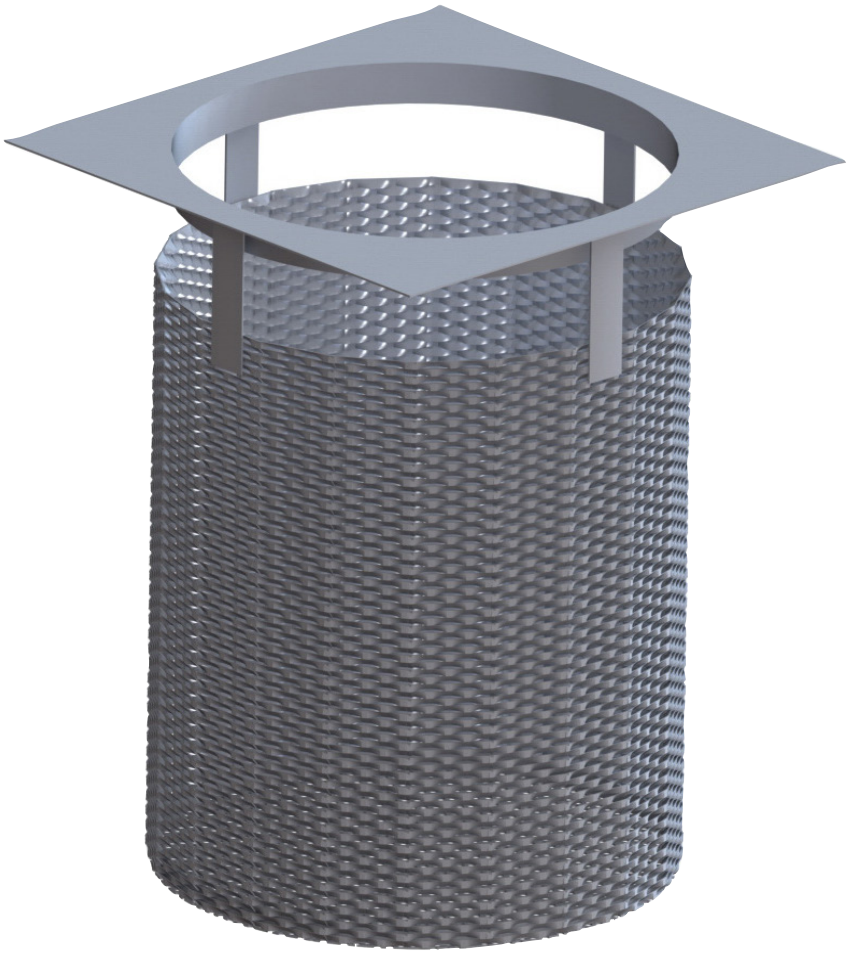
Comments:

398 Via El Centro, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

# Grate Inlet Filter

Bio Clean
A Forterra Company

# OPERATION & MAINTENANCE



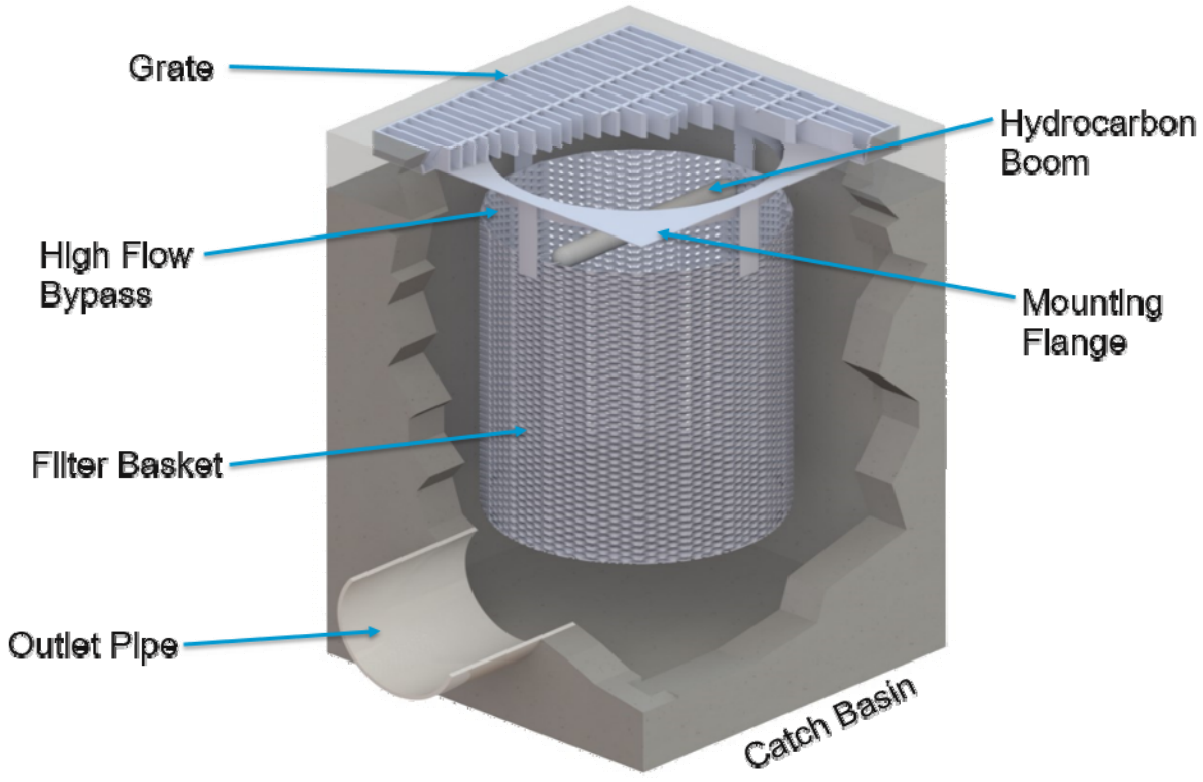
Bio Clean Environmental Services, Inc.
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f: 760.433.3176

# OPERATION & MAINTENANCE

The Bio Clean Grate Inlet Filter is a stormwater device designed to remove high levels of trash, debris, sediments and hydrocarbons. The filter is available in several configurations including trash full capture, multi-level screening, Kraken membrane filter and media filter variations. This manual covers maintenance procedures of the trash full capture and multi-level screening configurations. A supplemental manual is available for the Kraken and media filter variations. This filter is made of 100% stainless steel and is available and various sizes and depths allowing it to fit in any grated catch basin inlet. The filters heavy duty construction allows for cleaning with any vacuum truck. The filet can also easily be cleaned by hand.

As with all stormwater BMPs, inspection and maintenance on the Grate Inlet Filter is necessary. Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess site-specific loading conditions. This is recommended because pollutant loading can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding of roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years. Without appropriate maintenance a BMP can exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.




*System Diagram:*

*Inspection Equipment*

Following is a list of equipment to allow for simple and effective inspection of the Grate Inlet Filter:

- Bio Clean Environmental Inspection Form (contained within this manual).
- Manhole hook or appropriate tools to remove access hatches and covers.
- Appropriate traffic control signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections or maintenance of the system.



*Inspection Steps*

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the Grate Inlet Filter are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long-term inspection and maintenance interval requirements.

The Grate Inlet Filter can be inspected though visual observation. All necessary pre-inspection steps must be carried out before inspection occurs, such as safety measures to protect the inspector and nearby pedestrians from any dangers associated with an open grated inlet. Once the grate has been safely removed the inspection process can proceed:

- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other info (see inspection form).
- Observe the filter with the grate removed.
- Look for any out of the ordinary obstructions on the grate or in the filter and its bypass. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, foliage and sediment accumulated inside the filter basket. Record this information on the inspection form.
- Observe the condition and color of the hydrocarbon boom. Record this information on the inspection form.
- Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.

*Maintenance Indicators*

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components.
- Obstructions in the filter basket and its bypass.
- Excessive accumulation of trash, foliage and sediment in the filter basket. Maintenance is required when the basket is greater than half-full.
- The following chart shows the 50% and 100% storage capacity of each filter height:

| Model | Filter Basket Diameter (in) | Filter Basket Height (in) | 50% Storage Capacity (cu ft) | 100% Storage Capacity (cu ft) |
|---|---|---|---|---|
| **BC-GRATE-12-12-12** | 10.00 | 12.00 | 0.27 | 0.55 |
| **BC-GRATE-18-18-18** | 16.00 | 18.00 | 1.05 | 2.09 |
| **BC-GRATE-24-24-24** | 21.00 | 24.00 | 2.41 | 4.81 |
| **BC-GRATE-30-30-24** | 27.00 | 24.00 | 3.98 | 7.95 |
| **BC-GRATE-36-36-24** | 33.00 | 24.00 | 5.94 | 11.88 |
| **BC-GRATE-48-48-18** | 44.00 | 18.00 | 7.92 | 15.84 |

*Maintenance Equipment*

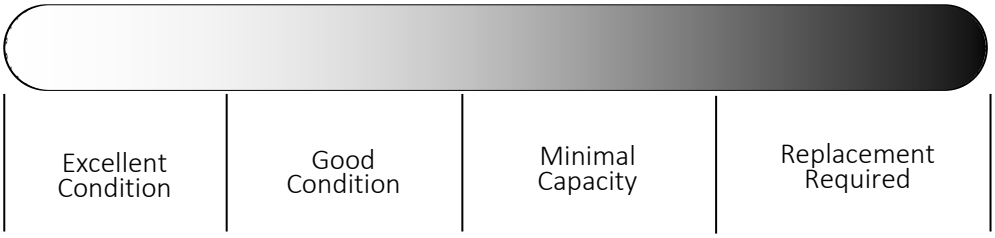
It is recommended that a vacuum truck be utilized to minimize the time required to maintain the Curb Inlet Filter, though it can easily cleaned by hand:

- Bio Clean Environmental Maintenance Form (contained in O&M Manual).
- Manhole hook or appropriate tools to remove the grate.
- Appropriate safety signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine maintenance of the system. Small or large vacuum truck (with pressure washer attachment preferred).

*Maintenance Procedures*

It is recommended that maintenance occurs at least two days after the most recent rain event to allow debris and sediments to dry out. Maintaining the system while flows are still entering it will increase the time and complexity required for maintenance. Cleaning of the Grate Inlet Filter can be performed utilizing a vacuum truck. Once all safety measures have been set up cleaning of the Grate Inlet Filter can proceed as followed:

- Remove grate (traffic control and safety measures to be completed prior).
- Using an extension on a vacuum truck position the hose over the opened catch basin. Insert the vacuum hose down into the filter basket and suck out trash, foliage and sediment. A pressure wash is recommended and will assist in spraying of any debris stuck on the side or bottom of the filter basket. Power wash off the filter basket sides and bottom.
- Next remove the hydrocarbon boom that is attached to the inside of the filter basket. The hydrocarbon boom is fastened to rails on two opposite sides of the basket (vertical rails). Assess the color and condition of the boom using the following information in the next bullet point. If replacement is required install and fasten on a new hydrocarbon boom. Booms can be ordered directly from the manufacturer.
- Follow is a replacement indication color chart for the hydrocarbon booms:




- The last step is to replace the grate and remove all traffic control.
- All removed debris and pollutants shall be disposed of following local and state requirements.
- Disposal requirements for recovered pollutants may vary depending on local guidelines. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.
- In the case of damaged components, replacement parts can be ordered from the manufacturer. Hydrocarbon booms can also be ordered directly from the manufacturer as previously noted.

*Maintenance Sequence*

Remove grate and set up vacuum truck to clean the filter basket.



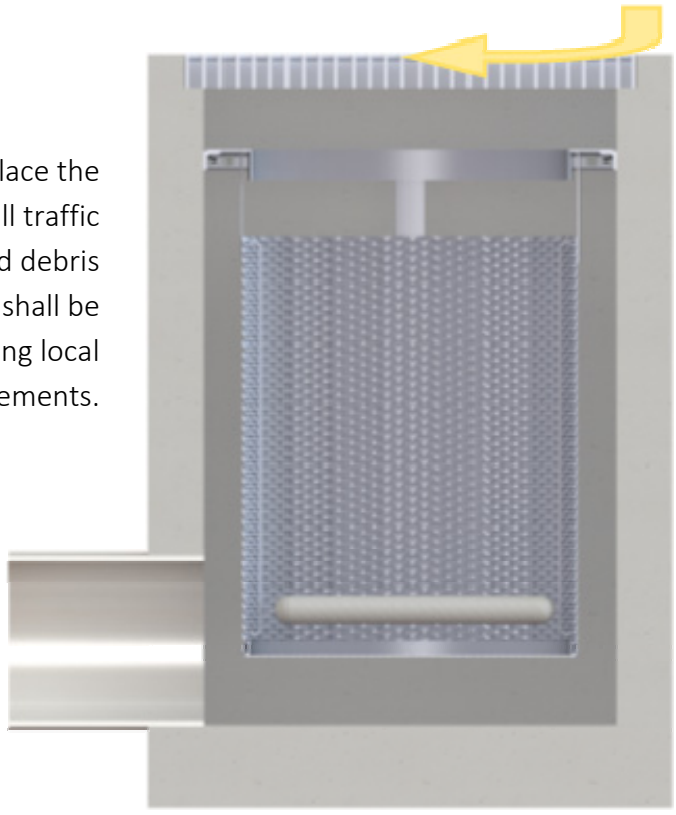


Insert the vacuum hose down into the filter basket and suck out debris. Use a pressure washer to assist in vacuum removal. Pressure wash off screens.



Remove the hydrocarbon boom that is attached to the inside of the filter basket. The hydrocarbon boom is fastened to rails on two opposite sides of the basket (vertical rails). Assess the color and condition of the boom using the following information in the next bullet point. If replacement is required install and fasten on a new hydrocarbon boom.

Close up and replace the grate and remove all traffic control. All removed debris and pollutants shall be disposed of following local and state requirements.



For Maintenance Services or Information Please Contact Us At:
760-433-7640
Or Email:
info@biocleanenvironmental.com

Bio Clean
A Forterra Company

# Inspection and Maintenance Report
# Catch Basin Only

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

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

Type of Inspection ☐ Routine ☐ollow Up ☐omplaint ☐torm Storm Event in Last 72-hours? ☐ ☐s

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 | Catch Basin Size | Evidence of Illicit Discharge? | Trash Accumulation | Foliage Accumulation | Sediment Accumulation | Signs of Structural Damage? | Functioning Properly or Maintenance Needed? |
|---|---|---|---|---|---|---|---|---|
| 1 | Lat:<br>Long: | | | | | | | |
| 2 | Lat:<br>Long: | | | | | | | |
| 3 | Lat:<br>Long: | | | | | | | |
| 4 | Lat:<br>Long: | | | | | | | |
| 5 | Lat:<br>Long: | | | | | | | |
| 6 | Lat:<br>Long: | | | | | | | |
| 7 | Lat:<br>Long: | | | | | | | |
| 8 | Lat:<br>Long: | | | | | | | |
| 10 | Lat:<br>Long: | | | | | | | |
| 11 | Lat:<br>Long: | | | | | | | |
| 12 | Lat:<br>Long: | | | | | | | |

Comments:

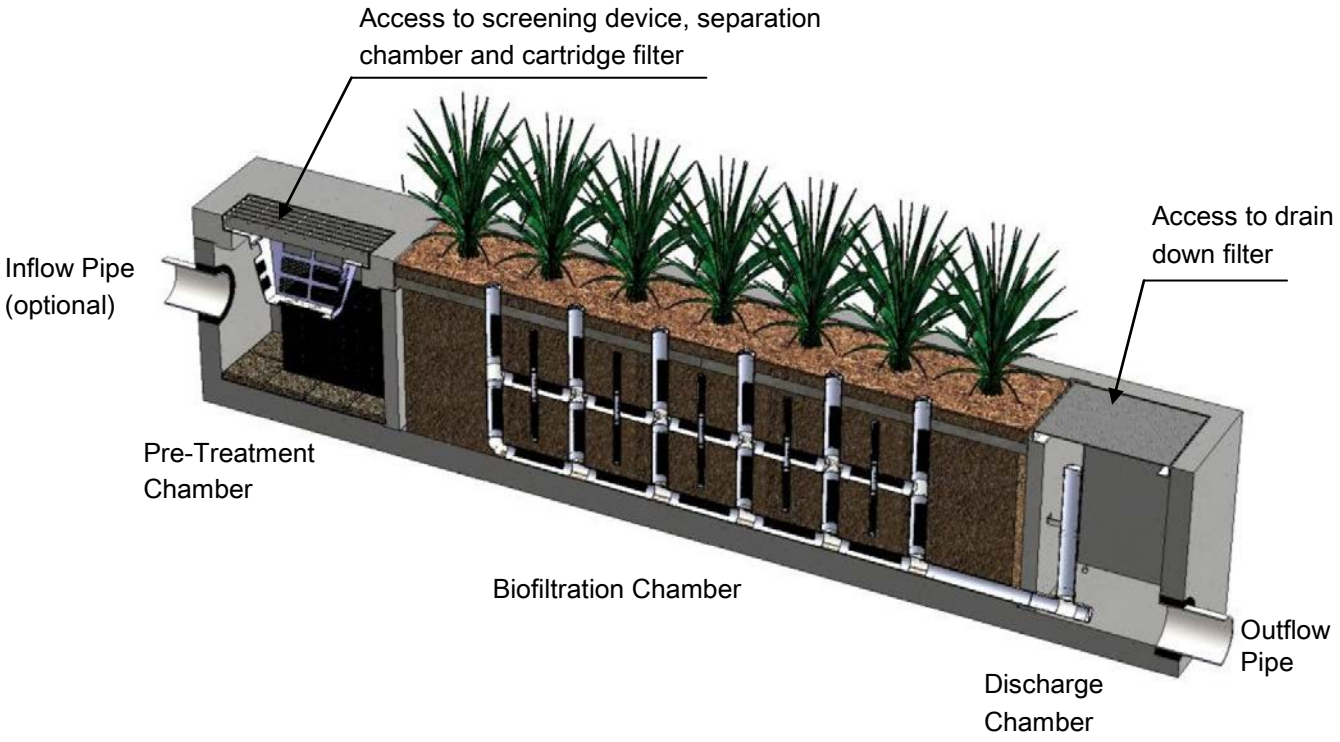
398 Via El Centro, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

# Maintenance Guidelines for Modular Wetland System - Linear

## Maintenance Summary

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

## System Diagram



# Maintenance Procedures

## Screening Device

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

## Separation Chamber

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

## Cartridge Filters

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

## Drain Down Filter

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

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# Maintenance Notes

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

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

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

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

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

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

# Maintenance Procedure Illustration

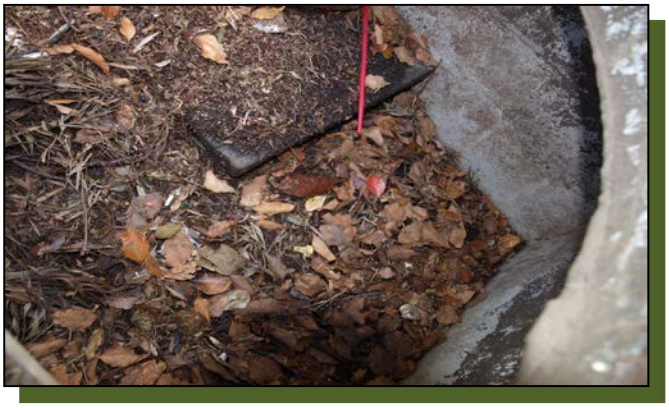
## Screening Device

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



## Separation Chamber

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







## Cartridge Filters

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








## Drain Down Filter

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



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## Trim Vegetation

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









# Inspection Form



Bio Clean
P. 855-566-3938
F. 760-433-3176
E. Info@BioCleanEnvironmental.com

Bio Clean
A Forterra Company

# Inspection Report
# Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

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

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

Weather Condition _____ Additional Notes _____

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

## Inspection Checklist

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

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

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

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

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

Additional Notes: _____

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# Maintenance Report




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P. 855-566-3938
F. 760-433-3176
E. Info@BioCleanEnvironmental.com

Bio Clean
A Forterra Company

# 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:

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StormTech
Detention • Retention • Water Quality
An ADS company

# Isolator® Row O&M Manual










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.

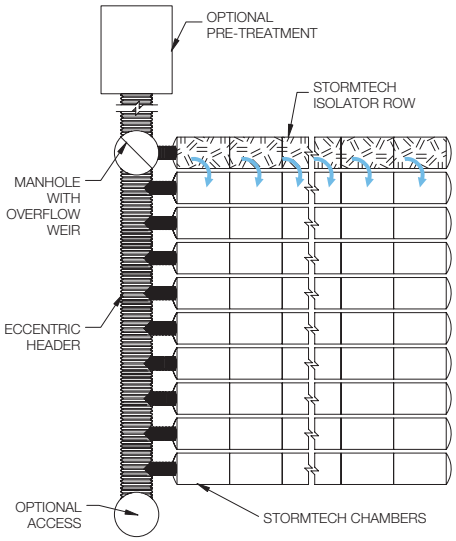
*Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.*



**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.

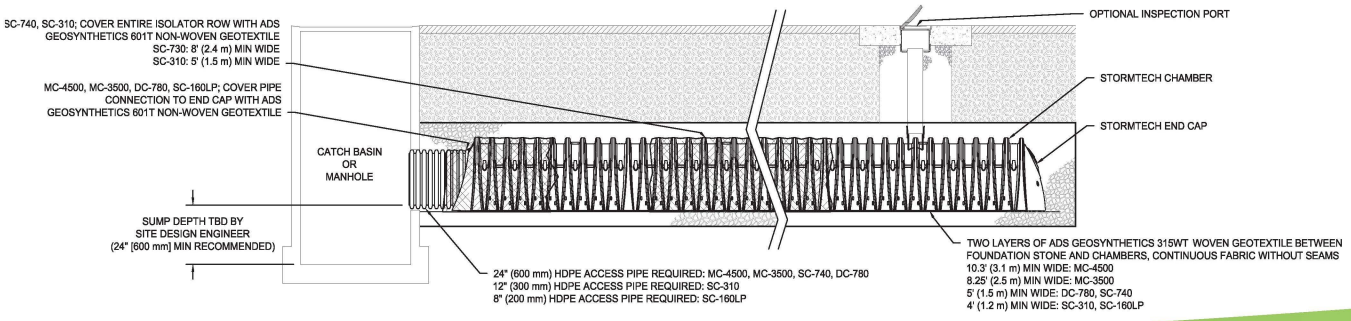
## MAINTENANCE

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.*



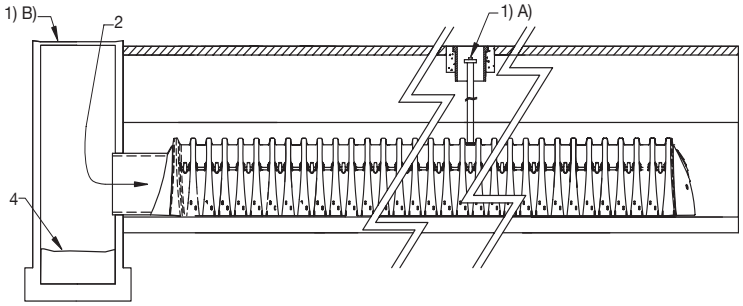
# ISOLATOR ROW STEP BY STEP MAINTENANCE PROCEDURES

**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 |

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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:

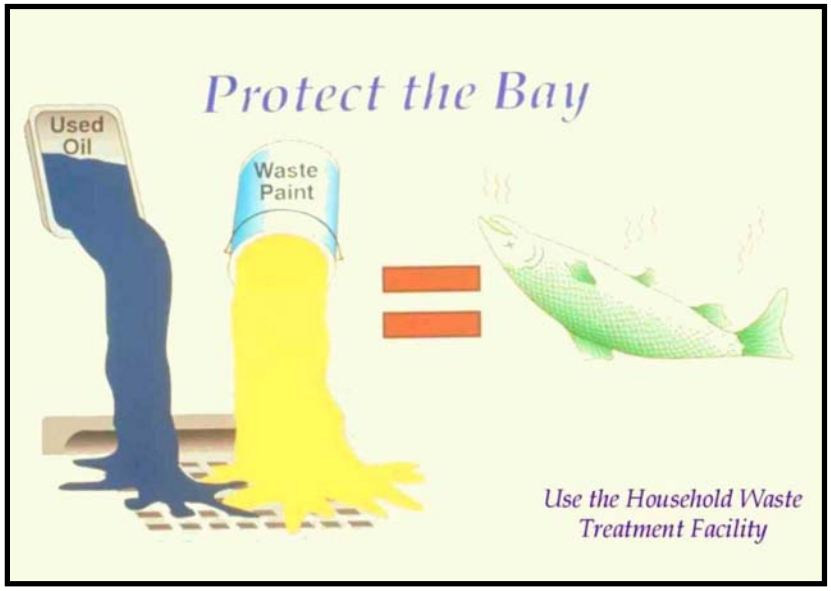
Pull pump out of wet well. Remove oil seal plug and inspect the oil for clarity. Clear oil indicates no water intrusion and chamber is to be topped off with 30 weight turbine oil. If oil is cloudy the mechanical seal and oil needs to be replaced.

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

# Non-Stormwater Discharges SC-10




Art Credit: Margie Winter

## Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

## Targeted Constituents

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

## Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. 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 car washing, air conditioner condensate, etc. However there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (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. They can generally be detected through a combination of detection and elimination. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of pollutants on streets and into the storm drain system and creeks.

## Approach

Initially the industry 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 in the elimination of non-stormwater discharges.

CASQA California Stormwater Quality Association

***Pollution Prevention***

- Ensure that used oil, used antifreeze, and hazardous chemical recycling programs are being implemented. Encourage litter control.

***Suggested Protocols***

*Recommended Complaint Investigation Equipment*

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms
  - Educational materials

*General*

- 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” stenciled or demarcated next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- See SC44 Stormwater Drainage System Maintenance for additional information.

*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 all discharges to the industrial 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. Also, 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 floor drains in older buildings.

*Smoke Testing*

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.
- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

*Dye Testing*

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

*TV Inspection of Drainage System*

- TV Cameras can be employed to visually identify illicit connections to the industrial storm drainage system.

*Illegal Dumping*

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- 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.

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 SC11 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.

*Reporting*

- 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.
- Document and report annually the results of the program.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

***Training***

- Training of technical staff in identifying and documenting illegal dumping incidents is required.
- Consider posting the 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.
- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.
- Conduct spill response drills annually (if no events occurred to evaluate your plan) in cooperation with other industries.
- When a responsible party is identified, educate the party on the impacts of his or her actions.

***Spill Response and Prevention***

- See SC11 Spill Prevention Control and Cleanup.

***Other Considerations***

- Many facilities do not have accurate, up-to-date schematic drawings.

## Requirements

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

- The primary cost is for staff time and depends on how aggressively a program is implemented.
- Cost for containment and disposal is borne by the discharger.
- Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- Indoor floor drains may require re-plumbing if cross-connections to storm drains are detected.

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

- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

## Supplemental Information

***Further Detail of the BMP***

*Illegal Dumping*

- Substances illegally dumped on streets and into the storm drain systems and creeks include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. All of these wastes 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)
- Responsible parties

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.

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges to the stormwater collection system may include any water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

*Permit Requirements*

- Facilities subject to stormwater permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The State's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

*Performance Evaluation*

- Review annually 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.

## References and Resources

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

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

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

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

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

# Spill Prevention, Control & Cleanup SC-11



Photo Credit: Geoff Brosseau

**Objectives**

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

## Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental or illegal spills. Preparation for accidental or illegal 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 potential spill areas, specify material handling procedures, describe spill response procedures, and provide spill clean-up equipment. 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.

**Targeted Constituents**

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

## Approach

### *Pollution 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.

- Develop a Spill Prevention Control and Countermeasure (SPCC) Plan. The plan should include:

- Description of the facility, owner and address, activities and chemicals present
- Facility map
- Notification and evacuation procedures
- Cleanup instructions
- Identification of responsible departments
- 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.

***Suggested Protocols (including equipment needs)***

*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 consistent 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 tank 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.

- Routine 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 Control and Cleanup Activities*

- Follow the Spill Prevention Control and Countermeasure Plan.
- 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. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- 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.
- 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 local agencies, such as the fire department; they can assist in cleanup.
- 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)

- Responsible parties

***Training***

- 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 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)***

- This BMP has no major administrative or staffing requirements. However, 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
- 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:

- The date and time the inspection was performed
- Name of the inspector
- Items inspected
- Problems noted
- Corrective action required
- 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
- 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, flanger, 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 adsorbent 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 adsorbent materials on small spills and general cleaning rather than hosing down the area. Remove the adsorbent 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
http://www.co.clark.wa.us/pubworks/bmpman.pdf

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

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



Photo Credit: Geoff Brosseau

## Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

## 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 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.

## Targeted Constituents

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

## 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.

### *Pollution Prevention*

- Keep accurate maintenance logs to evaluate materials removed and improvements made.
- 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.

CASQA California Stormwater Quality Association

### *Suggested Protocols*

*Loading and Unloading – General Guidelines*

- Develop an operations plan that describes procedures for loading and/or unloading.
- Conduct loading and unloading in dry weather if possible.
- 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 in the area.
- Grade and/or berm the loading/unloading area to a drain that is connected to a deadend.

*Inspection*

- Check loading and unloading equipment regularly for leaks, including valves, pumps, flanges and connections.
- Look for dust or fumes during loading or unloading operations.

### *Training*

- 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.

***Spill Response and Prevention***

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Contain leaks during transfer.
- Store and maintain appropriate spill cleanup materials in a location that is readily accessible and known to all and ensure that employees are familiar with the site's spill control plan and proper spill cleanup procedures.
- Have an emergency spill cleanup plan readily available.
- Use drip pans or comparable devices when transferring oils, solvents, and paints.

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

- Space and time limitations may preclude all transfers from being performed indoors or under cover.
- It may not be possible to conduct transfers only during dry weather.

## Requirements

***Costs***

Costs should be low except when covering a large loading/unloading area.

***Maintenance***

- Conduct regular inspections and make repairs as necessary. The frequency of repairs will depend on the age of the facility.
- Check loading and unloading equipment regularly for leaks.
- Conduct regular broom dry-sweeping of area.

## Supplemental Information

***Further Detail of the BMP***

*Special Circumstances for Indoor Loading/Unloading of Materials*

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

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

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

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

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

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

# 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, solid waste treatment and disposal, are examples of process operations that can lead to contamination of stormwater runoff. Source controls for outdoor process equipment operations and maintenance include reducing the amount of waste created, enclosing or covering all or some of the equipment, installing secondary containment, and training employees.

**Objectives**

- Cover
- Contain
- Educate
- Reduce/Minimize

## Approach

### *Pollution Prevention*

- Perform the activity during dry periods.
- Use non-toxic chemicals for maintenance and minimize or eliminate the use of solvents.

**Targeted Constituents**

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

### *Suggested Protocols*

- Consider enclosing the activity in a building and connecting the floor drains to the sanitary sewer.
- Cover the work area with a permanent roof if possible.
- Minimize contact of stormwater with outside process equipment operations through berming and drainage routing (run-on prevention). If possible, connect process equipment area to public sewer or facility wastewater treatment system. Some municipalities require that secondary containment areas be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.
- Dry clean the work area regularly.

### *Training*

- Train employees to perform the activity during dry periods only or substituting benign materials for more toxic ones.
- Train employee and contractors in proper techniques for spill containment and cleanup. Employees should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

### *Spill Response and Prevention*

- 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.
- Inspect storage areas regularly for leaks or spills. Also check for structural failure, spills and overfills due to operator error, and/or failure of piping system.

***Other Considerations***

- Providing cover may be expensive.
- Space limitations may preclude enclosing some equipment.
- Storage sheds often must meet building and fire code requirements.

## Requirements

***Costs***

Costs vary depending on the complexity of the operation and the amount of control necessary for stormwater pollution control.

***Maintenance***

- Conduct routine preventive maintenance, including checking process equipment for leaks.
- Clean the storm drain system regularly.

## Supplemental Information

***Further Detail of the BMP***

*Hydraulic/Treatment Modifications*

If stormwater becomes polluted, it should be captured and treated. If you do not have your own process wastewater treatment system, consider discharging to the public sewer system. Use of the public sewer might be allowed under the following conditions:

- If the activity area is very small (less than a few hundred square feet), the local sewer authority may be willing to allow the area to remain uncovered with the drain connected to the public sewer.
- It may be possible under unusual circumstances to connect a much larger area to the public sewer, as long as the rate of stormwater discharges does not exceed the capacity of the wastewater treatment plant. The stormwater could be stored during the storm and then transferred to the public sewer when the normal flow is low, such as at night.

Industries that generate large volumes of process wastewater typically have their own treatment system and corresponding permit. These industries have the discretion to use their wastewater treatment system to treat stormwater within the constraints of their permit requirements for process treatment. It may also be possible for the industry to discharge the stormwater directly to an effluent outfall without treatment as long as the total loading of the discharged process

water and stormwater does not exceed the loading had a stormwater treatment device been used. This could be achieved by reducing the loading from the process wastewater treatment system. Check with your Regional Water Quality Control Board or local sewering agency, as this option would be subject to permit constraints and potentially regular monitoring.

## References and Resources

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

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

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

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

# Waste Handling & Disposal SC-34



Photo Credit: Geoff Brosseau

## 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

### *Pollution Prevention*

- 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
  - 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 | ✓ |

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***Suggested Protocols***

*General*

- 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.
- Check storage 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 storage area regularly. If it is paved, do not hose down the area to a storm drain.
- 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.
- 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.

*Controlling Litter*

- 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.

*Good Housekeeping*

- Use all of the product before disposing of the container.
- 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.

*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.
- Stencil or demarcate storm drains on the facility's property with prohibitive message regarding waste disposal.

*Run-on/Runoff Prevention*

- 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, polypropyleneor 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.
- Move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

*Inspection*

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Check waste management areas for leaking containers or spills.

- Repair leaking equipment including valves, lines, seals, or pumps promptly.

***Training***

- Train staff in pollution prevention measures and proper disposal methods.
- Train employees and contractors in proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.
- Train employees and subcontractors in proper hazardous waste management.

***Spill Response and Prevention***

- Keep your Spill Prevention Control and Countermeasure (SPCC) 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
  - Trucks with sealed gates and spill guards for solid waste

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

Hazardous waste cannot be reused or recycled; it must be disposed of by a licensed hazardous waste hauler.

## Requirements

***Costs***

Capital and O&M costs for these programs will vary substantially depending on the size of the facility and the types of waste handled. Costs should be low if there is an inventory program in place.

***Maintenance***

- None except for maintaining equipment for material tracking program.

## Supplemental Information

***Further Detail of the BMP***

*Land Treatment System*

Minimize runoff of polluted stormwater from land application by:

- Choosing a site where slopes are under 6%, the soil is permeable, there is a low water table, it is located away from wetlands or marshes, and there is a closed drainage system

- Avoiding application of waste to the site when it is raining or when the ground is saturated with water
- Growing vegetation on land disposal areas to stabilize soils and reduce the volume of surface water runoff from the site
- Maintaining adequate barriers between the land application site and the receiving waters (planted strips are particularly good)
- Using erosion control techniques such as mulching and matting, filter fences, straw bales, diversion terracing, and sediment basins
- Performing routine maintenance to ensure the erosion control or site stabilization measures are working

***Examples***

The port of Long Beach has a state-of-the-art database for identifying potential pollutant sources, documenting facility management practices, and tracking pollutants.

## References and Resources

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

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

Solid Waste Container Best Management Practices – Fact Sheet On-Line Resources – Environmental Health and Safety. Harvard University. 2002.

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

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org

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

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

# Safer Alternative Products SC-35

## Description

Promote the use of less harmful products and products that contain little or no TMDL 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 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

### Objectives

- Educate
- Reduce/Minimize
- Product Substitution

### Targeted Constituents

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

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

Implement this BMP in conjunction with the Vehicle and Equipment Management fact sheets (SC20 – SC22) and SC41, Building and Grounds Maintenance.

***Training***

- Employees who handle potentially harmful materials in the use of safer alternatives.
- Purchasing departments should be encouraged to procure less hazardous materials and products that contain little or no harmful substances or TMDL pollutants.

***Regulations***

This BMP has no regulatory requirements. 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.

***Equipment***

- There are no major equipment requirements to this BMP.

***Limitations***

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

**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

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 listed below.

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. Rerefined 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 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.

#### *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 (www.dtsc.ca.gov)

California Integrated Waste Management Board (www.ciwmb.ca.gov)

City of Santa Monica (www.santa-monica.org/environment)

City of Palo Alto (www.city.palo-alto.ca.us/cleanbay)

City and County of San Francisco, Department of the Environment (www.ci.sf.ca.us/sfenvironment)

Earth 911 (www.earth911.org/master.asp)

Environmental Finance Center Region IX (www.greenstart.org/efc9)

Flex Your Power (www.flexyourpower.ca.gov)

GreenBiz.com (www.greenbiz.com)

Green Business Program (www.abag.org/bayarea/enviro/gbus/gb.html)

Pacific Industrial and Business Association (www.piba.org)

Sacramento Clean Water Business Partners (www.sacstormwater.org)

USEPA BMP fact sheet – Alternative products (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/poll_2.cfm)

USEPA Region IX Pollution Prevention Program (www.epa.gov/region09/p2)

Western Regional Pollution Prevention Network (www.westp2net.org)

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

National Electrical Manufacturers Association - Environment, Health and Safety (www.nema.org)

Sustainable Conservation (www.suscon.org)

- Auto Recycling Project
- Brake Pad Partnership

***Pesticides and Chemical Fertilizers***

Bio-Integral Resource Center (www.birc.org)

California Department of Pesticide Regulation (www.cdpr.ca.gov)

University of California Statewide IPM Program (www.ipm.ucdavis.edu/default.html)

***Dioxins***

Bay Area Dioxins Project (http://dioxin.abag.ca.gov/)

# Building & Grounds Maintenance SC-41




## Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

## Targeted Constituents

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

## 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.

### *Pollution Prevention*

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.

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- 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.

***Suggested Protocols***

*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.

*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*

- 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.
- 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.
- 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.

*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.

***Training***

- 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 nature of the staff.

***Spill Response and Prevention***

- 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.

***Other Considerations***

Alternative pest/weed controls may not be available, suitable, or effective in many cases.

## Requirements

***Costs***

- Cost will vary depending on the type and size of facility.
- Overall costs should be low in comparison to other BMPs.

***Maintenance***

Sweep paved areas regularly to collect loose particles. Wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

## Supplemental Information

***Further Detail of the BMP***

*Fire Sprinkler Line Flushing*

Building 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

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

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

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

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

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

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

# Building Repair and Construction SC-42




## Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Recycle

## Targeted Constituents

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

## Description

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 construction by using soil erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using safer alternative products, and training employees.

## Approach

### *Pollution Prevention*

- Recycle residual paints, solvents, lumber, and other materials to the maximum extent practical.
- Buy recycled products to the maximum extent practical.
- 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.

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- Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.

***Suggested Protocols***

*Repair & Remodeling*

- Follow BMPs identified in Construction BMP Handbook.
- Maintain good housekeeping practices while work is underway.
- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Cover materials of particular concern that must be left outside, particularly during the rainy season.
- Do not dump waste liquids down the storm drain.
- Dispose of wash water, sweepings, and sediments properly.
- Store materials properly that are normally used in repair and remodeling such as paints and solvents.
- Sweep out the gutter or wash the gutter and trap the particles at the outlet of the downspout if when repairing roofs, small particles have accumulated in the gutter. 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.
- Properly store and dispose waste materials generated from construction activities. See Construction BMP Handbook.
- Clean the storm drain system in the immediate vicinity of the construction activity after it is completed.

*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% 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 significant 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 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.

### *Training*

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 what they are expected to do.

### *Spill Response and Prevention*

- 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.
- Clean up spills immediately.
- Excavate and remove the contaminated (stained) soil if a spill occurs on dirt.

### *Limitations*

- This BMP is for minor construction only. The State's General Construction Activity Stormwater Permit has more requirements for larger projects. The companion "Construction Best Management Practice Handbook" contains specific guidance and best management practices for larger-scale projects.
- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Be certain that actions to help stormwater quality are consistent with Cal- and Fed-OSHA and air quality regulations.

# SC-42 Building Repair and Construction

## Requirements

***Costs***

These BMPs are generally low to modest in cost.

***Maintenance***

N/A

## Supplemental Information

***Further Detail of the BMP***

*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.

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. See Treatment Control Fact Sheet TC-20 Wet Pond/Basin in Section 5 of the New Development and Redevelopment Handbook regarding design criteria. Include in the catch basin a "turn-down" elbow or similar device to trap floatables.

## References and Resources

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

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

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

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

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

# Parking/Storage Area Maintenance SC-43



## Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

## Targeted Constituents

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

## Description

Parking lots and storage areas 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/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

## Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas and storage 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.

### *Pollution Prevention*

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook)
- Keep accurate maintenance logs to evaluate BMP implementation.

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# SC-43 Parking/Storage Area Maintenance

***Suggested Protocols***

*General*

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow 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.
- Discharge soapy water remaining in mop or wash buckets to the sanitary sewer through a sink, toilet, clean-out, or wash area with drain.

*Controlling Litter*

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel, and dispose of litter in the trash.

*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.
- 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.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- 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.
- Appropriately dispose of spilled materials and absorbents.

*Surface Repair*

- 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, 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.

*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.

### *Training*

- 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.

### *Spill Response and Prevention*

- 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.

### *Other Considerations*

Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

# SC-43 Parking/Storage Area Maintenance

## Requirements

### *Costs*

Cleaning/sweeping costs can be quite large. Construction and maintenance of stormwater structural controls can be quite expensive as well.

### *Maintenance*

- Sweep parking lot regularly to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities regularly to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

## Supplemental Information

### *Further Detail of the BMP*

*Surface Repair*

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (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. Only use only as much water as is necessary for dust control to avoid runoff.

## References and Resources


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

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

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

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

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

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

# Drainage System Maintenance SC-44



**Objectives**

- Cover
- Contain
- Educate
- Reduce/Minimize

## Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

**Targeted Constituents**

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

## Approach

### *Pollution Prevention*

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.

### *Suggested Protocols*

*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.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

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- 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. 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 (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. 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 Federal Corps of Engineers and USFWS.

*Illicit Connections and Discharges*

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers 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" 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.

*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)
  - 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.

### *Training*

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- 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).

***Spill Response and Prevention***

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- 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.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

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

- 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.
- 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, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

## Requirements

***Costs***

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:

  - Purchase and installation of signs.

  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.

  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.

  - Purchase of landfill space to dispose of illegally-dumped items and material.

- 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.

***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.

## Supplemental Information

***Further Detail of the BMP***

*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 resuspension 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 or that fire hydrant line flushing coincide with storm sewer flushing.

## References and Resources

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

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

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

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

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

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

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

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

# Site Design & Landscape Planning SD-10



**Design Objectives**

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

## Description

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

## Approach

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

## Suitable Applications

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

## Design Considerations

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

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***Designing New Installations***

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

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

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

*Conserve Natural Areas during Landscape Planning*

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

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

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

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

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

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

*Protection of Slopes and Channels during Landscape Design*

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

### *Redeveloping Existing Installations*

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

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

### Other Resources

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

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

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

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

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

# Efficient Irrigation SD-12



**Design Objectives**

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

## Description

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

## Approach

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

## Suitable Applications

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

## Design Considerations

### *Designing New Installations*

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

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

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

### *Redeveloping Existing Installations*

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

## Other Resources

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

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

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

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

# Storm Drain Signage SD-13




**Design Objectives**

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

## Description

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

## Approach

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

## Suitable Applications

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

## Design Considerations

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

### *Designing New Installations*

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

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

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

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

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

### *Redeveloping Existing Installations*

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

## Additional Information

### *Maintenance Considerations*

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

### *Placement*

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

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

## Supplemental Information

### *Examples*

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

## Other Resources

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

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

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

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

# 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).

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- 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.

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- 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.

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