LOW IMPACT DEVELOPMENT (LID) PLAN

16201 Raymer

Van Nuys

16201 Raymer Street.
Van Nuys, CA 91406

August 2023
Revised:

PREPARED FOR:

Longpoint Realty Partners
116 Huntington Avenue
Boston, MA 02116
Phone: 617-861-9771

PREPARED BY:

Kimley-Horn and Associates, Inc.
245 E. Third Street
Long Beach, CA 90802
(562) 549-2141
Attn: Hunter Starkey, P.E.

Kimley»Horn

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OWNER CERTIFICATION

PRELIMINARY
LOW IMPACT DEVELOPMENT PLAN

This Low Impact Development Plan (LID) has been prepared for Longpoint Realty Partners by Kimley-Horn and Associates, Inc. It is intended to comply with the requirements of the County of Los Angeles National Pollution Discharge Elimination Permit (Order No. R4-2012-0175, NPDES Permit No CAS004001), issued by the Los Angeles Regional Water Quality Control Board, of which the City of Los Angeles is a copermittee. The undersigned is authorized to approve implementation of the provisions of this plan as appropriate and will strive to have the plan carried out by successors consistent with the City of Los Angeles LID for Stormwater Management and the intent of the NPDES storm water program requirements.

Signature	Date
Name	Title

Longpoint Realty Partners
116 Huntington Avenue
Boston, MA 02116
Phone: 617-861-9771

I. INTRODUCTION

This document provides the methodology and calculations for the stormwater water quality design for the proposed project as prescribed in the Los Angeles County (LAC), Department of Public Works' (DPW) Low Impact Development (LID) Standards Manual, dated February 2014 (LID Manual). This analysis considers the proposed conditions and provides best management practice (BMP) assessment and sizing calculations.

The hydrology analysis and stormwater hydraulic design are incorporated in the proposed Project with the analysis, calculations, and narrative presented in the Project Drainage Report, prepared under separate cover.

The project site is 5.46 acres located at 16201 Raymer Street in the City of Los Angeles and County of Los Angeles, California. Figure 1 shows the project area and vicinity map. The proposed site development (Project) includes an industrial development with approximately 123,468 square feet (sf) of industrial building, approximately 114,500 square feet (sf) of sidewalk, truck dock, parking stalls, and landscaping areas.

Prior to issuance of any grading or building permit, the applicant shall submit a Low Impact Development (LID) Plan acceptable to the City Engineer to comply with the latest National Pollutant Discharge Elimination System (NPDES) Stormwater Regulations. The project shall incorporate both construction and operational Best Management Practices (BMPs) to minimize construction and urban pollutants in stormwater runoff. If required, the applicant shall obtain a State Water Resources Board General Construction Activities Storm Water Permit. The Engineering Department shall monitor compliance.

This LID Plan covers the post-construction operations on the tenant and site improvements, in the City of Los Angeles, California (see Figure 1, Vicinity Map, Page 5). It has been developed as mandated by the California Regional Water Quality Control Board, Los Angeles Region (RWQCB) for the City of Los Angeles and in accordance with good engineering practices.

This LID Plan shall identify, at a minimum, applicable BMPs, the assignment of long-term maintenance responsibilities, and illustrate the site-specific Plan that will be implemented to mitigate post-construction stormwater runoff pollution.

LEGAL DESCRIPTION :

All that certain real property situated in the County of Los Angeles, State of California, described as below:

Parcel 1:
Parcels B, C, and D of parcel map L.A. No. 3408, in the City of Los Angeles, County of Los Angeles, State of California, as per map filed in book 79, pages 99 and 100 of parcel maps, in the office of the County recorder of said county.

Parcel 2A:
Parcel B of parcel map L.A. No. 3077, in the City of Los Angeles, County of Los Angeles, State of California, as per map filed in book 65, pages 39 and 40 of parcel maps, in the office of the county recorder of said county.
Parcel 2B:
A nonexclusive surface water drainage easement over the southernmost five (5) feet of parcel C and D parcel map LA No. 3077 and lots 4 and 6 of tract No. 23827, as more particularly described in that certain reciprocal easement agreement (drainage) recorded June 13, 1997 as inst. No. 97-882140, official records, in the office of the county recorder of said county.

II. EXISTING SITE CONDITIONS

The property is classified as a light manufacturing facility situated in the Van Nuys region of the City of Los Angeles. Positioned on Raymer Street, it is bordered by industrial properties on both the western and eastern perimeters, with Raymer Street delineating the southern boundary and an existing railroad adjacent to the northern side.

In the existing drainage pattern, runoff originating from the paved parking lot, building structures, and landscaped areas sheet flows towards established concrete valley gutters that run in a north-to-south direction. This runoff subsequently enters existing grated inlets located near the southern boundary. From these drainage inlets, the water is directed into Raymer Street through existing curb drains and parkway drains, ultimately converging at the curb and gutter along Raymer Street. This combined flow is collected via curb opening catch basins, subsequently integrating into the public storm drain system jointly managed by the City of Los Angeles and the County of Los Angeles that eventually drains to the Queensway Bay and Pacific Ocean.

The project site is located within the Los Angeles River Watershed. The project site discharges to the Los Angeles River, Reach 5, and ultimately discharges to the Queensway Bay and Pacific Ocean. According to the 2010 303(d) List of Impaired Water Bodies, Los Angeles River, Reach 5, is listed for copper, lead, ammonia, trash, nutrients (algae), benthic community effects, toxicity, and oil.

City code requires that the stormwater treatment for the site be treated for the ¾" or 85th percentile whichever is greater.

16201 Raymer St.
Van Nuys, CA 91406



Figure 1: Vicinity Map

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III. PROPOSED SITE CONDITIONS

The proposed site development includes industrial development with parking lots, hardscape, and landscape in addition to a proposed industrial building. The total disturbed area is 5.46 acres. Under proposed conditions, the drainage pattern will remain similar to existing conditions. The site will continue to drain from the north to the south and ultimately toward Raymer Street. An underground storm drain system will connect a network of roof drains and surface inlets. The runoff will be captured via proposed onsite inlets and conveyed into underground capture and reuse system for the water quality purpose. The overflow of the entire site (25-year storm event) will be ultimately discharged south of the property toward existing curb and gutter near on Raymer Street. These on-site drains will ultimately drain toward Raymer Street through a new parkway drain.

An off-line storage and reuse system will be constructed to capture the first 85th-percentile of rainfall per City code. A diversion manhole will be placed upstream of the private storm drain. A low-flow drain will be directed from the diversion manhole to an HDPE storage chamber. A hydrodynamic separator will be placed upstream of the chamber to pre-treat the stormwater. The chamber will discharge to a pump system that will irrigate the Project site landscape. Pre-treatment will reduce the potential for clogging and reduce long-term maintenance of the storage and reuse system. Overflow of the system will be located at the hydrodynamic separator upstream of the re-use system.

The runoff will be captured via proposed onsite inlets and conveyed into underground cistern tanks for water quality purposes. The overflow of the entire site (25-year storm event) will be ultimately discharged south-west corner of the property existing curb and gutter near on Raymer Street. There are multiple offsite catch basins and an existing public storm drain line along Raymer Street, and the onsite overflow from the site will ultimately flow in that direction and into the City of Los Angeles and County of Los Angeles public storm system. Since the pervious areas have increased in the proposed condition in comparison with the existing, the peak flow will naturally decrease, eliminating the need for detention measures.

Refer to **Appendix 1** for the project's LID Exhibit, Grading, Drainage, and Treatment Control BMP Detail Sheet.

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IV. BMP SUMMARY

There are applicable, required or suggested treatment and source control BMPs based on the pollutants that are anticipated to be generated when the new tenant improvements are completed and in use. This report is responsible for determining, evaluating, and selecting the appropriate and applicable measures to treat the targeted pollutants to the MEP standard.

The proposed project is an industrial development. The expected pollutants of concern for this project include oil and grease, trash and debris, sediment, nutrients, solvents, metals, organic compounds, pathogens and oxygen demanding substances. The hydrodynamic separator has been designed to remove 80% of annual solids load reduction based on lab generated performance curves for a graduation with an average particle size (d50) of 125 microns (µm) or 50 microns (µm).

Infiltration was initially considered for the site but it is not feasible due to low infiltration rate measured onsite as 0.08 inch per hour. In addition, the geotechnical report gives the following recommendation: "In accordance with the County of Los Angeles guidelines infiltration (2021), subsurface soils with a minimum design infiltration rate of 0.3 inches per hour is required for stormwater infiltration systems. Based on the tested infiltration rate and the County guidelines, an onsite stormwater infiltration at the tested depths is not considered feasible from a geotechnical standpoint."
Rather than infiltration, a storage and reuse system will be used to capture smaller storm events and the beginning of larger storm events and utilize the stored runoff for irrigating the landscaped area on the industrial site.

SOURCE CONTROL BMPS

Source control BMPs are required to be incorporated in all new development and redevelopment projects unless not applicable. The table below indicates all BMPs to be incorporated in the project. For those designated as not applicable (N/A), a brief explanation why is provided.

The specific source control BMPs for the tenant improvement project include:

INCORPORATED SOURCE CONTROL BMP:	YES	N/A	DESCRIPTION
Peak Stormwater Runoff Discharge Rates	☒	☐	The project site's peak discharges will not cause or contribute to downstream erosion. Project runoff will discharge into the City's Street and into the City's storm drain system, which has been approved by the City. Existing drainage patterns will be maintained and the amount of run-off leaving the site will not be increased.
Conserve Natural Areas	☐	☒	Under existing conditions, the project site is developed and paved. No natural areas will be preserved.

INCORPORATED SOURCE CONTROL BMP:	YES	N/A	DESCRIPTION
Minimize Stormwater Pollutants of Concern	☒	☐	The proposed BMP will provide treatment of stormwater runoff.
Protect Slopes & Channels	☐	☒	There are no slopes or channels associated with the project site.
Provide Storm Drain System Stenciling & Signage	☒	☐	The phrase "No Dumping – Drains to Ocean" or equally effective phrase will be stenciled on catch basins and/or area drains to alert the public as to the destination of pollutants discharged into the stormwater.
Properly Design Outdoor Material Storage Areas	☐	☒	There are no outdoor storage areas proposed for the project site.
Properly Design Trash Storage Areas	☒	☐	The trash containers will be completely enclosed in a gate enclosure.
Provide Proof of Ongoing BMP Maintenance	☒	☐	The property owner will be responsible for the maintenance of the BMPs onsite and ensure that they are in good working order.
Properly Design Loading/Unloading Dock Areas	☒	☐	There is a proposed loading/unloading truck dock area for the project site, and a proposed inlet in the middle to capture the runoff.
Properly Design Repair/Maintenance Bays	☐	☒	There are no repair/maintenance bays proposed for the project site.
Properly Design Vehicle/ Equipment/ Accessory Wash Areas	☐	☒	There are no vehicle or equipment wash areas proposed for the project site.
Design Standards for Treatment Control BMPs	☒	☐	Post-construction structural BMP design will accommodate the ¾" or 85th percentile rainfall requirement.

The following source control BMP fact sheets taken from the 2003 California BMP Handbook are provided in **Appendix 7** of this report as a reference to the design plans and/or specifications for new commercial improvements:

- SC-30 Outdoor Loading/Unloading
- SC-34 Waste Handling & Disposal
- SC-41 Building & Grounds Maintenance
- SC-43 Parking/Storage Area Maintenance
- SC-44 Drainage System Maintenance
- SD-13 Storm Drainage Signage
- SD-32 Trash Storage Areas

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LID SITE DESIGN BMPS

The following table describes the Low Impact Development site design BMPs used in this project and the methods used to incorporate them. Careful consideration of site design is a critical first step in stormwater pollution prevention from new developments and redevelopments.

INCORPORATED LID SITE DESIGN BMP:	YES	NO	DESCRIPTION
Conserve natural areas.	☐	☒	Not applicable. The project is a paved site, and there are no natural areas to conserve.
Minimizing disturbances to natural drainage patterns.	☐	☒	No natural drainage patterns are present. The project will maintain the existing drainage patterns.
Minimizing and disconnecting impervious surfaces.	☐	☒	The project runoff will be directed to the proposed capture and reuse system. This will accomplish the same goals as minimizing and disconnecting impervious surfaces.
Minimizing soil compaction.	☐	☒	The project has been previously developed. Soil compaction will be conducted via geotechnical recommendations.
Directing runoff from impervious areas to pervious areas.	☐	☒	The project runoff will be directed to the proposed capture and reuse system. This will accomplish the same goals as minimizing and disconnecting impervious surfaces by directing the low flows to landscaped areas as irrigation.

LID TREATMENT CONTROL BMPS

The water quality design for the Project complies with the 2014 Los Angeles County LID Manual and the 2016 City of Los Angeles – Low Impact Development (LID) Manual. The LID goals of increasing groundwater recharge, enhancing water quality, and preventing degradation to downstream natural drainage courses, as outlined in LID Manual, were used in considering treatment method alternatives.

The LID manual outlines Implement LID and maximize in priority order:

1. Infiltrate
2. Capture and Use
3. High efficiency Bio-Filtration/Retention System BMP
4. Combination of above

The highest level on the priority list is to use Infiltration unless it is technically infeasible to do so. In this case, infiltration cannot be accomplished because of underground utilities and the Geotechnical recommendations found in **Appendix 9**. Storage and reuse of the stormwater for irrigation is proposed as BMP.

INCORPORATED LID TREATMENT CONTROL BMP:	YES	NO	DESCRIPTION
Bioretention with Underdrain	☐	☒	-
Cisterns/Rain Barrels	☒	☐	A capture and use system for irrigation is proposed.
Dry Ponds	☐	☒	-
Dry Wells	☐	☒	-
Engineered Wetlands	☐	☒	-
Green Roofs	☐	☒	-
Infiltration Basin	☐	☒	-
Infiltration Trenches	☐	☒	-
Landscape Irrigation	☐	☒	-
Planter Boxes	☐	☒	-
Porous pavements	☐	☒	-
Sand Filters	☐	☒	-
Vegetated Buffers	☐	☒	-
Vegetated Swales	☐	☒	-
Wet Ponds	☐	☒	-

DESIGN STANDARDS FOR TREATMENT CONTROL BMPS

Treatment Control BMPs must incorporate, at a minimum, a volume-based treatment control design standard to mitigate (infiltrate, filter, or treat) stormwater runoff. The project site is utilizing volume-based treatment to mitigate the storm water runoff. The calculated volume associated with the 85th percentile storm event is based on the Rational Method as outlined by the Los Angeles County Public Works Department "Hydrology Manual", January 2006.

Input parameters, applicable equations, and detailed hydrology and peak mitigation calculations are provided in **Appendix 2**. Refer to **Appendix 10** for LACDPW Hydrology Maps. Refer to the Drainage Area Exhibit within **Appendix 1** for the delineation of the project's drainage areas.

As illustrated in the table below, all treatment control BMPs selected for the project are adequately sized:

HydroCalc Input Parameters

Parameter	Value
Site Area	5.46 ac
Imperviousness (% of site)	86%
Longest Flow Path	812 ft
Flow Path Slope	1.0%
Soil Type Number	16
85th Percentile Rainfall Depth	1.1 in

SUMMARY OF VOLUME BASED TREATMENT BMP SIZING				
Treatment Control BMP	Sub-Areas	Required Volume to be treated (cu ft)	Selected BMP Size	BMP Volume (CF)
Storage and Reuse System	DMA-1	17,233	Contech storage system	18,096

V. HYDROMODIFICATION DISCUSSION

The site connects to a city-approved storm drain system that discharges to the Los Angeles River subsequently to the San Pedro Bay. Both drainage courses are improved and not susceptible to hydromodification. Additionally, the projected peak flow as well as the imperviousness demonstrates a reduction when compared to the existing condition.

VI. INSPECTION/MAINTENANCE RESPONSIBILITY

It has been determined that the property owner (Longpoint Realty Partners) shall assume all BMP inspection and maintenance responsibilities for the new tenant improvements. Longpoint Realty Partners will be responsible for maintenance of all storm drain inlets, collectors, v-ditches, capture and use rainwater harvesting system or any other related flood control or stormwater control devices. Furthermore, all interior streets and/or roadways, landscape, recreation areas, and/or facilities within the project limits will be maintained by the Owner. A Covenant and Agreement regarding on-site stormwater treatment devices maintenance shall be completed prior to completion and release of the project by the City of Los Angeles (see **Appendix 4**).

LONG-TERM FUNDING FOR BMP MAINTENANCE

Long-term funding for BMP maintenance shall be funded by Longpoint Realty Partners.

RESPONSIBLE PARTY CONTACT INFORMATION

Longpoint Realty Partners
116 Huntington Avenue
Boston, MA 02116
Phone: 617-861-9771
Attn: Matt Levine

Kimley»Horn

VII. OPERATION & MAINTENANCE PLAN

Proper O&M is an important element of a stormwater mitigation plan to ensure BMPs remove pollution effectively. Routine maintenance or service also contributes to the efficiency and continuous operation of a system. The post development BMP maintenance responsibility and frequency matrix provided in this section detail the specific party to perform the inspection and maintenance of each BMP for the tenant Improvements and details the maintenance and inspection activities to be performed, and the frequency with which each shall be performed. Further Operations and Maintenance details can be found in **Appendix 5**.

Structural BMP Maintenance Responsibility / Frequency Matrix

BMP		RESPONSIBILITY	MAINTENANCE FREQUENCY
SD-13	Storm Drainage Signage	Longpoint Realty Partners	Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible should be re-stenciled as soon as possible. Frequency: ANNUALLY
SD-32	Trash Storage Areas	Longpoint Realty Partners	Sweep trash area at least once per week and before October 1st each year. Maintain area clean of trash and debris at all times. Frequency: WEEKLY
SC-34	Waste Handling & Disposal	Longpoint Realty Partners	Train employees to clean regularly to remove potential sources of pollutants. Sweep area to be performed at least once per month and before Oct 1 of each year. Frequency: MONTHLY
SD-41	Building and Grounds Maintenance	Longpoint Realty Partners	Sweep paved areas regularly to collect loose particles and wipe up spills with rags and other absorbent material immediately, DO NOT hose down the area to a storm drain. Frequency: WEEKLY

BMP		RESPONSIBILITY	MAINTENANCE FREQUENCY
SC-43	Parking/Storage Area Maintenance	Longpoint Realty Partners	Parking lots must be swept at least quarterly (every 3 months), including prior to the start of the rainy season (October 1st). Frequency: QUARTERLY
CDS Hydrodynamic Separator		Longpoint Realty Partners	Units must be serviced at least twice per year. Manufacturer's specifications may recommend additional maintenance. Refer to the manufacturer's specifications and **Appendix 5**, maintenance materials for additional maintenance. Frequency: MANUFACTURER'S RECOMMENDATIONS
Contech® Storage and Reuse System		Longpoint Realty Partners	Units must be serviced at least once per year. Manufacturer's specifications may recommend additional maintenance. Refer to the manufacturer's specifications and **Appendix 5**, maintenance materials for additional maintenance. Frequency: MANUFACTURER'S RECOMMENDATIONS

VIII. APPENDICES

Appendix 1: LID Exhibit

Appendix 2: LID Calculations and Backup Documents

Appendix 3: Stormwater Observation Report Form

Appendix 4: Master Covenant and Agreement

Appendix 5: Treatment Control BMP Operation & Maintenance Plan Supplement

Appendix 6: Record of Inspections

Appendix 7: Source Control BMP Fact Sheets

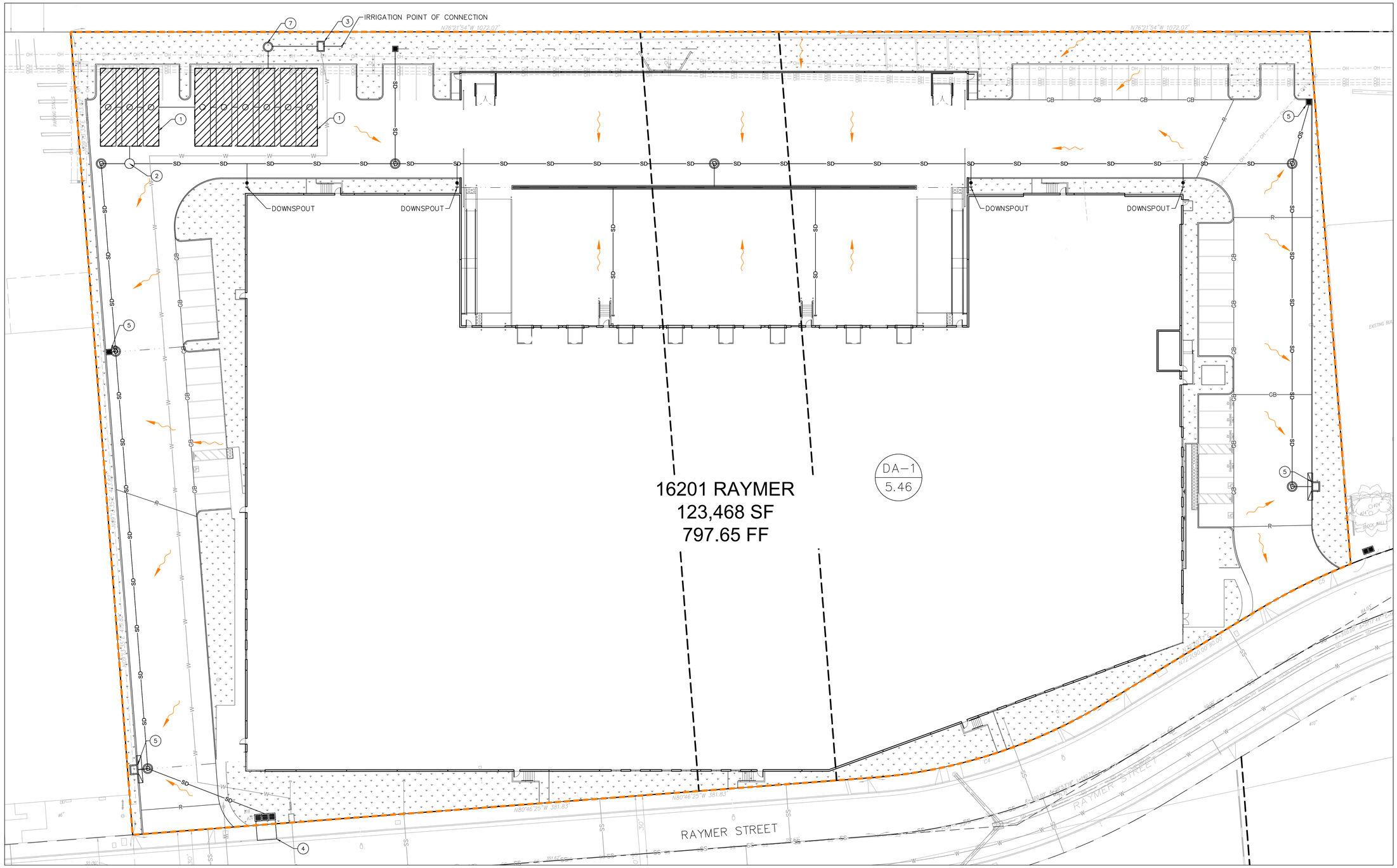
Appendix 8: Public Education Materials

Appendix 9: Geotechnical Information

Appendix 10: LACDPW Hydrology Maps

APPENDIX 1

LID and Drainage Area Exhibit, Treatment Control BMP Details



LID KEYNOTES

1. INSTALL PRE-CAST CONCRETE RAINWATER HARVESTING TANK.
2. INSTALL STORMWATER WATER QUALITY PRETREATMENT UNIT.
3. PROPOSED MECHANICAL SKID FOR IRRIGATION PUMP BY OTHERS. REFER TO PLUMBING PLANS AND LANDSCAPE PLANS FOR DETAILS.
4. PROPOSED SIDEWALK OUTLET STRUCTURE. SIDEWALK OUTLET STRUCTURE PER SEPARATE OFFSITE PERMIT.
5. PROPOSED SITE STORM DRAIN SYSTEM. SEE STORM DRAIN PLAN FOR DESIGN INFORMATION.
6. NON-POTABLE DRINKING SIGN. COORDINATE WITH OWNER FOR CONSTRUCTION.
7. PROPOSED IRRIGATION LIFT STATION.

LEGEND

- RIGHT OF WAY/ PROPERTY LINE
- CENTERLINE
- 147 EXISTING CONTOURS
- 147 PROPOSED CONTOURS
- DMA BOUNDARY
- SD PROPOSED STORM DRAIN
- LANDSCAPE AREA
- DIRECTION OF WATER FLOW
- PROPOSED LID CISTERN
- DMA ID / ACRES DRAINAGE AREA LABEL
- PROPOSED CURB INLET
- Ⓓ PROPOSED STORM DRAIN MANHOLE
- PROPOSED CATCH BASIN
- XX.XX TC / XX.XX FS PROPOSED SPOT GRADE

GENERAL NOTES

1. SEE PLUMBING PLANS FOR ROUTING OF STORM DRAIN INTERNAL TO THE BUILDING STRUCTURE.
2. ALL GRADING SLOPES SHALL BE PLANTED AND SPRINKLERED PER LANDSCAPE PLANS.
3. ANY CHANGES (TYPE, SIZE, LOCATION) TO APPROVED STORMWATER BEST MANAGEMENT PRACTICE(S) (BMPS) MUST OBTAIN WRITTEN APPROVAL FROM LOS ANGELES, DEPARTMENT OF PUBLIC WORKS, BUREAU OF SANITATION PRIOR TO CONSTRUCTION OF BMP(S).
4. REFER TO LOS ANGELES COUNTY DEPARTMENT OF PUBLIC HEALTH PLAN REVIEW REPORT FOR INSTALLATION OF RAINWATER CATCHMENT AND IRRIGATION SYSTEM.
5. CONTRACTOR TO LOCATE APPROPRIATE LOCATION FOR NON POTABLE WATER SIGNAGE. CONTRACTOR TO COORDINATE WITH THE OWNER.

LID TABULATION

PROPOSED BMP	SITE AREA (AC)	SITE AREA (SF)	IMPERVIOUS TRIBUTARY AREA (SF)	PERVIOUS AREA (SF)	REQUIRED VOLUME (CF)	CISTERN STORAGE VOLUME (CF)	PERCENT MITIGATION (%)
CAPTURE AND REUSE CISTERN	5.46	237,955	205,272	32,683	17,233	18,096	100%

GRAPHIC SCALE IN FEET
0 10 20 40

811 Know what's below. Call 811 before you dig.

Plotted By:Divaldar, Hans Street Set:EXHIBITS Layout:EXHIBIT 16201 September 26, 2023 02:32:03pm K:\ORA_LDEV\194571002- Raymer Street Von Nuys\Reports\WQMP\Exhibits\PROPOSED LID EXHIBIT_16201.dwg
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No.	REVISIONS	DATE	BY

Kimley»Horn
© 2023 KIMLEY-HORN AND ASSOCIATES, INC.
1100 W TOWN AND COUNTRY ROAD,SUITE 700,
ORANGE, CA 92868
PHONE: 714-939-1030 FAX: 714-938-9488
WWW.KIMLEY-HORN.COM

KHA PROJECT
PROJ #
DATE
SCALE AS SHOWN
DESIGNED BY
DRAWN BY
CHECKED BY

LICENSED PROFESSIONAL
LIC PROF 1
STATE LICENSE NUMBER
LIC PROF 1 #
DATE:

LID PLAN

16201 RAYMER STREET

PREPARED FOR
LONGPOINT REALTY PARTNERS

STATE
MUNICIPALITY

SHEET NUMBER
C1

APPENDIX 2

LID Calculations and Backup Documents

Peak Flow Hydrologic Analysis

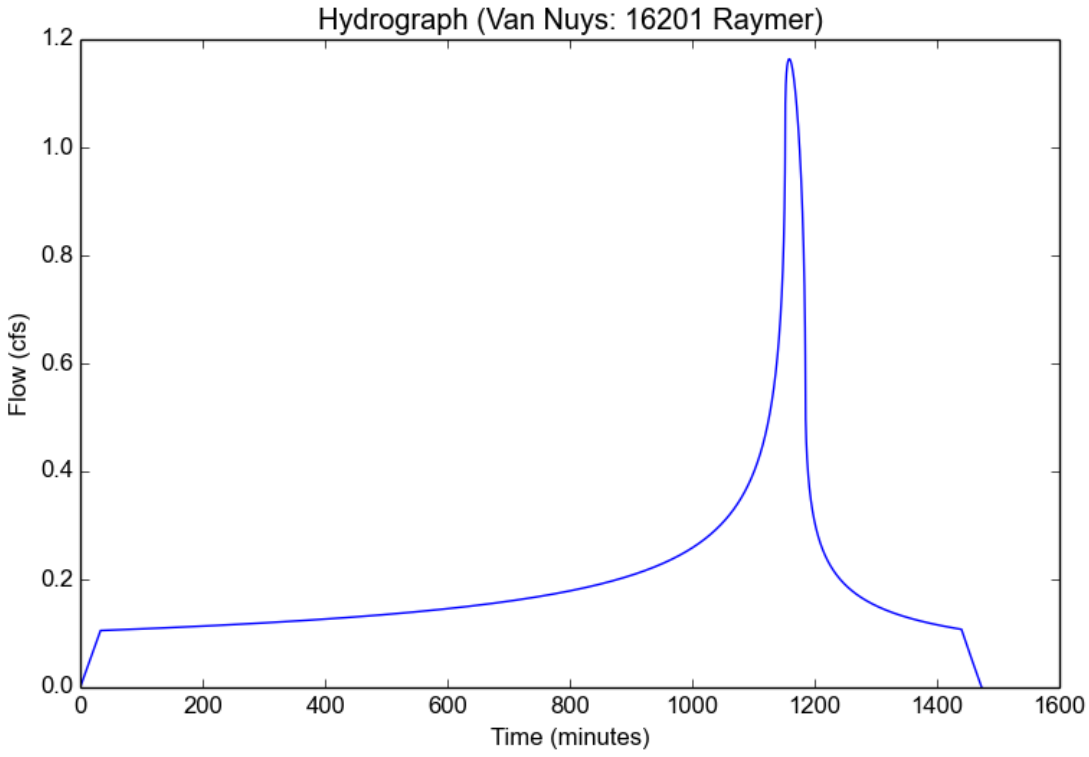
File location: K:/ORA_LDEV/194571002- Raymer Street Van Nuys/Reports/WQMP/Calculations/HYDROCALC CALCULATIONS/DCV 85th Percentile/20
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Van Nuys
Subarea ID	16201 Raymer
Area (ac)	5.462695133
Flow Path Length (ft)	812.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.86
Soil Type	16
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.2703
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	33.0
Clear Peak Flow Rate (cfs)	1.1637
Burned Peak Flow Rate (cfs)	1.1637
24-Hr Clear Runoff Volume (ac-ft)	0.3913
24-Hr Clear Runoff Volume (cu-ft)	17046.4682



Drainage Area 16201
Capture & Use Sizing

[1]	Total Area (SF)		237,955
[2]	Impervious Area (SF)		205,272
[3]	Pervious Area (SF)	**[1]-[2] =**	32,683
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	188,013
[5]	Design storm depth (in)		1.10
[6]	V_{design} (gal)	**[5]*[4]*7.48/12 =**	**128,914**
[7]	Planting Area (SF)		32,683
[8]	Plant Factor*		0.30
[9]	$ETWU_{(7\text{-month})}$	**21.7*0.62*[8]*[7] =**	131,915
[10]	Is $V_{design} \leq ETWU_{(7\text{-month})}$?		**YES**

*The plant factor used shall be from WUCOLS. The plant factor ranges from 0 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

Note: Circular Detention Pipe Sizing

[10]	V_{design} (CF)	**0.133681*[6] =**	**17233**
[11]	Number of Detention Pipes		9
[12]	Diameter of Detention Pipe (FT)		8
[13]	Length of Detention Pipe (FT)		40
[14]	$V_{provided}$ (CF)	**[12]*π ([13]^2) /4*[14] =**	**18096**
[15]	Is $V_{provided} \geq V_{design}$?		**YES**
[16]	Percent Full		95.2%

APPENDIX 3

STORMWATER OBSERVATION REPORT FORM

STORMWATER OBSERVATION REPORT FORM

(Residential ≥ 5 units & All other Development)

LOW IMPACT DEVELOPMENT

IN THE EVENT THAT THE APPROVED STORMWATER BMP CANNOT BE BUILT PER PLANS (OR ANY MODIFICATION), CONSULT WITH BUREAU OF SANITATION STAFF PRIOR TO ANY PLAN MODIFICATIONS. FAILURE TO DO SO MAY DELAY OBTAINING A FINAL APPROVAL AND CERTIFICATE OF OCCUPANCY (C OF O).

STORMWATER OBSERVATION *means the visual observation of the stormwater related Best Management Practices (BMPs) for conformance with the approved LID Plan at significant construction stages and at completion of the project. Stormwater observation does not include or waive the responsibility for the inspections required by Section 108 or other sections of the City of Los Angeles Building Code.*

STORMWATER OBSERVATION *must be performed by the engineer or architect responsible for the approved LID Plan or designated staff in their employment.* ***As part of the observation, provide photos of the BMPs taken during various construction phases.***

STORMWATER OBSERVATION REPORT *must be signed and stamped (see below) by the engineer or architect responsible for the approved LID Plan and submitted to the city prior to the issuance to the certificate of occupancy.* ***PRIOR TO CERTIFICATE OF OCCUPANCY (C of O), SOR FORM, PRINTED PHOTOS OF THE BMPS TAKEN DURING VARIOUS CONSTRUCTION PHASES AND APPROVED STAMPED PLANS BY THE BUREAU OF SANITATION MUST BE SUBMITTED TO THE PUBLIC COUNTER FOR STAFF APPROVAL.***

Project Address:	Building Permit No.:
Name of Engineer/Architect responsible for the approved LID Plan:	Phone Number:

List all BMPs installed as part of the project: Coordinates of the most significant (or typical) BMPs:

BMP Type:_____ # of units: _____ Lat: _____ ; Long:_____ ***Ex: Lat: 34.04152; Long: -118.25962 (5 sig digits)***	BMP Type:_____ # of units: _____ Lat: _____ ; Long:_____
BMP Type:_____ # of units: _____ Lat: _____ ; Long:_____	BMP Type:_____ # of units: _____ Lat: _____ ; Long:_____

I DECLARE THAT THE FOLLOWING STATEMENTS ARE TRUE TO THE BEST OF MY KNOWLEDGE:

1. I am the engineer or architect responsible for the approved LID Plan, and;
2. I, or designated staff under my responsible charge, has preformed the required site visits at each significant construction stage and at the completion to verify that the Best Management Practices (BMPs) as shown on approved plans have been constructed and installed in accordance with the approved LID Plan.

Wet Stamp of Engineer or Architect

_____

Signature Date

APPENDIX 4

MASTER COVENANT AND AGREEMENT

Recording requested by and mail to:

Name: **LONGPOINT REALTY PARTNERS**

Address: **116 HUNTINGTON AVENUE**

BOSTON, MA 02116

********** Space Above This Line For Recorder's Use **********

MASTER COVENANT AND AGREEMENT

REGARDING ON-SITE STORMWATER MITIGATION MEASURES AND MAINTENANCE

I (We), the undersigned, hereby certify that I am (we are) the owner(s) of the hereinafter legally described real property ("Property") located in the City of Los Angeles, County of Los Angeles, State of California (please give the legal description):

LEGAL DESCRIPTION

ASSESSOR'S ID# _____ TRACT NO. _____ BLOCK NO. _____ LOT NO _____

Site Address **16201 RAYMER STREET, VAN NUYS, CA, 91406**

In consideration of the City of Los Angeles allowing **Longpoint Realty Partners** development on said Property, I (we) do hereby covenant and agree to install, operate and maintain in a good operable condition at all times, at my (our) sole cost, all on-site stormwater Best Management Practices (BMPs) per approved plans. The location and type of each BMP feature installed on the Subject Property is identified on the site diagram attached hereto as Exhibit 1. I (we) shall maintain, in accordance with the attached Operation & Maintenance Plan (Attachment 1), the following on-site stormwater BMPs:

☐ Rain Tank (min 55 gal): # of barrels _____; _____total gallons, with minimum of _____ Sq. Ft of vegetated landscaping

☒ Rain Tank / Cistern: # of tanks / cistern **9** ; **135,364** total gallons, with minimum of **32,683** Sq. Ft of vegetated landscaping

☐ Porous pavement/pavers: _____ Sq. Ft (for incidental rainfall); and / or _____ Sq. Ft. with _____ ft sub base

☐ Rain Garden (lined): # of rain gardens _____; _____total Sq. Ft. ☐ Dry Well: _____ Cu. Ft.

☐ Rain Garden (unlined): # of rain gardens _____; _____total Sq. Ft. ☐ Infiltration Trench: _____ Cu. Ft.

☐ Flow Thru Planter: # of planters _____; _____total Sq. Ft. ☐ Green Roof: _____ Sq. Ft.

☐ Other: _____

_____

Owner further covenants and agrees that the above-described stormwater device(s) shall not be removed from the Subject Property unless a revised Plan is approved by the Bureau of Sanitation In the event that any portion of the above-specified on-site stormwater pollution removal device(s) or BMPs is modified, I (we) shall immediately provide the Bureau of Sanitation of the City of Los Angeles with a revised Plan for their approval, and sign and record a Supplemental Covenant and Agreement, specifying all of the on-site stormwater pollution removal device(s) and BMPs, as modified (along with a modified O&M Plan). No Supplemental Covenant and Agreement shall, in any way, limit or diminish my (our) General Maintenance Obligation.

This Master Covenant and Agreement, and all obligations herein, shall run with the Property and shall be binding upon any future owners, encumbrancers, their successors, heirs or assigns and shall continue in effect until the Bureau of Sanitation approves the termination hereof.

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

_____ _____

(Print Name of Property Owner) (Print Name of Property Owner)

_____ _____

(Signature of Property Owner) (Signature of Property Owner)

Dated this _____ day of _____ 20____. Dated this _____ day of _____ 20____.

(PLEASE ATTACH NOTARY ACKNOWLEDGEMENT)

********** Space Below This Line For Bureau Internal Use **********

Permit No. _____

Approved for recording by: Department of Public Works, Bureau of Sanitation

_____ _____ Date: _____

(Print Name) Engineering Associate (Signature)

APPENDIX 5

TREATMENT CONTROL BMP OPERATION AND MAINTENANCE PLAN SUPPLEMENT

CDS® Inspection and Maintenance Guide

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015	5	1.5	3.0	0.9	1.3	1.0



CONTECH®
ENGINEERED SOLUTIONS



ChamberMaxx® Inspection and Maintenance Guide



CHAMBERMaxx®

ChamberMaxx®

Safety

Before entering into any storm sewer or underground retention/detention system check to make sure all OSHA and local safety regulations and guidelines are observed during the maintenance process. Hard hats, safety glasses, steel-toed boots and any other appropriate personal protective equipment shall be worn at all times.

Inspection Frequency

Inspections are recommended at a minimum annually. The first year of operation may require more frequent inspections. Frequency of inspections will vary significantly on the local site conditions. An individual inspection schedule should be established for each site.

Inspections

Inspection is the key to effective maintenance and is easily performed. Inspections may need to be performed more often in the winter months in climates where sanding operations may lead to rapid sediment accumulations, or in equipment washdown areas. It is very useful to keep a record of each inspection. A sample inspection log is included for your use.

The entire treatment train should be inspected and maintained. The treatment train may consist of an upstream sump manhole, manifold system or pre-treatment HDS device. Inspections should start at the upstream device and continue downstream to the discharge orifice if incorporated into the chamber system.

Pre-Treatment Device Inspection

Inspection and maintenance procedures provided by the manufacturer should be followed for pre-treatment systems such as a CDS®, Vortechs®, VortSentry® or VortSentry® HS. Expected pollutants will be floatable trash, sediment and oil and grease. Pre-treatement devices are recommended for all detention/retention devices regardless of type.

Containment Row™ Inspection

The optional Containment Row consists of a diversion concrete manhole with a weir and a drain down orifice, and a row of chambers wrapped in a impermeable 20-mil HDPE liner. The diversion weir directs the first flush flows into the Containment Row of chambers. The majority of sediment will be captured in the Containment Row due to the extended detention time which allows the particles to settle out. Containment Row drains down via an orifice located in the diversion manhole weir allowing the remaining pollutants to be contained. Higher flows overtop (bypass) the weir into the manifold system.

The Containment Row will typically be located in the first row of chambers connected to the diversion manhole. Inspection can be done through accessing the diversion manhole and visually inspecting the Containment Row through the inlet pipe. Inspection ports throughout the system can be used for visual observation and measurement of sediment accumulation using a stadia rod. When the depth of sediment accumulates over 4-inch (102 mm), cleanout is recommended.

Manifold System Inspection

The main manifold pipe can be inspected from the diversion manhole upstream. When a quarter of the pipe volume has been filled with sediment the header system should be maintained.

Visual Inspection

Maintenance or further investigation may be required if any of the following conditions exist:

- Evidence of an unusual amount of silt and soil build-up on the surface.
- Clogged outlet drainpipe.
- System does not drain to the elevation of the lowest pipe in dry conditions.
- Evidence of potholes or sinkholes

Maintenance

Underground stormwater retention/detention systems should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities rather than the size or configuration of the system. If accumulated silt is interfering with the operation of the detention system (i.e.: blocking outlet pipes or deposits significantly reduce the storage capacity of the system) it should be removed.

It is easiest to maintain a system when there is no flow entering. For this reason, cleanout should be scheduled during dry weather.

It is important to block the orifice in the Containment Row diversion manhole weir prior to maintenance to limit the potential for pollutants to be flushed downstream.

A vacuum truck or other similar devices can be used to remove sediment from the treatment train. Starting upstream, maintain manholes with sumps and any pre-treatment devices (following manufacturer recommended procedures). Once maintenance is complete, replace all caps, lids and covers. It is important to document maintenance events on the Inspection and Maintenance Log.

Header System Maintenance:

If maintenance is required, use a high pressure nozzle with rear facing jets to wash the sediments and debris into the diversion manhole. Use the vacuum hose stinger nozzle to remove the washed sediments from the sump of the diversion manhole. It is important to not flush sediments into the chamber system during the maintenance process.

Containment Row™ Maintenance

If maintenance is required, a JetVac truck utilizing a high pressure nozzle (sledge dredging tool) with rear facing jets will be required. Insert the nozzle from the diversion manhole into the Containment Row through the inlet pipe. Turn the water feed hose on and feed the supply hose until the nozzle has reached the end of the Containment Row. Withdraw the nozzle slowly.

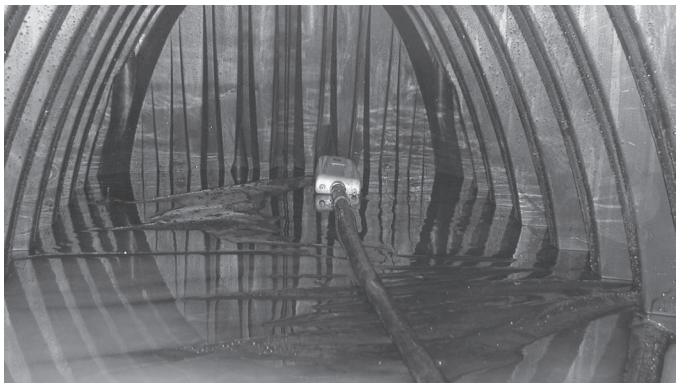


Figure 1— Containment Row shown with high pressure cleaning nozzle

The tool will backflush the Containment Row forcing debris into the diversion manhole sump. Use the stringer vacuum hose to remove the sediments and debris from the sump of the diversion manhole. Multiple passes may be required to fully cleanout the Containment Row. Vacuum out the diversion manhole and remove all debris that may be clogging the drain down orifice. See Figure 1.

Inspection & Maintenance Log Sample Template

ChamberMaxx **Location:**

Date	Depth of Sediment	Accumulated Trash	Name of Inspector	Maintenance Performed/Notes

CHAMBERMaxx®

Support

- Drawings and specifications are available at www.ContechES.com.
- Site-specific support is available from our engineers.

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www.ContechES.com

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The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; related foreign patents or other patents pending.

System Maintenance Questions

1 Q: What do you do for overflow/dewatering for maintenance?



A: All cisterns should be designed to divert flows around or through the cistern when full. Ideally, maintenance would be timed during a dry period so dewatering would be minimal. Otherwise, the system will have to be dewatered in accordance with local requirements. If make-up water refills the cistern, make sure it is disabled before maintenance begins.

2 Q: Do you have an idea of annual cost to operate a rainwater harvesting system? Maintenance, electricity, etc.

A: The maintenance and operation costs will vary widely depending on the pump size, level of treatment, and volume of water treated. Utility savings usually exceed maintenance cost, so that there is a net savings annually. Proper pretreatment will also reduce maintenance on the cistern and self-cleaning final filters that automatically back-flush reduce maintenance.

3 Q: How is the removed material handled? Is it considered hazardous?

The material that is removed from a pretreatment system or cistern is not hazardous unless there has been a hazardous spill that has contaminated the system. This waste can be sent directly to a landfill for disposal.

4 Q: What amount of maintenance is required for the pre-treatment device?

The CDS unit can be serviced using a vacuum truck to remove the collected sediment in the sump of the unit. The StormFilter requires replacement cartridges and a vacuum truck to perform maintenance. For most rainwater harvesting applications, the CDS unit will be sufficient, but for a higher level of pretreatment, the StormFilter may be a better choice.

5 Q: What is the cleaning frequency of a cistern? At what level do you recommend removal?

Q: We recommend inspecting the cistern quarterly during the first year to help gage the site loading characteristics and amount of sediment that is accumulating in the unit. Typically, these units will require maintenance every 1-2 years, depending on the site conditions. Contech offers cistern options with in-field electrofusion joints, so there is no limit to the volume that we can store.

6 Q: Is it possible to clean out bottom sediment in an underground cistern?

A: Yes. Contech recommends at least one large 36" diameter access opening in the cistern to allow for entry into the unit and cleaning. Maintenance is typically performed using a vacuum truck.

7 Q: Where does the back flush water go? Is disposal a problem?

A: Back flush water should go to a sanitary sewer. This is usually not a problem.

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APPENDIX 6

RECORD OF INSPECTION

BMP Inspection and Maintenance Log

Inspection Date	BMP Inspected	Maintenance Performed? (Y/N)	Inspector

APPENDIX 7

SOURCE CONTROL BMP FACT SHEETS

Outdoor Loading/Unloading SC-30



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. Loading and unloading of material may include package products, barrels, and bulk products. 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	☑
Oxygen Demanding	☑

Approach

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 materials with the potential to contaminate stormwater.
- Prevent stormwater runon.
- Regularly check equipment 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.
- Do not conduct loading and unloading during wet weather, whenever possible.
- Cover designated loading/unloading areas to reduce exposure of materials to rain.
- A seal or door skirt between delivery vehicles and building can reduce or prevent exposure to rain.
- Design loading/unloading area to prevent stormwater runon which would include grading or berming the area, and positioning roof downspouts so they direct stormwater away from the loading/unloading areas.
- If feasible, load and unload all materials and equipment in covered areas such as building overhangs at loading docks.
- 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 he loading/ unloading area to a drain that is connected to a dead-end sump.

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.
- Employees trained in spill containment and cleanup should be present during the 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

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Keep your spill prevention Control and countermeasure (SPCC) Plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Space, material characteristics and/or time limitations may preclude all transfers from being performed indoors or under cover.

Requirements

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.
- Regular broom dry-sweeping of area.
- Conduct major clean-out of loading and unloading area and sump prior to October 1 of each year.

Supplemental Information

Further Detail of the BMP

Special Circumstances for Indoor Loading/Unloading of Materials

As appropriate loading or unloading of liquids should occur indoors 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.
  - Transfer area should be designed to prevent runon 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.

- 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 (if allowed). 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

http://www.stormwatercenter.net/

King County - ftp://dnr.metrokc.gov/wlr/dss/spcm/Chapter%203.PDF

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) -
http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf

Waste Handling & Disposal SC-34



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

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, re-use, and recycling; and preventing runon and runoff.

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Approach

Pollution Prevention

- Reduction in the amount of waste generated can be accomplished using the following source controls such as:
  - 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.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

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 runon 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 or leaks regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Place waste containers under cover if possible.
- 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.
- Stencil storm drains on the facility's property with prohibitive message regarding waste disposal.

Chemical/Hazardous Wastes

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers protected from vandalism, and in compliance with fire and hazardous waste codes.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.

Runon/Runoff Prevention

- Prevent stormwater runon from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent the 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 pollution prevention measures and proper disposal methods.
- Train employees and contractors proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.
- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.
- Vehicles transporting waste should have spill prevention equipment that can prevent spills during transport. The spill prevention equipment includes:
  - Vehicles equipped with baffles for liquid waste
  - Trucks with sealed gates and spill guards for solid waste

Other Considerations

- Hazardous waste cannot be re-used or recycled; it must be disposed of by a licensed hazardous waste hauler.

Requirements

Costs

- Capital and operation and maintenance costs 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 the runoff of polluted stormwater from land application of municipal waste on-site 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, 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.

References and Resources

King County Stormwater Pollution Control Manual - http://dnr.metrokc.gov/wlr/dss/spcm.htm

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Associations (BASMAA). On-line: http://www.basmaa.org

Building & Grounds Maintenance SC-41



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, and abnormal pH. Utilizing the following protocols 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

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.
- 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.

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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 waste 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 water 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 he 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. Ensure that this practice does not kill grass.

Landscaping Activities

- Do not apply any chemicals (insecticide, herbicide, or fertilizer) directly to surface waters, unless the application is approved and permitted by the state.

- 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.

- Check irrigation schedules so pesticides will not be washed away and to minimize non-stormwater discharge.

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 paint brushes 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. 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. In which case you should direct the water through hay bales and filter fabric or use other sediment filters or traps.

- Store toxic material under cover with secondary containment 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 or mechanical 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.

- Follow manufacturers' recommendations and label directions. Pesticides must never be applied if precipitation is occuring or predicted. Do not apply insecticides within 100 feet of surface waters such as lakes, ponds, wetlands, and streams.

- Use less toxic pesticides that will do the job, whenever possible. 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.
- Work fertilizers into the soil rather than dumping or broadcasting them 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 use of pesticides 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

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Overall costs should be low in comparison to other BMPs.

Maintenance

- Sweep paved areas regularly to collect loose particles, and 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, between flushes and 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

King County - ftp://dnr.metrokc.gov/wlr/dss/spcm/Chapter%203.PDF

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASSMA) http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA) http://www.basmaa.org/

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) -
http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf

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	☑
Oxygen Demanding	☑

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 following protocols 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

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.

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 concentrations.

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- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.

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 or vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system.
- 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.
- If water is used follow the procedures below:
  - Block the storm drain or contain runoff.
  - Wash water should be collected and pumped to the sanitary sewer or discharged to a pervious surface, do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- When cleaning heavy oily deposits:
  - Use absorbent materials on oily spots prior to sweeping or washing.
  - Dispose of used absorbents appropriately.

Surface Repair

- Pre-heat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination form contacting stormwater runoff.
- Cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc., where applicable. Leave covers in place until job is complete and until 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 the parking facilities and stormwater conveyance systems associated with them 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

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, nad implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

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.

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 to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities on a regular basis 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 form 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 until 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.

References and Resources

http://www.stormwatercenter.net/

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

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality control Board. July 1998 (Revised February 2002 by the California Coastal Commission).

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA) http://www.basma.org

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP)
http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf

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.

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.

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.

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

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

APPENDIX 8

PUBLIC EDUCATION MATERIALS

Storm Drains are for Rain...

More than 200,000 times each month, lawns and gardens throughout LA County are sprayed with pesticides. Overwatering or rain causes pesticides on leaves and grass to flow into the storm drain and to the ocean — untreated.



Please use pesticides wisely, not before a rain, and water carefully.

...not pesticides.



1(888)CLEAN LA
www.888CleanLA.com

Pesticide Tips:

You can keep your lawn and garden green and at the same time solve the pollution problem by taking these easy steps...

- Never dispose of lawn or garden chemicals in storm drains. This is called illegal dumping. Take them to a household hazardous waste roundup. Call 1(888)CLEAN LA or visit www.888CleanLA.com to locate a roundup or collection facility near you.
- More is not better. Use pesticides sparingly. "Spot" apply, rather than "blanket" apply.
- Read labels! Use only as directed.
- Use non-toxic products for your garden and lawn whenever possible.
- If you must store pesticides, make sure they are in a sealed, water-proof container that cannot leak.
- When watering your lawn, use the least amount of water possible so it doesn't run into the street and carry pesticide chemicals with it. Don't use pesticides before a rain storm. You will not only lose the pesticide, but also will be harming the environment.



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- More is not better. Use pesticides sparingly. "Spot" apply, rather than "blanket" apply.
- Read labels! Use only as directed.
- Use non-toxic products for your garden and lawn whenever possible.
- If you must store pesticides, make sure they are in a sealed, water-proof container that cannot leak.
- When watering your lawn, use the least amount of water possible so it doesn't run into the street and carry pesticide chemicals with it. Don't use pesticides before a rain storm. You will not only lose the pesticide, but also will be harming the environment.



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Don't Paint the Town Red!

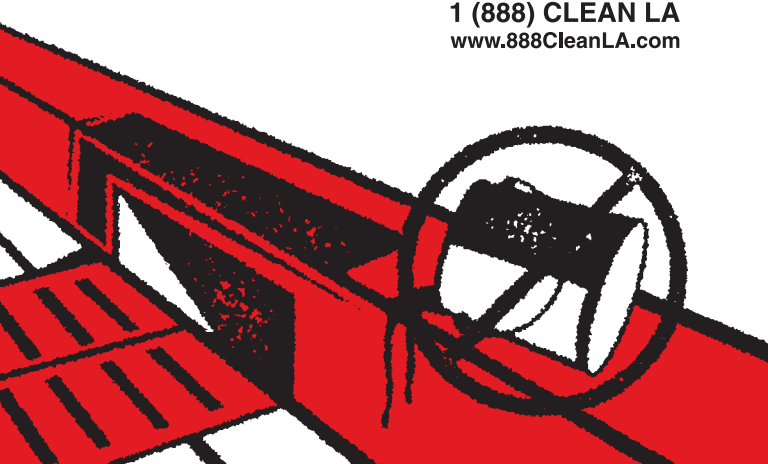
Storm drains are for rain…
they're not for paint disposal.

More than **197,000** times each month, L.A. County residents wash their dirty paint brushes under an outdoor faucet.

This dirty rinse water flows into the street, down the storm drain and straight to the ocean — **untreated**.

Remember to clean water-based paint brushes in the sink, rinse oil-based paint brushes with paint thinner, and take old paint and paint-related products to a Household Hazardous Waste/E-Waste collection event.

1 (888) CLEAN LA
www.888CleanLA.com



Tips for Paint Clean-Up:

L.A. County residents can help solve the stormwater pollution problem by taking these easy steps when working with paint and paint-related products…

- Never dispose of paint or paint-related products in the gutters or storm drains. This is called illegal dumping. Take them to a Household Hazardous Waste/E-Waste collection event. Call 1 (888) CLEAN LA or visit www.888CleanLA.com to locate an event near you.
- Buy only what you need. Reuse leftover paint for touch-ups or donate it to a local graffiti abatement program. Recycle or use excess paint.
- Clean water-based paint brushes in the sink.
- Oil-based paints should be cleaned with paint thinner. Filter and reuse paint thinner. Set the used thinner aside in a closed jar to settle-out paint particles.
- Store paints and paint-related products in rigid, durable and watertight containers with tight-fitting covers.

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A message from the County of Los Angeles Department of Public Works.
Printed on recycled paper.

Are You a Litter Bug and Don't Know It?

Take our quiz!

Have you ever...

- Dropped a cigarette butt or trash on the ground?
- Failed to pick up after your dog while out on a walk?
- Overwatered your lawn after applying fertilizers/pesticides?
- Disposed of used motor oil in the street, gutter or garbage?

If you answered **yes** to any of these actions, then **YOU ARE A LITTER BUG**!

Each of these behaviors contribute to stormwater pollution, which contaminates our ocean and waterways, kills marine life and causes beach closures.

You can become part of the solution!
To find out how, flip this card over.

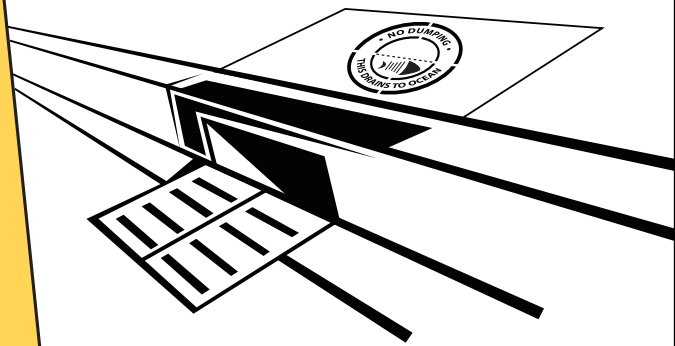
For more information, call or visit:

1 (888) CLEAN LA
www.888CleanLA.com

PROJECT Pollution PREVENTION

Follow these simple steps to prevent stormwater pollution:

- Put your garbage where it belongs — in the trash can.
- Pick up after your dog when out on a walk.
- Reduce pesticide and fertilizer use; don't overwater after application or apply if rain is forecast.
- Dispose of used motor oil at an oil recycling center or at a free Household Hazardous Waste/E-Waste collection event.



A message from the County of Los Angeles Department of Public Works.
Printed on recycled paper.

Storm Drains are for Rain...



More than 50% of the automotive oil sold to do-it-yourself oil changers is not recycled. There are more than 600 State-certified used oil collection centers within Los Angeles County.

Never dispose of automotive fluids in the street or gutter. Take them to your local auto parts store, gas station or repair shop, or a household hazardous waste Roundup for recycling.

1(888)CLEAN LA
www.888CleanLA.com

...not automotive fluids.



Car Care Tips:

You can keep your car running smoothly and efficiently, and at the same time help prevent stormwater pollution by taking these easy steps...

- When changing vehicle fluids — motor oil, transmission, brake and radiator fluids — drain them into separate drip pans to avoid spills. Do not combine these fluids. Do not dispose of these fluids in the street, gutter or garbage. It is illegal.
- If a spill occurs, use kitty litter, sawdust or cornmeal for cleanup. Do not hose or rinse with water.
- Recycle all used vehicle fluids. Call 1(888)CLEAN LA or visitwww.888CleanLA.com for the location of an auto parts store or gas station that recycles these fluids, or for the location of a local household hazardous waste Roundup.
- Regularly check and maintain your car to keep it running safely and efficiently. Water runoff from streets, parking lots and driveways picks up oil and grease drippings, asbestos from brake linings, zinc from tires and organic compounds and metals from spilled fuels and carries them to the ocean.



PROJECT Pollution PREVENTION

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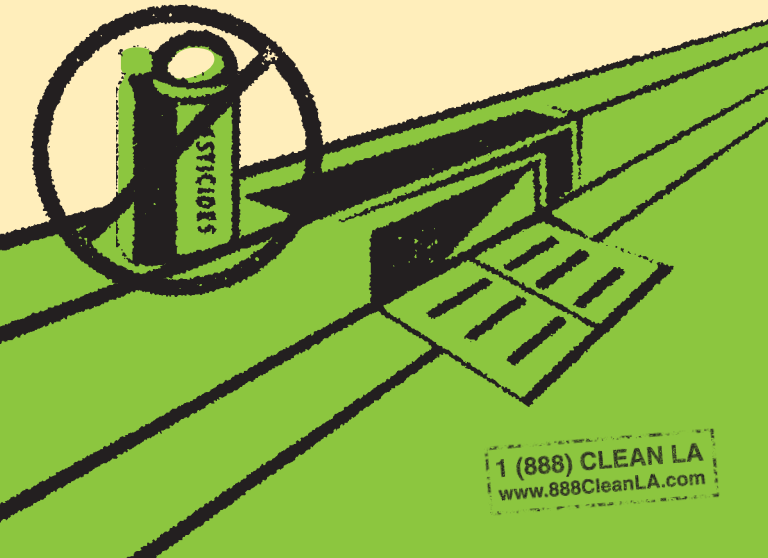
A Yard is a Terrible Thing to Waste!

Storm drains are for rain…**not yard waste.**

Residential yard waste represents about **13 percent** of the total waste generated in L.A. County.

Pesticides, fertilizer and yard waste such as leaves and mowed grass wash from the ground and streets into storm drains and flow straight to the ocean — **untreated**.

Remember to use pesticides and fertilizer wisely and pick-up yard waste.



Tips For Yard Care:

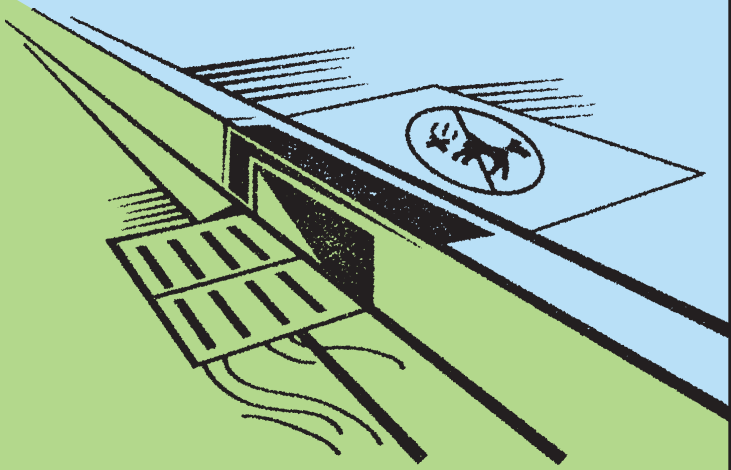
L.A. County residents can help solve the stormwater pollution problem by taking these easy steps…

- Do not over-fertilize and do not use fertilizer or pesticides near ditches, gutters or storm drains.
- Do not use fertilizer or pesticides before a rain.
- Follow the directions on the label carefully.
- Use pesticides sparingly — more is not better. "Spot" apply, rather than "blanket" apply.
- When watering your lawn, use the least amount of water possible so it doesn't run into the street carrying pesticides and other chemicals with it.
- Use non-toxic products for your garden and lawn whenever possible.
- If you must store pesticides or fertilizer, make sure they are in a sealed, water-proof container in a covered area to prevent runoff.
- Do not blow, sweep, hose or rake leaves or other yard trimmings into the street, gutter or storm drain.

PROJECT Pollution PREVENTION

A message from the County of Los Angeles Department of Public Works.
Printed on recycled paper.

Pick Up After Your Pooch!



Storm drains are for rain…
they're not pooper scoopers.

L.A. County residents walk a dog without picking up the droppings more than **62,000** times per month.

Disease-causing dog waste washes from the ground and streets into storm drains and flows straight to the ocean — untreated.

Remember to bring a bag and clean up after your dog.

1 (888) CLEAN LA
www.888CleanLA.com

Tips for Dog Owners:

Dog owners can help solve the stormwater pollution problem by taking these easy steps…

- Clean up after your dog every single time.
- Take advantage of the complimentary waste bags offered in dispensers at local parks.
- Ensure you always have extra bags in your car so you are prepared when you travel with your dog.
- Carry extra bags when walking your dog and make them available to other pet owners who are without.
- Teach children how to properly clean up after a pet. Encourage them to throw the used bags in the nearest trash receptacle if they are away from home.
- Put a friendly message on the bulletin board at the local dog park to remind pet owners to clean up after their dogs.
- Tell friends and neighbors about the ill effects of animal waste on the environment. Encourage them to clean up after their pets as well.

PROJECT Pollution PREVENTION

Storm Drains are for Rain...

More than 50% of the automotive oil sold to do-it-yourself oil changers is not recycled. There are more than 600 State-certified used oil collection centers within Los Angeles County.

Never dispose of automotive fluids, recyclable products, or household hazardous wastes into the street or gutter. Take them to your local auto repair station, recycling center or a household hazardous waste roundup.

...they're not recycling centers.

1(888)CLEAN LA
www.888CleanLA.com



Recycling Tips:

You can help keep your community clean, protect our area waterways and make the beaches safe for ocean swimmers by putting recyclable materials where they belong — at a recycling center or household hazardous waste roundup. Never throw or pour anything into the streets or gutters...

- When changing vehicle fluids – transmission, hydraulic and motor oil, brake and radiator fluid – drain them into a drip pan to avoid spills. Do not combine these fluids. Do not dispose of them in the street, gutter or in the garbage. It is illegal.
- Recycle all used vehicle fluids. Call 1(888)CLEAN LA or visit www.888CleanLA.com for the location of a center that recycles these fluids, or for the location of a local household hazardous waste Roundup.
- Other materials that should be taken to a household hazardous waste Roundup are: paint and paint-related materials, household cleaners, batteries, pesticides and fertilizers, pool chemicals, and aerosol products.
- Aluminum, glass, plastic and newspapers should be placed in your curbside recycling bin or taken to a local recycling center.

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APPENDIX 9

GEOTECHNICAL INFORMATION

PRELIMINARY GEOTECHNICAL EXPLORATION REPORT

PROPOSED INDUSTRIAL BUILDING

16201 RAYMER STREET

VAN NUYS DISTRICT OF LOS ANGELES CALIFORNIA

Prepared For

LRF2 LA VAN NUYS INDUSTRIAL PORTFOLIO LLC
C/O LONGPOINT REALTY PARTNERS
116 HUNTINGTON AVENUE, SUITE 1001
BOSTON, MASSACHUSETTS 02116

Prepared By

LEIGHTON CONSULTING, INC.
2600 MICHELSON DRIVE, SUITE 400
IRVINE, CALIFORNIA 92612

Project No. 13918.001

July 27, 2023 (Revised September 1, 2023)

Leighton Consulting, Inc.
A Leighton Group Company

July 27, 2023

(Revised September 1, 2023)

Project No. 13918.001

LRF2 LA VAN NUYS INDUSTRIAL PORTFOLIO LLC
c/o Longpoint Realty Partners
116 Huntington Avenue, Suite 1001
Boston, Massachusetts 02116

Attention: Mr. Andy Torres (9th St. Partners)

Subject: Preliminary Geotechnical Exploration Report
Proposed Industrial Warehouse Building
16201 Raymer Street
Van Nuys District of Los Angeles, California

In accordance with our proposal, authorized on May 11, 2023, Leighton Consulting, Inc. (Leighton) has prepared this preliminary geotechnical exploration report for the subject project (site). Development of the site will include demolition of existing buildings/improvements and construction of a new on-grade one-story industrial building encompassing 123,468 square feet of space. The proposed building will be constructed within the southern and central portion of the site along with associated truck loading on the northern side of the building, Los Angeles Fire Department access, and vehicular surface parking. Ancillary improvements are expected to include utility infrastructure, pavement, flatwork, and landscaping.

The purpose of our geotechnical exploration was to evaluate subsurface soil conditions underlying the site, identify potential geologic and seismic hazards that may impact the project, and provide preliminary geotechnical recommendations for design and construction of the proposed improvements as currently planned.

Based on the results of our study, Leighton concludes development of the site/project is feasible from a geotechnical standpoint. The results of our exploration, conclusions and recommendations are presented in this report.

We appreciate the opportunity to be of service to you on this project. If you have any questions or if we can be of further service, please contact us at ***(866) LEIGHTON***; or specifically at the phone extensions or e-mail addresses listed below.

Respectfully submitted,

LEIGHTON CONSULTING, INC.



Jeff L. Hull, CEG 2056
Associate Geologist
Extension 4265, jhull@leightongroup.com



Christian Delgadillo, PE, GE 3144
Associate Engineer
Extension: 4218, cdelgadillo@leightongroup.com

LFO/JLH/CD/lr/dlm

Distribution: (1) Addressee

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Important Information About Your Geotechnical Engineering Report Rear of Text

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Appendix A – Exploration Logs
Appendix B – Percolation Test Data
Appendix C – Laboratory Test Results
Appendix D – Earthwork and Grading Guide Specifications

Based on these findings, groundwater is not expected to pose a constraint during or after construction. Fluctuations of the groundwater levels, localized zones of perched water, and an increase in soil moisture, should be anticipated during /following rainy seasons or periods of locally intense rainfall or storm water runoff, or from stormwater infiltration.

2.5 Infiltration

A shallow field percolation test was performed to evaluate the infiltration characteristics of subsurface soils. The test was performed within a temporary well LP-2 located in the southwest portion of the site. The test zone ranged in depth between approximately 8 to 10 feet bgs. The percolation test was conducted in general accordance with Los Angeles County guidelines (LADPW, 2021). Results of the percolation testing are presented in Appendix B. The test location is shown on Figure 2.

A boring percolation test is useful for field measurements of the infiltration rate of soils, and is suited for testing when the design depth of the infiltration device is deeper than current existing grades, especially in areas where it is difficult to dig test pits, or where the depths of these test pits would be considerably deep. At the subject site, testing consisted of advancing the borings to general depths anticipated for the invert of typical infiltration devices.

The falling-head test method was employed for testing within LP-2, in which the volume of discharge was calculated by adding the total volume of water that dropped within the PVC pipe and within the annulus, and incorporating a porosity reduction factor to account for the porosity of the annulus material. The infiltration surface area was calculated based on the average water height within the test well. The infiltration rate was calculated by dividing the rate of discharge by the infiltration surface area, or flow area.

Detailed results of the field testing data and measured infiltration rate for the test well are presented in Appendix B. The test results are summarized in the table below:

Table 1 – Measured (Unfactored) Infiltration Rate

Test Well Designation	Approximate Depth of Test Zone (feet bgs)	Measured Infiltration Rate (inch per hour)	Design Infiltration Rate (inch per hour)
LP-2	8 to 10	0.15	0.08

Per the guidelines by County of Los Angeles Department of Public Works (2021), the measured infiltration rates should be reduced by the design professional with a correction factor (i.e., reduction factor) to determine design values representative of long-term infiltration system performance. Note that a reduction factor is intended to account for siltation, plugging, and maintenance, and should be applied to the design infiltration rates provided in Table 4. This reduction factor ranges from 1 to 3 and should be selected based on the specified levels of pre-treatment and maintenance requirements of the proposed infiltration system. Based on the test type, number of tests performed and site variability, we recommend a minimum correction factor of 2.0 be incorporated into system design.

In accordance with the County of Los Angeles guidelines infiltration (2021), subsurface soils with a minimum design infiltration rate of 0.3 inches per hour is required for stormwater infiltration systems. Based on the tested infiltration rate and the County guidelines, an onsite stormwater infiltration at the tested depths is not considered feasible from a geotechnical standpoint.

2.6 Surface Fault Rupture

Our review of available literature indicates that no known active faults have been mapped across the site, and the site is **not** located within a designated Alquist-Priolo Earthquake Fault Zone (Bryant and Hart, 2007; CGS, 2018). Therefore, the potential for surface fault rupture at the site is expected to be low and a surface fault rupture hazard evaluation is not mandated for this site.

The location of the closest active faults to the site was evaluated using the United States Geological Survey (USGS) Earthquake Hazards Program National Seismic Hazard Maps (USGS, 2008). The closest active faults to the site with the potential for surface fault rupture are the Northridge Hills fault, Mission Hills fault and Verdugo fault, located approximately 1.4 miles, 4.5 miles and 5.2 miles from the site, respectively. The San Andreas fault, which is the largest active fault in California, is approximately 30.9 miles northeast of the site. Major regional faults with surface expression in proximity to the site are shown on Figure 4, *Regional Fault and Historic Seismicity Map*.

APPENDIX 10

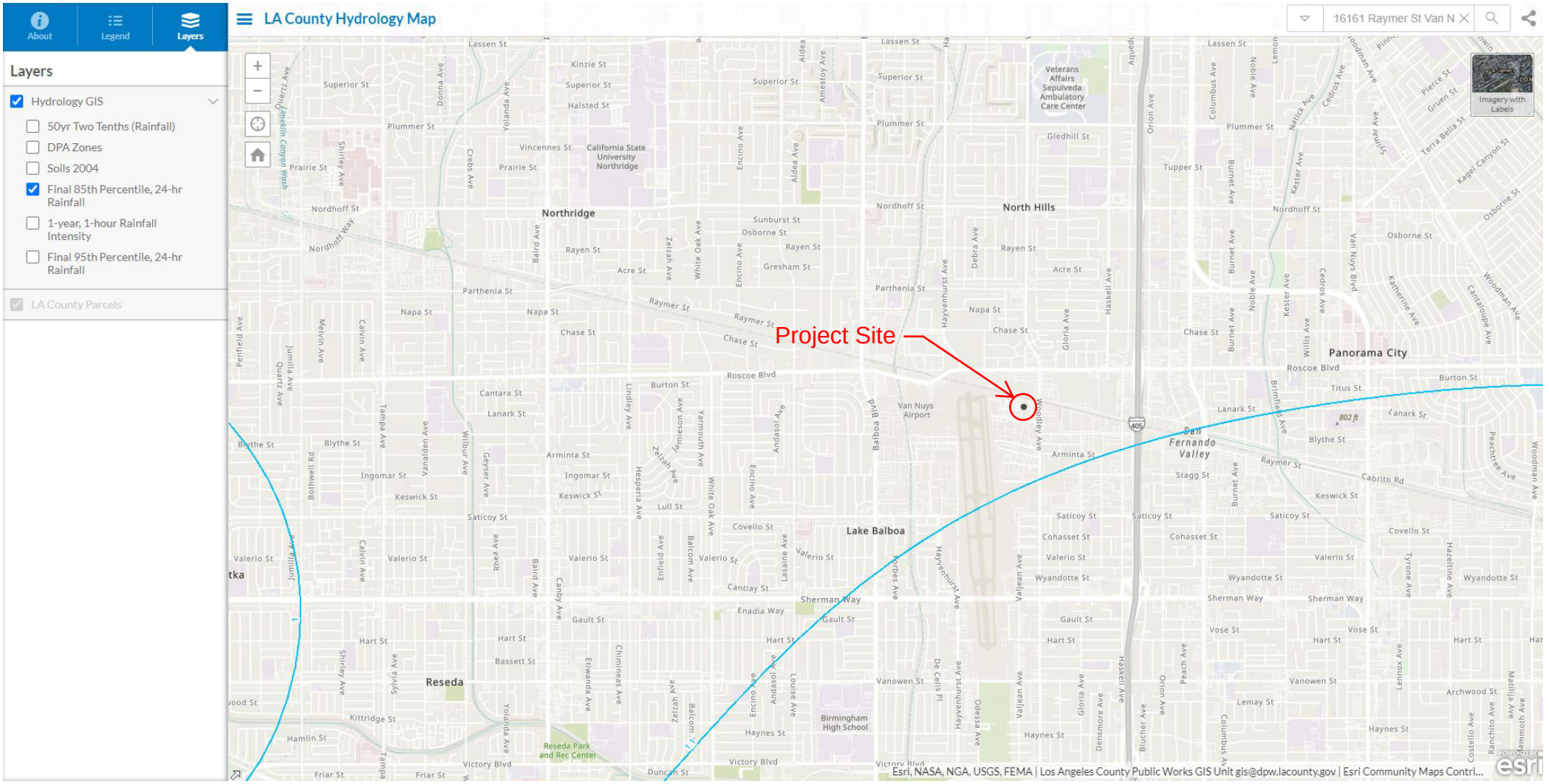
LACDPW HYDROLOGY MAPS

16201 Raymer St., Van Nuys, CA

Hydrology Map References

Kimley»Horn

85th Percentile = 1.1 inch

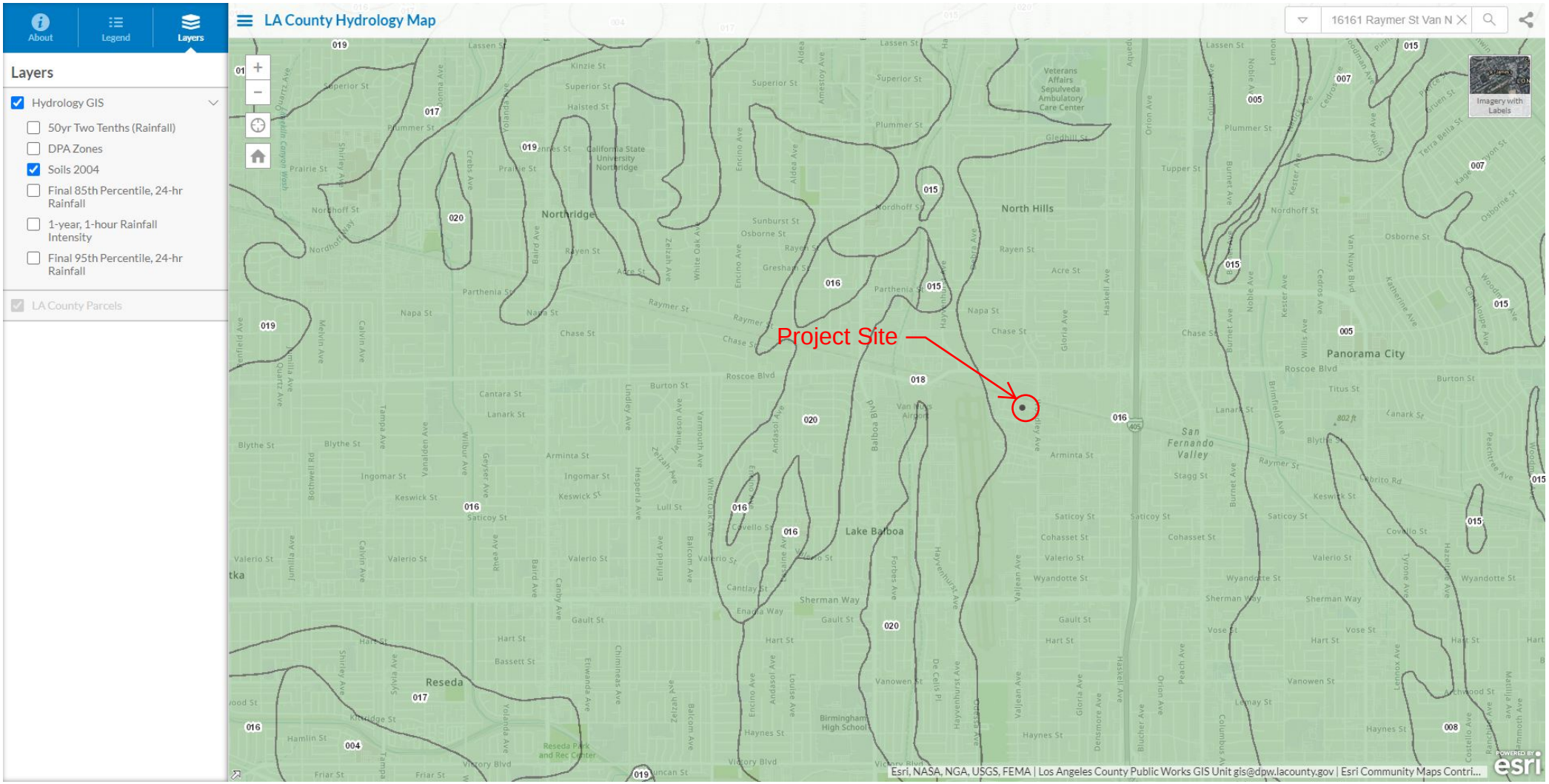


16201 Raymer St., Van Nuys, CA

Hydrology Map References

Kimley»Horn

Soil Type = 016



16201 Raymer St., Van Nuys, CA

Hydrology Map References

Kimley»Horn

50-year = 7.3 inch

