City of Garden Grove, California

Preliminary Water Quality Management Plan

(PWQMP)

Project Name:

Lincoln Industrial

7441 Lincoln Way

(APN: 0131-021-26)

Prepared By: Pacific Consulting Group, Inc.

GARDEN GROVE

Preliminary Water Quality Management Plan (PWQMP)

Project Name:

Lincoln Industrial

Prepared for:

JYJ Logistics LLC

4 Park Plaza, Suite 830

Irvine, CA 92614

Insert Telephone-then TAB.

Prepared by:

Pacific Consulting Group, Inc.

Engineer _Kyle Prouty_ **Registration No.** **C95048**

2239 State Ave, #B

Costa Mesa, CA 92627

(818)800-6991

01/30/2025

Project Owner's Certification			
Permit/Application No.	TBD	Grading Permit No.	TBD
Tract/Parcel Map No.	PARCEL 1 OF PARCEL MAP 82-511	Building Permit No.	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract)			7441 LINCOLN WAY 131-021-026

This Water Quality Management Plan (WQMP) has been prepared for JYJ Logistics LLC by Pacific Consulting Group, Inc. The WQMP is intended to comply with the requirements of the local NPDES Stormwater Program requiring the preparation of the plan, and the California Environmental Quality Act (CEQA) as part of the environmental assessment of the project impacts for entitlement review.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity. Each Project WQMP will be stored within the City's files, and will continue with the property after the completion of the construction phase, and the City will require that the terms, conditions and requirements be recorded with the County Recorder's office by the property owner or any successive owner as authorized by the Water Quality Ordinance. The City will also require the Project WQMP to include a Notice of Transfer Responsibility Form, which serves to notify the City that a change in ownership has occurred and notify the new owner of its responsibility to continue implementing the Project WQMP. The final Project WQMP must include calculations to support the structural integrity of the selected LID or treatment control BMP as appropriate and be prepared by or under the direction of a California Registered Civil Engineer and affixed with their stamp.

Owner:	
Title	
Company	JYJ Logistics LLC
Address	4 Park Plaza, Suite 830
Email	

Telephone #			
Signature		Date	

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Attachments

Section I Discretionary Permit(s) and Water Quality Conditions

Provide discretionary permit and water quality information. *Refer to Section 2.1 in the Technical Guidance Document (TGD) available from the Orange County Stormwater Program (ocwatersheds.com).*

Project Infomation			
Permit/Application No.	#325581	Tract/Parcel Map No.	PARCEL 1 OF PARCEL MAP 82-511
Additional Information/ Comments:	This Preliminary WQMP has been prepared to comply with the requirements of CEQA to assess the impacts of the project during entitlement review and recommend mitigation		
Water Quality Conditions			
Water Quality Conditions (list verbatim)	1. A geotechnical study prepared by a registered geotechnical engineer is required. The report shall analyze the liquefaction potential of the site and make recommendations. The report shall analyze sub-surface issues related to the past uses of the site, including sub-surface tanks and basement and septic facilities. Any soil or groundwater contamination shall be remediated prior to the issuance of a building permit in a manner meeting the approval of the City Engineer in concert with the Orange County Health Department. The report shall make recommendations for pavement design the interior streets and parking spaces. The report shall also test and analyze soil conditions for LID (Low Impact Development) principles and implementations, including potential infiltration alternatives, soil compaction, saturation, permeability and groundwater levels. a. **WQMP** i. Prior to the issuance of any grading or building permits or prior to recordation upon subdivision of land if determined applicable by the City Building Official, the applicant shall submit to the City for review and approval a Water Quality Management Plan that:		

	· Addresses Site Design BMPs such as minimizing impervious areas, maximizing permeability, minimizing directly connected impervious areas, creating reduced or "zero discharge" areas, and conserving natural areas · Incorporates the applicable Routine Source Control BMPs as defined in the DAMP · Incorporates structural and Treatment Control BMPs as defined in the DAMP • Generally describes the long-term operation and maintenance requirements for the Treatment Control BMPs · Identifies the entity that will be responsible for long-term operation and maintenance of the Treatment Control BMPs · Describes the mechanism for funding the long-term operation and maintenance of the Treatment Control BMPs. 2. Prior to grading or building permit closeout and/or the issuance of a certificate of use or a certificate of occupancy, the applicant shall: · Demonstrate that all structural best management practices (BMPs) described in the Project WQMP have been constructed and installed in conformance with approved plans and specifications · Demonstrate that applicant is prepared to implement all non-structural BMPs described in the Project WQMP · Demonstrate that an adequate number of copies of the approved Project WQMP are available onsite · Submit for review and approval by the City an Operations and Maintenance (O&M) Plan for all structural BMPs
Watershed-Based Plan Conditions	
Provide applicable conditions from watershed - based plans including WIHMPs and TMDLS.	There is currently no approved WIHMP for the Anaheim Bay-Huntington Harbor Watershed. TMDLs have not been established or not being developed for Anaheim Bay-Hunting Harbor Watershed.

Section II Project Description

II.1 Project Description

Provide a detailed project description including:

- Project areas;
- Land uses;
- Land cover;
- Design elements;
- A general description not broken down by drainage management areas (DMAs).

Include attributes relevant to determining applicable source controls. *Refer to Section 2.2 in the TGD for information that must be included in the project description.*

Description of Proposed Project		
Development Category (Verbatim from WQMP):	The proposed project is under SIC code is 4225 (General warehousing and storage of a general line of goods) and qualifies to the "Priority Projects" of North Orange County Permit Area. It meets the criteria of a new industrial development project that create 10,000 square feet or more of impervious surface.	
Project Area (ft^2): 93,841	Number of Dwelling Units: N/A	SIC Code: 4225
Narrative Project Description:	The proposed industrial development is located within the Santa Ana region North Orange County permit area, and is not in an ESA. The project is not eligible for a water credit. The existing site is currently developed with an existing 22,108 SF industrial building and approximately 55,390 Sf of paved parking area and hardscaped walkways. The existing parcel provides vehicular access from both Lincoln Way and Western Ave. The proposed project consists of a new industrial building totaling approximately 46,806 SF and 34,279 SF of paved parking area and hardscaped walkways. Warehouse access will be provided via the north side loading dock or the perimeter pedestrian access paths located at the south and eastern limits of the building. The project proposes landscape area intermittently throughout the parking area and adjacent to the proposed structure. Routine outdoor activities include loading and unloading of commercial products, emptying trash into trash enclosures, trash pickup by private refuse collection company, landscape watering and maintenance, and	

<table>
<tr><td></td><td colspan="4">general groundskeeping and maintenance. There will be no maintenance of any vehicles on-site.

Full trash capture compliance is achieved by providing overhead coverage of trash enclosures, providing filter inserts on all surface drains, the use of modular wetlands for DMA A BMP device, planter boxes will receive any sediment, trash, or debris within the planter box and routine maintenance will be performed to clear all sediment, trash and debris to ensure proper treatment is maintained, and routine site maintenance will be performed by ownership including the emptying of catch basin filters and drains, clearing any debris and trash, etc. which will ensure proper full capture of trash is ensured in the project.</td></tr>
<tr><td rowspan="2">Project Area</td><td colspan="2">Pervious</td><td colspan="2">Impervious</td></tr>
<tr><td>Area
(acres or sq ft)</td><td>Percentage</td><td>Area
(acres or sq ft)</td><td>Percentage</td></tr>
<tr><td>Pre-Project Conditions</td><td>16,343 SF</td><td>17%</td><td>77,498 SF</td><td>83%</td></tr>
<tr><td>Post-Project Conditions</td><td>12,627 SF</td><td>14%</td><td>80,854 SF</td><td>86%</td></tr>
<tr><td>Drainage Patterns/Connections</td><td colspan="4">The site generally flows from northeast to southwest throughout the property. The existing drainage it conveyed via sheet flow through ribbon gutters before it discharged to Lincoln Way. A portion of the existing lot does sheet flow to the westerly parcel through a gutter before discharging to Lincoln Way. The proposed condition will route the site runoff through downspouts collecting roof runoff and treating the roof runoff with planter boxes. Some of the roof runoff that cannot be conveyed to planter boxes will be directly connected below grade to conveyance piping and conveyed to the onsite drainage conveyance system. Other portions of the site such as the rear paving area will be collected via sheet flow through gutters and drains and also connected to the on-site conveyance system before getting pumped to a proprietary BMP of a modular wetland. These areas are to include an additional 1,709 SF or 0.04 Ac of run-on from the adjacent property which can be seen in the drainage plan in Attachment C.

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</table>

II.2 Potential Stormwater Pollutants

Determine and list expected stormwater pollutants based on land uses and site activities. *Refer to Section 2.2.2 and Table 2.1 in the TGD for guidance.*

Pollutants of Concern			
Pollutant	Circle One: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Suspended-Solid/ Sediment	(E)	N	Expected during construction activities
Nutrients	(E)	N	Expected during construction activities
Heavy Metals	(E)	N	The site proposes an industrial use and heavy metal exposure may occur throught construction into standard operations. Owner shall ensure spill kits are available during operation to minimize any pollutant exposure to run-off.
Pathogens (Bacteria/Virus)	(E)	N	The site proposes an industrial use and bacteria exposure may occur throughout construction into standard operations. Owner shall ensure proper maintenance and housekeeping procedures are taken during operation to minimize any pollutant exposure to run-off.
Pesticides	(E)	N	The site proposes new landscaping and exposure to pesticides may occur throughout construction into standard operations. Owner shall ensure proper maintenance and housekeeping procedures are taken during operation to minimize any pollutant exposure to run-off.
Oil and Grease	(E)	N	The site proposes an industrial use and oil and grease exposure may occur throughout construction into standard operations. Owner shall ensure spill kits are available during

			operation to minimize any pollutant exposure to run-off.
Toxic Organic Compounds	(E)	N	The site proposes an industrial use and Toxic organic compounds exposure may occur throughout construction into standard operations. Owner shall ensure proper maintenance and housekeeping procedures are taken during operation to minimize any pollutant exposure to run-off.
Trash and Debris	(E)	N	The site proposes an industrial use and trash and debris accumulation may occur throughout construction into standard operations. Owner shall ensure proper maintenance and housekeeping procedures are taken during operation to minimize any pollutant exposure to run-off.

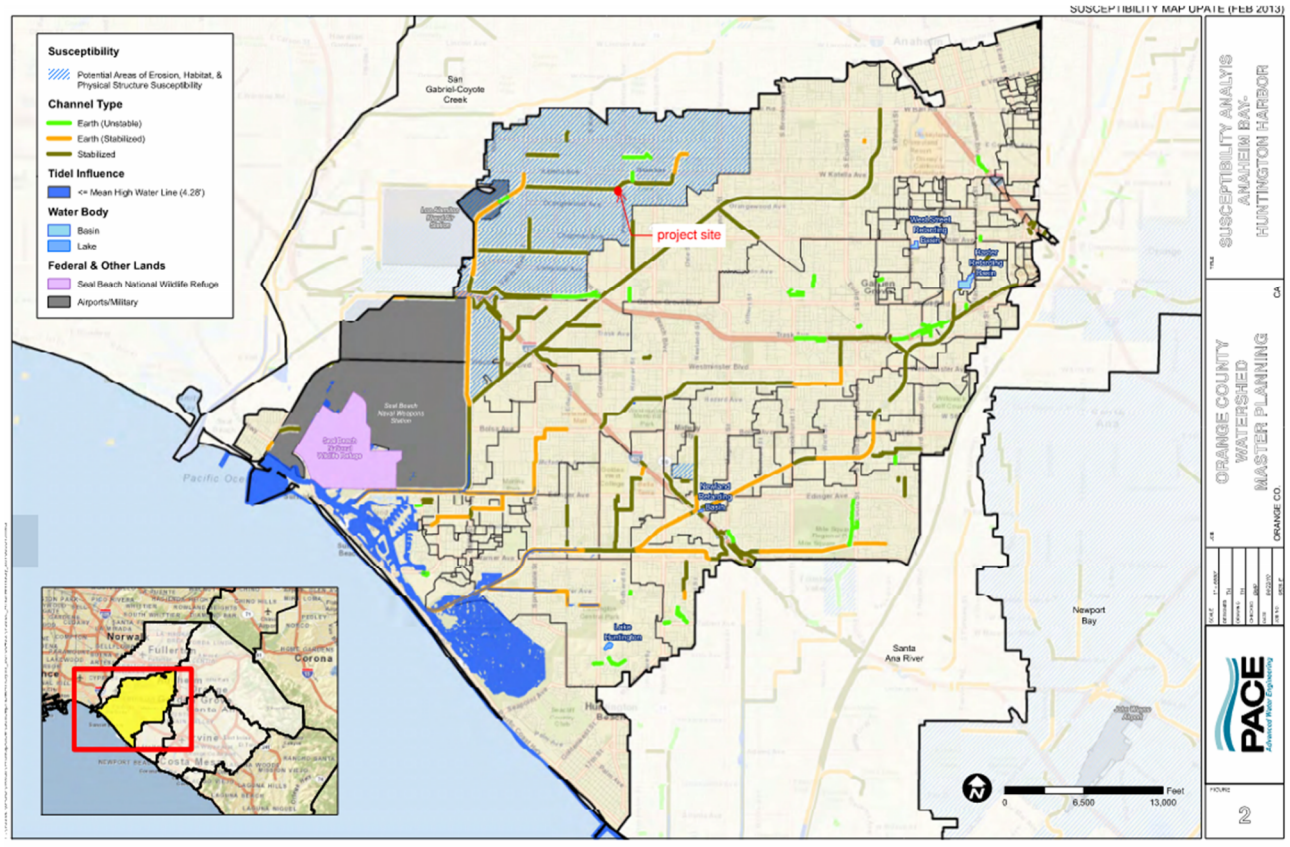
II.3 Hydrologic Conditions of Concern

Determine if streams located downstream from the project area are determined to be potentially susceptible to hydromodification impacts. *Refer to Section 2.2.3.1 in the TGD for* NOC *or Section 2.2.3.2 for* SOC.

☒ No – Show map

☐ Yes – Describe applicable hydrologic conditions of concern below. *Refer to Section 2.2.3 in the TGD.*

The map shown below shows the project is within a potential area for erosion, habitat, and physical structure susceptibility but the project does not propose any risk to these noted items.



II.4 Post Development Drainage Characteristics

Describe post development drainage characteristics. Refer *to Section 2.2.4 in the TGD.*

The site generally flows from northeast to southwest throughout the property. The existing drainage it conveyed via sheet flow through ribbon gutters before it discharged to Lincoln Way. A portion of the existing lot does sheet flow to the westerly parcel through a gutter before discharging to Lincoln Way. The proposed condition will route the site runoff through downspouts collecting roof runoff and treating the roof runoff with planter boxes. Some of the roof runoff that cannot be conveyed to planter boxes will be directly connected below grade to conveyance piping and conveyed to the onsite drainage conveyance system. Other portions of the site such as the rear paving area will be collected via sheet flow through gutters and drains and also connected to the on-site conveyance system before getting pumped to a proprietary BMP of a modular wetland. These areas are to include an additional 1,709 SF or 0.04 Ac of run-on from the adjacent property which can be seen in the drainage plan in Attachment C.

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II.5 Property Ownership/Management

Describe property ownership/management. *Refer to Section 2.2.5 in the TGD.*

JYJ Logistics, LLC

4 Park Plaza, Suite 830

Irvine, CA 92614

Section III Site Description

III.1 Physical Setting

Fill out table with relevant information. *Refer to Section 2.3.1 in the TGD.*

Planning Area/ Community Name	N/A
Location/Address	7441 Lincoln Way
	Garden Grove, CA
Land Use	Industrial
Zoning	Zoning District: PUD (I), General Plan Designation: Industrial
Acreage	93,842 SF/ 2.154 Ac
Predominant Soil Type	Hydrologic Soils Group B. See attached map.

III.2 Site Characteristics

Fill out table with relevant information and include information regarding BMP sizing, suitability, and feasibility, as applicable. Refer to Section 2.3.2 in the TGD.

Precipitation Zone	*0.8 inch*
Topography	*site mildly slopes southwesterly. Average grade is approximately 1% across the site.*
Drainage Patterns/Connections	The site generally flows from northeast to southwest throughout the property. The existing drainage it conveyed via sheet flow through ribbon gutters before it discharged to Lincoln Way. A portion of the existing lot does sheet flow to the westerly parcel through a gutter before discharging to Lincoln Way. The proposed condition will route the site runoff through downspouts collecting roof runoff and treating the roof runoff with planter boxes. Other portions of the site such as the rear paving area will be collected via sheet flow through gutters and collected in drains before getting pumped to a proprietary BMP a modular wetland.
Soil Type, Geology, and Infiltration Properties	*The soils is classified as B in the Hydrologic Soil Group Map in the appendices. Geotechnical investigation has noted that the site earth materials consist mostly of fill and alluvium soils with the existing fill being noted in the top 2' of the exploratory borings. The geotechnical report also notes a higher potential for liquefaction so infiltration has been deemed not suitable for this site.*

Site Characteristics (continued)	
Hydrogeologic (Groundwater) Conditions	*As noted in the project geotechnical report prepared by NorCal Engineering, groundwater was discovered between 9-9.5 feet below surface. The project is also susceptible to liquefaction.*
Geotechnical Conditions (relevant to infiltration)	*As noted in the project geotechnical report prepared by NorCal Engineering, groundwater was discovered between 9-9.5 feet below surface. The project is also susceptible to liquefaction. Measured infiltration rates were also noted to be 0.07 in/hr which is low for the consideration for infiltration. Based on these findings and notes infiltration is not feasible for the project.*
Off-Site Drainage	*There is a small portion of the northwesterly property (approximately 1,200 square feet) that will run on to the property due to the existing design of the parcels. This additional area will be accommodated in the design of the project BMPs.*
Utility and Infrastructure Information	*The existing topographic survey has noted underground utilities within the project limit and has identified public utility infrastructures off-site. The majority of the on-site utilities will be relocated to avoid any conflicts with the proposed development.*

III.3 Watershed Description

Fill out table with relevant information and include information regarding BMP sizing, suitability, and feasibility, as applicable. *Refer to Section 2.3.3 in the TGD.*

Receiving Waters	The downstream conveyance of the project runoff flows to the street gutters on the west side of Western Ave and the north side of Lincoln Way. There is a catch basin located at the project midspan on Western Ave and another catch basin located on the western terminus of Lincon Way. These catch basins are connected to a system of underground conveyance piping that connects to OCFCD main located in Katella Blvd. This piping connects downstream to Huntington Harbor at it's furthest downstream point of discharge.
303(d) Listed Impairments	Chlordane, Copper, Indicator Basteria, Lead, PCBs, Toxicity
Applicable TMDLs	Dieldrin, Nickel, Copper, Indicator Bacteria, Lead, Toxicity, Arsenic, Cadmium, Chlorpyrifos, Diazinon, Endrin, Invasive species, Malathion, Mercury, Selenium, Silver, Zinc, pH, Chlordane, PCBs
Pollutants of Concern for the Project	Oil and grease, pesticides, trash and debris, and heavy metals are expected for the project.
Environmentally Sensitive and Special Biological Significant Areas	This project is not within an Environmentally sensitive area.

Section IV Best Management Practices (BMPs)

IV. 1 Project Performance Criteria

Describe project performance criteria. Several steps must be followed in order to determine what performance criteria will apply to a project. These steps include:

- If the project has an approved WIHMP or equivalent, then any watershed specific criteria must be used and the project can evaluate participation in the approved regional or sub-regional opportunities. The local Permittee planning or NPDES staff should be consulted regarding the existence of an approved WIHMP or equivalent.
- Determine applicable hydromodification control performance criteria. *Refer to Section 7.II-2.4.2.2 of the Model WQMP.*
- Determine applicable LID performance criteria. *Refer to Section 7.II-2.4.3 of the Model WQMP.*
- Determine applicable treatment control BMP performance criteria. *Refer to Section 7.II-3.2.2 of the Model WQMP.*
- Calculate the LID design storm capture volume for the project. *Refer to Section 7.II-2.4.3 of the Model WQMP.*

(NOC Permit Area only) Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implementing LID on regional or sub-regional basis?	YES ☐	NO ☒
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.		

Project Performance Criteria (continued)	
If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP)	No HCOC are anticipated. The project runoff increase would be nominal if any and the time of concentration would remain similar toi the existing condition. There are also no concerns for the post development downstream impacts as the run-off will be discharged to the street and conveyed through existing stormwater piping and infrastructure.
List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)	Per section 7.II-2.4.3of the MWQP , The following performance criteria for LID implementation are stated in both permits: • Priority Projects must infiltrate, harvest and use, evapotranspire, or biotreat/biofilter, the 85th percentile, 24-hour storm event (Design Capture Volume). • A properly designed biotreatment system may only be considered if infiltration, harvest and use, and evapotranspiration (ET) cannot be feasibly implemented for the full design capture volume. In this case, infiltration, harvest and use, and ET practices must be implemented to the greatest extent feasible and biotreatment may be provided for the remaining design capture volume. •Plant materials should be tolerant of summer drought, ponding fluctuations, and saturated soil conditions for 48 hours; native place species and/or hardy cultivars that are not invasive and do not require chemical inputs should be used to the maximum extent feasible. Vegetation shall be maintained to ensure planting does not die out and vegetation will remain healthy for the proper use of the BMP. Infiltration has been deemed infeasible due to geologic conditions, so the project has chosen a bioretention planter box with underdrain and proprietary biotreatment options in lieu of groundwater recharge options. These BMPs have been sized according to the North Orange County TGD and calculations can be found in the attachments.
List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)	N/A

Calculate LID design storm capture volume for Project.	See Attachment G for calculations.

IV.2. SITE DESIGN AND DRAINAGE PLAN

Describe site design and drainage plan including

- A narrative of site design practices utilized or rationale for not using practices;
- A narrative of how site is designed to allow BMPs to be incorporated to the MEP
- A table of DMA characteristics and list of LID BMPs proposed in each DMA.
- Reference to the WQMP plot plan.
- Calculation of Design Capture Volume (DCV) for each drainage area.
- A listing of GIS coordinates for LID and Treatment Control BMPs (unless not required by local jurisdiction).

Refer to Section 2.4.2 in the TGD.

Various site design practices were proposed in the preliminary planning phase of this project. Stated below is the explanation of each site design principle and technique from section 3 of the NOC TGD.

3.2.1 Minimize Impervious area - The project has implemented landscape breaks and planters where possible.

3.2.1.3 Planning Phase techniques – this design practice is used by adding as much landscape as possible to the project while still able to achieve site design goals.

3.2.4 Disconnect Impervious Surfaces – the project will discharge roof runoff directly to bioretention planters for treatment and the remainder of the paving and additional roof area will be conveyed to a proprietary biotreatment planter before leaving the project.

3.3.2 Revegetate Disturbed Areas – the construction will occupy the footprint of the property and landscaping will be proposed where feasible.

3.3.5 xeriscape Landscaping – Water efficient landscaping and irrigation are required to be used as a state requirement.

Biofiltration planters (DMA B, C, & D) are designed to collect direct roof runoff and outlet directly to the street via curb outlets. Overflow for planter boxes include underdrain and surface drain in planter set to be at the design ponding depth. DMA A will collect roof runoff from direct pipe connections below grade and surface runoff, the drains and filters at grade. DMA A is in a sump condition and therefore, will use a sump pump to convey water to the proposed BMP (Modular Wetland). The modular wetland will directly overflow to the street through means of a curb outlet as well.

The WQMP plot plan can be found in Attachment C.

DCV calculations can be found in Attachment G.

Coordinates for LID treatment control BMPs are below and noted on the WQMP plot plan found in Attachment C.

DMA ID	BMP TYPE	COORDINATES
A	Modular wetland	(33.798900,-118.001802)
B	Biotreatment planter with underdrain	(33.798405, -118.002833)

C	Biotreatment planter with underdrain	(33.798427, -118.002296)
D	Biotreatment planter with underdrain	(33.798427,-118.001851)

IV.3 LID BMP SELECTION AND PROJECT CONFORMANCE ANALYSIS

Each sub-section below documents that the proposed design features conform to the applicable project performance criteria via check boxes, tables, calculations, narratives, and/or references to worksheets. *Refer to Section 2.4.2.3 in the TGD for selecting LID BMPs and Section 2.4.3 in the TGD for conducting conformance analysis with project performance criteria.*

IV.3.1 Hydrologic Source Controls

If required HSCs are included, fill out applicable check box forms. If the retention criteria are otherwise met with other LID BMPs, include a statement indicating HSCs not required.

Name	Included?
Localized on-lot infiltration	☐
Impervious area dispersion (e.g. roof top disconnection)	☒
Street trees (canopy interception)	☐
Residential rain barrels (not actively managed)	☐
Green roofs/Brown roofs	☐
Blue roofs	☐
Impervious area reduction (e.g. permeable pavers, site design)	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐

IV.3.2 Infiltration BMPs

Identify infiltration BMPs to be used in project. If design volume cannot be met state why BMPs cannot be met

Name	Included?
Bioretention without underdrains	☐
Rain gardens	☐
Porous landscaping	☐
Infiltration planters	☐
Retention swales	☐
Infiltration trenches	☐
Infiltration basins	☐
Drywells	☐
Subsurface infiltration galleries	☐
French drains	☐
Permeable asphalt	☐
Permeable concrete	☐
Permeable concrete pavers	☐
Other:	☐
Other:	☐

Show calculations below to demonstrate if the LID Design Strom Capture Volume can be met with infiltration BMPs. If not document how much can be met with infiltration and document why it is not feasible to meet the full volume with infiltration BMPs.

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

If the full Design Storm Capture Volume cannot be met with infiltration BMPs, describe any evapotranspiration, rainwater harvesting BMPs.

Name	Included?
All HSCs; *See Section IV.3.1*	☐
Surface-based infiltration BMPs	☐
Biotreatment BMPs	☐
Above-ground cisterns and basins	☐
Underground detention	☐
Other:	☐
Other:	☐
Other:	☐

Show calculations below to demonstrate if the LID Design Strom Capture Volume can be met with evapotranspiration, rainwater harvesting BMPs in combination with infiltration BMPs. If not document how much can be met with either infiltration BMPs, evapotranspiration, rainwater harvesting BMPs, or a combination, and document why it is not feasible to meet the full volume with either of these BMPs categories.

IV.3.4 Biotreatment BMPs

If the full Design Storm Capture Volume cannot be met with infiltration BMPs, and/or evapotranspiration and rainwater harvesting BMPs, describe biotreatment BMPs. Include sections for selection, suitability, sizing, and infeasibility, as applicable.

Name	Included?
Bioretention with underdrains	☐
Stormwater planter boxes with underdrains	☒
Rain gardens with underdrains	☐
Constructed wetlands	☐
Vegetated swales	☐
Vegetated filter strips	☐
Proprietary vegetated biotreatment systems	☒
Wet extended detention basin	☐
Dry extended detention basins	☐
Other:	☐
Other:	☐

Show calculations below to demonstrate if the LID Design Strom Capture Volume can be met with infiltration, evapotranspiration, rainwater harvesting and/or biotreatment BMPs. If not document how much can be met with either infiltration BMPs, evapotranspiration, rainwater harvesting BMPs, or a combination, and document why it is not feasible to meet the full volume with either of these BMPs categories.

Stormwater planter boxes have been selected for specific site drainage areas. Locations of planter boxes can be found in the WQMP exhibits and calculations can be found in Attachment G.

Proprietary Bio treatment is proposed for the project to treat one of the drainage areas. Drainage area is delineated in the WQMP exhibits and calculations can be found in attachment G.

IV.3.5 Hydromodification Control BMPs

Describe hydromodification control BMPs. See Section 5 TGD. Include sections for selection, suitability, sizing, and infeasibility, as applicable. Detail compliance with Prior Conditions of Approval.

Hydromodification Control BMPs	
BMP Name	**BMP Description**

IV.3.6 Regional/Sub-Regional LID BMPs

Describe regional/sub-regional LID BMPs in which the project will participate. *Refer to Section 7.II-2.4.3.2 of the Model WQMP.*

Regional/Sub-Regional LID BMPs

IV.3.7 Treatment Control BMPs

Treatment control BMPs can only be considered if the project conformance analysis indicates that it is not feasible to retain the full design capture volume with LID BMPs. Describe treatment control BMPs including sections for selection, sizing, and infeasibility, as applicable.

Treatment Control BMPs	
BMP Name	**BMP Description**

IV.3.8 Non-structural Source Control BMPs

Fill out non-structural source control check box forms or provide a brief narrative explaining if non-structural source controls were not used.

Non-Structural Source Control BMPs

Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☒	☐	
N2	Activity Restrictions	☒	☐	
N3	Common Area Landscape Management	☒	☐	
N4	BMP Maintenance	☒	☐	
N5	Title 22 CCR Compliance (How development will comply)	☒	☐	
N6	Local Industrial Permit Compliance	☒	☐	
N7	Spill Contingency Plan	☒	☐	
N8	Underground Storage Tank Compliance	☐	☒	No UST on site
N9	Hazardous Materials Disclosure Compliance	☒	☐	
N10	Uniform Fire Code Implementation	☒	☐	
N11	Common Area Litter Control	☒	☐	
N12	Employee Training	☒	☐	
N13	Housekeeping of Loading Docks	☒	☐	
N14	Common Area Catch Basin Inspection	☒	☐	
N15	Street Sweeping Private Streets and Parking Lots	☒	☐	
N16	Retail Gasoline Outlets	☐	☒	No retail gas is proposed on site.

IV.3.9 Structural Source Control BMPs

Fill out structural source control check box forms or provide a brief narrative explaining if Structural source controls were not used.

Structural Source Control BMPs

Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	No Outdoor material storage area is being proposed.
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☒	☐	
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☐	☒	There are no slopes or channels requiring velocity dissipation for the project
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☐	
S6	Dock areas	☒	☐	
S7	Maintenance bays	☐	☒	There are no maintenance bays being proposed.
S8	Vehicle wash areas	☐	☒	There are no vehicle wash areas being proposed.
S9	Outdoor processing areas	☐	☒	There are no outdoor processing areas being proposed.
S10	Equipment wash areas	☐	☒	There are no equipment wash areas being proposed.
S11	Fueling areas	☐	☒	There are no fueling areas being proposed.
S12	Hillside landscaping	☐	☒	There is no hillside to landscape.

S13	Wash water control for food preparation areas	☐	☒	There are no wash water control for food preparation areas being proposed.
S14	Community car wash racks	☐	☒	There are no community car wash racks being proposed.

IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

IV.4.1 Water Quality Credits

Determine if water quality credits are applicable for the project. *Refer to Section 3.1 of the Model WQMP for description of credits and Appendix VI of the TGD for calculation methods for applying water quality credits.*

<table>
<tr><th colspan="5">Description of Proposed Project</th></tr>
<tr><td colspan="5">Project Types that Qualify for Water Quality Credits (Select all that apply):</td></tr>
<tr><td colspan="2">☐Redevelopment projects that reduce the overall impervious footprint of the project site.</td><td colspan="2">☐Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.</td><td>☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).</td></tr>
<tr><td colspan="2">☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).</td><td colspan="2">☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned</td><td>☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).</td></tr>
<tr><td>☐Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.</td><td>☐ Developments in a city center area.</td><td>☐ Developments in historic districts or historic preservation areas.</td><td>☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.</td><td>☐In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.</td></tr>
<tr><td>Calculation of Water Quality Credits
(if applicable)</td><td colspan="4"></td></tr>
</table>

IV.4.2 Alternative Compliance Plan Information

Describe an alternative compliance plan (if applicable). Include alternative compliance obligations (i.e., gallons, pounds) and describe proposed alternative compliance measures. *Refer to Section 7.II 3.0 in the WQMP.*

Section V Inspection/Maintenance Responsibility for BMPs

Fill out information in table below. Prepare and attach an Operation and Maintenance Plan. Identify the mechanism through which BMPs will be maintained, including any documenting forms, required permits (if any) . Inspection and maintenance records must be kept for a minimum of five years for inspection by the regulatory agencies. *Refer to Section 7.II 4.0 in the Model WQMP.*

BMP Inspection/Maintenance			
BMP	**Reponsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
Proprietary Bio Treatment	Owner: JYJ Logistics LLC	See Manufacturer's recommended maintenance procedure provided herein.	See Manufacturer's recommended maintenance procedure provided herein.
Stencilling and Signage	Owner: JYJ Logistics LLC	Maintain Legibility of stencils and signs.	As needed. Should be inspected yearly.
Trash Enclosures	Owner: JYJ Logistics LLC	Conduct routine preventative maintenance.	As needed and prior to any rain event.
Bioretention Plante boxes	Owner: JYJ Logistics LLC	Inspection shall be made to ensure debris and additional sedimentation is not impacting the performance of the planter.	As needed and before and after any rain event.

BMP Inspection/Maintenance			
BMP	**Reponsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**

Section VI Site Plan and Drainage Plan

VI.1 SITE PLAN AND DRAINAGE PLAN

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural BMP locations
- Drainage delineations and flow information
- Drainage connections
- BMP details

VI.2 ELECTRONIC DATA SUBMITTAL

The minimum requirement is to provide submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open.

If the local jurisdiction requires specialized electronic document formats (CAD, GIS) to be submitted, this section will be used to describe the contents (e.g., layering, nomenclature, georeferencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

Section VII Educational Materials

Refer to the Orange County Stormwater Program (ocwatersheds.com) for a library of materials available. For the copy submitted to the Permittee, only attach the educational materials specifically applicable to the project. Other materials specific to the project may be included as well and must be attached.

Education Materials			
Residential Material (http://www.ocwatersheds.com)	**Check If Applicable**	**Business Material (http://www.ocwatersheds.com)**	**Check If Applicable**
The Ocean Begins at Your Front Door	☒	Tips for the Automotive Industry	☐
Tips for Car Wash Fund-raisers	☐	Tips for Using Concrete and Mortar	☐
Tips for the Home Mechanic	☐	Tips for the Food Service Industry	☐
Homeowners Guide for Sustainable Water Use	☒	Proper Maintenance Practices for Your Business	☒
Household Tips	☐	**Other Material**	**Check If Attached**
Proper Disposal of Household Hazardous Waste	☒		
Recycle at Your Local Used Oil Collection Center (North County)	☒		☐
Recycle at Your Local Used Oil Collection Center (Central County)	☐		☐
Recycle at Your Local Used Oil Collection Center (South County)	☐		☐
Tips for Maintaining a Septic Tank System	☐		☐
Responsible Pest Control	☒		☐
Sewer Spill	☒		☐
Tips for the Home Improvement Projects	☒		☐
Tips for Horse Care	☐		☐
Tips for Landscaping and Gardening	☒		☐
Tips for Pet Care	☒		☐
Tips for Pool Maintenance	☐		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☐		☐
Tips for Projects Using Paint	☒		☐

PACIFIC CONSULTING GROUP

Attachment A

Educational Material

2239 State Ave, #B
Costa Mesa, California 92627
(818) 800 6991
Kyle@pacificconsultinginc.com

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities such as painting can lead to water pollution if you're not careful. Paint must be used, stored and disposed of properly to ensure that it does not enter the street, gutter or storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

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

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

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

For emergencies, dial 911.

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

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Tips for Projects Using Paint

Tips for Projects Using Paint

Paint can cause significant damage to our environment. Whether you hire a contractor or do it yourself, it is important to follow these simple tips when purchasing, using, cleaning, storing and disposing of paint.

Purchasing Paint

- Measure the room or object to be painted, then buy only the amount needed.
- Whenever possible, use water-based paint since it usually does not require hazardous solvents such as paint thinner for cleanup.

Painting

- Use only one brush or roller per color of paint to reduce the amount of water needed for cleaning.
- Place open paint containers or trays on a stable surface and in a position that is unlikely to spill.
- Always use a tarp under the area or object being painted to collect paint drips and contain spills.

Cleaning

- Never clean brushes or rinse paint containers in the street, gutter or storm drain.
- For oil-based products, use as much of the paint on the brushes as possible. Clean brushes with thinner. To reuse thinner, pour it through a fine filter (e.g. nylon, metal gauze or filter paper) to remove solids such as leftover traces of paint.
- For water-based products, use as much of the paint on the brushes as possible, then rinse in the sink.
- Collect all paint chips and dust. Chips and dust from marine paints or paints containing lead, mercury or tributyl tin are hazardous waste. Sweep up and dispose of at a Household Hazardous Waste Collection Center (HHWCC).

Storing Paint

- Store paint in a dry location away from the elements.
- Store leftover water-based paint, oil-based paint and solvents separately in original or clearly marked containers.
- Avoid storing paint cans directly on cement floors. The bottom of the can will rust much faster on cement.
- Place the lid on firmly and store the paint can upside-down to prevent air from entering. This will keep the paint usable longer. Oil-based paint is usable for up to 15 years. Water-based paint remains usable for up to 10 years.

Alternatives to Disposal

- Use excess paint to apply another coat, for touch-ups, or to paint a closet, garage, basement or attic.
- Give extra paint to friends or family. Extra paint can also be donated to a local theatre group, low-income housing program or school.
- Take extra paint to an exchange program such as the **"Stop & Swap"** that allows you to drop off or pick up partially used home care products free of charge. **"Stop & Swap"** programs are available at most HHWCCs.
- For HHWCC locations and hours, call **(714) 834-6752** or visit **www.oclandfills.com**.

Disposing of Paint

- Never put wet paint in the trash.

For water-based paint:

- If possible, brush the leftover paint on cardboard or newspaper. Otherwise, allow the paint to dry in the can with the lid off in a well-ventilated area protected from the elements, children and pets. Stirring the paint every few days will speed up the drying.
- Large quantities of extra paint should be taken to a HHWCC.
- Once dried, paint and painted surfaces may be disposed of in the trash. When setting a dried paint can out for trash collection, leave the lid off so the collector will see that the paint has dried.

For oil-based paint:

- Oil-based paint is a household hazardous waste. All leftover paint should be taken to a HHWCC.

Aerosol paint:

- Dispose of aerosol paint cans at a HHWCC.

Spills

- Never hose down pavement or other impermeable surfaces where paint has spilled.
- Clean up spills immediately by using an absorbent material such as cat litter. Cat litter used to clean water-based paint spills can be disposed of in the trash. When cleaning oil-based paint spills with cat litter, it must be taken to a HHWCC.
- Immediately report spills that have entered the street, gutter or storm drain to the County's 24-Hour Water Pollution Problem Reporting Hotline at **(714) 567-6363** or visit **www.ocwatersheds.com** to fill out an incident reporting form.

PROJECT Pollution PREVENTION

The Pollution Solution

Several residential activities can result in water pollution. Among these activities are car washing and hosing off driveways and sidewalks. Both activities can waste water and result in excess runoff. Water conservation methods described in this pamphlet can prevent considerable amounts of runoff and conserve water. By taking your car to a commercial car wash and by sweeping driveways and sidewalks, you can further prevent the transport of pollutants to Orange County waterways. Here are some of the common pollutants for which you can be part of the solution:

1 Pesticides and Fertilizer

- **Pollution:** The same pesticides that are designed to be toxic to pests can have an equally lethal impact on our marine life. The same fertilizer that promotes plant growth in lawns and gardens can also create nuisance algae blooms, which remove oxygen from the water and clog waterways when it decomposes.
- **Solution:** Never use pesticides or fertilizer within 48 hours of an anticipated rainstorm. Use only as much as is directed on the label and keep it off driveways and sidewalks.

2 Dirt and Sediment

- **Pollution:** Dirt or sediment can impede the flow of the stormwater and negatively impact stream habitat as it travels through waterways and deposits downstream. Pollutants can attach to sediment, which can then be transported through our waterways.
- **Solution:** Protect dirt stockpiles by covering them with tarps or secure plastic sheets to prevent wind or rain from allowing dirt or sediment to enter the storm drain system.

3 Metals

- **Pollution:** Metals and other toxins present in car wash water can harm important plankton, which forms the base of the aquatic food chain.
- **Solution:** Take your car to a commercial car wash where the wash water is captured and treated at a local wastewater treatment plant.

DID YOU KNOW?

Did you know that most of the pollution found in our waterways is not from a single source, but from a "non-point" source meaning the accumulation of pollution from residents and businesses throughout the community

4 Pet Waste

- **Pollution:** Pet waste carries bacteria through our watersheds and eventually will be washed out to the ocean. This can pose a health risk to swimmers and surfers.
- **Solution:** Pick up after your pets!

5 Trash and Debris

- **Pollution:** Trash and debris can enter waterways by wind, littering and careless maintenance of trash receptacles. Street sweeping collects some of this trash; however, much of what isn't captured ends up in our storm drain system where it flows untreated out to the ocean.
- **Solution:** Don't litter and make sure trash containers are properly covered. It is far more expensive to clean up the litter and trash that ends up in our waterways than it is to prevent it in the first place. Come out to one of Orange County's many locations for Coastal and Inner-Coastal Cleanup Day, which is held in September.

6 Motor Oil / Vehicle Fluids

- **Pollution:** Oil and petroleum products from our vehicles are toxic to people, wildlife and plants.
- **Solution:** Fix any leaks from your vehicle and keep the maintenance up on your car. Use absorbent material such as cat litter on oil spills, then sweep it up and dispose of it in the trash. Recycle used motor oil at a local Household Hazardous Waste Collection Center.

A TEAM EFFORT

The Orange County Stormwater Program has teamed with the Municipal Water District of Orange County (MWDOC) and the University of California Cooperative Extension Program (UCCE) to develop this pamphlet.

Low Impact Development (LID) and sustainable water use prevents water pollution and conserves water for drinking and reuse. Reducing your water use and the amount of water flowing from your home protects the environment and saves you money.

Thank you for making water protection a priority!

For more information, please visit
www.ocwatersheds.com/publiced/

www.mwdoc.com

www.uccemg.com

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

Special Thanks to
The City of Los Angeles Stormwater Program for the use of its artwork

The Metropolitan Water District of Southern California for the use of the California-Friendly Plant and Native Habitat photos

Homeowners Guide for Sustainable Water Use

Low Impact Development, Water Conservation & Pollution Prevention

The Ocean Begins at Your Front Door

RUNOFF, RAINWATER AND REUSE

Where Does Water Runoff Go?

Stormwater, or water from rainfall events, and runoff from outdoor water use such as sprinklers and hoses flows from homes directly into catch basins and the storm drain system. After entering the storm drain, the water flows untreated into streams, rivers, bays and ultimately the Pacific Ocean. Runoff can come from lawns, gardens, driveways, sidewalks and roofs. As it flows over hard, impervious surfaces, it picks up pollutants. Some pollutants carried by the water runoff include trash, pet waste, pesticides, fertilizer, motor oil and more.

Water Conservation

Pollution not only impairs the water quality for habitat and recreation, it can also reduce the water available for reuse. Runoff allowed to soak into the ground is cleaned as it percolates through the soil, replenishing depleted groundwater supplies. Groundwater provides approximately 50% of the total water for drinking and other indoor household activities in north and central Orange County. When land is covered with roads, parking lots, homes, etc., there is less land to take in the water and more hard surfaces over which the water can flow.

In Orange County, 60-70% of water used by residents and businesses goes to irrigation and other outdoor uses. Reusing rainwater to irrigate our lawn not only reduces the impact of water pollution from runoff, but it also is a great way to conserve our precious water resources and replenish our groundwater basin.

What is Low Impact Development (LID)?

Low Impact Development (LID) is a method of development that seeks to maintain the natural hydrologic character of an area. LID provides a more sustainable and pollution-preventative approach to water management.

New water quality regulations require implementation of LID in larger new developments and encourage implementation of LID and other sustainable practices in existing residential areas. Implementing modifications to your lawn or garden can reduce pollution in our environment, conserve water and reduce your water bill.

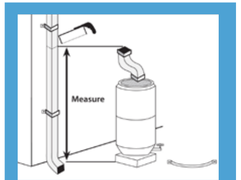
Permeable pavement allows water runoff to infiltrate through the soil and prevents most pollutants from reaching the storm drain system.

OPTIONS FOR RAINWATER HARVESTING AND REUSE

Rainwater harvesting is a great way to save money, prevent pollution and reduce potable water use. To harvest your rainwater, simply redirect the runoff from roofs and downspouts to rain barrels. Rain gardens are another option; these reduce runoff as well as encourage infiltration.

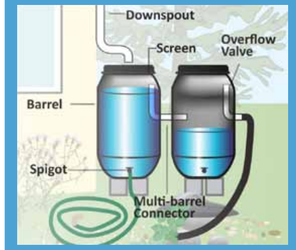
Downspout Disconnection/Redirection

Disconnecting downspouts from pipes running to the gutter prevents runoff from transporting pollutants to the storm drain. Once disconnected, downspouts can be redirected to rain gardens or other vegetated areas, or be connected to a rain barrel.



Rain Barrels

Rain barrels capture rainwater flow from roofs for reuse in landscape irrigation. Capacity of rain barrels needed for your home will depend on the amount of roof area and rainfall received. When purchasing your rain barrel, make sure it includes a screen, a spigot to siphon water for use, an overflow tube to allow for excess water to run out and a connector if you wish to connect multiple barrels to add capacity of water storage.



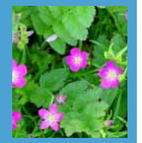
Mosquito growth prevention is very important when installing a rain barrel. The best way to prevent mosquito breeding is to eliminate entry points by ensuring all openings are sealed tightly. If these methods are unsuccessful, products are available to kill mosquito larvae, but that are harmless to animals and humans. Regular application of these products is essential. Please visit the Orange County Vector Control website for more information at www.ocvcd.org/mosquitoes3.php.

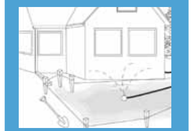
Rain Gardens

Rain gardens allow runoff to be directed from your roof downspout into a landscaped area. Vegetation and rocks in the garden will slow the flow of water to allow for infiltration into the soil. Plants and soil particles will absorb pollutants from the roof runoff. By utilizing a native plant palate, rain gardens can be maintained all year with minimal additional irrigation. These plants are adapted to the semi-arid climate of Southern California, require less water and can reduce your water bill.

Before modifying your yard to install a rain garden, please consult your local building and/or planning departments to ensure your garden plan follows pertinent building codes and ordinances. Besides codes and ordinances, some home owner associations also have guidelines for yard modifications. If your property is in hill areas or includes engineered slopes, please seek professional advice before proceeding with changes.

For information on how to disconnect a downspout or to install and maintain a rain barrel or rain garden at your home, please see the Los Angeles Rainwater Harvesting Program, A Homeowner's "How-To" Guide, November 2009 at www.larainwaterharvesting.org/





OTHER WATER CONSERVATION AND POLLUTION PREVENTION TECHNIQUES

Native Vegetation and Maintenance

"California Friendly" plants or native vegetation can significantly reduce water use. These plants often require far less fertilizers and pesticides, which are two significant pollutants found in Orange County waterways. Replacing water "thirsty" plants and grass types with water efficient natives is a great way to save water and reduce the need for potentially harmful pesticides and fertilizer.

Please see the California Friendly Garden Guide produced by the Metropolitan Water District of Southern California and associated Southern California Water Agencies for a catalog of California friendly plants and other garden resources at www.bewaterwise.com/Gardensoft.

Weed Free Yards

Weeds are water thieves. They often reproduce quickly and rob your yard of both water and nutrients. Weed your yard by hand if possible. If you use herbicides to control the weeds, use only the amount recommended on the label and never use it if rain is forecast within the next 48 hours.

Soil Amendments

Soil amendments such as green waste (e.g. grass clippings, compost, etc.) can be a significant source of nutrients and can help keep the soil near the roots of plants moist. However, they can cause algal booms if they get into our waterways, which reduces the amount of oxygen in the water and impacts most aquatic organisms. It is important to apply soil amendments more than 48 hours prior to predicted rainfall.

IRRIGATE EFFICIENTLY

Smart Irrigation Controllers

Water runoff from sprinklers left on too long will carry pollutants into our waterways.

Smart Irrigation Controllers have internal clocks as well as sensors that will turn off the sprinklers in response to environmental changes. If it is raining, too windy or too cold, the smart irrigation control sprinklers will automatically shut off.

Check with your local water agency for available rebates on irrigation controllers and smart timers.

- Aim your sprinklers at your lawn, not the sidewalk – By simply adjusting the direction of your sprinklers you can save water, prevent water pollution from runoff, keep your lawn healthy and save money.
- **Set a timer for your sprinklers** – lawns absorb the water they need to stay healthy within a few minutes of turning on the sprinklers. Time your sprinklers; when water begins running off your lawn, you can turn them off. Your timer can be set to water your lawn for this duration every time.
- **Water at Sunrise** – Watering early in the morning will reduce water loss due to evaporation. Additionally, winds tend to die down in the early morning so the water will get to the lawn as intended.
- **Water by hand** – Instead of using sprinklers, consider watering your yard by hand. Hand-watering ensures that all plants get the proper amount of water and you will prevent any water runoff, which wastes water and carries pollutants into our waterways.
- **Fix leaks** - Nationwide, households waste one trillion gallons of water a year to leaks – that is enough water to serve the entire state of Texas for a year. If your garden hose is leaking, replace the nylon or rubber hose washer and ensure a tight connection. Fix broken sprinklers immediately.

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

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

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

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

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

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

For emergencies, dial 911.

RECYCLE USED OIL

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Proper Disposal of Household Hazardous Waste

The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

ORANGE COUNTY

Pollution Prevention

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

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

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

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

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

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

Common household hazardous wastes

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

Tips for household hazardous waste

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

Preventing water pollution at your commercial/industrial site

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many landscape and building maintenance activities can lead to water pollution if you're not careful. Paint, chemicals, plant clippings and other materials can be blown or washed into storm drains that flow to the ocean. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never pour soap or fertilizers into the ocean, so why would you let them enter the storm drains? Follow these easy tips to help prevent water pollution.

Some types of industrial facilities are required to obtain coverage under the State General Industrial Permit. For more information visit: **www.swrcb.ca.gov/stormwater/industrial.html**

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

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

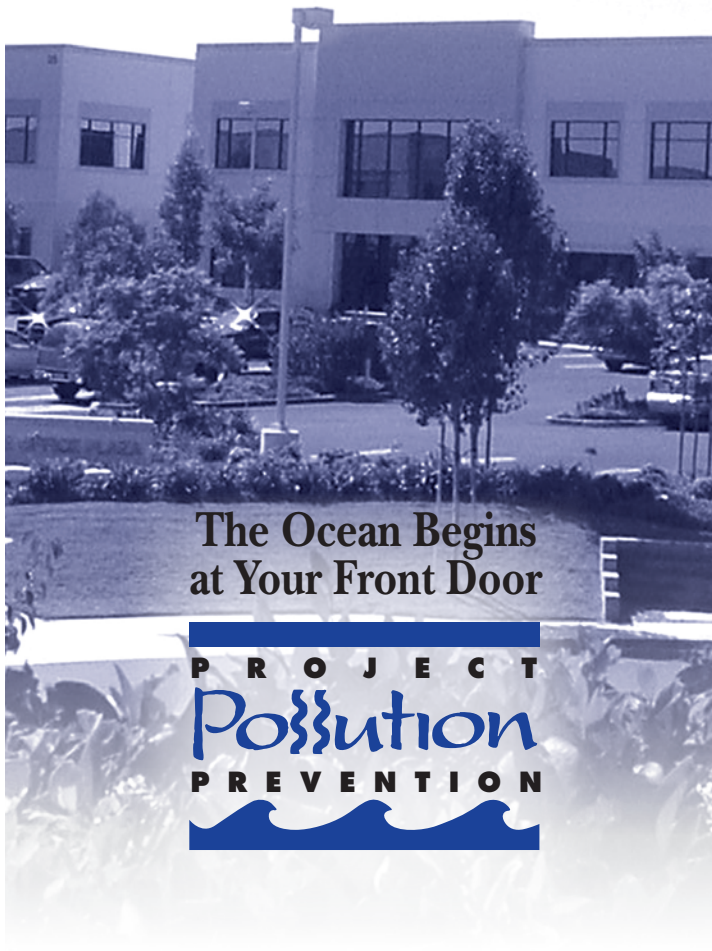
For emergencies, dial 911.

RECYCLE USED OIL

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Proper Maintenance Practices for Your Business



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Proper Maintenance Practices for your Business

Landscape Maintenance

- Compost grass clippings, leaves, sticks and other vegetation, or dispose of it at a permitted landfill or in green waste containers. Do not dispose of these materials in the street, gutter or storm drain.
- Irrigate slowly and inspect the system for leaks, overspraying and runoff. Adjust automatic timers to avoid overwatering.
- Follow label directions for the use and disposal of fertilizers and pesticides.
- Do not apply pesticides or fertilizers if rain is expected within 48 hours or if wind speeds are above 5 mph.
- Do not spray pesticides within 100 feet of waterways.
- Fertilizers should be worked into the soil rather than dumped onto the surface.
- If fertilizer is spilled on the pavement or sidewalk, sweep it up immediately and place it back in the container.

Building Maintenance

- Never allow washwater, sweepings or sediment to enter the storm drain.
- Sweep up dry spills and use cat litter, towels or similar materials to absorb wet spills. Dispose of it in the trash.
- If you wash your building, sidewalk or parking lot, you **must** contain the water. Use a shop vac to collect the water and contact your city or sanitation agency for proper disposal information. Do not let water enter the street, gutter or storm drain.
- Use drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of materials in the trash.
- Use a ground cloth or oversized tub for mixing paint and cleaning tools.
- Use a damp mop or broom to clean floors.
- Cover dumpsters to keep insects, animals, rainwater and sand from entering. Keep the area around the dumpster clear of trash and debris. Do not overfill the dumpster.
- Call your trash hauler to replace leaking dumpsters.
- Do not dump any toxic substance or liquid waste on the pavement, the ground, or near a storm drain. Even materials that seem harmless such as latex paint or biodegradable cleaners can damage the environment.

NEVER DISPOSE OF ANYTHING IN THE STORM DRAIN.

- Recycle paints, solvents and other materials. For more information about recycling and collection centers, visit **www.oclandfills.com**.
- Store materials indoors or under cover and away from storm drains.
- Use a construction and demolition recycling company to recycle lumber, paper, cardboard, metals, masonry, carpet, plastic, pipes, drywall, rocks, dirt, and green waste. For a listing of construction and demolition recycling locations in your area, visit **www.ciwmb.ca.gov/recycle.**
- Properly label materials. Familiarize employees with Material Safety Data Sheets.

PROJECT Pollution PREVENTION

HOMEOWNER TIPS
PROTECTING WATER

Before Buying Pest Control Products

- Identify the pest.
- Decide if pest control products are the best control measure or if there are alternatives available.
- Are integrated pest management guidelines available for this pest?
- Read the product label:
  - Is the pest listed on the label?
  - Is it the best product for the pest?

Before Mixing Your Sprayer

- Read the label carefully.
- Buy only enough pesticide to treat the area affected by the pest.
- Check the weather and don't apply if it's windy or about to rain
- Measure the area you're treating.
- Calculate how much spray to mix.
- Wear long sleeve shirt, long pants, shoes and any other protective equipment listed on the label and follow all the label precautions.
- Be prepared for spills and know how to clean them up.

When You're Ready To Spray

- Mix and load spray in an area where any spilled pesticide will not be able to drain or be washed away into storm drains, ditches, streams, ponds or other bodies of water.
- Mix sprayer on grass, not the sidewalk or driveway.
- Mix only as much as needed.

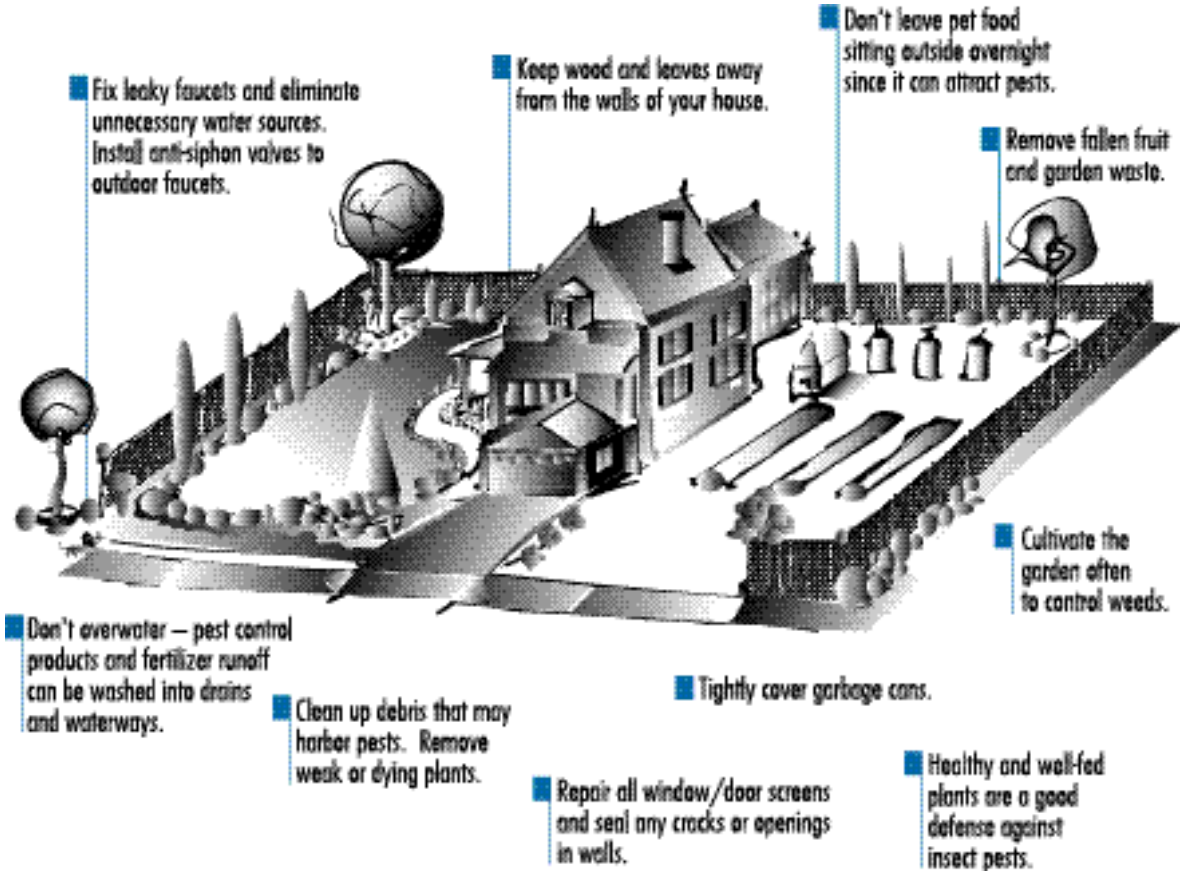
When You're Spraying

- AVOID spraying in or near storm drains, ditches, streams, and ponds!
- Leave an untreated strip around these areas to protect the water.

When You're done

- Never dump leftovers down any drain; Save for a future application.
- Triple-rinse sprayer and apply rinsewater to treated area.
- Take any old or unwanted pesticides to a Household Hazardous Waste Collection Center (714) 834-6752.

Using Pest Control Products. It's Your Responsibility To Do It Right!



IPM... Outsmarting Pests While Protecting Water

With Integrated Pest Management (IPM), homeowners use common sense and nature to make it difficult for pests to survive. IPM techniques include cultural practices (such as mulching to prevent weeds), encouraging natural enemies (good bugs), and judicious use of pest control products.

- First, identify your pest problem. To find the best solution, you need to pin down the problem. Consult gardening books, your county cooperative extension office or your local nursery.
- Decide how much pest control is necessary. If you can live with some pest damage, you can avoid intensive pest control product treatments.
- Choose an effective option. Try various types of controls first: washing bugs off plants, pruning diseased parts of plants. If you need to use pest control products, choose one that targets the problem and poses the least hazard.
- Finally, it's easier to prevent pests than to control them.

Think ahead.

This brochure is being distributed in order to reduce the impacts of pesticides on water quality. It was produced with support from the Orange County Storm Water Program, the Coalition for Urban/Rural Environmental Stewardship (CURES) and a 319(h) grant from the State Water Resources Control Board.

Orange County Storm Water Program Participants:

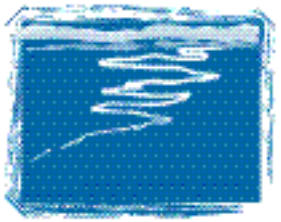
Anaheim Public Works/Engineering	(714) 765-5176
Brea Engineering	(714) 990-7666
Buena Park Public Works	(714) 562-3655
Costa Mesa Public Services	(714) 754-5248
Cypress Engineering	(714) 229-6752
Dana Point Public Works	(949) 248-3562
Fountain Valley Public Works	(714) 593-4400 x347
Fullerton Engineering Dept	(714) 738-6853
Garden Grove Development Services	(714) 741-5554
Huntington Beach Public Works	(714) 536-5432
Irvine Public Works	(949)724-6515
La Habra Public Services	(562) 905-9792
La Palma Public Works	(714) 523-1140 x102
Laguna Beach Municipal Services	(949) 497-0711
Laguna Hills Engineering	(949) 707-2600
Laguna Niguel Public Works	(949) 362-4337
Lake Forest Public Works	(949) 461-3480
Los Alamitos Community Dev	(562) 431-3538 x301
Mission Viejo Public Works	(949) 470-3095
Newport Beach Public works	(949) 644-3311
Orange Public Works	(714) 744-5551
Placentia Engineering	(714) 993-8131
San Clemente Engineering	(949) 361-6100
San Juan Capistrano Engineering	(949) 493-1171
Santa Ana Public Works	(714) 647-3380
Seal Beach Engineering	(562) 431-2527 x318
Stanton Public Works	(714) 379-9222 x204
Tustin Public Works Engineering	(714) 573-3150
Villa Park Engineering	(714) 998-1500
Westminster Public Works Eng.	(714) 898-3311 x215
Yorba Linda Engineering	(714) 961-7170 x174
O.C. Storm Water Program	1-877-89-SPILL (1-877-897-7455)
24 Hour Water Pollution Hotline	(714) 567-6363 or ashbyk@pfrd.co.orange.ca.us
Chemical and Hazardous Material Spill Emergencies	911

Other Important Phone Numbers:

For Additional Brochures	1-877-89-SPILL (1-877-897-7455)
UC Masters & Coop Extension	(714) 708-1646 ucmastergardeners@yahoo.com
O.C. Household Hazardous Waste Information	(714) 834-6752 or www.oc.ca.gov/IWMD
Information on agriculture chemicals, pesticides and possible alternatives, O.C. Agriculture Commissioner	(714) 447-7115

Original graphics developed with support from:
Coalition For Urban/Rural Environmental Stewardship (CURES)
Western Crop Protection Association (WCPA)
Responsible Industry for a Sound Environment (RISE)

Keeping Pest Control Products Out of Creeks, Rivers and The Ocean



HOMEOWNER TIPS

PROTECTING WATER

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

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

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

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

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

For emergencies, dial 911.

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

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Help Prevent Ocean Pollution:

Responsible Pest Control

Tips for Pest Control

Key Steps to Follow:

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

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

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

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

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

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

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

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

UC CE University of California Cooperative Extension

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Store unused chemicals in a locked cabinet.

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

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

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

PROJECT Pollution PREVENTION

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

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

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

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

Please do not mix your oil with other substances!

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

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

RECYCLE USED OIL

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

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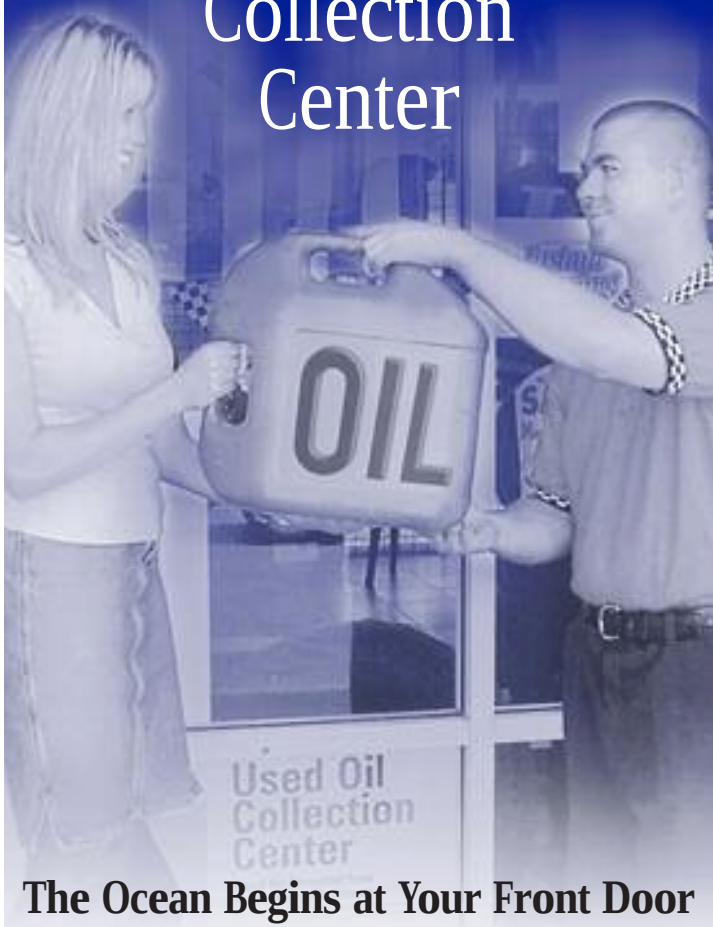
Help Prevent Ocean Pollution:

Recycle at Your Local Used Oil Collection Center



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

NORTH COUNTY

Used Oil Collection Centers

Anaheim

All Seasons Tire and Auto Center, Inc.
817 S Brookhurst St., Anaheim, CA 92804
(714)772-6090( )
CIWMB#: 30-C-03177

AutoZone #3317
423 N Anaheim Blvd., Anaheim, CA 92805
(714)776-0787( )
CIWMB#: 30-C-05263

AutoZone #5226
2145 W Lincoln Ave., Anaheim, CA 92801
(714)533-6599( )
CIWMB#: 30-C-04604

Bedard Automotive
3601 E Miraloma Ave., Anaheim, CA 92806
(714)528-1380( )
CIWMB#: 30-C-02205

Classic Chevrolet
1001 Weir Canyon Rd., Anaheim, CA 92807
(714)283-5400( )
CIWMB#: 30-C-05223

Econo Lube N' Tune #4
3201 W Lincoln Ave., Anaheim, CA 92801
(714)821-0128( )
CIWMB#: 30-C-01485

EZ Lube Inc - Savi Ranch #43
985 N Weir Canyon Rd., Anaheim, CA 92807
(714)556-1312( )
CIWMB#: 30-C-06011

Firestone Store #71C7
1200 S Magnolia Ave., Anaheim, CA 92804
(949)598-5520( )
CIWMB#: 30-C-05743

Great Western Lube Express
125 N Brookhurst St., Anaheim, CA 92801
(714)254-1300( )
CIWMB#: 30-C-05542

HR Pro Auto Service Center
3180 W Lincoln Ave., Anaheim, CA 92801
(714)761-4343( )
CIWMB#: 30-C-05927

Ira Newman Automotive Services
1507 N State College Blvd., Anaheim, CA 92806
(714)635-2392( )
CIWMB#: 30-C-01482

Jiffy Lube #1028
2400 W Ball Rd., Anaheim, CA 92804
(714)761-5211( )
CIWMB#: 30-C-00870

Jiffy Lube #1903
2505 E Lincoln Ave., Anaheim, CA 92806
(714)772-4000( )
CIWMB#: 30-C-05511

Jiffy Lube #2340
2181 W Lincoln Ave., Anaheim, CA 92801
(714)533-1000( )
CIWMB#: 30-C-04647

Kragen Auto Parts #1303
1088 N State College Blvd., Anaheim, CA 92806
(714)956-7351( )
CIWMB#: 30-C-03438

Kragen Auto Parts #1399
2245 W Ball Rd., Anaheim, CA 92804
(714)490-1274( )
CIWMB#: 30-C-04094

Kragen Auto Parts #1565
2072 Lincoln Ave., Anaheim, CA 92806
(714)502-6992( )
CIWMB#: 30-C-04078

Kragen Auto Parts #1582
3420 W Lincoln Ave., Anaheim, CA 92801
(714)828-7977( )
CIWMB#: 30-C-04103

Pep Boys #613
10912 Katella Ave., Anaheim, CA 92804
(714)638-0863( )
CIWMB#: 30-C-01756

Pep Boys #663
3030 W Lincoln Anaheim, CA 92801
(714)826-4810( )
CIWMB#: 30-C-03417

Pep Boys #809
8205 E Santa Ana Cyn Rd., Anaheim, CA 92808
(714)974-0105( )
CIWMB#: 30-C-03443

Pick Your Part
1235 S Beach Blvd., Anaheim, CA 92804
(714)527-1645( )
CIWMB#: 30-C-03744

PK Auto Performance
3106 W. Lincoln Ave., Anaheim, CA 92801
(714)826-2141( )
CIWMB#: 30-C-05628

Quick Change Lube and Oil
2731 W Lincoln Ave., Anaheim, CA 92801
(714)821-4464( )
CIWMB#: 30-C-04363

Saturn of Anaheim
1380 S Auto Center Dr., Anaheim, CA 92806
(714)648-2444( )
CIWMB#: 30-C-06332

Sun Tech Auto Service
105 S State College Blvd., Anaheim, CA 92806
(714)956-1389( )
CIWMB#: 30-C-06455

Vonic Truck Services
515 S Rose St., Anaheim, CA 92805
(714)533-3333( )
CIWMB#: 30-C-01142

Anaheim Hills

Anaheim Hills Car Wash & Lube
5810 E La Palma Ave., Anaheim Hills, CA 92807
(714)777-6605( )
CIWMB#: 30-C-01387

Brea

Firestone Store #27A9
891 E Imperial Hwy., Brea, CA 92821
(714)529-8404( )
CIWMB#: 30-C-01221

Oil Can Henry's
230 N Brea Blvd., Brea, CA 92821
(714)990-1900( )
CIWMB#: 30-C-04273

Buena Park

Firestone Store #71F7
6011 Orangethorpe Buena Park, CA 90620
(714)670-7912( )
CIWMB#: 30-C-01218

Firestone Store #71T8
8600 Beach Blvd., Buena Park, CA 90620
(714)827-5300( )
CIWMB#: 30-C-02121

Kragen Auto Parts #1204
5303 Beach Blvd., Buena Park, CA 90621
(714)994-1320( )
CIWMB#: 30-C-02623

Cypress

AutoZone #5521
5471 Lincoln Ave., Cypress, CA 90630
(714)995-4644( )
CIWMB#: 30-C-00836

Big O Tires
6052 Cerritos Ave., Cypress, CA 90630
(714)826-6334( )
CIWMB#: 30-C-04245

Econo Lube N' Tune #213
5497 Cerritos Ave., Cypress, CA 90630
(714)761-0456( )
CIWMB#: 30-C-06240

Jiffy Lube #851
4942 Lincoln Ave., Cypress, CA 90630
(626)965-9689( )
CIWMB#: 30-C-06182

M & N Coastline Auto & Tire Service
4005 Ball Rd., Cypress, CA 90630
(714)826-1001( )
CIWMB#: 30-C-04387

Masterlube #103
5904 Lincoln Cypress, CA 90630
(714)826-2323( )
CIWMB#: 30-C-01071

Masterlube #104
5971 Ball Rd., Cypress, CA 90630
(714)220-1555( )
CIWMB#: 30-C-04682

Metric Motors of Cypress
6042 Cerritos Ave., Cypress, CA 90630
(714)821-4702( )
CIWMB#: 30-C-05157

Fullerton

AutoZone #2898
146 N. Raymond Ave., Fullerton, CA 92831
(714)870-9772( )
CIWMB#: 30-C-04488

AutoZone #5522
1801 Orangethorpe W. Fullerton, CA 92833
(714)870-8286( )
CIWMB#: 30-C-06062

AutoZone #5523
102 N Euclid Fullerton, CA 92832
(714)870-8286( )
CIWMB#: 30-C-04755

EZ Lube #17
4002 N Harbor Blvd., Fullerton, CA 92835
(714)871-9980( )
CIWMB#: 30-C-03741

Firestone Store #27EH
1933 N Placentia Ave., Fullerton, CA 92831
(714)993-7100( )
CIWMB#: 30-C-02122

Fox Service Center
1018 W Orangethorpe Fullerton, CA 92833
(714)879-1430( )
CIWMB#: 30-C-02318

Fullerton College Automotive Technology
321 E Chapman Ave., Fullerton, CA 92832
(714)992-7275( )
CIWMB#: 30-C-03165

Kragen Auto Parts #0731
2978 Yorba Linda Fullerton, CA 92831
(714)996-4780( )
CIWMB#: 30-C-02628

Kragen Auto Parts #4133
904 W Orangethorpe Ave., Fullerton, CA 92832
(714)526-3570( )
CIWMB#: 30-C-06256

Pep Boys #642
1530 S Harbor Blvd., Fullerton, CA 92832
(714)870-0700( )
CIWMB#: 30-C-01755

Sunnyside 76 Car Care Center
2701 N Brea Blvd., Fullerton, CA 92835
(714)256-0773( )
CIWMB#: 30-C-01381

Garden Grove

76 Pro Lube Plus
9001 Trask Ave., Garden Grove, CA 92844
(714)393-0590( )
CIWMB#: 30-C-05276

AutoZone #5527
13190 Harbor Blvd., Garden Grove, CA 92843
(714)636-5665( )
CIWMB#: 30-C-04760

David Murray Shell
12571 Vly View St., Garden Grove, CA 92845
(714)898-0170( )
CIWMB#: 30-C-00547

Express Lube & Wash
8100 Lampson Ave., Garden Grove, CA 92841
(909)316-8261( )
CIWMB#: 30-C-06544

Firestone Store #7180
10081 Chapman Ave., Garden Grove, CA 92840
(714)530-4630( )
CIWMB#: 30-C-01224

Firestone Store #71W3
13961 Brookhurst St., Garden Grove, CA 92843
(714)590-2741( )
CIWMB#: 30-C-03690

Jiffy Lube #1991
13970 Harbor Blvd., Garden Grove, CA 92843
(714)554-0610( )
CIWMB#: 30-C-05400

Kragen Auto Parts #1251
13933 N Harbor Blvd., Garden Grove, CA 92843
(714)554-3780( )
CIWMB#: 30-C-02663

Kragen Auto Parts #1555
9851 Chapman Ave., Garden Grove, CA 92841
(714)741-8030( )
CIWMB#: 30-C-04079

Nissan of Grarden Grove
9670 Trask Ave., Garden Grove, CA 92884
(714)537-0900( )
CIWMB#: 30-C-06553

Toyota of Garden Grove
9444 Trask Ave., Garden Grove, CA 92844
(714)895-5595( )
CIWMB#: 30-C-06555

La Habra

AutoZone #5532
1200 W Imperial Hwy., La Habra, CA 90631
(562)694-5337( )
CIWMB#: 30-C-04784

Burch Ford
201 N Harbor Blvd., La Habra, CA 90631
(562)691-3225( )
CIWMB#: 30-C-05179

Firestone Store #2736
1071 S Beach Blvd., La Habra, CA 90631
(562)691-1731( )
CIWMB#: 30-C-01169

Kragen Auto Parts #1569
1621 W Whittier Blvd., La Habra, CA 90631
(562)905-2538( )
CIWMB#: 30-C-04076

Pep Boys #997
125 W Imperial Hwy., La Habra, CA 90631
(714)447-0601( )
CIWMB#: 30-C-04026

SpeeDee Oil Change & Tune-Up
1580 W Imperial Hwy., La Habra, CA 90631
(562)697-3513( )

Los Alamitos

Jiffy Lube #1740
3311 Katella Ave., Los Alamitos, CA 90720
(562)596-1827( )
CIWMB#: 30-C-03529

Midway City

Bolsa Transmission
8331 Bolsa Ave., Midway City, CA 92655
(714)799-6158( )
CIWMB#: 30-C-05768

Placentia

Advanced Auto & Diesel
144 S Bradford Placentia, CA 92870
(714)996-8222( )
CIWMB#: 30-C-06242

Castner's Auto Service
214 S. Bradford Ave., Placentia, CA 92870
(714)528-1311( )
CIWMB#: 30-C-06452

Econo Lube N' Tune
100 W Chapman Ave., Placentia, CA 92870
(714)524-0424( )
CIWMB#: 30-C-06454

Fairway Ford
1350 E Yorba Linda Blvd., Placentia, CA 92870
(714)524-1200( )
CIWMB#: 30-C-01863

Seal Beach

M & N Coastline Auto & Tire Service
12239 Seal Beach Blvd., Seal Beach, CA 90740
(714)826-1001( )
CIWMB#: 30-C-04433

Seal Beach Chevron
12541 Seal Beach Blvd., Seal Beach, CA 90740
(949)495-0774(14)
CIWMB#: 30-C-06425

Stanton

AutoZone #2806
11320 Beach Blvd., Stanton, CA 90680
(714)895-7665( )
CIWMB#: 30-C-04563

Joe's Auto Clinic
11763 Beach Blvd., Stanton, CA 90680
(714)891-7715( )
CIWMB#: 30-C-03253

Kragen Auto Parts #1742
11951 Beach Blvd., Stanton, CA 90680
(714)799-7574( )
CIWMB#: 30-C-05231

Scher Tire #20
7000 Katella Ave., Stanton, CA 90680
(714)892-9924( )
CIWMB#: 30-C-05907

USA 10 Minute Oil Change
8100 Lampson Ave., Stanton, CA 92841
(714)373-4432( )
CIWMB#: 30-C-05909

Westminster

AutoZone #5543
6611 Westminster Blvd., Westminster, CA 92683
(714)898-2898( )
CIWMB#: 30-C-04964

AutoZone #5544
8481 Westminster Blvd., Westminster, CA 92683
(714)891-3511( )
CIWMB#: 30-C-04966

City of Westminster Corporate Yard
14381 Olive St., Westminster, CA 92683
(714)895-2876(292)
CIWMB#: 30-C-02008

Honda World
13600 Beach Blvd., Westminster, CA 92683
(714)890-8900( )
CIWMB#: 30-C-03639

Jiffy Lube #1579
6011 Westminster Blvd., Westminster, CA 92683
(714)899-2727( )
CIWMB#: 30-C-02745

John's Brake & Auto Repair
13050 Hoover St., Westminster, CA 92683
(714)379-2088( )
CIWMB#: 30-C-05617

Kragen Auto Parts #0762
6562 Westminster Blvd., Westminster, CA 92683
(714)898-0810( )
CIWMB#: 30-C-02590

Midway City Sanitary District
14451 Cedarwood St., Westminster, CA 92683
(714)893-3553( )
CIWMB#: 30-C-01626

Pep Boys #653
15221 Beach Blvd., Westminster, CA 92683
(714)893-8544( )
CIWMB#: 30-C-03415

Yorba Linda

AutoZone #5545
18528 Yorba Linda Blvd., Yorba Linda, CA 92886
(714)970-8933( )
CIWMB#: 30-C-04971

Econo Lube N' Tune
22270 La Palma Ave., Yorba Linda, CA 92887
(714)692-8394( )
CIWMB#: 30-C-06513

EZ Lube Inc. #41
17511 Yorba Linda Blvd., Yorba Linda, CA 92886
(714)556-1312( )
CIWMB#: 30-C-05739

Firestone Store #27T3
18500 Yorba Linda Blvd., Yorba Linda, CA 92886
(714)779-1966( )
CIWMB#: 30-C-01222

Jiffy Lube #1532
16751 Yorba Linda Blvd., Yorba Linda, CA 92886
(714)528-2800( )
CIWMB#: 30-C-03777

Mike Schultz Import Service
4832 Eureka Ave., Yorba Linda, CA 92886
(714)528-4411( )
CIWMB#: 30-C-04313

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

Sewage Spill Regulatory Requirements

Allowing sewage to discharge to a gutter or storm drain may subject you to penalties and/or out-of-pocket costs to reimburse cities or public agencies for clean-up efforts.

Here are the pertinent codes, fines, and agency contact information that apply.

Orange County Stormwater Program
24 Hour Water Pollution Reporting Hotline
1-877-89-SPILL (1-877-897-7455)

- County and city water quality ordinances prohibit discharges containing pollutants.

Orange County Health Care Agency Environmental Health
(714) 433-6419

California Health and Safety Code, Sections 5410-5416

- No person shall discharge raw or treated sewage or other waste in a manner that results in contamination, pollution or a nuisance.
- Any person who causes or permits a sewage discharge to any state waters:
  - must immediately notify the local health agency of the discharge.
  - shall reimburse the local health agency for services that protect the public's health and safety (water-contact receiving waters).
  - who fails to provide the required notice to the local health agency is guilty of a misdemeanor and shall be punished by a fine (between $500–$1,000) and/or imprisonment for less than one year.

Regional Water Quality Control Board
Santa Ana Region (951) 782-4130
San Diego Region (858) 467-2952

- Requires the prevention, mitigation, response to and reporting of sewage spills.

California Office of Emergency Services
(800) 852-7550

California Water Code, Article 4, Chapter 4, Sections 13268-13271
California Code of Regulations, Title 23, Division 3, Chapter 9.2, Article 2, Sections 2250-2260

- Any person who causes or permits sewage in excess of 1,000 gallons to be discharged to state waters **shall immediately notify the Office of Emergency Services.**
- Any person who fails to provide the notice required by this section is **guilty of a misdemeanor** and shall be punished by a fine (less than $20,000) and/or imprisonment for not more than one year.

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Sewage Spill
Reference Guide

Your Responsibilities as a Private Property Owner

Residences
Businesses
Homeowner/Condominium Associations
Federal and State Complexes
Military Facilities

Orange County Sanitation District

Health Care Agency
Environmental Health

PROJECT Pollution PREVENTION
www.ocwatersheds.com

This brochure was designed courtesy of the Orange County Sanitation District (OCSD). For additional information, call (714) 962-2411, or visit their website at www.ocsd.com

What is a Sewage Spill?

Sewage spills occur when the wastewater being transported via underground pipes overflows through a manhole, cleanout or broken pipe. Sewage spills can cause health hazards, damage to homes and businesses, and threaten the environment, local waterways and beaches.

Common Causes of Sewage Spills

Grease builds up inside and eventually blocks sewer pipes. Grease gets into the sewer from food establishments, household drains, as well as from poorly maintained commercial grease traps and interceptors.

Structure problems caused by tree roots in the lines, broken/cracked pipes, missing or broken cleanout caps or undersized sewers can cause blockages.

Infiltration and inflow (I/I) impacts pipe capacity and is caused when groundwater or rainwater enters the sewer system through pipe defects and illegal connections.

You Are Responsible for a Sewage Spill Caused by a Blockage or Break in Your Sewer Lines!

Time is of the essence in dealing with sewage spills. You are required to **immediately**:

Control and minimize the spill. Keep spills contained on private property and out of gutters, storm drains and public waterways by shutting off or not using the water.

Use sandbags, dirt and/or plastic sheeting to prevent sewage from entering the storm drain system.

Clear the sewer blockage. Always wear gloves and wash your hands. It is recommended that a plumbing professional be called for clearing blockages and making necessary repairs.

Always notify your city sewer/public works department or public sewer district of sewage spills. If the spill enters the storm drains also notify the Health Care Agency. In addition, if it exceeds 1,000 gallons notify the Office of Emergency Services. Refer to the numbers listed in this brochure.

Overflowing cleanout pipe located on private property

You Could Be Liable

Allowing sewage from your home, business or property to discharge to a gutter or storm drain may subject you to penalties and/or out-of-pocket costs to reimburse cities or public agencies for clean-up and enforcement efforts. See Regulatory Codes & Fines section for pertinent codes and fines that apply.

What to Look For

Sewage spills can be a very noticeable gushing of water from a manhole or a slow water leak that may take time to be noticed. Don't dismiss unaccounted-for wet areas.

Look for:

- Drain backups inside the building.
- Wet ground and water leaking around manhole lids onto your street.
- Leaking water from cleanouts or outside drains.
- Unusual odorous wet areas: sidewalks, external walls or ground/landscape around a building.

Caution

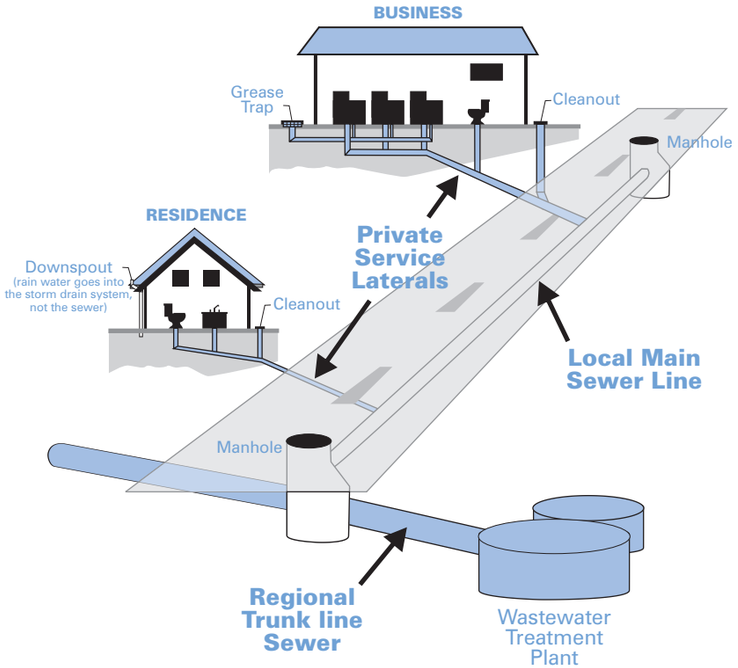
Keep people and pets away from the affected area. Untreated sewage has high levels of disease-causing viruses and bacteria. Call your local health care agency listed on the back for more information.

If You See a Sewage Spill Occurring, Notify Your City Sewer/Public Works Department or Public Sewer District IMMEDIATELY!

How a Sewer System Works

A property owner's sewer pipes are called service laterals and are connected to larger local main and regional trunk lines. Service laterals run from the connection at the home to the connection with the public sewer (including the area under the street). These laterals are the responsibility of the property owner and must be maintained by the property owner. Many city agencies have adopted ordinances requiring maintenance of service laterals. Check with your city sewer/local public works department for more information.

Operation and maintenance of **local and regional sewer lines** are the responsibility of the city sewer/public works departments and public sewer districts.



How You Can Prevent Sewage Spills

1. **Never put grease down garbage disposals, drains or toilets.**
2. **Perform periodic cleaning to eliminate grease, debris and roots in your service laterals.**
3. **Repair any structural problems in your sewer system and eliminate any rainwater infiltration/inflow leaks into your service laterals.**

Preventing Grease Blockages

The drain is not a dump! Recycle or dispose of grease properly and never pour grease down the drain.

Homeowners should mix fats, oils and grease with absorbent waste materials such as paper, coffee grounds, or kitty litter and place it in the trash. Wipe food scraps from plates and pans and dump them in the trash.

Restaurants and commercial food service establishments should always use "Kitchen Best Management Practices." These include:

- Collecting all cooking grease and liquid oil from pots, pans and fryers in covered grease containers for recycling.
- Scraping or dry-wiping excess food and grease from dishes, pots, pans and fryers into the trash.
- Installing drain screens on all kitchen drains.
- Having spill kits readily available for cleaning up spills.
- Properly maintaining grease traps or interceptors by having them serviced regularly. Check your local city codes.

Orange County Agency Responsibilites

- **City Sewer/Public Works Departments—** Responsible for protecting city property and streets, the local storm drain system, sewage collection system and other public areas.
- **Public Sewer/Sanitation District—** Responsible for collecting, treating and disposing of wastewater.
- **County of Orange Health Care Agency—** Responsible for protecting public health by closing ocean/bay waters and may close food-service businesses if a spill poses a threat to public health.
- **Regional Water Quality Control Boards—** Responsible for protecting State waters.
- **Orange County Stormwater Program—** Responsible for preventing harmful pollutants from being discharged or washed by stormwater runoff into the municipal storm drain system, creeks, bays and the ocean.

You Could Be Liable for Not Protecting the Environment

Local and state agencies have legal jurisdiction and enforcement authority to ensure that sewage spills are remedied.

They may respond and assist with containment, relieving pipe blockages, and/or clean-up of the sewage spill, especially if the spill is flowing into storm drains or onto public property.

A property owner may be charged for costs incurred by these agencies responding to spills from private properties.

Report Sewage Spills!

City Sewer/Public Works Departments

Aliso Viejo	(949) 425-2500
Anaheim	(714) 765-6860
Brea	(714) 990-7691
Buena Park	(714) 562-3655
Costa Mesa	(949) 645-8400
Cypress	(714) 229-6760
Dana Point	(949) 248-3562
Fountain Valley	(714) 593-4600
Fullerton	(714) 738-6897
Garden Grove	(714) 741-5375
Huntington Beach	(714) 536-5921
Irvine	(949) 453-5300
Laguna Beach	(949) 497-0765
Laguna Hills	(949) 707-2650
Laguna Niguel	(949) 362-4337
Laguna Woods	(949) 639-0500
La Habra	(562) 905-9792
Lake Forest	(949) 461-3480
La Palma	(714) 690-3310
Los Alamitos	(562) 431-3538
Mission Viejo	(949) 831-2500
Newport Beach	(949) 644-3011
Orange	(714) 532-6480
Orange County	(714) 567-6363
Placentia	(714) 993-8245
Rancho Santa Margarita	(949) 635-1800
San Clemente	(949) 366-1553
San Juan Capistrano	(949) 443-6363
Santa Ana	(714) 647-3380
Seal Beach	(562) 431-2527
Stanton	(714) 379-9222
Tustin	(714) 962-2411
Villa Park	(714) 998-1500
Westminster	(714) 893-3553
Yorba Linda	(714) 961-7170

Public Sewer/Water Districts

Costa Mesa Sanitary District	(714) 393-4433/ (949) 645-8400
El Toro Water District	(949) 837-0660
Emerald Bay Service District	(949) 494-8571
Garden Grove Sanitary District	(714) 741-5375
Irvine Ranch Water District	(949) 453-5300
Los Alamitos/Rossmoor Sewer District	(562) 431-2223
Midway City Sanitary District (Westminster)	(714) 893-3553
Moulton Niguel Water District	(949) 831-2500
Orange County Sanitation District	(714) 962-2411
Santa Margarita Water District	(949) 459-6420
South Coast Water District	(949) 499-4555
South Orange County Wastewater Authority	(949) 234-5400
Sunset Beach Sanitary District	(562) 493-9932
Trabuco Canyon Sanitary District	(949) 858-0277
Yorba Linda Water District	(714) 777-3018

Other Agencies

Orange County Health Care Agency	(714) 433-6419
Office of Emergency Services	(800) 852-7550

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Home improvement projects and work sites must be maintained to ensure that building materials do not enter the street, gutter or storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never dump building materials into the ocean, so don't let them enter the storm drains. Follow these tips to help prevent water pollution.

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

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

For emergencies, dial 911.

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

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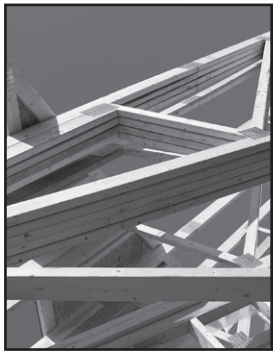
Help Prevent Ocean Pollution:

Tips for Home Improvement Projects

Tips for Home Improvement Projects

Home improvement projects can cause significant damage to the environment. Whether you hire a contractor or work on the house yourself, it is important to follow these simple tips while renovating, remodeling or improving your home:

General Construction



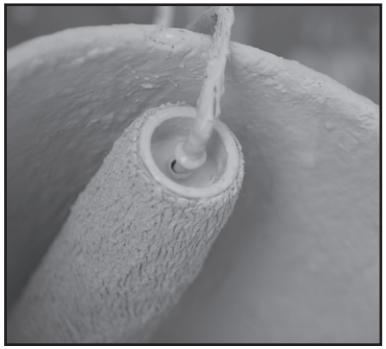
- Schedule projects for dry weather.
- Keep all construction debris away from the street, gutter and storm drain.
- Store materials under cover with temporary roofs or plastic sheets to eliminate or reduce the possibility that rainfall, runoff or wind will carry materials from the project site to the street, storm drain or adjacent properties.

Building Materials

- Never hose materials into a street, gutter or storm drain.
- Exposed piles of construction material should not be stored on the street or sidewalk.
- Minimize waste by ordering only the amount of materials needed to complete the job.
- Do not mix more fresh concrete than is needed for each project.
- Wash concrete mixers and equipment in a designated washout area where the water can flow into a containment area or onto dirt.
- Dispose of small amounts of dry excess materials in the trash. Powdery waste, such as dry concrete, must be properly contained within a box or bag prior to disposal. Call your local trash hauler for weight and size limits.

Paint

- Measure the room or object to be painted, then buy only the amount needed.
- Place the lid on firmly and store the paint can upside-down in a dry location away from the elements.
- Tools such as brushes, buckets and rags should never be washed where excess water can drain into the street, gutter or storm drain. All tools should be rinsed in a sink connected to the sanitary sewer.
- When disposing of paint, never put wet paint in the trash.
- Dispose of water-based paint by removing the lid and letting it dry in the can. Large amounts must be taken to a Household Hazardous Waste Collection Center (HHWCC).



- Oil-based paint is a household hazardous waste. All leftover paint should be taken to a HHWCC.
- For HHWCC locations and hours, call **(714) 834-6752** or visit **www.oclandfills.com**.

Erosion Control

- Schedule grading and excavation projects for dry weather.
- When temporarily removing soil, pile it in a contained, covered area where it cannot spill into the street, or obtain the required temporary encroachment or street closure permit and follow the conditions instructed by the permit.
- When permanently removing large quantities of soil, a disposal location must be found prior to excavation. Numerous businesses are available to handle disposal needs. For disposal options, visit **www.ciwmb.ca.gov/SWIS**.
- Prevent erosion by planting fast-growing annual and perennial grasses. They will shield and bind the soil.

Recycle

- Use a construction and demolition recycling company to recycle lumber, paper, cardboard, metals, masonry (bricks, concrete, etc.), carpet, plastic, pipes (plastic, metal and clay), drywall, rocks, dirt and green waste.

- For a listing of construction and demolition recycling locations in your area, visit **www.ciwmb.ca.gov/recycle.**

Spills

- Clean up spills immediately by using an absorbent material such as cat litter, then sweep it up and dispose of it in the trash.
- Immediately report spills that have entered the street, gutter or storm drain to the County's 24-Hour Water Pollution Problem Reporting Hotline at **(714) 567-6363** or visit **www.ocwatersheds.com** to fill out an incident reporting form.

PROJECT Pollution PREVENTION

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

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

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

UCCE Master Gardener Hotline:
(714) 708-1646

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

For emergencies, dial 911.

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

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Help Prevent Ocean Pollution:

Tips for Landscape & Gardening

The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Tips for Landscape & Gardening

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

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.
- Plant native vegetation to reduce the amount of water, fertilizers, and pesticide applied to the landscape.

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

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.

- Use slow-release fertilizers to minimize leaching, and use organic fertilizers.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.

- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting. For more information, visit **www.ipm.ucdavis.edu**.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Hazardous Waste Collection Center to be recycled. Locations are provided below.

Household Hazardous Waste Collection Centers

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

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

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

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

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

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

For emergencies, dial 911.

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

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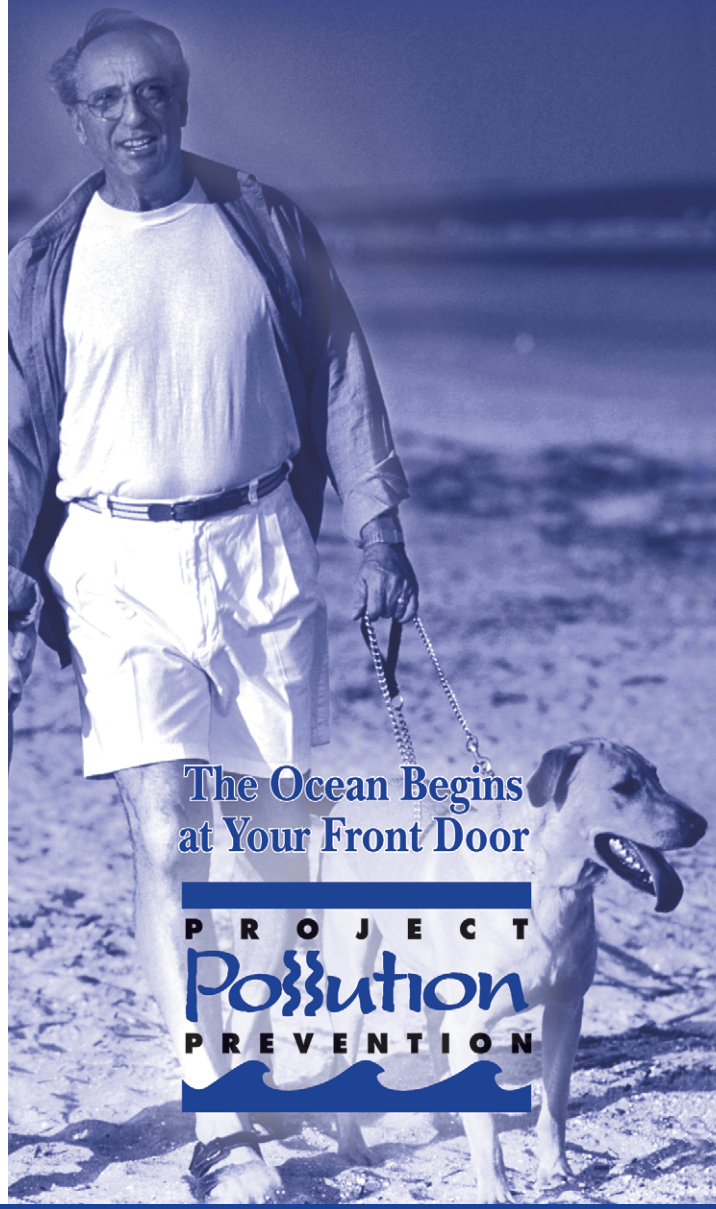
Help Prevent Ocean Pollution:

Tips for Pet Care



Tips for Pet Care

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

Washing Your Pets

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

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

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

Flea Control

- Consider using oral or topical flea control products.

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

Why You Should Pick Up After Your Pet

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

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

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

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

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

PROJECT Pollution PREVENTION

The Ocean Begins at Your Front Door

Never allow pollutants to enter the

street, gutter or storm drain!

Follow these simple steps to help reduce water pollution:

Household Activities

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

Automotive

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

Pool Maintenance

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

Landscape and Gardening

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

Trash

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

Pet Care

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

Common Pollutants

Home Maintenance

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

Lawn and Garden

- Pet and animal waste
- Pesticides
- Clippings, leaves and soil
- Fertilizer

Automobile

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

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

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

Did You Know?

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

Where Does It Go?

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

Sources of Non-Point Source Pollution

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

The Effect on the Ocean

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

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

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

For More Information

California Environmental Protection Agency
www.calepa.ca.gov

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

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

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

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

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

Stormwater Best Management Practice Handbook
Visit www.cabmphandbooks.com

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

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

Orange County Stormwater Program

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

Orange County 24-Hour
Water Pollution Problem Reporting Hotline
1-877-89-SPILL (1-877-897-7455)

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

Printed on Recycled Paper

The Ocean Begins at Your Front Door

Attachment B

Hydrology Maps

2239 State Ave, #B
Costa Mesa, California 92627
(818) 800 6991
Kyle@pacificconsultinginc.com

SUBJECT TO FURTHER REVISION

LEGEND

City Boundaries

OCWD Groundwater Basin Protection Boundary

Depth To Groundwater

<= 5'

5-10'

Note: Data are not available for South Orange County at this time.

Source:
Sprotte, Fuller and Greenwood, 1980.
California Division of Mines and Geology;
California Geological Survey

LOS ANGELES COUNTY
ORANGE COUNTY

SAN BERNARDINO COUNTY
ORANGE COUNTY

RIVERSIDE COUNTY
ORANGE COUNTY

project site

0 2 4 8 Kilometers

0 1.25 2.5 5 Miles

TITLE

NORTH ORANGE COUNTY
MAPPED SHALLOW GROUNDWATER

ORANGE COUNTY
INFILTRATION STUDY

CA

JOB

ORANGE CO.

SCALE	1" = 1.25 miles
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	02/09/11
JOB NO.	9526-E

PACE
Advanced Water Engineering

FIGURE

XVI-2e

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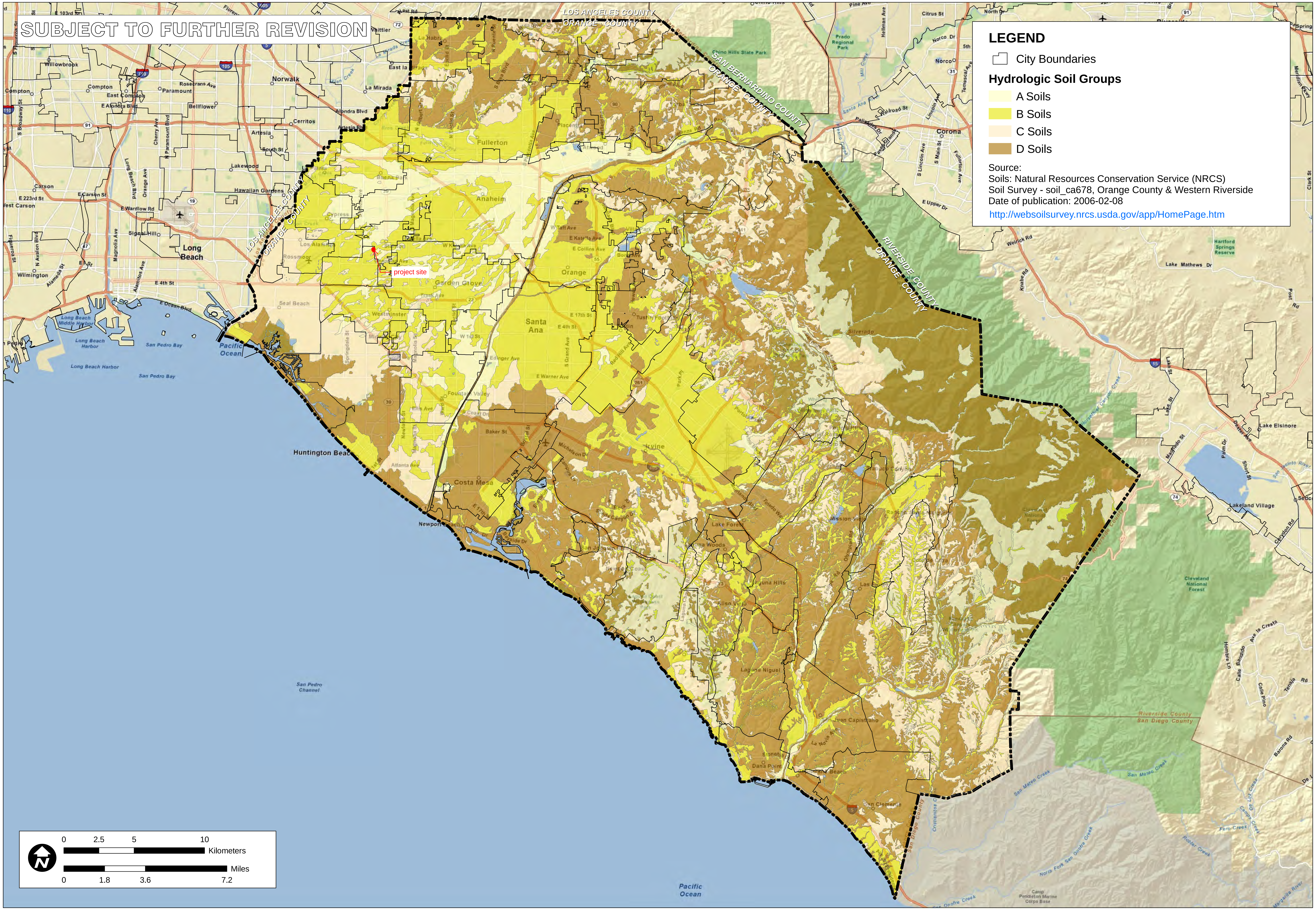

NRCS HYDROLOGIC SOILS GROUPS

TITLE

ORANGE COUNTY INFILTRATION STUDY

JOB

ORANGE CO. CA

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

PACE Advanced Water Engineering

FIGURE

XVI-2a

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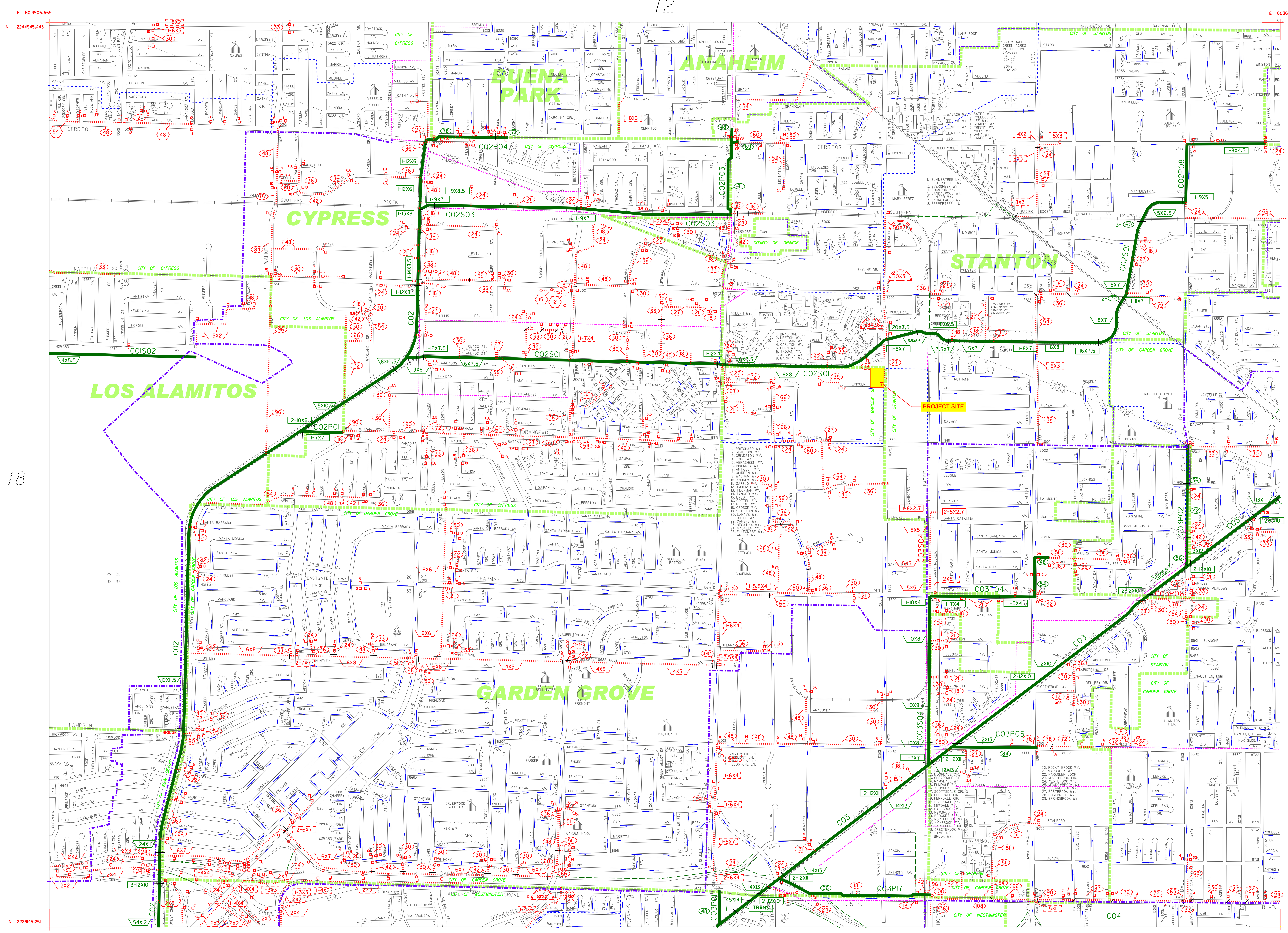
12



18

20

27

19

NOTICE

The drainage information has been prepared for information purposes only. The location, ownership, facility information and limits have been determined from available information provided by public agencies, but may not be exact, accurate, or up-to-date. The user of this information is responsible for verifying exact location, ownership, accuracy, and the regional versus local character of drainage facilities.

Additional information may be obtained from public plans and recorded deeds. Facility designations included with this information are for convenience only and are not controlling or intended to imply ownership by the County or the Orange County Flood Control District (OCFCD). The information is being provided as a courtesy and neither the County of Orange nor OCFCD assume any liabilities for inaccuracy of the information.

To notify OC Public Works Flood Control Section of additions or corrections, please contact Sal Gutierrez at (714) 647-3992 or by email at sal.gutierrez@ocpw.ocgov.com

N

0 200 400 600 800
FEET

ORANGE COUNTY FLOOD CONTROL DISTRICT

BASE MAP
OF DRAINAGE FACILITIES
IN ORANGE COUNTY

REVISION	DATE	SHEET NO.	DWG. NO.
S. GUTIERREZ	JAN 23,2012	19	MAPS-113-3

- Channel Drainage Area Boundary
- Major Sub-Area Drainage Boundary
- Minor Sub-Area Drainage Boundary
- Existing O.C.F.C.D. Facility
- Existing Local Facility
- Existing Retarding Basin or Reservoir
- Natural Watercourse
- City Limits
- G G — Greenbelt
- P.S. P.S. — Pump Station
- Catch Basin (length in feet)
- Drop Inlet or Other Entry
- OCFCD Basins or Reservoirs

Ownership (If other than City or County): Private = P State = S Federal = F

EXISTING FACILITIES

O.C.F.C.D. / LOCAL

- Earth Trapezoidal Channel (base width by height in feet)
- Reinforced Concrete Trapezoidal Channel (base width by height in feet)
- Reinforced Concrete Rectangular Channel (base width by height in feet)
- Reinforced Concrete Box (RCB) (number of barrels-span by height in feet)
- Reinforced Concrete Pipe (RCP) (diameter in inches)
- Metal Sheet Channel (MSC) (Base width by pile height in feet/Sheet pile total length)
- Corrugated Metal Pipe (CMP) (diameter in inches)
- Concrete Pipe (diameter in inches)
- Concrete Oval Pipe (width by height in inches)
- Steel Pipe (diameter in inches)
- Reinforced Concrete Arch (base span by height in inches)
- Corrugated Metal Arch (base span by height in inches)

19

SUBJECT TO FURTHER REVISION

LEGEND

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

Rainfall Zones

Design Capture Storm Depth (inches)

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

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

0.65 0.7 0.75 0.8 0.85 0.9 0.95 1 1.05 1.1

project site

LOS ANGELES COUNTY
ORANGE COUNTY
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
San Diego County

0 3 6 12 Kilometers
0 1.8 3.6 7.2 Miles

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TITLE: RAINFALL ZONES

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

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

PACE Advanced Water Engineering

FIGURE XVI-1

Susceptibility

Potential Areas of Erosion, Habitat, & Physical Structure Susceptibility

Channel Type

Earth (Unstable)

Earth (Stabilized)

Stabilized

Tidel Influence

<= Mean High Water Line (4.28')

Water Body

Basin

Lake

Federal & Other Lands

Seal Beach National Wildlife Refuge

Airports/Military

San Gabriel-Coyote Creek

project site

Los Alamitos Naval Air Station

Seal Beach Naval Weapons Station

Seal Beach National Wildlife Refuge

West Street Retarding Basin

Haster Retarding Basin

Newland Retarding Basin

Lake Huntington

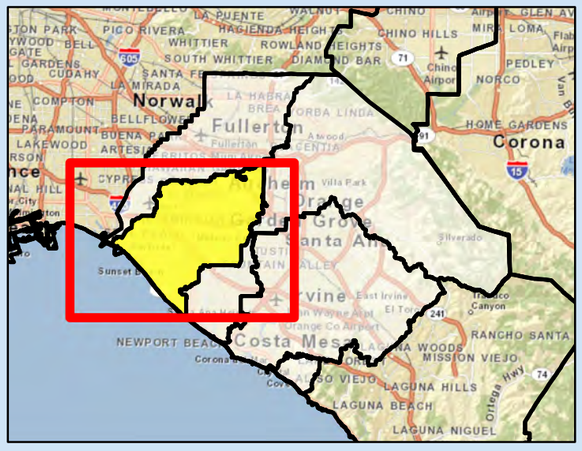
Santa Ana River

Newport Bay

John Wayne Airport

Pacific Ocean

0 6,500 13,000 Feet



TITLE: SUSCEPTIBILITY ANALYIS ANAHEIM BAY- HUNTINGTON HARBOR

ORANGE COUNTY WATERSHED MASTER PLANNING

JOB: ORANGE CO.

SCALE	1" = 6500'
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	04/22/10
JOB NO.	9526-E

CA

PACE Advanced Water Engineering

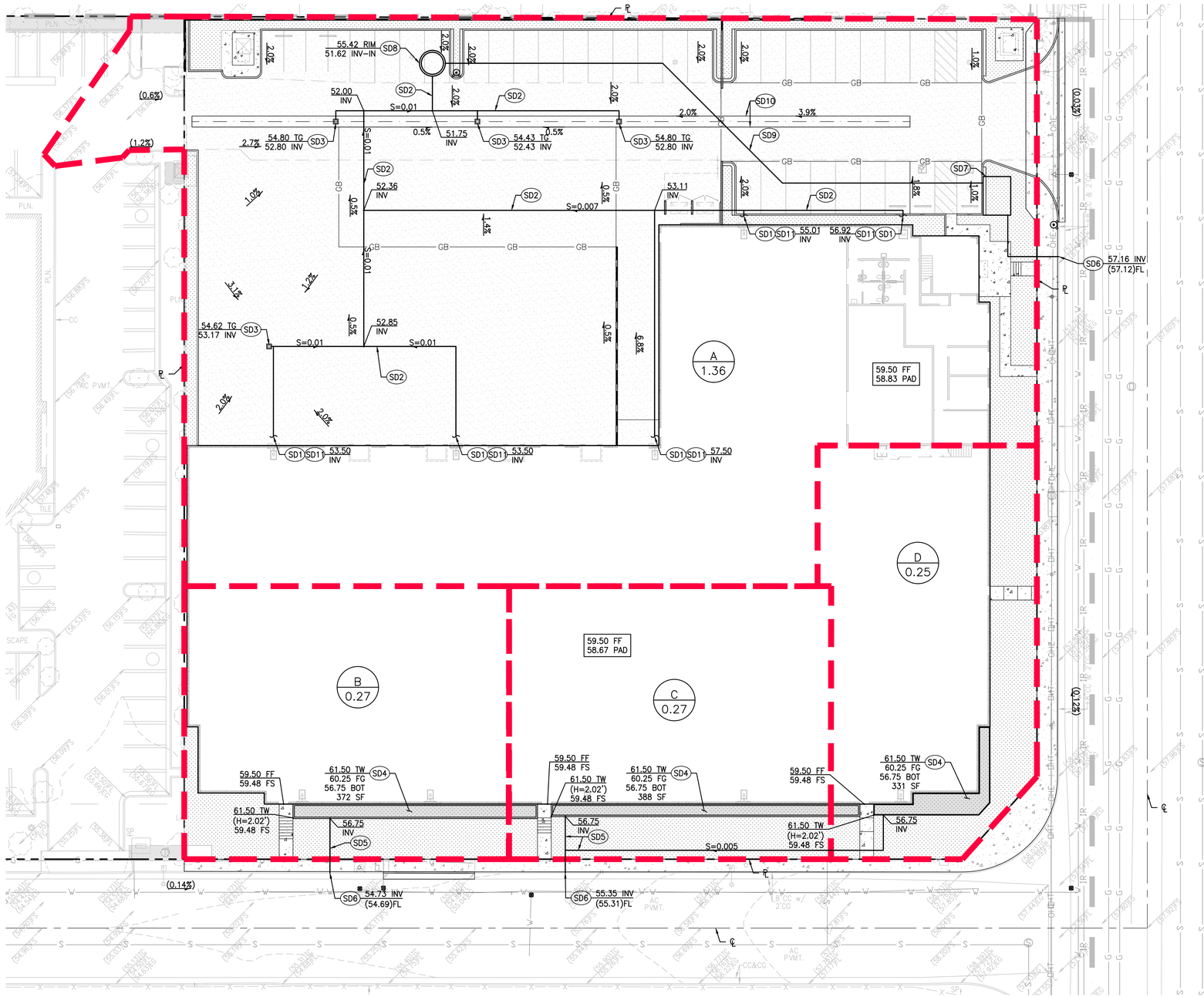
FIGURE 2

P:\9526E\6-GIS\Mxds\Workspace\SusceptibleAnalysis_20100422\9526E_AnaheimBay_20100331.mxd

Attachment C

WQMP Exhibits

2239 State Ave, #B
Costa Mesa, California 92627
(818) 800 6991
Kyle@pacificconsultinginc.com



LEGEND

- LANDSCAPE AREA BY OTHERS
- VEHICULAR CONCRETE PAVING
- PEDESTRIAN CONCRETE PAVING
- RETAINING WALL
- PROPERTY LINE
- GRADE BREAK
- RIDGE LINE
- FLOW LINE
- CATCH BASIN
- AREA DRAIN
- SUB-HYDROLOGY AREA BOUNDARIES
- SUB AREA ID (X / X.XX)
- SUB-HYDROLOGY AREA IN ACRES
- BIORETENTION WITH UNDERDRAIN/ PLANTERBOX

STORM WATER QUALITY SUMMARY			
SUB-HYDROLOGY AREA	TRIBUTARY AREA (AC)	PROPOSED BMP	COORDINATES
A*	1.40*	BMP1	(33.798900, -118.001802)
B	0.27	BMP2	(33.798405, -118.002833)
C	0.27	BMP3	(33.798427, -118.002296)
D	0.25	BMP4	(33.798427, -118.001851)
TOTAL	2.15		

* DMA A WILL RECIEVE RUN-ON FROM THE ADJACENT PROPERTY. THE ADDITIONAL AREA CONSIDERED IN THE DESIGN IS 1,709 SF/ .04 ACRES.

EXISTING CONDITIONS	
AREA	QUANTITIES
TOTAL SITE AREA (S.F.)	93,841
IMPERVIOUS AREA (S.F.)	77,498
PERVIOUS AREA (S.F.)	16,343
PERCENT IMPERVIOUS	17%

CONSTRUCTION NOTES

STORM DRAIN

- (SD1) POINT OF CONNECTION FROM PROPOSED ROOF DRAINAGE.
- (SD2) INSTALL PVC STORM DRAIN PIPE.
- (SD3) INSTALL PRECAST CONCRETE CATCH BASIN WITH FLOGAURD FILTER PER DETAIL 4, SHEET C310.
- (SD4) INSTALL BIORETNETION WITH UNDERDRAIN/ PLANTERBOX. SEE DETAIL 1, SHEET C310.
- (SD5) INSTALL PVC OVERFLOW PIPE.
- (SD6) INSTALL CURB DRAIN PER CITY OF GARDEN GROVE STANDARD PLAN B-209.
- (SD7) INSTALL PROPRIETARY BIOTREATMENT BMP. SEE DETAIL 3, SHEET C310.
- (SD8) INSTALL STORMWATER SUMP PUMP.
- (SD9) INSTALL PVC STORMWATER PUMP PIPING.
- (SD10) INSTALL RIBBON GUTTER PER DETAIL 2, SHEET C310.
- (SD11) ROOF DRAIN TO CONNECT DIRECTLY TO UNDERGROUND CONVEYANCE PIPING BELOW GRADE.

BMP NOTES

1. ANY CHANGES (TYPE, SIZE, LOCATION) TO APPROVED STORMWATER BEST MANAGEMENT PRACTICE(s) (BMPs) MUST OBTAIN WRITTEN APPROVAL FROM CITY OF GARDEN GROVE DEPARTMENT OF PUBLIC WORKS, BUREAU OF SANITATION PRIOR TO CONSTRUCTION OF BMP(s).
2. ALL DOWNSPOUTS TO DRAIN TO PROPOSED BMPS.
3. SEE SHEET C301 FOR PERMAVOID SUMMARY AND CALCULATION.

WQMP SUMMARY					
DRAINAGE MANAGEMENT AREA	A	B	C	D	TOTAL
TOTAL DEVELOPMENT AREA (S.F.)					93,481
DISTURBED PROJECT AREA (S.F.)	59,253	11,646	11,546	11,036	93,481
PROPOSED IMPERVIOUS AREA (S.F.)	54,713	9,114	9,312	7,715	80,854
PROPOSED IMPERVIOUS PERCENTAGE	92%	78%	81%	70%	86%
PROPOSED BUILDINGS (S.F.)	21,055	9,014	9,212	7,530	46,811
PROPOSED PAVING/HARDSCAPE (S.F.)	33,658	100	100	185	34,043
PROPOSED PERVIOUS AREA (S.F.)	4,540	2,532	2,234	3,321	12,627
DCV (C.F.)	3,446	576	594	490	4,964
REQUIRED PLANTER BOX AREA (S.F.)	N/A	354	365	302	1,021
PLANTER BOX AREA PROVIDED (S.F.)	N/A	372	388	331	1,091
Q_{DESIGN} (CFS)	0.29*	N/A	N/A	N/A	N/A

* DMA A WILL RECIEVE RUN-ON FROM THE ADJACENT PROPERTY. THE ADDITIONAL AREA CONSIDERED IN THE DESIGN IS 1,709 SF/ .04 ACRES.

N

0 10' 20'
SCALE: 1"=20'

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

REGISTERED PROFESSIONAL ENGINEER
KYLE JARDINE PRUITT
C 95048
EXP. 09/30/25
CIVIL
STATE OF CALIFORNIA
SIGN DATE 01/30/2025

ENGINEER'S NOTICE TO CONTRACTOR

THE CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIBAILITY, REALL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

DESIGNED BY:	DRAWN BY:	CHECKED BY:
KP	KP	

APPROVED BY:

DATE R.C.E. NO.

REFERENCE PLANS FOR THESE IMPROVEMENTS

DATE	BY	DESCRIPTION REVISIONS	APP'D

NOT FOR CONSTRUCTION

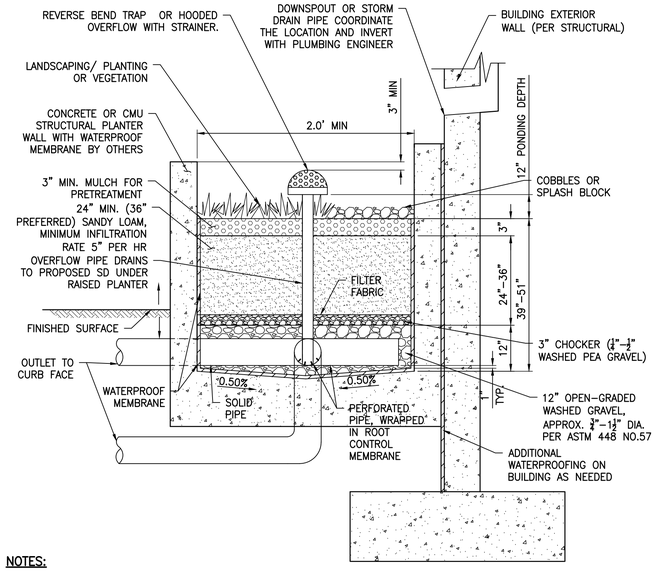
CITY OF GARDEN GROVE
LINCOLN INDUSTRIAL
7441 LINCOLN WAY

DATE 1/30/2025

DRAINAGE PLAN

DRAWING NUMBER
C300

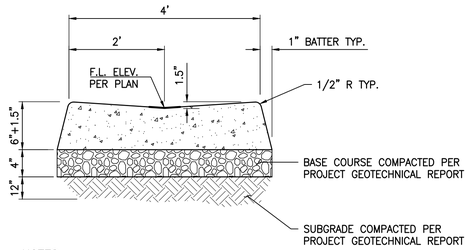
SHEET 7 OF 9



NOTES:

1. PLANT MATERIALS SHOULD BE TOLERANT OF SUMMER DROUGHT, PONDING FLUCTUATIONS, AND SATURATED SOIL CONDITIONS FOR 48 HOURS; NATIVE PLACE SPECIES AND/OR HARDY CULTIVARS THAT ARE NOT INVASIVE AND DO NOT REQUIRE CHEMICAL INPUTS SHOULD BE USED TO THE MAXIMUM EXTENT FEASIBLE. VEGETATION SHALL BE MAINTAINED TO ENSURE PLANTING DOES NOT DIE OUT AND VEGETATION WILL REMAIN HEALTHY FOR THE PROPER USE OF THE BMP.

1 BIORETENTION WITH UNDERDRAIN/ PLANTERBOX TYPICAL DETAIL
C310 — N.T.S.



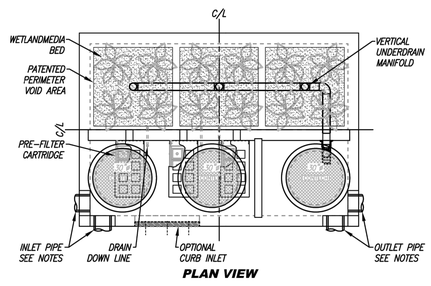
NOTES:

1. ISOLATION JOINTS SHALL BE PLACED ONLY AS SPECIFIED.
2. CONTROL JOINTS CONSISTING OF 1" DEEP SCORES SHALL BE PLACED AT 10' INTERVALS O.C.

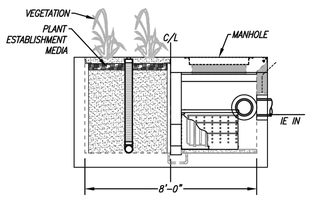
2 RIBBON GUTTER TYPICAL DETAIL
C310 — N.T.S.

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.29 CFS
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			5.7 (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

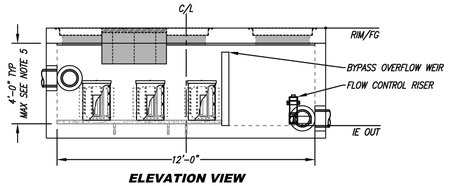
* PRELIMINARY ONLY - NOT FOR CONSTRUCTION



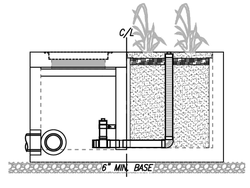
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
4. CONTRACTOR RESPONSIBLE FOR CONTACTING CONTECH FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH REPRESENTATIVE.
5. VERTICAL HEIGHT VARIES BASED ON SITE SPECIFIC REQUIREMENTS.

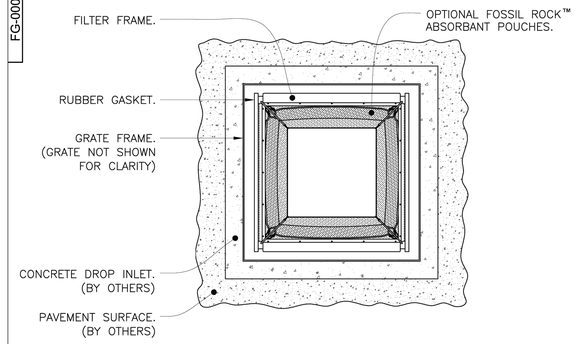
3 MODULAR WETLAND TYPICAL DETAIL
C310 — N.T.S.

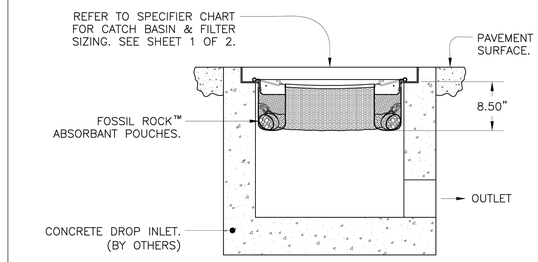
MODULAR WETLANDS — FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH ENGINEERED SOLUTIONS LLC — www.ContechES.com

MWS-L-8-12-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

FG-0001

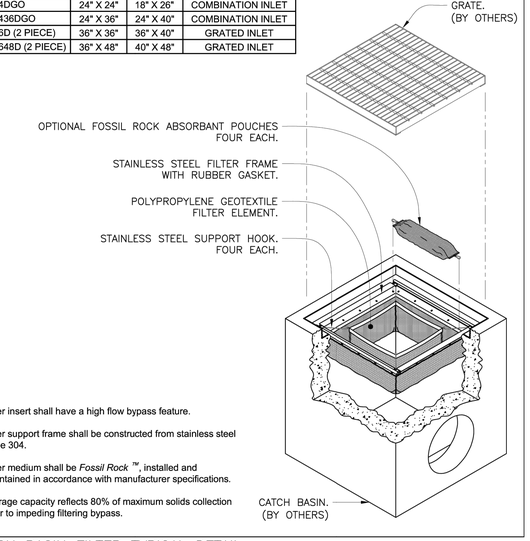




SECTION VIEW

FG-0001

SPECIFIER CHART			
MODEL	INLET ID	GRATE OD	COMMENTS
FF-12D	12" X 12"	15" X 15"	GRATED INLET
FF-16D	16" X 16"	18" X 18"	GRATED INLET
FF-18D	18" X 18"	20" X 20"	GRATED INLET
FF-1836SD	18" X 36"	18" X 40"	GRATED INLET
FF-1836DGO	18" X 36"	18" X 40"	COMBINATION INLET
FF-24D	24" X 24"	26" X 26"	GRATED INLET
FF-2436SD	24" X 36"	24" X 40"	GRATED INLET
FF-24DGO	24" X 24"	18" X 26"	COMBINATION INLET
FF-2436DGO	24" X 36"	24" X 40"	COMBINATION INLET
FF-36D (2 PIECE)	36" X 36"	36" X 40"	GRATED INLET
FF-3648D (2 PIECE)	36" X 48"	40" X 48"	GRATED INLET



NOTES:

1. Filter insert shall have a high flow bypass feature.
2. Filter support frame shall be constructed from stainless steel Type 304.
3. Filter medium shall be *Fossil Rock ™*, installed and maintained in accordance with manufacturer specifications.
4. Storage capacity reflects 80% of maximum solids collection prior to impeding filtering bypass.

4 CATCH BASIN FILTER TYPICAL DETAIL
C310 — N.T.S.

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

REGISTERED PROFESSIONAL ENGINEER — KYLE JARDINE PROUTY — C 95048 — EXP. 09/30/25 — CIVIL — STATE OF CALIFORNIA

SIGN DATE 01/30/2025

DESIGNED BY:	DRAWN BY:	CHECKED BY:
KP	KP	

APPROVED BY:

DATE R.C.E. NO.

REFERENCE PLANS FOR THESE IMPROVEMENTS

DATE	BY	DESCRIPTION	APP'D
		REVISIONS	

NOT FOR CONSTRUCTION

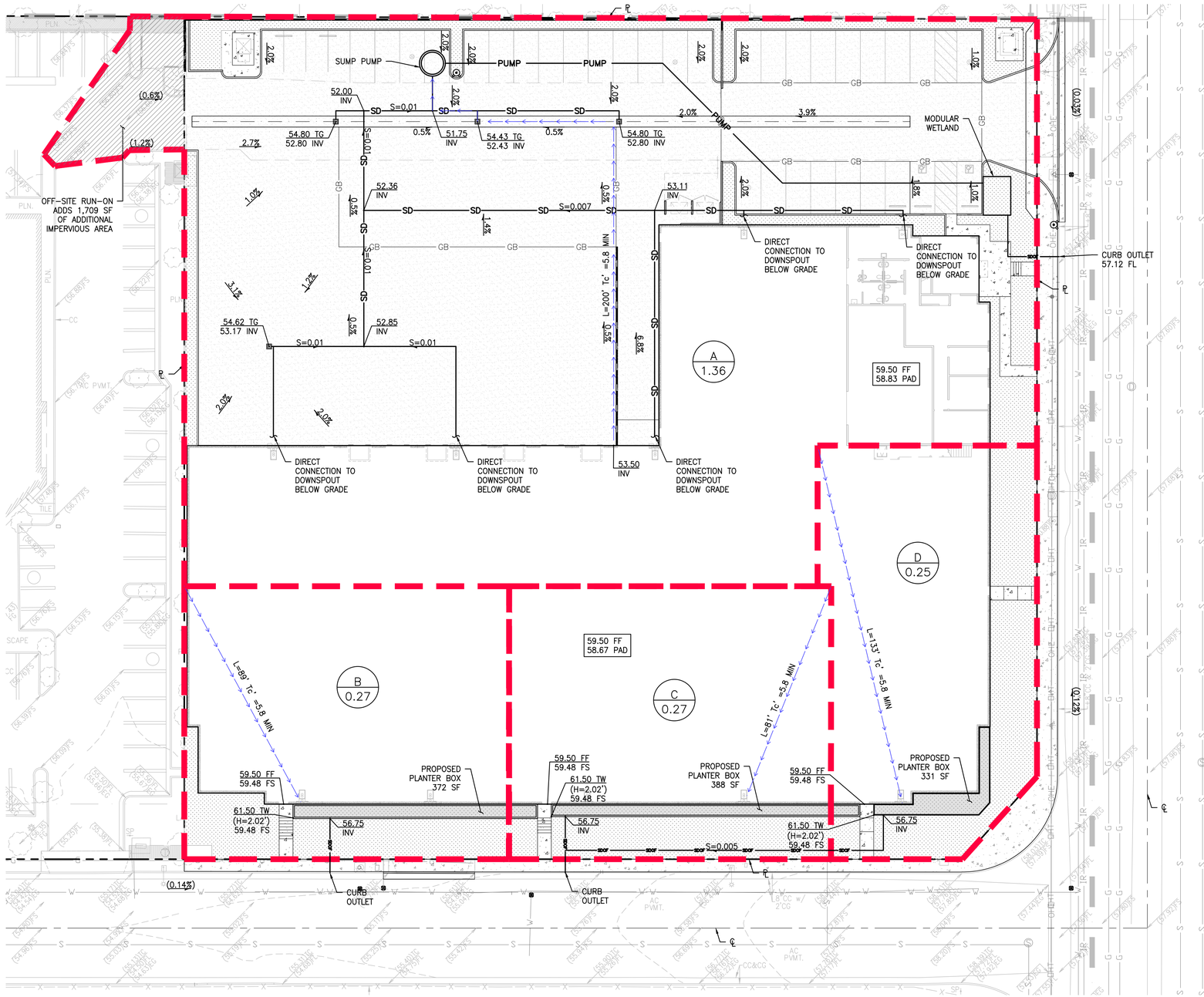
CITY OF GARDEN GROVE
LINCOLN INDUSTRIAL
7441 LINCOLN WAY

DATE 1/30/2025

DRAINAGE DETAILS

DRAWING NUMBER
C310

SHEET 8 OF 9



LEGEND

- LANDSCAPE AREA BY OTHERS
- VEHICULAR CONCRETE PAVING
- PEDESTRIAN CONCRETE PAVING
- RETAINING WALL
- PROPERTY LINE
- GRADE BREAK
- RIDGE LINE
- FLOW PATH
- CATCH BASIN
- AREA DRAIN
- SUB-HYDROLOGY AREA BOUNDARIES
- SUB AREA ID
- SUB-HYDROLOGY AREA IN ACRES
- BIORETENTION WITH UNDERDRAIN/ PLANTERBOX
- STORM DRAIN CONVEYANCE PIPING
- PUMP PIPING
- STORM DRAIN OVERFLOW PIPING

STORM WATER QUALITY SUMMARY			
SUB-HYDROLOGY AREA	TRIBUTARY AREA (AC)	PROPOSED BMP	COORDINATES
A*	1.40*	BMP1	(33.798900, -118.001802)
B	0.27	BMP2	(33.798405, -118.002833)
C	0.27	BMP3	(33.798427, -118.002296)
D	0.25	BMP4	(33.798427, -118.001851)
TOTAL	2.15		

* DMA A WILL RECIEVE RUN-ON FROM THE ADJACENT PROPERTY. THE ADDITIONAL AREA CONSIDERED IN THE DESIGN IS 1,709 SF/ .04 ACRES.

EXISTING CONDITIONS	
AREA	QUANTITIES
TOTAL SITE AREA (S.F.)	93,841
IMPERVIOUS AREA (S.F.)	77,498
PERVIOUS AREA (S.F.)	16,343
PERCENT IMPERVIOUS	17%

WQMP SUMMARY					
DRAINAGE MANAGEMENT AREA	A	B	C	D	TOTAL
TOTAL DEVELOPMENT AREA (S.F.)					93,481
DISTURBED PROJECT AREA (S.F.)	59,253	11,646	11,546	11,036	93,481
PROPOSED IMPERVIOUS AREA (S.F.)	54,713	9,114	9,312	7,715	80,854
PROPOSED IMPERVIOUS PERCENTAGE	92%	78%	81%	70%	86%
PROPOSED BUILDINGS (S.F.)	21,055	9,014	9,212	7,530	46,811
PROPOSED PAVING/HARDSCAPE (S.F.)	33,658	100	100	185	34,043
PROPOSED PERVIOUS AREA (S.F.)	4,540	2,532	2,234	3,321	12,627
DCV (C.F.)	3,318	576	594	490	4,964
REQUIRED PLANTER BOX AREA (S.F.)	N/A	354	365	302	1,021
PLANTER BOX AREA PROVIDED (S.F.)	N/A	372	388	331	1,091
Q_{DESIGN} (CFS)	0.27*	N/A	N/A	N/A	N/A

* DMA A WILL RECIEVE RUN-ON FROM THE ADJACENT PROPERTY. THE ADDITIONAL AREA CONSIDERED IN THE DESIGN IS 1,709 SF/ .04 ACRES.

BMP NOTES

1. ANY CHANGES (TYPE, SIZE, LOCATION) TO APPROVED STORMWATER BEST MANAGEMENT PRACTICE(s) (BMPs) MUST OBTAIN WRITTEN APPROVAL FROM CITY OF GARDEN GROVE DEPARTMENT OF PUBLIC WORKS, BUREAU OF SANITATION PRIOR TO CONSTRUCTION OF BMP(s).
2. ALL DOWNSPOUTS TO DRAIN TO PROPOSED BMPS.
3. SEE SHEET C301 FOR PERMAVOID SUMMARY AND CALCULATION.

N

0 10' 20'
SCALE: 1"=20'

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

REGISTERED PROFESSIONAL ENGINEER KYLE JARDINE PRIDDY C 95048 EXP. 09/30/25 CIVIL STATE OF CALIFORNIA
SIGN DATE 01/30/2025

ENGINEER'S NOTICE TO CONTRACTOR

THE CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIBAILITY, REALL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

DESIGNED BY: KP | DRAWN BY: KP | CHECKED BY:
APPROVED BY:
DATE R.C.E. NO.

REFERENCE PLANS FOR THESE IMPROVEMENTS

DATE	BY	DESCRIPTION REVISIONS	APP'D

CITY TRAFFIC ENGR. #2167
STREET DIVISIONS MGR.
WATER SERVICES MGR.

APPROVED BY : DATE :
CITY ENGINEER R.C.E. No. 52125 DIRECTOR OF PUBLIC WORKS
THIS PLAN IS SIGNED BY THE PUBLIC WORKS DEPARTMENT FOR CONCEPT AND ADHERENCE TO CITY STANDARDS AND REQUIREMENTS ONLY. THE PUBLIC WORKS DEPARTMENT IS NOT RESPONSIBLE FOR DESIGN, DESIGN ASSUMPTIONS OR ACCURACY.

CITY OF GARDEN GROVE
LINCOLN INDUSTRIAL
7441 LINCOLN WAY

DATE 10/31/2024
PROPOSED HYDROLOGY
DRAWING NUMBER
C300
SHEET 7 OF 9

Attachment D

Geotechnical Report

2239 State Ave, #B
Costa Mesa, California 92627
(818) 800 6991
Kyle@pacificconsultinginc.com

Geotechnical Engineering Investigation
Proposed Industrial Warehouse Development
7321 to 7441 Lincoln Way
Garden Grove, California

JYL Logistics LLC
4 Park Plaza, Suite 830
Irvine, California 92614

Project Number 24727-24
July 26, 2024

NorCal Engineering

TABLE OF CONTENTS

NorCal Engineering

Soils and Geotechnical Consultants
10641 Humbolt Street Los Alamitos, CA 90720
(562) 799-9469

July 26, 2024 Project Number 24727-24

JYL Logistics LLC
4 Park Plaza, Suite 830
Irvine, California 92614

RE: **Geotechnical Engineering Investigation** - Proposed Industrial Warehouse Development - Located at 7321 to 7441 Lincoln Way, in the City of Garden Grove, California

Dear Sir/Madam:

Pursuant to your request, this firm has performed a Geotechnical Engineering Investigation for the above referenced project in accordance with your approval of our proposal dated May 31, 2024. The purpose of this investigation is to evaluate the geotechnical conditions of the subject site and to provide recommendations for the proposed office warehouse development. The scope of work included the following: 1) site reconnaissance; 2) subsurface geotechnical exploration and sampling; 3) laboratory testing; 4) soil infiltration testing; 5) engineering analysis of field and laboratory data; and 6) preparation of a geotechnical engineering report.

1.0 Project Description

It is proposed to construct an industrial warehouse development on the 7.3-acre subject parcel. The concrete tilt-up structure(s) will be supported by a conventional slab-on-grade foundation system with perimeter-spread footings and isolated interior footings. Other improvements will include asphalt and concrete pavement areas, hardscape and landscaping. It is assumed that the proposed grading for the development will consist of minor cut and fill procedures on the order of a few feet to achieve finished grade elevations. Final building plans shall be reviewed by this firm prior to submittal for city approval to determine the need for any additional study and revised recommendations pertinent to the proposed development, if necessary.

2.0 Site Description

The subject property is located within the 7300 and 7400 block and north side of Lincoln Way, bordered by Western Avenue to the east, in the City of Garden Grove. The generally rectangular-shaped parcel is elongated in an east to west direction with topography of the relatively level property descending from gradually from north to south direction on the order of a few feet. The parcel is occupied by three (3) industrial warehouse buildings with surrounding asphalt and concrete pavement.

3.0 Site Exploration

The investigation consisted of the placement of one (1) electronic cone penetrometer (CPT) to a depth of 50 feet and seven (7) subsurface exploratory borings by a truck mounted drill rig with eight-inch outside diameter hollow-stem, continuous flight augers to depths ranging between 5 and 50 feet below current ground elevations. The CPT consists of advancing a cone-tipped cylindrical probe into the ground while simultaneously measuring the resulting resistance to penetration. An on-field computer generated CPT log measures the penetration resistance values and inferred soil description. The boring and trench explorations were visually classified and logged by a field engineer with locations of the subsurface explorations shown on the attached Site Plan.

The field explorations revealed the existing earth materials to consist of fill and alluvium soils. Detailed descriptions of the subsurface conditions are listed on the boring logs in Appendix A. It should be noted that the transition from one soil type to another as shown on the boring logs is approximate and may in fact be a gradual transition. The soils encountered are described as follows:

Fill: A fill soil classifying as a brown, fine to medium grained, silty SAND and clayey SILT were encountered to depths ranging from 1 to 2 feet below ground surface. These soils were noted to be loose to medium dense/medium stiff and damp to moist.

Alluvium: A natural undisturbed soil classifying as a brown fine to medium grained, silty SAND to a sandy and clayey SILT was encountered beneath the fill soils. These soils were observed to be medium dense to medium stiff and moist to wet. Deeper soils consisted of medium dense SAND to firm silty CLAY and dense silty SAND.

The overall engineering characteristics of the earth material were relatively uniform with each excavation. Groundwater was encountered at a depth of 9 and 9.5 feet below existing ground surface and some caving occurred in the deeper cohesionless soils below groundwater.

4.0 Laboratory Tests

Relatively undisturbed samples of the subsurface soils were obtained to perform laboratory testing and analysis for direct shear, consolidation tests, and to determine in-place moisture/densities. These relatively undisturbed ring samples were obtained by driving a thin-walled steel sampler lined with one-inch long brass rings with an inside diameter of 2.42 inches into the undisturbed soils. Bulk bag samples were obtained in the upper soils for expansion index tests and maximum density tests.

Standard penetration tests were obtained by driving a steel sampler unlined with an inside diameter of 1.5 inches into the soils. This standard penetrometer sampler was driven a total of eighteen inches with blow counts tallied every six inches. Blow count data is given on the Boring Logs in Appendix A. All test results are included in Appendix B, unless otherwise noted.

4.1 **Field Moisture Content** (ASTM: D 2216) and the dry density of the ring samples were determined in the laboratory. This data is listed on the logs of explorations.

4.2 **Sieve analyses** (ASTM: D 422-63) and the percent by weight of soil finer than the No. 200 sieve (ASTM: 1140) were performed on selected soil samples. These results are shown later within the body of this report.

4.3 **Maximum Density tests** (ASTM: D 1557) were performed on typical samples of the upper soils. Results of these tests are shown on Table I.

4.4 **Expansion Index tests** (ASTM: D 4829) were performed on remolded samples of the upper soils to determine expansive characteristics. Results of these tests are provided on Table II.

4.5 **Atterberg Limits** (ASTM: D 4318) consisting of liquid limit, plastic limit and plasticity index were performed on representative soil samples. Results are shown on Table III.

4.6 **Corrosion tests** consisting of sulfate, pH, resistivity and chloride analysis to determine potential corrosive effects of soils on concrete and underground utilities. Test results are provided on Table IV.

4.7 **R-Value test** per California Test Method 301 was performed on a representative sample, which may be anticipated to be near subgrade to determine pavement design. Results are provided within the pavement design section of the report.

4.8 **Direct Shear tests** (ASTM: D 3080) were performed on undisturbed and/or remolded samples of the subsurface soils. The test is performed under saturated conditions at loads of 1,000 lbs./sq.ft., 2,000 lbs./sq.ft., and 3,000 lbs./sq.ft. with results shown on Plate A.

4.9 **Consolidation tests** (ASTM: D 2435) were performed on undisturbed samples to determine the differential and total settlement which may be anticipated based upon the proposed loads. Water was added to the samples at a surcharge of one KSF and the settlement curves are plotted on Plates B to E.

5.0 Seismicity Evaluation

The proposed development lies outside of any Alquist Priolo Special Studies Zone and the potential for damage due to direct fault rupture is considered unlikely. The nearest fault is located about 9 kilometers from the site and is capable of producing a Magnitude 6.9 earthquake. Ground shaking originating from earthquakes along other active faults in the region is expected to induce lower horizontal accelerations due to smaller anticipated earthquakes and/or greater distances to other faults. The seismic design acceleration parameters for the project site are provided on the following based on the ASCE/SEI 7-16 American Society of Civil Engineers (ASCE) website, https://asce7hazardtool.online/ and is attached in Appendix C.

Seismic Design Acceleration Parameters

Latitude	33.799
Longitude	-118.005
Site Class	D
Risk Category	II
Mapped Spectral Response Acceleration	S_S = 1.427 S_1 = 0.505
Adjusted Maximum Acceleration	S_{MS} = 1.427
Design Spectral Response Acceleration Parameters	S_{DS} = 0.951
Peak Ground Acceleration	PGA_M = 0.671

Use of these values is dependent on the latest requirements of the Section 11-4.8, ASCE 7 exception 2 that requires the value of the seismic response coefficient C_s be determined by Equation 12.8.2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either 12.8-3 for $T_L \geq T \geq 1.5T_s$ or Equation 12.8-4 for $T > T_L$. Computations and verification of these conditions is referred to the structural engineer.

6.0 Liquefaction Evaluation

The site is expected to experience ground shaking and earthquake activity that is typical of Southern California area. It is during severe ground shaking that loose, granular soils below the groundwater table can liquefy. A review of the exploratory boring log and the laboratory test results on selected soil samples obtained indicate the following soil classifications, field blowcounts and amounts of fines passing through the No. 200 sieve.

Field Blowcount and Gradation Data

Boring No.	Classification	Blowcounts (blows/ft)	Relative Density	% Passing No. 200 Sieve
B-3 @ 5'	SM	8	Dense	41
B-3 @ 10'	SW	14	Dense	10
B-3 @ 15'	CL	8	Medium Stiff	78
B-3 @ 20'	CL	7	Medium Stiff	80
B-3 @ 25'	ML	16	Medium Stiff	53
B-3 @ 30'	SW	30	Very Dense	10
B-3 @ 35'	SW/SM	37	Very Dense	15
B-3 @ 40'	SW	43	Very Dense	11
B-3 @ 45'	SM	49	Very Dense	30
B-3 @ 50'	SM	56	Very Dense	19

Based upon information in the California Division of Mines and Geology "Seismic Hazard Zone Map – Los Alamitos Quadrangle", dated March 25, 1999, the subject site is situated in an area of historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions to indicate a potential for permanent ground displacement. Our liquefaction evaluation utilized the nearest mode of predominate Magnitude 6.9 Mw earthquake. Review of the *California Department of Conservation – Division of Mines and Geology Open File Report 97-03, Plate 1.2,* indicates a *historic* high groundwater level less than 10 feet below ground surface.

The results of our analysis indicates the liquefaction potential at this site to be high based upon the historic groundwater depth and a Peak Ground Acceleration (PGA_M) of 0.67g. The associated seismic-induced settlements would be on the order of 3 inches and would occur rather uniformly across the site. Differential settlements would be on the order of 2 inches over a 50-foot (horizontal) distance.

It is recommended that a stiffened foundation system be utilized for the proposed structure to mitigate for the seismic-induced settlements. The stiffened system shall consist of either a post-tensioned slab design, mat foundation or a system of grade beams connecting the foundations in two directions throughout the new structure. Our seismic settlement calculations are included in Appendix C.

7.0 Infiltration Characteristics

Infiltration tests were performed in accordance with the Orange County Technical Guidance Document (OCTGD) Appendix VII – Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations dated December 20, 2013.

A truck mounted Simco 2800 Drill Rig equipped with a hollow stem auger was used to excavate the exploratory borings to depths of 5 below existing ground surface. The borings consisted of six-inch diameter test holes. A three-inch diameter perforated PVC casing with solid end cap was installed in the borings and then surrounded with gravel materials to prevent caving. The infiltration holes were carefully filled with clean water and refilled after two initial readings.

Based upon the initial rates of infiltration at each location, test measurements were measured at selected maximum intervals thereafter. Measurements were obtained by using an electronic tape measure with 1/16-inch divisions and timed with a stopwatch.

The subsurface soils exhibit the following field infiltration rates which do not include a factor of safety. The drainage disposal system shall also incorporate the safety factor required by the county standard. Calculations are based using the Porchet Method (aka Inverse Borehole Method) and are provided in Appendix D.

Boring/Test No.	Depth	Soil Classification	Field Infiltration Rate
B-1/TH-1	5'	Sandy SILT	0.07 in/hr
B-2/TH-2	3'	Sandy SILT	0.07 in/hr

Based upon our test results and the presence of shallow groundwater at a depth of 9 feet below ground surface, the infiltration of stormwater into the subsurface soils is deemed not feasible. In addition, the site was also calculated with moderate liquefaction potential. It is recommended that an alternate means of storing and disposing of stormwater be evaluated by the project civil engineer. All systems must meet the latest city and/or county specifications and the California Regional Water Quality Control Board (CRWQCB) requirements.

8.0 Conclusions and Recommendations

Based upon our evaluations, the proposed development is acceptable from a geotechnical engineering standpoint. By following the recommendations and guidelines set forth in our report, the structures will be safe from excessive settlements under the anticipated design loadings and conditions. The proposed development shall meet all requirements of the City Building Ordinance and will not impose any adverse effect on existing adjacent structures.

The following recommendations are based upon soil conditions encountered in our field investigation; these near-surface soil conditions could vary across the site. Variations in the soil conditions may not become evident until the commencement of grading operations for the proposed development and revised recommendations from the soils engineer may be necessary based upon the conditions encountered.

It is recommended that site inspections be performed by a representative of this firm during all grading and construction of the development to verify the findings and recommendations documented in this report. Any unusual conditions which may be encountered in the course of the project development may require the need for additional study and revised recommendations.

8.1 Site Grading Recommendations

Any vegetation and/or demolition debris shall be removed and hauled from proposed grading areas prior to the start of grading operations. Existing vegetation shall not be mixed or disced into the soils. Any removed soils may be reutilized as compacted fill once any deleterious material or oversized materials (in excess of eight inches) is removed. Grading operations shall be performed in accordance with the attached *Specifications for Placement of Compacted Fill.*

8.1.1 Removal and Recompaction Recommendations

All disturbed soils and/or fill (about 1 to 2 feet below ground surface) shall be removed to competent alluvium material, the exposed surface scarified to a depth of 12 inches, brought to within 2% of optimum moisture content and compacted to a minimum of 90% of the laboratory standard (ASTM: D-1557) prior to placement of any additional compacted fill soils, foundations, slabs-on-grade and pavement. Grading shall extend a minimum of five horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater.

Since the subsurface soils were noted to be excessive in moisture, soil stabilization may be required at the bottom of the building pad overexcavation. These soils may need the placement of an approved geofabric (Mirafi 600x or equivalent) and layer of approved gravel to stabilize the native soils prior to placement of engineered fill.

It is possible that isolated areas of undiscovered fill not described in this report are present on site; if found, these areas should be treated as discussed earlier. A diligent search shall also be conducted during grading operations in an effort to uncover any underground structures, irrigation or utility lines. If encountered, these structures and lines shall be either removed or properly abandoned prior to the proposed construction.

Any imported fill material should be preferably soil similar to the upper soils encountered at the subject site. All soils shall be approved by this firm prior to importing at the site and will be subjected to additional laboratory testing to assure concurrence with the recommendations stated in this report.

If placement of slabs-on-grade and pavement is not completed immediately upon completion of grading operations, additional testing and grading of the areas may be necessary prior to continuation of construction operations. Likewise, if adverse weather conditions occur which may damage the subgrade soils, additional assessment by the soils engineer as to the suitability of the supporting soils may be needed.

8.1.2 Fill Blanket Recommendations

Due to the potential for differential settlement of foundations placed on compacted fill and alluvium, it is recommended that foundations including floor slab areas be underlain by a uniform compacted fill blanket at least two feet in thickness. This fill blanket shall extend a minimum of five horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater.

8.2 Shrinkage and Subsidence

Results of our in-place density tests reveal that the soil shrinkage will be on the order of 15 to 20% due to excavation and recompaction, based upon the assumption that the fill is compacted to 92% of the maximum dry density per ASTM standards. Subsidence should be 0.2 feet die to earthwork operations. The volume change does not include any allowance for vegetation or organic stripping, removal of subsurface improvements, or topographic approximations. Although these values are only approximate, they represent our best estimate of lost yardage, which will likely occur during grading. If more accurate shrinkage and subsidence factors are needed, it is recommended that field testing the actual equipment and grading techniques should be conducted.

8.3 Temporary Excavations

Temporary unsurcharged excavations in the existing site materials may be made at vertical inclinations up to 4 feet in height unless cohesionless soils are encountered. In areas where soils with little or no binder are encountered, where adverse geological conditions are exposed, or where excavations are adjacent to existing structures, shoring or flatter excavations may be required. The temporary cut slope gradients given above do not preclude local raveling and sloughing. Additional recommendations regarding specific excavations may be provided once typical detail sections are made available.

All excavations shall be made in accordance with the requirements of the soils engineer, CAL-OSHA and other public agencies having jurisdiction. Care should be taken to provide or maintain adequate lateral support for all adjacent improvements and structures at all times during the grading operations and construction phase.

8.4 Foundation Design

All foundations may be designed utilizing the following allowable bearing capacities for an embedded depth of 24 inches into approved engineered fill with the corresponding widths:

Allowable Bearing Capacity (psf)		
Width (feet)	Continuous Foundation	Isolated Foundation
1.5	1500	2000
2.0	1575	2075
4.0	1875	2375
6.0	2000	2500

The bearing value may be increased by 500 psf for each additional foot of depth in excess of the 24-inch minimum depth, up to a maximum of 3,000 psf. A one-third increase may be used when considering short-term loading and seismic forces. Any foundations located along property line or where lateral overexcavation is not possible may utilize an allowable bearing capacity of 1,000 psf and embedded into competent native soils. All foundations shall be reinforced a minimum of two No. 4 bars, top and bottom. A representative of this firm shall inspect all foundation excavations prior to pouring concrete.

A stiffened foundation system should be utilized to support the proposed structure to mitigate for seismic induced settlements. The stiffened system shall consist of a post-tensioned slab design, mat foundation or a conventional slab with a system of grade beams connecting the foundations in two directions throughout the new structure.

In lieu of grade beams, an allowable bearing pressure of 1,500 psf may be used for the mat foundation with a minimum 24-inch footing embedment depth. The mat foundation slab shall be a minimum of 12 inches in thickness and placed on a blanket of engineered fill soils compacted to a minimum of 90% of the laboratory standard. A one-third increase may be used when considering short-term loading and seismic forces. A modulus of subgrade reaction (k) of 100 pci may be used for design of slabs placed on engineered fill soils supporting sustained concentrated loads.

8.5 Settlement Analysis

Resultant pressure curves for the consolidation tests are shown on Plates B and C. Computations utilizing these curves and the recommended allowable soil bearing capacities reveal that the foundations will experience settlements on the order of ¾ inch and differential settlements of less than ¼ inch.

8.6 Lateral Resistance

The following values may be utilized in resisting lateral loads imposed on the structure. Requirements of the California Building Code should be adhered to when the coefficient of friction and passive pressures are combined.

Coefficient of Friction - 0.35

Equivalent Passive Fluid Pressure = 200 lbs./cu.ft.

Maximum Passive Pressure = 2,000 lbs./cu.ft.

The passive pressure recommendations are valid only for approved compacted fill soils or competent native materials.

8.7 **Retaining Wall Design Parameters**

Active earth pressures against retaining walls will be equal to the pressures developed by the following fluid densities. These values are for **granular backfill material** placed behind the walls at various ground slopes above the walls.

Surface Slope of Retained Materials (Horizontal to Vertical	Equivalent Fluid Density (lb./cu.ft.)
Level	30
5 to 1	35
4 to 1	38
3 to 1	40
2 to 1	45

Any applicable short-term construction surcharges and seismic forces should be added to the above lateral pressure values. An equivalent fluid pressure of 45 pcf may be utilized for the restrained wall condition with a level grade behind the wall.

The seismic-induced lateral soil pressure for walls greater than 6 feet may be computed using a triangular pressure distribution with the maximum value at the top of the wall. The maximum lateral pressure of (20 pcf) H where H is the height of the retained soils above the wall footing should be used in final design of retaining walls. Sliding resistance values and passive fluid pressure values may be increased by 1/3 during short-term wind and seismic loading conditions.

All walls shall be waterproofed as needed and protected from hydrostatic pressure by a reliable permanent subdrain system. The subsurface drainage system shall consist of a four-inch diameter perforated PVC pipe encased with gravel and wrapped with filter fabric. The granular backfill to be utilized immediately adjacent to retaining walls shall consist of an approved select granular soil with a sand equivalency greater than 30. This backfill zone of free draining material shall consist of a wedge beginning a minimum of one horizontal foot from the base of the wall extending upward at an inclination of no less than ¾ to 1 (horizontal to vertical).

8.8 **Slab Design**

If a conventional floor slab with a system of grade beams is utilized, it is recommended that concrete slabs shall be a minimum of six inches in thickness in the proposed warehouse areas and four inches in office and hardscape both reinforced a minimum of No. 4 bars, sixteen inches in each direction and positioned in the center of slab and placed on approved subgrade soils. Additional reinforcement requirements and an increase in thickness of the slabs-on-grade may be necessary based upon proposed loading conditions in the structures and should be evaluated further by the project engineers and/or architect. All subgrade soils shall be moisture conditioned to 3% over optimum moisture content to a depth eighteen inches.

A vapor retarder (10-mil minimum thickness) should be utilized in areas which would be sensitive to the infiltration of moisture. This retarder shall meet requirements of ASTM E 96, *Water Vapor Transmission of Materials* and ASTM E 1745, *Standard Specification for Water Vapor Retarders used in Contact with Soil or Granular Fill Under Concrete Slabs.* The vapor retarder shall be installed in accordance with procedures stated in ASTM E 1643, *Standard practice for Installation of Water Vapor Retarders used in Contact with Earth or Granular Fill Under Concrete Slabs.*

The moisture retarder may be placed directly upon compacted subgrade soils conditioned to near optimum moisture levels, although one to two inches of sand beneath the membrane is desirable. The subgrade upon which the retarder is placed shall be smooth and free of rocks, gravel or other protrusions which may damage the retarder. Use of sand above the retarder is under the purview of the structural engineer; if sand is used over the retarder, it should be placed in a dry condition.

8.9 **Pavement Section Design**

The table below provides a preliminary pavement design based upon an R-Value of 27 for the subgrade soils for the proposed pavement areas. Final pavement design may need to be based on R-Value testing of the subgrade soils near the conclusion of site grading to assure that these soils are consistent with those assumed in this preliminary design.

The recommendations are based upon estimated traffic loads. Client should submit any other anticipated traffic loadings to the geotechnical engineer, if necessary, so that pavement sections may be reviewed to determine adequacy to support the proposed loadings.

Type of Traffic	Traffic Index	Asphalt (in.)	Base Material (in.)
Automobile Parking Stalls	4.0	3.0	4.0
Light Vehicle Circulation Areas	6.0	3.5	8.5
Heavy Truck Access Areas	7.0	4.0	12.0

Any concrete slab-on-grade in pavement areas shall be a minimum of seven inches in thickness and placed on approved subgrade soils. All pavement areas shall have positive drainage toward an approved outlet from the site. Drain lines behind curbs and/or adjacent to landscape areas should be considered by client and the appropriate design engineers to prevent water from infiltrating beneath pavement. If such infiltration occurs, damage to pavement, curbs and flow lines, especially on sites with expansive soils, may occur during the life of the project.

Any approved base material shall consist of a Class II aggregate or equivalent and should be compacted to a minimum of 95% relative compaction. All pavement materials shall conform to the requirements set forth by the City of Garden Grove. The base material; and asphaltic concrete should be tested prior to delivery to the site and during placement to determine conformance with the project specifications. A pavement engineer shall designate the specific asphalt mix design to meet the required project specifications.

8.10 **Utility Trench and Excavation Backfill**

Trenches from installation of utility lines and other excavations may be backfilled with on-site soils or approved imported soils compacted to a minimum of 90% relative compaction. All utility lines shall be properly bedded with clean sand having a sand equivalency rating of 30 or more. This bedding material shall be thoroughly water jetted around the pipe structure prior to placement of compacted backfill soils.

8.11 **Corrosion Design Criteria**

Representative samples of the surficial soils, typical of the subgrade soils expected to be encountered within foundation excavations and underground utilities were tested for corrosion potential. The minimum resistivity value obtained for the samples tested is representative of an environment that may be corrosive to metals. The soil pH value was considered mildly alkaline and may not have a significant effect on soil corrosivity. Consideration should be given to corrosion protection systems for buried metal such as protective coatings, wrappings or the use of PVC where permitted by local building codes.

According to Table 4.3.1 of ACI 318 Building Code and Commentary, these contents revealed negligible sulfate concentrations. Therefore, a Type II cement according to latest CBC specifications may be utilized for building foundations at this time. It is recommended that additional sulfate tests be performed at the completion of site grading to assure that the as graded conditions are consistent with the recommendations stated in this design. Corrosion test results may be found on the attached Table IV.

8.12 **Expansive Soil**

Since expansive soils were encountered, special attention should be given to the project design and maintenance. The attached *Expansive Soil Guidelines* should be reviewed by the engineers, architects, owner, maintenance personnel and other interested parties and considered during the design of the project and future property maintenance.

9.0 Closure

The recommendations and conclusions contained in this report are based upon the soil conditions uncovered in our test excavations. No warranty of the soil condition between our excavations is implied. NorCal Engineering should be notified for possible further recommendations if unexpected to unfavorable conditions are encountered during construction phase. It is the responsibility of the owner to ensure that all information within this report is submitted to the Architect and appropriate Engineers for the project.

A preconstruction conference should be held between the developer, general contractor, grading contractor, city inspector, architect, and geotechnical engineer to clarify any questions relating to the grading operations and subsequent construction. Our representative should be present during the grading operations and construction phase to certify that such recommendations are complied within the field.

This geotechnical investigation has been conducted in a manner consistent with the level of care and skill exercised by members of our profession currently practicing under similar conditions in the Southern California area. No other warranty, expressed or implied is made.

We appreciate this opportunity to be of service to you. If you have any further questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
NORCAL ENGINEERING

Keith D. Tucker
Project Engineer
R.G.E. 841

Scott D. Spensiero
Project Manager

References

1. ASCE Vol. 113, No. 8, August 1987 - Evaluation of Settlements in Sands Due to Earthquake Shaking by K. Tokimatsu and H.B. Seed,

2. American Society of Civil Engineers (ASCE) website, https://asce7hazardtool.online/

3. California Building Code, 2022.

4. California Department of Conservation, California Geological Survey, 2007, Fault-Rupture Hazard Zones in California; Special Publication 42.

5. California Department of Water Resources, Internet Website, http://www.water.ca.gov/waterdatalibrary/index.cfm.

6. California Division of Mines and Geology, 1998, Seismic Hazard Zone for Los Alamitos 7.5-Minute Quadrangle, Orange County, California

7. California Division of Mines and Geology, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California: Special Publication 117A.

8. Earthquake Zones of Required Investigation, Seismic Hazard Zones, Los Alamitos Quadrangle, published by the California Geological Survey.

9. Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils, Edited by T.L Youd and I.M. Idriss, December 31, 1997

10. Orange County Technical Guidance Document (OCTGD) Appendix VII – Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations dated December 20, 2013.

11. Southern California Earthquake Center - Recommended Procedures for Implementation of DMG Special Report, 117 Guidelines for Analyzing and Mitigating Liquefaction in California, March 1999.

SPECIFICATIONS FOR PLACEMENT OF COMPACTED FILL

Excavation

Any existing low-density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Geotechnical Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90% relative compaction (in accordance with ASTM: D 1557).

In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure.

Material for Fill

The on-site soils or approved import soils may be utilized for the compacted fill provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Geotechnical Engineering firm a minimum of 72 hours prior to importation of site.

Placement of Compacted Fill Soils

The approved fill soils shall be placed in layers not excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2% of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90% relative compaction (in accordance with ASTM: D 1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Geotechnical Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every 2 feet of compacted fill placed.

The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Geotechnical Engineering firm.

Grading Observations

The controlling governmental agencies should be notified prior to commencement of any grading operations. This firm recommends that the grading operations be conducted under the observation of a Geotechnical Engineering firm as deemed necessary. A 24-hour notice must be provided to this firm prior to the time of our initial inspection.

Observation shall include the clearing and grubbing operations to assure that all unsuitable materials have been properly removed; approve the exposed subgrade in areas to receive fill and in areas where excavation has resulted in the desired finished grade and designate areas of overexcavation; and perform field compaction tests to determine relative compaction achieved during fill placement. In addition, all foundation excavations shall be observed by the Geotechnical Engineering firm to confirm that appropriate bearing materials are present at the design grades and recommend any modifications to construct footings.

EXPANSIVE SOIL GUIDELINES

The following expansive soil guidelines are provided for your project. The intent of these guidelines is to inform you, the client, of the importance of proper design and maintenance of projects supported on expansive soils. ***You, as the owner or other interested party, should be warned that you have a duty to provide the information contained in the soil report including these guidelines to your design engineers, architects, landscapers and other design parties in order to enable them to provide a design that takes into consideration expansive soils.***

In addition, you should provide the soil report with these guidelines to any property manager, lessee, property purchaser or other interested party that will have or assume the responsibility of maintaining the development in the future.

Expansive soils are fine-grained silts and clays which are subject to swelling and contracting. The amount of this swelling and contracting is subject to the amount of fine-grained clay materials present in the soils and the amount of moisture either introduced or extracted from the soils. Expansive soils are divided into five categories ranging from "very low" to "very high". Expansion indices are assigned to each classification and are included in the laboratory testing section of this report. *If the expansion index of the soils on your site, as stated in this report, is 21 or higher, you have expansive soils.* The classifications of expansive soils are as follows:

Classification of Expansive Soil*

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

*From Table 18A-I-B of California Building Code (1988)

When expansive soils are compacted during site grading operations, care is taken to place the materials at or slightly above optimum moisture levels and perform proper compaction operations. Any subsequent excessive wetting and/or drying of expansive soils will cause the soil materials to expand and/or contract. These actions are likely to cause distress of foundations, structures, slabs-on-grade, sidewalks and pavement over the life of the structure. ***It is therefore imperative that even after construction of improvements, the moisture contents are maintained at relatively constant levels, allowing neither excessive wetting or drying of soils.***

Evidence of excessive wetting of expansive soils may be seen in concrete slabs, both interior and exterior. Slabs may lift at construction joints producing a trip hazard or may crack from the pressure of soil expansion. Wet clays in foundation areas may result in lifting of the structure causing difficulty in the opening and closing of doors and windows, as well as cracking in exterior and interior wall surfaces. In extreme wetting of soils to depth, settlement of the structure may eventually result. Excessive wetting of soils in landscape areas adjacent to concrete or asphaltic pavement areas may also result in expansion of soils beneath pavement and resultant distress to the pavement surface.

Excessive drying of expansive soils is initially evidenced by cracking in the surface of the soils due to contraction. Settlement of structures and on-grade slabs may also eventually result along with problems in the operation of doors and windows.

Projects located in areas of expansive clay soils will be subject to more movement and "hairline" cracking of walls and slabs than similar projects situated on non-expansive sandy soils. There are, however, measures that developers and property owners may take to reduce the amount of movement over the life the development. The following guidelines are provided to assist you in both design and maintenance of projects on expansive soils:

- Drainage away from structures and pavement is essential to prevent excessive wetting of expansive soils. Grades should be designed to the latest building code and maintained to allow flow of irrigation and rain water to approved drainage devices or to the street. Any "ponding" of water adjacent to buildings, slabs and pavement after rains is evidence of poor drainage; the installation of drainage devices or regrading of the area may be required to assure proper drainage. Installation of rain gutters is also recommended to control the introduction of moisture next to buildings. Gutters should discharge into a drainage device or onto pavement which drains to roadways.

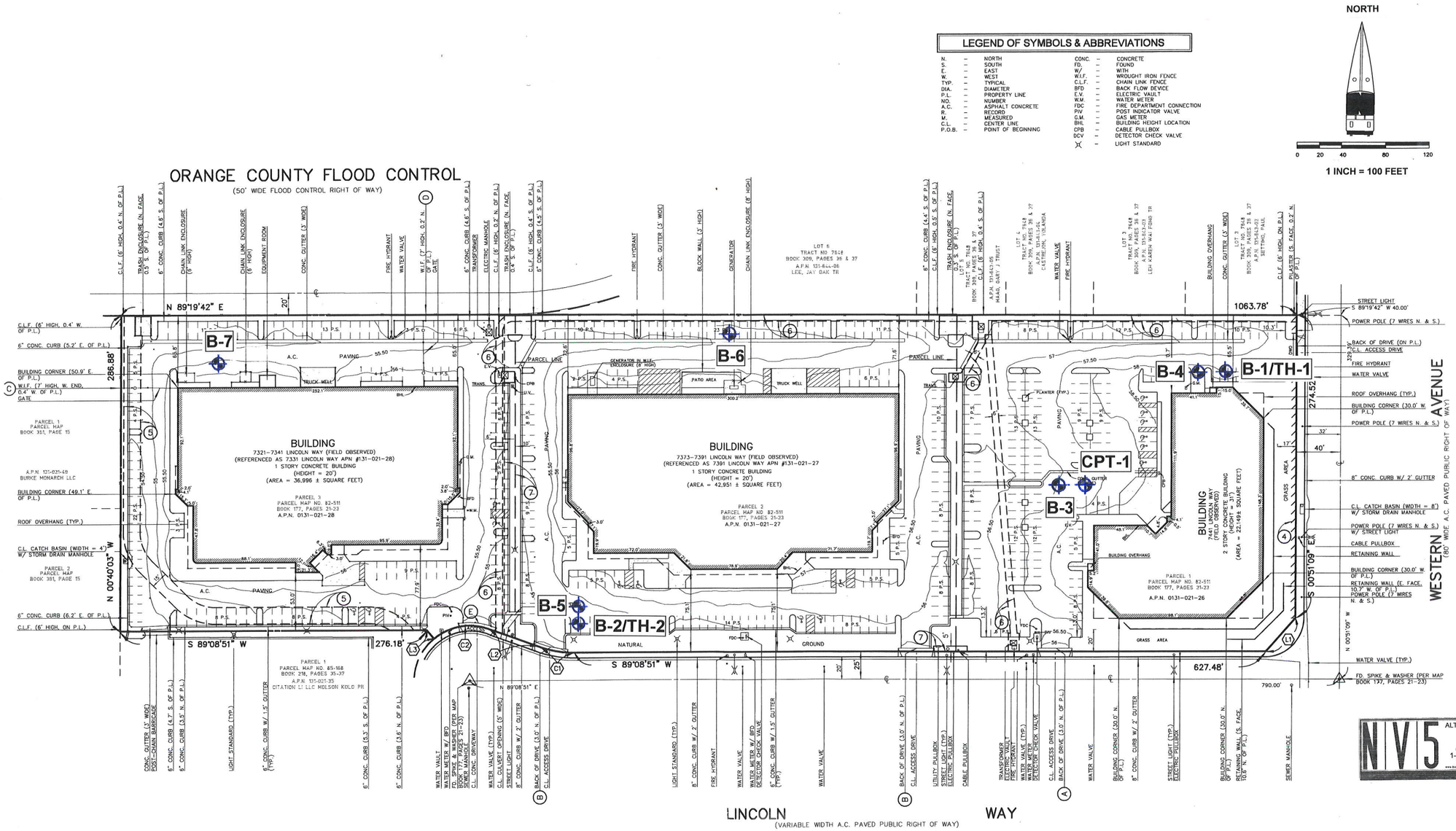
- Irrigation should be strictly controlled around building foundations, slabs and pavement and may need to be adjusted depending upon season. This control is essential to maintain a relatively uniform moisture content in the expansive soils and to prevent swelling and contracting. Over-watering adjacent to improvements may result in damage to those improvements. NorCal Engineering makes no specific recommendations regarding landscape irrigation schedules.

- Planting schemes for landscaping around structures and pavement should be analyzed carefully. Plants (including sod) requiring high amounts of water may result in excessive wetting of soils. Trees and large shrubs may actually extract moisture from the expansive soils, thus causing contraction of the fine-grained soils.

- Thickened edges on exterior slabs will assist in keeping excessive moisture from entering directly beneath the concrete. A six-inch thick or greater deepened edge on slabs may be considered. Underlying interior and exterior slabs with 6 to 12 inches or more of non-expansive soils and providing presaturation of the underlying clayey soils as recommended in the soil report will improve the overall performance of on-grade slabs.

- Increase the amount of steel reinforcing in concrete slabs, foundations and other structures to resist the forces of expansive soils. The precise amount of reinforcing should be determined by the appropriate design engineers and/or architects.

- Recommendations of the soil report should always be followed in the development of the project. Any recommendations regarding presaturation of the upper subgrade soils in slab areas should be performed in the field and verified by the Soil Engineer.



NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

PROJECT	24727-24	DATE	JULY 2024

SITE PLAN

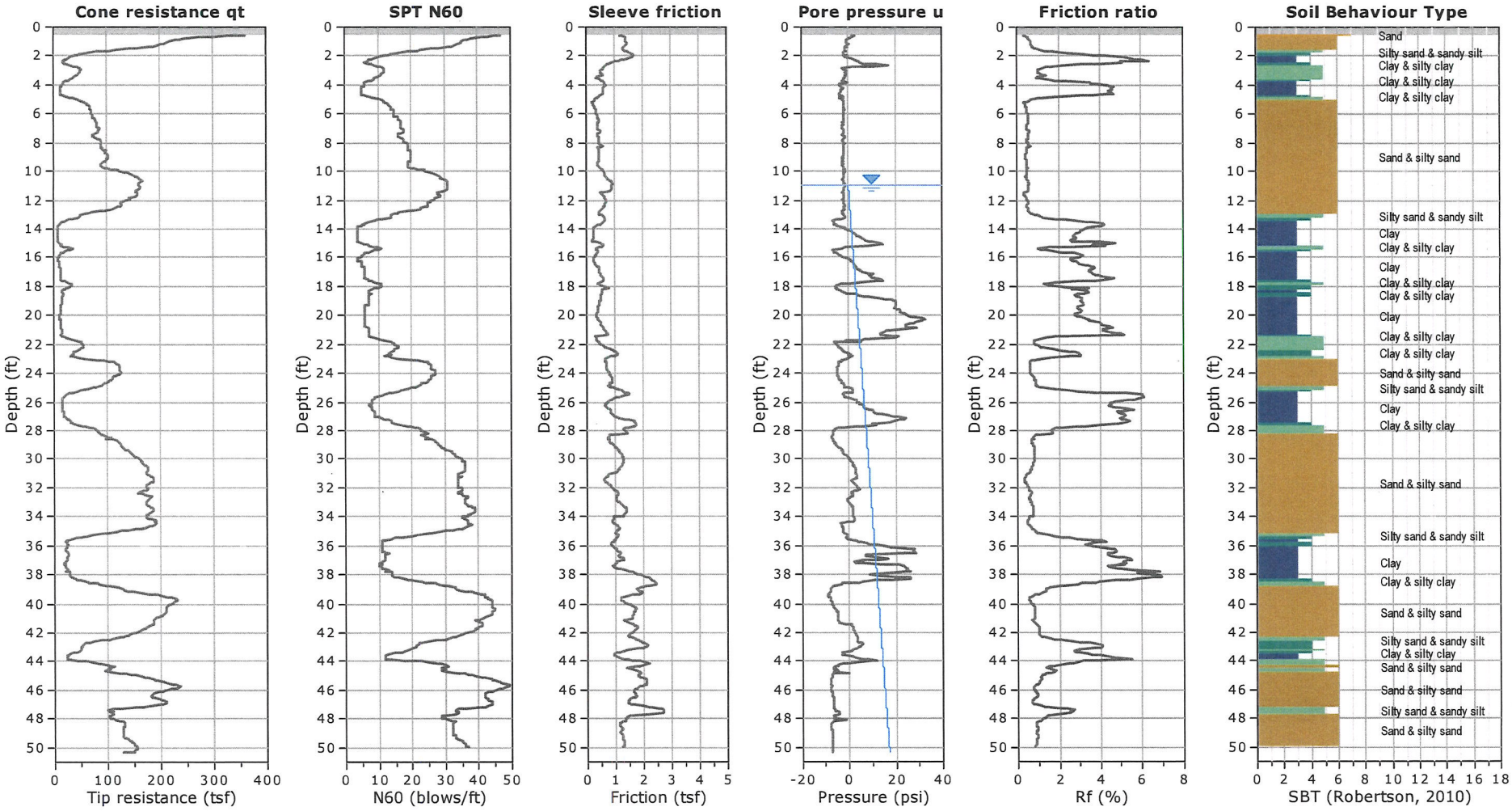
List of Appendices
(in order of appearance)

Appendix A
Log of Excavations

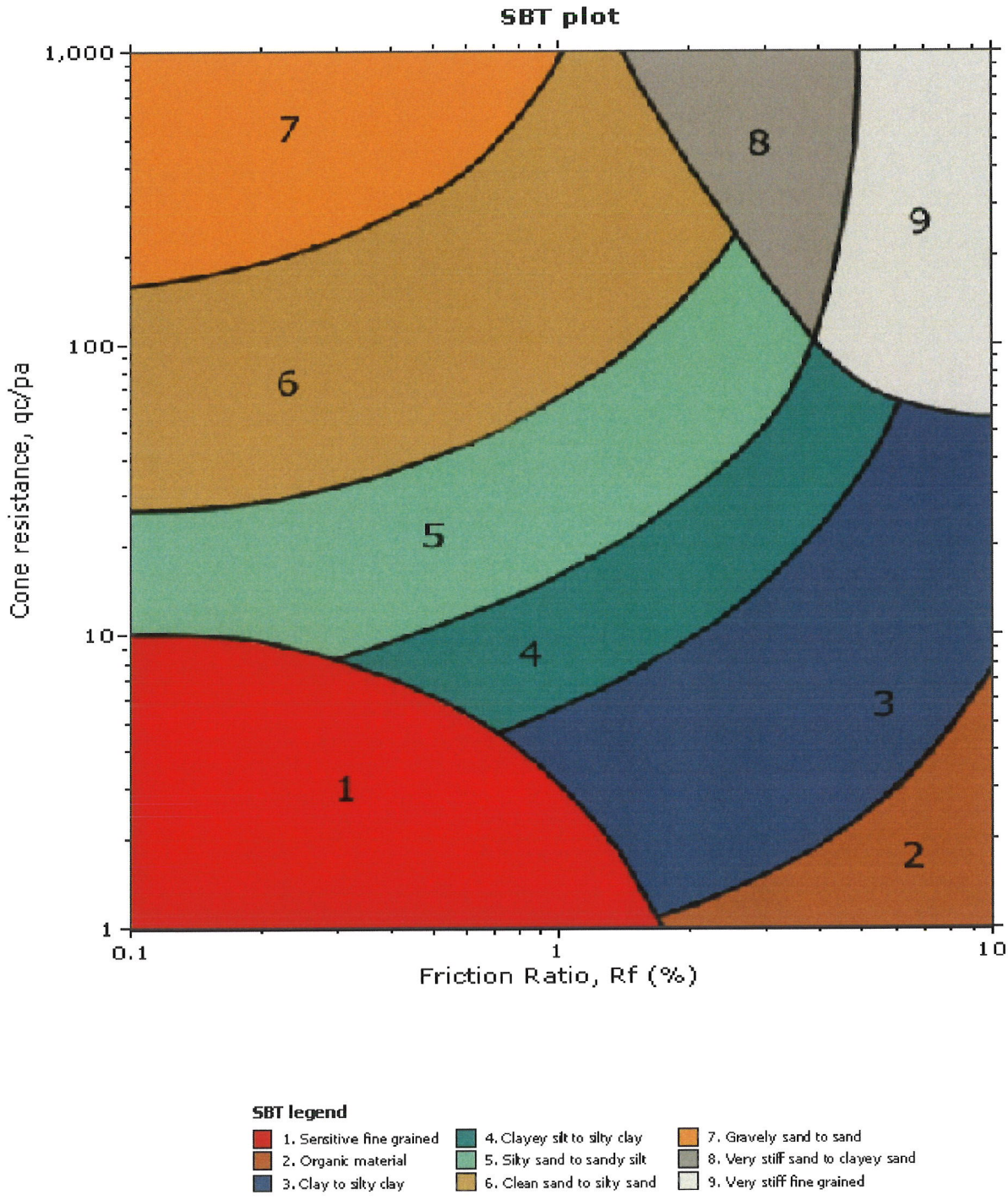
Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: NorCal Engineering / JYL Logistics
Location: 7321 Lincoln Way, Garden Grove, CA

CPT-1
Total depth: 50.34 ft, Date: 7/10/2024



Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com



	In situ data						Estimations															
No	Depth (ft)	qc (tsf)	fs (tsf)	SBTn	Ksbt (ft/s)	Cv (ft2/s)	SPT N60 (blows/feet)	Constrained Mod. (tsf)	Dr (%)	Friction angle (°)	Es (tsf)	Go (tsf)	Nkt	Su (tsf)	Su ratio	Kocr	OCR	Vs (ft/s)	State parameter	Ko	Sensitivity	Peak phi (°)	Shear strength (tsf)
1	0.09	-9876	-9876	0	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0
2	0.13	-9876	-9876	0	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0
3	0.22	-9876	-9876	0	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0
4	0.27	-9876	-9876	0	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0
5	0.34	-9876	-9876	0	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0
6	0.41	-9876	-9876	0	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0
7	0.49	-9876	-9876	0	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0	0	0
8	0.55	359.22	1.19	7	0.00E+00	0.00E+00	47	1743.94	100	50	871.97	1092.87	0	0	0	0.33	0	747.32	-0.38	0	0	0	0.04
9	0.59	325.03	1.28	7	2.21E-02	1.21E+03	45	1714.66	100	50	857.33	1074.52	0	0	0	0.33	0	740.06	-0.38	0	0	0	0.04
10	0.68	301.15	1.42	7	1.38E-02	7.65E+02	43	1729.77	100	50	864.88	1083.99	0	0	0	0.33	0	741.76	-0.38	0	0	0	0.05
11	0.73	274.94	1.4	7	1.02E-02	5.44E+02	41	1668.57	100	50	834.28	1045.64	0	0	0	0.33	0	729.39	-0.37	0	0	0	0.05
12	0.82	247.25	1.38	7	7.10E-03	3.64E+02	38	1601.4	100	49	800.7	1003.55	0	0	0	0.33	0	715.63	-0.36	0	0	0	0.06
13	0.87	237.03	1.38	7	5.99E-03	3.04E+02	37	1583.1	100	49	791.55	992.07	0	0	0	0.33	0	711.75	-0.35	0	0	0	0.06
14	0.92	229.79	1.38	7	5.28E-03	2.65E+02	36	1570.31	100	49	785.15	984.06	0	0	0	0.33	0	709.09	-0.35	0	0	0	0.06
15	1.01	219.56	1.42	7	4.15E-03	2.08E+02	35	1567.19	100	48	783.59	982.1	0	0	0	0.33	0	708.2	-0.34	0	0	0	0.07
16	1.06	213.43	1.45	7	3.50E-03	1.76E+02	35	1570.76	100	48	785.38	984.34	0	0	0	0.33	0	708.67	-0.34	0	0	0	0.07
17	1.15	207.21	1.46	7	3.01E-03	1.51E+02	34	1567.38	100	48	783.69	982.23	0	0	0	0.33	0	707.97	-0.33	0	0	0	0.08
18	1.19	203.21	1.44	7	2.85E-03	1.42E+02	34	1552.77	100	48	776.38	973.07	0	0	0	0.33	0	705.09	-0.33	0	0	0	0.08
19	1.26	195.78	1.41	6	2.55E-03	1.25E+02	33	1526.04	100	48	763.02	956.32	0	0	0	0.33	0	699.71	-0.32	0	0	0	0.09
20	1.33	187.79	1.36	6	2.30E-03	1.10E+02	32	1491.1	100	47	745.55	934.42	0	0	0	0.33	0	692.64	-0.32	0	0	0	0.09
21	1.38	178.4	1.33	6	1.97E-03	9.19E+01	31	1456.77	100	47	728.38	912.91	0	0	0	0.33	0	685.36	-0.31	0	0	0	0.09
22	1.47	154.99	1.31	6	1.21E-03	5.36E+01	28	1381.61	100	46	690.81	865.81	0	0	0	0.33	0	668.66	-0.3	0	0	0	0.1
23	1.51	141.7	1.31	6	8.81E-04	3.78E+01	26	1337.98	100	46	668.99	838.47	0	0	0	0.33	0	658.68	-0.29	0	0	0	0.1
24	1.59	117.91	1.34	6	4.34E-04	1.76E+01	23	1265.23	98	45	632.61	792.88	0	0	0	0.33	0	641.25	-0.27	0	0	0	0.1
25	1.64	104.9	1.39	6	2.63E-04	1.04E+01	22	1232.34	94	45	616.17	772.26	0	0	0	0.33	0	632.9	-0.26	0	0	0	0.1
26	1.71	82.7	1.45	6	1.02E-04	3.78E+00	19	1151.64	88	44	575.82	721.7	0	0	0	0.33	0	612.49	-0.26	0	0	0	0.1
27	1.79	67.55	1.53	6	4.38E-05	1.54E+00	17	1096.5	83	44	548.25	687.14	0	0	0	0.33	0	597.92	-0.25	0	0	0	0.11
28	1.89	50.64	1.66	8	1.29E-05	4.23E-01	14	1025.12	76	44	512.56	642.41	0	0	0	0.33	0	578.38	-0.25	0	0	0	0.11
29	1.92	45.72	1.7	8	8.38E-06	2.68E-01	13	999.94	73	44	499.97	626.63	0	0	0	0.33	0	571.4	-0.25	0	0	0	0.12
30	1.97	39.21	1.7	9	4.72E-06	8.28E-02	12	547.18	0	0	0	596.07	14	2.79	22.8	0.33	56.09	558.07	0	1	80.28	0	2.79
31	2.04	32.34	1.67	9	2.42E-06	3.49E-02	10	450.79	0	0	0	554.21	14	2.3	18.19	0.33	48.81	539.51	0	1	67.62	0	2.3
32	2.11	27.69	1.52	9	1.63E-06	2.01E-02	9	386.06	0	0	0	509.95	14	1.97	15.03	0.33	42.6	519.71	0	1	63.36	0	1.97
33	2.21	23.42	1.33	9	1.13E-06	1.18E-02	8	326.41	0	0	0	460.86	14	1.67	12.19	0.33	36.2	496.92	0	1	61.29	0	1.67
34	2.25	20.53	1.24	9	7.92E-07	7.25E-03	7	285.9	0	0	0	430.23	14	1.46	10.46	0.33	32.45	481.78	0	1	57.51	0	1.46
35	2.31	18.12	1.16	9	5.68E-07	4.59E-03	7	252.36	0	0	0	403.25	14	1.29	9.03	0.33	29.2	467.99	0	1	54.29	0	1.29
36	2.38	20.4	1.03	9	1.06E-06	9.65E-03	7	284.37	0	0	0	405.96	14	1.45	9.86	0.33	29.96	470.72	0	1	68.92	0	1.45
37	2.44	18.03	0.92	9	8.34E-07	6.71E-03	6	251.16	0	0	0	374.44	14	1.28	8.52	0.33	26.71	454.28	0	1	68.29	0	1.28
38	2.52	20.26	0.79	4	1.63E-06	1.48E-02	7	282.56	0	0	0	373.05	14	1.44	9.29	0.33	27.44	454.98	0	1	89.01	0	1.44
39	2.58	24.53	0.76	5	3.46E-06	3.81E-02	8	343.31	51	41	315.64	395.6	0	0	0	0.33	0	468.23	-0.18	0	0	0	0.14
40	2.64	31.78	0.72	5	9.52E-06	2.08E-01	9	682.27	55	40	341.14	427.56	0	0	0	0.33	0	486.16	-0.17	0	0	0	0.14
41	2.71	40.23	0.65	6	2.51E-05	5.82E-01	10	722.69	58	40	361.35	452.89	0	0	0	0.33	0	500.82	-0.16	0	0	0	0.14
42	2.76	44.23	0.63	6	3.67E-05	8.71E-01	11	740.12	60	40	370.06	463.81	0	0	0	0.33	0	506.96	-0.16	0	0	0	0.14
43	2.85	50.55	0.6	6	6.13E-05	1.51E+00	12	770.44	62	40	385.22	482.81	0	0	0	0.33	0	517.19	-0.16	0	0	0	0.15
44	2.9	52.13	0.58	6	7.22E-05	1.79E+00	12	771.51	62	40	385.76	483.48	0	0	0	0.33	0	518.05	-0.16	0	0	0	0.15
45	2.98	52.5	0.53	6	8.42E-05	2.04E+00	12	755.77	61	39	377.89	473.62	0	0	0	0.33	0	514.18	-0.16	0	0	0	0.15
46	3.03	51.29	0.51	6	7.99E-05	1.91E+00	12	745.43	60	39	372.71	467.14	0	0	0	0.33	0	511.22	-0.15	0	0	0	0.15
47	3.12	49.71	0.51	6	6.96E-05	1.65E+00	12	740.58	59	39	370.29	464.1	0	0	0	0.33	0	509.72	-0.15	0	0	0	0.15
48	3.17	49.15	0.51	6	6.54E-05	1.55E+00	12	740.43	59	39	370.22	464	0	0	0	0.33	0	509.67	-0.15	0	0	0	0.16
49	3.22	47.39	0.53	6	5.32E-05	1.26E+00	11	740.81	58	39	370.41	464.24	0	0	0	0.33	0	509.44	-0.15	0	0	0	0.16
50	3.31	44.6	0.58	6	3.58E-05	8.58E-01	11	748.79	57	39	374.4	469.24	0	0	0	0.33	0	511.08	-0.15	0	0	0	0.16
51	3.35	43.58	0.61	6	3.02E-05	7.29E-01	11	754.54	57	39	377.27	472.84	0	0	0	0.33	0	512.49	-0.15	0	0	0	0.17
52	3.45	40.14	0.41	6	4.25E-05	8.88E-01	10	652.78	53	38	326.39	409.08	0	0	0	0.33	0	483.16	-0.13	0	0	0	0.16
53	3.49	37.82	0.37	6	3.99E-05	7.94E-01	9	621.91	52	38	310.96	389.73	0	0	0	0.33	0	473.47	-0.12	0	0	0	0.16
54	3.54	35.68	0.41	6	2.74E-05	5.50E-01	9	627.74	51	38	313.87	393.38	0	0	0	0.33	0	474.52	-0.12	0	0	0	0.17
55	3.64	31.31	0.49	5	1.20E-05	2.45E-01	9	638.85	49	38	319.42	400.35	0	0	0	0.33	0	476.39	-0.13	0	0	0	0.17
56	3.68	28.53	0.53	5	7.33E-06	1.49E-01	8	635.74	47	38	317.87	398.4	0	0	0	0.33	0	474.49	-0.13	0	0	0	0.18
57	3.74	23.79	0.59	5	3.09E-06	3.26E-02	7	329.43	45	39	309.22	387.55	0	0	0	0.33	0	467.42	-0.14	0	0	0	0.18
58	3.82	17.75	0.63	4	9.00E-07	7.07E-03	6	245.23	0	0	0	360.57	14	1.25	5.45	0.33	18.59	451.26	0	1	97.36	0	1.25
59	3.91	18.12	0.65	4	8.77E-07	7.02E-03	6	249.91	0	0	0	369.21	14	1.28	5.43	0.33	18.65	456.05	0	1	95.91	0	1.28
60	3.94	17.19	0.66	4	6.92E-07	5.25E-03	6	236.65	0	0	0	364.87	14	1.21	5.1	0.33	17.89	453.43	0	1	89.6	0	1.21
61	4.05	15.42	0.68	4	4.24E-07	2.88E-03	6	211.88	0	0	0	356.93	14	1.08	4.45	0.33	16.34	448.63	0	1	78.23	0	1.08
62	4.1	14.68	0.67	4	3.51E-07	2.27E-03	6	201.51	0	0	0	351.31	14	1.03	4.19	0.33	15.63	445.4	0	1	74.87	0	1.03
63	4.14	14.03	0.66	4	3.05E-07	1.88E-03	5	192.43	0	0	0	344.03	14	0.98	3.96	0.33	14.97	441.32	0	1	73.22	0	0.98
64	4.22	13.57	0.61	4	2.97E-07	1.77E-03	5	186.07	0	0	0	334.43	14	0.95	3.76	0.33	14.27	436.2	0	1	75.66	0	0.95
65	4.27	13.38	0.61	4	2.81E-07	1.65E-03	5	183.28	0	0	0	332.63	14	0.94	3.66	0.33	13.99	435.23	0	1	75.28	0	0.94
66	4.35	13.38	0.61	4	2.71E-07	1.59E-03	5	183.15	0	0	0	334.5	14	0.93	3.6	0.33	13.83	436.4	0	1	74.91	0	0.93
67	4.42	13.38	0.59	4	2.86E-07	1.68E-03	5	183.09	0	0	0	331.24	14	0.93	3.54	0.33	13.59	434.85	0	1	78.07	0	0.93
68	4.46	13.38	0.61	4	2.62E-07	1.54E-03	5	183.07	0	0	0	336.56	14	0.93	3.51	0.33	13.56	437.78	0	1	75.09	0	0.93
69	4.55	13.47	0.62	4	2.49E-07	1.47E-03	5	184.18	0	0	0	341.75	14	0.94	3.46	0.33	13.48	440.77	0	1	73.76	0	0.94
70	4.6	13.47	0.58	4	2.77E-07	1.63E-03	5	184.13	0	0	0	335.09	14	0.94	3.43	0.33	13.25	437.41	0	1	78.85	0	0.94
71	4.69	14.5	0.52	4	4.45E-07	2.83E-03	5	198.48	0	0	0	331.54	14	1.01	3.63	0.33	13.59	436.46	0	1	95.98	0	1.01
72	4.74	16.07	0.49	4	7.20E-07	5.08E-03	6	220.48	0	0	0	337.54	14	1.12	3.99	0.33	14.47	440.75	0	1	113.14	0	1.12
73	4.83	23.51	0.43	5	3.64E-06	3.78E-02	7	324.79	40	37	295.96	370.93	0	0	0	0.33	0	461.97	-0.11	0	0	0	0.22
74	4.89	32.8	0.39	5	1.47E-05	3.04E-01	9	642.99	45	37	321.5	402.94	0	0	0	0.33	0	481.41	-0.1	0	0	0	0.22
75	4.93	36.33	0.36	6	2.36E-05	4.96E-01	9	655	47	37	327.5	410.47	0	0	0	0.33	0	486.33	-0.1	0	0	0	0.22
76	5	45.9	0.32	6	6.54E-05	1.44E+00	11	689.28	51	37	344.64	431.95	0	0	0	0.33	0	499.54	-0.1	0	0	0	0.22
77	5.06	50.92	0.31	6	1.01E-04	2.30E+00	12	707.03	52	37	353.51	443.07	0	0	0	0.33	0	506.17	-0.11	0	0	0	0.23
78	5.15	57.52	0.22	6	2.39E-04	5.23E+00	12	684.52	54	37	342.26	428.97	0	0	0	0.33	0	502.78	-0.1	0	0	0	0.23
79	5.2	59.1	0.21	6	2.84E-04	6.20E+00	12	681.62	54	37	340.81	427.15	0	0	0	0.33	0	502.78	-0.1	0	0	0	0.23
80	5.29	62.44	0.23	6	2.92E-04	6.70E+00	13	716.74	55	37	358.37	449.16	0	0	0	0.33	0	513.17	-0.11	0	0	0	0.24
81	5.34	64.3	0.26	6	2.84E-04	6.74E+00	13	741.98	56	37	370.99	464.97	0	0	0	0.33	0	520.28	-0.11	0	0	0	0.24
82	5.36	65.32	0.27	6	2.74E-04	6.66E+00	13	758.43	56	38	379.22	475.29	0	0	0	0.33	0	524.84	-0.12	0	0	0	0.24
83	5.47	67.83	0.3	6	2.78E-04	7.00E+00	14	785.59	57	38	392.8	492.3	0	0	0	0.33	0	532.57	-0.12	0	0	0	0.25
84	5.52	68.02	0.3	6	2.69E-04	6.82E+00	14	792.81	57	38	396.41	496.83	0	0	0	0.33	0	534.54	-0.12	0	0	0	0.25
85	5.61	68.2	0.32	6	2.47E-04	6.38E+00	14	807.01	57	38	403.51	505.73	0	0	0	0.33	0	538.33	-0.12	0	0	0	0.26
86	5.65	68.76	0.33	6	2.44E-04	6.38E+00	14	815.19	57	38	407.6	510.85	0	0	0	0.33	0	540.59	-0.12	0	0	0	0.26
87	5.72	69.6	0.34	6	2.42E-04	6.42E+00	15	826.4	58	38	413.2	517.88	0	0	0	0.33	0	543.72	-0.12	0	0	0	0.26
88	5.8	70.06	0.35	6	2.37E-04	6.34E+00	15	835.13	58	38	417.56	523.35	0	0	0	0.33	0	546.15	-0.13	0	0	0	0.27
89	5.84	70.71	0.35	6	2.37E-04	6.41E+00	15	842.77	58	38	421.38	528.13	0	0	0	0.33	0	548.29	-0.13	0	0	0	0.27
90	5.94	71.45	0.36	6	2.30E-04	6.31E+00	15	856.29	58	38	428.15	536.61	0	0	0	0.33	0	551.96	-0.13	0	0	0	0.27
91	5.98	71.73	0.37	6	2.25E-04	6.22E+00	15	863.12	58	38	431.56	540.89	0	0	0	0.33	0	553.79	-0.13	0	0	0	0.28
92	6.08	72.48	0.39	6	2.17E-04	6.10E+00	15	877.93	58	38	438.97	550.17	0	0	0	0.33	0	557.75	-0.13	0	0	0	0.28
93	6.12	72.57	0.39	6	2.11E-04	5.96E+00	15	883.77	58	38	441.88	553.83	0	0	0	0.33	0	559.27	-0.13	0	0	0	0.28
94	6.18	73.68	0.4	6	2.15E-04	6.15E+00	16	894.11	59	38	447.05	560.31	0	0	0	0.33	0	562.12	-0.13	0	0	0	0.29
95	6.26	74.71	0.41	6	2.13E-04	6.20E+00	16	907.74	59	38	453.87	568.85	0	0	0	0.33	0	565.77	-0.13	0	0	0	0.29
96	6.3	76.1	0.42	6	2.22E-04	6.52E+00	16	918.32	59	38	459.16	575.48	0	0	0	0.33	0	568.68	-0.13	0	0	0	0.29
97	6.4	78.33	0.43	6	2.32E-04	6.98E+00	16	937.26	60	38	468.63	587.35	0	0	0	0.33	0	573.81	-0.13	0	0	0	0.3
98	6.44	79.35	0.43	6	2.41E-04	7.29E+00	17	943.09	60	39	471.54	591	0	0	0	0.33	0	575.46	-0.14	0	0	0	0.3
99	6.54	80.56	0.43	6	2.56E-04	7.77E+00	17	947.12	60	38	473.56	593.53	0	0	0	0.33	0	576.83	-0.14	0	0	0	0.3
100	6.57	81.02	0.42	6	2.63E-04	7.99E+00	17	947.92	60	38	473.96	594.03	0	0	0	0.33	0	577.16	-0.14	0	0	0	0.31
101	6.63	81.49	0.42	6	2.72E-04	8.25E+00	17	947.81	60	38	473.91	593.96	0	0	0	0.33	0	577.34	-0.13	0	0	0	0.31
102	6.72	82.23	0.41	6	2.89E-04	8.75E+00	17	945.94	60	38	472.97	592.79	0	0	0	0.33	0	577.24	-0.13	0	0	0	0.31

103	6.77	82.42	0.4	6	2.93E-04	8.88E+00	17	945.55	60	38	472.78	592.55	0	0	0	0.33	0	577.27	-0.13	0	0	0	0.31
104	6.86	82.88	0.4	6	3.03E-04	9.16E+00	17	945.36	60	38	472.68	592.42	0	0	0	0.33	0	577.49	-0.13	0	0	0	0.32
105	6.91	84	0.4	6	3.15E-04	9.59E+00	17	951.32	60	38	475.66	596.16	0	0	0	0.33	0	579.22	-0.13	0	0	0	0.32
106	7	86.41	0.39	6	3.50E-04	1.08E+01	17	960.13	61	39	480.07	601.68	0	0	0	0.33	0	581.9	-0.14	0	0	0	0.33
107	7.04	86.88	0.4	6	3.51E-04	1.08E+01	18	964.93	61	39	482.46	604.69	0	0	0	0.33	0	583.18	-0.14	0	0	0	0.33
108	7.09	86.79	0.41	6	3.31E-04	1.03E+01	18	974.24	61	39	487.12	610.53	0	0	0	0.33	0	585.37	-0.14	0	0	0	0.33
109	7.18	85.02	0.52	6	2.08E-04	6.92E+00	18	1037.43	61	39	518.72	650.12	0	0	0	0.33	0	599.63	-0.14	0	0	0	0.34
110	7.23	83.07	0.51	6	1.91E-04	6.35E+00	18	1027.74	60	39	513.87	644.05	0	0	0	0.33	0	597.18	-0.14	0	0	0	0.34
111	7.32	79.17	0.44	6	2.05E-04	6.36E+00	17	968.22	58	38	484.11	606.75	0	0	0	0.33	0	582.94	-0.13	0	0	0	0.34
112	7.36	77.77	0.41	6	2.06E-04	6.26E+00	16	950.56	58	38	475.28	595.69	0	0	0	0.33	0	578.63	-0.13	0	0	0	0.34
113	7.43	74.33	0.41	6	1.75E-04	5.24E+00	16	935	56	38	467.5	585.94	0	0	0	0.33	0	574.41	-0.12	0	0	0	0.34
114	7.51	73.96	0.42	6	1.60E-04	4.85E+00	16	945.39	56	38	472.69	592.44	0	0	0	0.33	0	576.92	-0.12	0	0	0	0.34
115	7.55	76.01	0.43	6	1.73E-04	5.32E+00	16	958.14	57	38	479.07	600.43	0	0	0	0.33	0	580.39	-0.12	0	0	0	0.34
116	7.63	80	0.43	6	2.06E-04	6.46E+00	17	977.47	58	38	488.73	612.55	0	0	0	0.33	0	585.78	-0.13	0	0	0	0.35
117	7.69	84.18	0.43	6	2.48E-04	7.90E+00	18	995.12	59	38	497.56	623.61	0	0	0	0.33	0	590.73	-0.13	0	0	0	0.35
118	7.78	87.62	0.43	6	2.83E-04	9.17E+00	18	1011.27	60	38	505.64	633.73	0	0	0	0.33	0	595.17	-0.13	0	0	0	0.36
119	7.83	88.74	0.44	6	2.92E-04	9.54E+00	18	1018.16	60	38	509.08	638.05	0	0	0	0.33	0	597	-0.13	0	0	0	0.36
120	7.89	89.39	0.44	6	2.95E-04	9.67E+00	18	1024.14	60	38	512.07	641.79	0	0	0	0.33	0	598.56	-0.13	0	0	0	0.37
121	7.96	89.57	0.46	6	2.78E-04	9.25E+00	18	1036.91	60	38	518.45	649.79	0	0	0	0.33	0	601.58	-0.14	0	0	0	0.37
122	8.01	89.67	0.47	6	2.68E-04	8.97E+00	19	1045.42	60	39	522.71	655.13	0	0	0	0.33	0	603.59	-0.14	0	0	0	0.37
123	8.1	90.22	0.5	6	2.48E-04	8.46E+00	19	1066.68	60	39	533.34	668.45	0	0	0	0.33	0	608.56	-0.14	0	0	0	0.38
124	8.16	89.94	0.51	6	2.30E-04	7.93E+00	19	1078.05	60	39	539.03	675.58	0	0	0	0.33	0	611.13	-0.14	0	0	0	0.38
125	8.24	90.13	0.58	6	1.85E-04	6.65E+00	19	1123.34	60	39	561.67	703.96	0	0	0	0.33	0	621.28	-0.14	0	0	0	0.39
126	8.29	90.13	0.52	6	2.24E-04	7.78E+00	19	1085.11	60	39	542.56	680	0	0	0	0.33	0	612.93	-0.14	0	0	0	0.39
127	8.35	90.87	0.42	6	3.13E-04	1.03E+01	19	1029.97	60	38	514.99	645.45	0	0	0	0.33	0	600.9	-0.13	0	0	0	0.39
128	8.42	92.82	0.43	6	3.25E-04	1.09E+01	19	1044.95	60	38	522.47	654.84	0	0	0	0.33	0	604.69	-0.13	0	0	0	0.39
129	8.47	95.61	0.44	6	3.52E-04	1.20E+01	19	1060.9	61	39	530.45	664.83	0	0	0	0.33	0	608.75	-0.14	0	0	0	0.39
130	8.56	98.96	0.45	6	3.82E-04	1.32E+01	20	1082.14	62	39	541.07	678.14	0	0	0	0.33	0	614.1	-0.14	0	0	0	0.4
131	8.6	98.4	0.46	6	3.66E-04	1.27E+01	20	1084.03	62	39	542.01	679.32	0	0	0	0.33	0	614.48	-0.14	0	0	0	0.4
132	8.69	97.84	0.46	6	3.47E-04	1.21E+01	20	1088.43	61	39	544.22	682.08	0	0	0	0.33	0	615.48	-0.14	0	0	0	0.41
133	8.73	101.19	0.46	6	3.95E-04	1.39E+01	20	1099.75	62	39	549.87	689.18	0	0	0	0.33	0	618.54	-0.14	0	0	0	0.41
134	8.83	103.32	0.45	6	4.43E-04	1.56E+01	20	1099.74	63	39	549.87	689.17	0	0	0	0.33	0	619.01	-0.15	0	0	0	0.42
135	8.88	103.51	0.44	6	4.57E-04	1.60E+01	20	1095.8	63	39	547.9	686.7	0	0	0	0.33	0	618.27	-0.14	0	0	0	0.42
136	8.96	103.7	0.43	6	4.67E-04	1.64E+01	20	1093.18	62	39	546.59	685.06	0	0	0	0.33	0	617.86	-0.14	0	0	0	0.42
137	9.01	103.6	0.43	6	4.63E-04	1.62E+01	20	1093.93	62	39	546.97	685.53	0	0	0	0.33	0	618.08	-0.14	0	0	0	0.42
138	9.06	103.23	0.43	6	4.54E-04	1.59E+01	20	1093.85	62	39	546.93	685.48	0	0	0	0.33	0	618.08	-0.14	0	0	0	0.43
139	9.14	100.91	0.44	6	4.05E-04	1.42E+01	20	1091.41	61	39	545.7	683.95	0	0	0	0.33	0	617.32	-0.14	0	0	0	0.43
140	9.2	99.33	0.44	6	3.74E-04	1.31E+01	20	1089.64	61	39	544.82	682.84	0	0	0	0.33	0	616.77	-0.14	0	0	0	0.43
141	9.29	97.66	0.43	6	3.53E-04	1.23E+01	20	1082.41	60	38	541.2	678.31	0	0	0	0.33	0	615.07	-0.13	0	0	0	0.43
142	9.33	95.05	0.43	6	3.24E-04	1.11E+01	19	1069.87	60	38	534.93	670.45	0	0	0	0.33	0	611.98	-0.13	0	0	0	0.43
143	9.43	91.24	0.41	6	2.91E-04	9.76E+00	19	1046.83	58	38	523.41	656.01	0	0	0	0.33	0	606.42	-0.13	0	0	0	0.43
144	9.46	90.22	0.41	6	2.77E-04	9.28E+00	19	1044.07	58	38	522.03	654.28	0	0	0	0.33	0	605.7	-0.12	0	0	0	0.43
145	9.52	90.22	0.42	6	2.70E-04	9.07E+00	19	1049.24	58	38	524.62	657.53	0	0	0	0.33	0	606.92	-0.12	0	0	0	0.43
146	9.61	90.22	0.42	6	2.67E-04	9.00E+00	19	1050.91	58	38	525.46	658.57	0	0	0	0.33	0	607.43	-0.12	0	0	0	0.44
147	9.67	92.73	0.44	6	2.67E-04	9.24E+00	19	1080.82	59	38	540.41	677.31	0	0	0	0.33	0	614.51	-0.13	0	0	0	0.44
148	9.75	96.91	0.49	6	2.67E-04	9.67E+00	20	1129.3	60	38	564.65	707.7	0	0	0	0.33	0	625.8	-0.13	0	0	0	0.45
149	9.8	102.49	0.52	6	3.07E-04	1.14E+01	21	1165.5	61	39	582.75	730.38	0	0	0	0.33	0	634.4	-0.14	0	0	0	0.46
150	9.86	110.57	0.55	6	3.74E-04	1.45E+01	22	1213.75	63	39	606.87	760.62	0	0	0	0.33	0	645.71	-0.15	0	0	0	0.47
151	9.93	119.77	0.58	6	4.63E-04	1.88E+01	24	1264.99	66	40	632.5	792.73	0	0	0	0.33	0	657.5	-0.16	0	0	0	0.48
152	9.98	124.05	0.6	6	5.03E-04	2.08E+01	24	1290.93	67	40	645.47	808.98	0	0	0	0.33	0	663.32	-0.16	0	0	0	0.48
153	10.06	133.43	0.64	6	5.95E-04	2.57E+01	26	1347.47	69	40	673.74	844.41	0	0	0	0.33	0	675.77	-0.17	0	0	0	0.5
154	10.12	139.1	0.65	6	6.84E-04	3.00E+01	26	1369.84	70	40	684.92	858.44	0	0	0	0.33	0	680.83	-0.18	0	0	0	0.5
155	10.19	143.93	0.66	6	7.64E-04	3.40E+01	27	1389.64	71	41	694.82	870.84	0	0	0	0.33	0	685.27	-0.18	0	0	0	0.51
156	10.25	149.32	0.66	6	8.68E-04	3.92E+01	28	1408.87	72	41	704.43	882.89	0	0	0	0.33	0	689.59	-0.19	0	0	0	0.52
157	10.35	155.73	0.68	6	9.57E-04	4.43E+01	29	1443.82	73	41	721.91	904.79	0	0	0	0.33	0	697.02	-0.19	0	0	0	0.53
158	10.39	158.33	0.7	6	9.69E-04	4.55E+01	29	1464.81	74	41	732.41	917.95	0	0	0	0.33	0	701.33	-0.19	0	0	0	0.53
159	10.44	159.35	0.73	6	9.41E-04	4.47E+01	29	1482	74	41	741	928.72	0	0	0	0.33	0	704.74	-0.19	0	0	0	0.53
160	10.53	162.7	0.77	6	9.24E-04	4.49E+01	30	1518.21	75	41	759.1	951.41	0	0	0	0.33	0	711.97	-0.2	0	0	0	0.54
161	10.58	164	0.8	6	8.84E-04	4.37E+01	30	1542.59	75	41	771.3	966.69	0	0	0	0.33	0	716.72	-0.2	0	0	0	0.55
162	10.67	167.72	0.86	6	8.40E-04	4.28E+01	31	1592.62	76	42	796.31	998.04	0	0	0	0.33	0	726.42	-0.2	0	0	0	0.55
163	10.72	167.25	0.89	6	7.86E-04	4.04E+01	31	1607.4	76	42	803.7	1007.3	0	0	0	0.33	0	729.17	-0.2	0	0	0	0.55
164	10.77	164	0.91	6	6.92E-04	3.57E+01	31	1612.57	75	41	806.28	1010.54	0	0	0	0.33	0	729.97	-0.2	0	0	0	0.56
165	10.85	160.56	0.93	6	6.05E-04	3.14E+01	31	1617.26	74	41	808.63	1013.49	0	0	0	0.33	0	730.7	-0.19	0	0	0	0.56
166	10.89	160.61	0.93	6	6.02E-04	3.12E+01	31	1619.38	74	41	809.69	1014.81	0	0	0	0.33	0	731.14	-0.19	0	0	0	0.56
167	10.99	160.65	0.92	6	6.08E-04	3.15E+01	31	1616.96	74	41	808.48	1013.3	0	0	0	0.33	0	730.81	-0.19	0	0	0	0.56
168	11.04	162.61	0.92	6	6.43E-04	3.34E+01	31	1620.09	74	41	810.04	1015.25	0	0	0	0.33	0	731.54	-0.19	0	0	0	0.57
169	11.09	163.63	0.91	6	6.67E-04	3.46E+01	31	1619.68	74	41	809.84	1015	0	0	0	0.33	0	731.57	-0.19	0	0	0	0.57
170	11.18	162.79	0.89	6	6.76E-04	3.48E+01	31	1607.11	74	41	803.56	1007.12	0	0	0	0.33	0	729.24	-0.19	0	0	0	0.57
171	11.22	160	0.88	6	6.46E-04	3.30E+01	31	1592.29	73	41	796.14	997.83	0	0	0	0.33	0	726.32	-0.19	0	0	0	0.57
172	11.31	155.08	0.85	6	5.99E-04	3.00E+01	30	1564.58	72	41	782.29	980.47	0	0	0	0.33	0	720.85	-0.19	0	0	0	0.57
173	11.36	154.52	0.84	6	6.02E-04	3.00E+01	30	1557.52	72	41	778.76	976.05	0	0	0	0.33	0	719.52	-0.19	0	0	0	0.57
174	11.45	155.82	0.6	6	1.08E-03	4.90E+01	28	1412.31	72	41	706.15	885.05	0	0	0	0.33	0	692.06	-0.18	0	0	0	0.57
175	11.49	156.94	0.52	6	1.40E-03	6.09E+01	28	1357.69	72	41	678.84	850.82	0	0	0	0.33	0	681.66	-0.18	0	0	0	0.57
176	11.59	158.7	0.56	6	1.29E-03	5.76E+01	28	1393.42	72	41	696.71	873.21	0	0	0	0.33	0	688.77	-0.19	0	0	0	0.57
177	11.64	158.42	0.59	6	1.19E-03	5.37E+01	29	1412.12	72	41	706.06	884.93	0	0	0	0.33	0	692.36	-0.19	0	0	0	0.57
178	11.68	158.24	0.61	6	1.11E-03	5.09E+01	29	1427.06	72	41	713.53	894.29	0	0	0	0.33	0	695.23	-0.19	0	0	0	0.58
179	11.78	156.01	0.66	6	9.29E-04	4.33E+01	29	1453.47	72	41	726.73	910.84	0	0	0	0.33	0	700.15	-0.18	0	0	0	0.58
180	11.82	141.61	0.66	6	6.21E-04	2.82E+01	27	1418.38	69	40	709.19	888.85	0	0	0	0.33	0	692.16	-0.17	0	0	0	0.56
181	11.91	144.02	0.68	6	6.39E-04	2.94E+01	27	1434.98	69	40	717.49	899.25	0	0	0	0.33	0	695.64	-0.17	0	0	0	0.57
182	11.95	141.23	0.69	6	5.78E-04	2.65E+01	27	1432.75	69	40	716.38	897.86	0	0	0	0.33	0	694.99	-0.17	0	0	0	0.57
183	12.05	133.34	0.7	6	4.39E-04	2.00E+01	26	1421.33	67	40	710.66	890.7	0	0	0	0.33	0	692.13	-0.16	0	0	0	0.56
184	12.1	128.23	0.7	6	3.79E-04	1.70E+01	26	1403.35	66	40	701.67	879.43	0	0	0	0.33	0	688.17	-0.16	0	0	0	0.56
185	12.14	126.18	0.69	6	3.61E-04	1.61E+01	25	1393.19	65	40	696.59	873.06	0	0	0	0.33	0	686.01	-0.16	0	0	0	0.56
186	12.24	125.81	0.67	6	3.69E-04	1.64E+01	25	1383.37	65	39	691.68	866.91	0	0	0	0.33	0	684.09	-0.16	0	0	0	0.56
187	12.28	126.46	0.67	6	3.83E-04	1.70E+01	25	1380.95	65	39	690.48	865.4	0	0	0	0.33	0	683.7	-0.16	0	0	0	0.56
188	12.38	127.67	0.64	6	4.19E-04	1.84E+01	25	1372.04	65	40	686.02	859.81	0	0	0	0.33	0	682.11	-0.16	0	0	0	0.56
189	12.42	126.74	0.63	6	4.20E-04	1.83E+01	25	1361.22	65	39	680.61	853.03	0	0	0	0.33	0	679.9	-0.16	0	0	0	0.56
190	12.48	121.16	0.61	6	3.65E-04	1.56E+01	24	1334.2	64	39	667.1	836.1	0	0	0	0.33	0	673.98	-0.15	0	0	0	0.56
191	12.56	114.85	0.58	6	3.18E-04	1.32E+01	23	1296.06	62	39	648.03	812.2	0	0	0	0.33	0	665.67	-0.14	0	0	0	0.55
192	12.6	109.46	0.56	6	2.81E-04	1.14E+01	23	1262.89	60	39	631.45	791.41	0	0	0	0.33	0	658.32	-0.14	0	0	0	0.55
193	12.7	93.94	0.51	6	1.77E-04	6.67E+00	20	1177.15	56	38	588.58	737.68	0	0	0	0.33	0	638.52	-0.12	0	0	0	0.54
194	12.74	87.44	0.48	6	1.47E-04	5.33E+00	19	1132.33	54	37	566.16	709.59	0	0	0	0.33	0	628.03	-0.11	0	0	0	0.53
195	12.83	70.52	0.43	6	7.21E-05	2.39E+00	16	1036.46	49	37	518.23	649.51	0	0	0	0.33	0	604.13	-0.09	0	0	0	0.52
196	12.88	64.49	0.43	6	5.09E-05	1.64E+00	16	1008.38	47	36	504.19	631.92	0	0	0	0.33	0	596.63	-0.09	0	0	0	0.51
197	12.93	59.28	0.43	6	3.60E-05	1.14E+00	15	985.68	45	36	492.84	617.69	0	0	0	0.33	0	590.37	-0.08	0	0	0	0.51
198	13.02	51.29	0.47	6	1.72E-05	5.35E-01	14	973.07	42	36	486.54	609.79	0	0	0	0.33	0	585.79	-0.08	0	0	0	0.5
199	13.07	50.08	0.53	5	1.27E-05	4.09E-01	14	1002.35	42	36	501.17	628.14	0	0	0	0.33	0	592.48	-0.08	0	0	0	0.51
200	13.12	50.64	0.6	5	1.06E-05	3.57E-01	14	1047.26	42	36	523.63	656.28	0	0	0	0.33	0	603.1	-0.09	0	0	0	0.52
201	13.2	48.41	0.63	5	8.06E-06	2.72E-01	14	1052.17	41	36	526.08	659.36	0	0	0	0.33	0	603.85	-0.09	0	0	0	0.52
202	13.3	33.36	0.66	5	1.56E-06	2.28E-02	11	455.55	35	37	483.65	606.17	0	0	0	0.33	0	580.39	-0.1	0	0	0	0.52
203	13.34	28.25	0.66	4	7.71E-07	9.47E-03	10	383.68	0	0	0	580.18	14	1.96	2.76	0.33	11.94	568.77	0	1	145.36	0	1.96
204	13.39	23.04	0.66	4	3.28E-07	3.26E-03	9	310.45	0	0	0	548.01	14	1.58	2.23	0.33	9.83	554.08	0	1	118.37	0	1.58
205	13.48	17.84	0.61	4	1.27E-07	9.64E-04	7	237.6	0	0	0	498.16	14	1.21	1.7	0.33	7.66	531.07	0	1	97.97	0	1.21
206	13.52	16.07	0.58	3	8.61E-08	5.87E-04	7	212.78	0	0	0	478.34	14	1.09	1.52	0.33	6.9	521.59	0	1	91	0	1.09
207	13.59	13.38	0.55	3	4.30E-08	2.41E-04	6	175.07	0	0	0	446.24	14	0.89	1.25	0.33	5.75	505.74	0	1	79.29	0	0.89

208	13.66	11.8	0.49	3	3.00E-08	1.47E-04	6	152.96	0	0	0	416.06	14	0.78	1.09	0.33	5.03	490.79	0	1	77.44	0	0.78
209	13.75	10.04	0.42	3	1.95E-08	7.32E-05	5	117.02	0	0	0	377.58	14	0.66	0.91	0.33	4.21	471.03	0	1	77.04	0	0.66
210	13.8	9.11	0.37	3	1.55E-08	4.68E-05	5	94.37	0	0	0	353.93	14	0.59	0.82	0.33	3.78	458.4	0	1	78.14	0	0.59
211	13.85	8.64	0.33	3	1.47E-08	3.96E-05	4	83.89	0	0	0	336.91	14	0.56	0.77	0.33	3.56	449.17	0	1	82.24	0	0.56
212	13.94	7.99	0.27	3	1.47E-08	3.34E-05	4	70.82	0	0	0	310	14	0.51	0.71	0.33	3.27	434.18	0	1	92.36	0	0.51
213	13.98	7.9	0.26	3	1.54E-08	3.41E-05	4	69.03	0	0	0	303.64	14	0.5	0.7	0.33	3.22	430.61	0	1	96.57	0	0.5
214	14.08	7.62	0.24	3	1.49E-08	3.04E-05	4	63.73	0	0	0	294.11	14	0.49	0.67	0.33	3.09	425.08	0	1	100.28	0	0.49
215	14.12	7.71	0.24	3	1.58E-08	3.32E-05	4	65.43	0	0	0	294.83	14	0.49	0.68	0.33	3.13	425.6	0	1	102.11	0	0.49
216	14.2	7.71	0.24	3	1.58E-08	3.30E-05	4	65.4	0	0	0	295.41	14	0.49	0.68	0.33	3.13	425.98	0	1	101.94	0	0.49
217	14.27	8.08	0.24	3	1.96E-08	4.56E-05	4	72.54	0	0	0	299.3	14	0.52	0.71	0.33	3.29	428.55	0	1	107.51	0	0.52
218	14.31	8.27	0.24	3	2.19E-08	5.35E-05	4	76.38	0	0	0	301.38	14	0.53	0.73	0.33	3.37	429.91	0	1	110.35	0	0.53
219	14.39	8.55	0.24	3	2.54E-08	6.69E-05	4	82.09	0	0	0	304.28	14	0.55	0.76	0.33	3.49	431.8	0	1	114.57	0	0.55
220	14.45	8.73	0.24	3	2.81E-08	7.71E-05	4	85.78	0	0	0	305.82	14	0.57	0.77	0.33	3.57	432.84	0	1	117.61	0	0.57
221	14.53	8.64	0.23	3	2.72E-08	7.30E-05	4	83.7	0	0	0	304.15	14	0.56	0.76	0.33	3.52	431.9	0	1	117.82	0	0.56
222	14.59	8.55	0.23	3	2.56E-08	6.71E-05	4	81.76	0	0	0	304.21	14	0.55	0.75	0.33	3.48	431.89	0	1	115.8	0	0.55
223	14.63	8.36	0.24	3	2.24E-08	5.58E-05	4	77.79	0	0	0	304.24	14	0.54	0.73	0.33	3.39	431.77	0	1	111.18	0	0.54
224	14.72	8.18	0.24	3	2.05E-08	4.87E-05	4	74.1	0	0	0	302.03	14	0.53	0.71	0.33	3.3	430.45	0	1	109.7	0	0.53
225	14.77	8.08	0.21	3	2.32E-08	5.35E-05	4	72.15	0	0	0	291.8	14	0.52	0.7	0.33	3.26	424.68	0	1	120.07	0	0.52
226	14.84	8.08	0.22	3	2.25E-08	5.21E-05	4	72.34	0	0	0	293.97	14	0.52	0.71	0.33	3.26	425.95	0	1	118.01	0	0.52
227	14.91	8.46	0.35	3	1.21E-08	3.11E-05	4	80.14	0	0	0	346.42	14	0.55	0.74	0.33	3.43	454.72	0	1	77.8	0	0.55
228	14.98	10.5	0.51	3	1.64E-08	6.77E-05	5	128.72	0	0	0	416.07	14	0.7	0.94	0.33	4.34	490.94	0	1	67.87	0	0.7
229	15.04	13.19	0.56	3	3.79E-08	2.12E-04	6	174.95	0	0	0	456.36	14	0.89	1.2	0.33	5.52	511.14	0	1	77.99	0	0.89
230	15.1	15.98	0.59	3	7.84E-08	5.37E-04	7	213.79	0	0	0	488.83	14	1.09	1.46	0.33	6.64	527.11	0	1	90.84	0	1.09
231	15.17	13.84	0.59	3	4.07E-08	2.39E-04	7	182.97	0	0	0	471.06	14	0.93	1.24	0.33	5.74	518.16	0	1	77.26	0	0.93
232	15.24	22.3	0.54	4	3.59E-07	3.45E-03	9	299.57	0	0	0	520.14	14	1.53	2.03	0.33	9	543.27	0	1	138.03	0	1.53
233	15.3	29.36	0.45	5	1.58E-06	2.02E-02	10	398.35	32	35	422.05	528.97	0	0	0	0.33	0	549.47	-0.07	0	0	0	0.53
234	15.36	36.42	0.37	5	5.35E-06	8.51E-02	11	496.92	35	35	422.3	529.29	0	0	0	0.33	0	551.83	-0.06	0	0	0	0.52
235	15.44	32.15	0.37	5	3.13E-06	4.38E-02	10	436.45	33	35	408.62	512.14	0	0	0	0.33	0	543.5	-0.06	0	0	0	0.52
236	15.49	27.13	0.38	5	1.46E-06	1.71E-02	9	366.09	30	35	393.43	493.09	0	0	0	0.33	0	533.79	-0.06	0	0	0	0.53
237	15.57	21.93	0.39	4	5.66E-07	5.31E-03	8	293.29	0	0	0	469.06	14	1.5	1.97	0.33	8.66	521.4	0	1	185.72	0	1.5
238	15.62	18.3	0.4	4	2.58E-07	2.00E-03	7	242.49	0	0	0	447.02	14	1.24	1.62	0.33	7.25	509.94	0	1	152.89	0	1.24
239	15.7	13.75	0.38	4	7.89E-08	4.52E-04	6	178.9	0	0	0	408.57	14	0.91	1.2	0.33	5.45	489.64	0	1	116.86	0	0.91
240	15.77	12.08	0.36	3	4.99E-08	2.49E-04	6	155.56	0	0	0	385.95	14	0.79	1.04	0.33	4.77	477.66	0	1	108.63	0	0.79
241	15.81	10.78	0.34	3	3.25E-08	1.31E-04	5	125.8	0	0	0	368.52	14	0.7	0.92	0.33	4.23	468.12	0	1	100.8	0	0.7
242	15.9	9.94	0.31	3	2.67E-08	9.00E-05	5	105.11	0	0	0	349.36	14	0.64	0.84	0.33	3.86	457.81	0	1	102.38	0	0.64
243	15.95	9.29	0.28	3	2.26E-08	6.53E-05	5	90.36	0	0	0	334.24	14	0.6	0.77	0.33	3.58	449.46	0	1	103.45	0	0.6
244	16.04	9.01	0.24	3	2.53E-08	6.86E-05	4	84.65	0	0	0	317.28	14	0.58	0.75	0.33	3.46	440.24	0	1	115.87	0	0.58
245	16.08	9.01	0.23	3	2.76E-08	7.47E-05	4	84.62	0	0	0	312.55	14	0.58	0.75	0.33	3.46	437.71	0	1	121.86	0	0.58
246	16.18	9.01	0.23	3	2.71E-08	7.33E-05	4	84.47	0	0	0	313.63	14	0.58	0.75	0.33	3.45	438.35	0	1	121.08	0	0.58
247	16.22	9.01	0.24	3	2.51E-08	6.78E-05	4	84.43	0	0	0	318.18	14	0.58	0.75	0.33	3.44	440.84	0	1	115.92	0	0.58
248	16.29	9.2	0.26	3	2.48E-08	7.01E-05	5	88.29	0	0	0	326.39	14	0.59	0.76	0.33	3.52	445.44	0	1	111.65	0	0.59
249	16.36	9.38	0.28	3	2.43E-08	7.15E-05	5	92.02	0	0	0	334.8	14	0.6	0.78	0.33	3.59	450.08	0	1	107.27	0	0.6
250	16.41	9.76	0.29	3	2.69E-08	8.64E-05	5	100.33	0	0	0	343.41	14	0.63	0.81	0.33	3.75	454.92	0	1	107.13	0	0.63
251	16.5	10.41	0.34	3	2.65E-08	9.77E-05	5	115.35	0	0	0	369.8	14	0.68	0.87	0.33	4.01	468.94	0	1	96.67	0	0.68
252	16.54	10.59	0.37	3	2.55E-08	9.77E-05	5	119.51	0	0	0	379.12	14	0.69	0.88	0.33	4.08	473.75	0	1	92.67	0	0.69
253	16.62	10.96	0.39	3	2.59E-08	1.07E-04	5	128.48	0	0	0	392.41	14	0.72	0.91	0.33	4.23	480.6	0	1	89.28	0	0.72
254	16.68	11.34	0.43	3	2.59E-08	1.15E-04	6	138.18	0	0	0	407.38	14	0.74	0.95	0.33	4.38	488.12	0	1	85.24	0	0.74
255	16.75	12.54	0.47	3	3.47E-08	1.81E-04	6	162.65	0	0	0	430.9	14	0.83	1.05	0.33	4.87	499.98	0	1	86.96	0	0.83
256	16.81	13.1	0.47	3	4.19E-08	2.29E-04	6	170.47	0	0	0	436.6	14	0.87	1.1	0.33	5.09	502.98	0	1	90.83	0	0.87
257	16.87	13.38	0.47	3	4.59E-08	2.56E-04	6	174.44	0	0	0	439.51	14	0.89	1.13	0.33	5.19	504.53	0	1	92.95	0	0.89
258	16.96	13.29	0.47	3	4.49E-08	2.49E-04	6	173.29	0	0	0	438.22	14	0.88	1.12	0.33	5.15	503.95	0	1	93.03	0	0.88
259	17.01	13.19	0.47	3	4.22E-08	2.32E-04	6	172.02	0	0	0	440.07	14	0.88	1.11	0.33	5.11	504.77	0	1	90.81	0	0.88
260	17.1	13.19	0.49	3	4.01E-08	2.22E-04	6	172.47	0	0	0	445.16	14	0.88	1.11	0.33	5.11	507.17	0	1	88.41	0	0.88
261	17.14	13.19	0.49	3	3.95E-08	2.19E-04	6	172.62	0	0	0	446.77	14	0.88	1.11	0.33	5.11	507.94	0	1	87.73	0	0.88
262	17.23	13.19	0.5	3	3.74E-08	2.07E-04	6	172.51	0	0	0	450.99	14	0.88	1.1	0.33	5.09	509.92	0	1	85.54	0	0.88
263	17.27	12.92	0.52	3	3.23E-08	1.75E-04	6	168.5	0	0	0	452.24	14	0.86	1.08	0.33	4.97	510.38	0	1	81.75	0	0.86
264	17.33	12.73	0.53	3	2.81E-08	1.49E-04	6	165.83	0	0	0	456.52	14	0.85	1.06	0.33	4.88	512.28	0	1	77.63	0	0.85
265	17.42	12.36	0.59	3	2.03E-08	1.04E-04	6	160.7	0	0	0	469.37	14	0.82	1.02	0.33	4.72	517.97	0	1	68.34	0	0.82
266	17.47	12.64	0.6	3	2.17E-08	1.14E-04	6	164.81	0	0	0	475.64	14	0.84	1.05	0.33	4.83	520.95	0	1	68.72	0	0.84
267	17.55	14.22	0.61	3	3.57E-08	2.14E-04	7	187.31	0	0	0	493.78	14	0.96	1.18	0.33	5.47	529.75	0	1	76.45	0	0.96
268	17.6	16.35	0.62	3	6.44E-08	4.48E-04	7	217.23	0	0	0	514.66	14	1.11	1.37	0.33	6.29	539.81	0	1	87.58	0	1.11
269	17.67	20.63	0.59	4	1.91E-07	1.69E-03	8	276.59	0	0	0	538.36	14	1.41	1.74	0.33	7.87	551.62	0	1	117.14	0	1.41
270	17.74	25.09	0.48	4	6.26E-07	6.78E-03	9	337.88	0	0	0	530.47	14	1.72	2.12	0.33	9.43	550.03	0	1	175.25	0	1.72
271	17.79	29.64	0.41	5	1.65E-06	2.11E-02	10	400.66	31	35	421.35	528.1	0	0	0	0.33	0	550.61	-0.06	0	0	0	0.57
272	17.86	33.36	0.43	5	2.47E-06	3.57E-02	11	452.1	33	35	441.98	553.94	0	0	0	0.33	0	562.27	-0.06	0	0	0	0.57
273	17.91	33.36	0.52	5	1.78E-06	2.58E-02	11	451.73	33	35	468.21	586.83	0	0	0	0.33	0	575.32	-0.07	0	0	0	0.58
274	17.98	30.38	0.66	4	7.69E-07	1.01E-02	11	409.82	0	0	0	619.96	14	2.09	2.56	0.33	11.33	587.42	0	1	154.67	0	2.09
275	18.06	26.95	0.77	4	3.46E-07	4.01E-03	10	361.88	0	0	0	632.54	14	1.85	2.25	0.33	10.1	591.34	0	1	117.86	0	1.85
276	18.13	22.95	0.79	4	1.63E-07	1.60E-03	9	305.71	0	0	0	612.02	14	1.56	1.9	0.33	8.6	582.23	0	1	97.27	0	1.56
277	18.2	20.81	0.55	4	2.08E-07	1.84E-03	8	275.82	0	0	0	528.56	14	1.41	1.71	0.33	7.72	547.86	0	1	125.55	0	1.41
278	18.25	19.51	0.56	4	1.50E-07	1.23E-03	8	257.63	0	0	0	524.15	14	1.31	1.59	0.33	7.23	545.51	0	1	114.4	0	1.31
279	18.34	16.82	0.57	3	7.49E-08	5.29E-04	7	220.19	0	0	0	507.6	14	1.12	1.36	0.33	6.22	537.37	0	1	96	0	1.12
280	18.38	16.63	0.57	3	7.12E-08	4.96E-04	7	217.69	0	0	0	506.53	14	1.11	1.34	0.33	6.15	536.85	0	1	94.85	0	1.11
281	18.48	17.19	0.55	4	8.81E-08	6.37E-04	7	225.61	0	0	0	505.09	14	1.15	1.39	0.33	6.34	536.56	0	1	102.18	0	1.15
282	18.52	18.03	0.53	4	1.19E-07	9.08E-04	8	238.05	0	0	0	504.65	14	1.21	1.46	0.33	6.65	536.81	0	1	112.71	0	1.21
283	18.61	17.56	0.49	4	1.20E-07	8.89E-04	7	231.55	0	0	0	490.36	14	1.18	1.42	0.33	6.46	530.5	0	1	117.49	0	1.18
284	18.66	17	0.5	4	1.01E-07	7.26E-04	7	224.04	0	0	0	489.25	14	1.14	1.37	0.33	6.25	529.79	0	1	111.84	0	1.14
285	18.7	16.54	0.5	4	9.01E-08	6.29E-04	7	217.95	0	0	0	485.94	14	1.11	1.33	0.33	6.08	528.16	0	1	108.93	0	1.11
286	18.8	15.61	0.49	3	7.30E-08	4.81E-04	7	205.58	0	0	0	476.16	14	1.05	1.25	0.33	5.74	523.48	0	1	104.89	0	1.05
287	18.84	15.24	0.49	3	6.72E-08	4.32E-04	7	200.9	0	0	0	472.37	14	1.03	1.22	0.33	5.61	521.66	0	1	103.37	0	1.03
288	18.93	15.15	0.48	3	6.62E-08	4.24E-04	7	200	0	0	0	471.5	14	1.02	1.21	0.33	5.57	521.29	0	1	103.46	0	1.02
289	18.98	14.96	0.48	3	6.41E-08	4.06E-04	7	197.53	0	0	0	468.44	14	1.01	1.2	0.33	5.49	519.87	0	1	103.44	0	1.01
290	19.03	14.87	0.47	3	6.52E-08	4.10E-04	7	196.28	0	0	0	464.02	14	1	1.19	0.33	5.45	517.88	0	1	105.48	0	1
291	19.11	14.77	0.47	3	6.28E-08	3.92E-04	7	194.82	0	0	0	463.72	14	0.99	1.17	0.33	5.4	517.74	0	1	104.61	0	0.99
292	19.16	14.5	0.47	3	5.59E-08	3.42E-04	7	191.05	0	0	0	464.41	14	0.97	1.15	0.33	5.29	517.93	0	1	100.78	0	0.97
293	19.26	13.94	0.46	3	4.99E-08	2.92E-04	7	183.09	0	0	0	454.35	14	0.93	1.1	0.33	5.07	513.14	0	1	100.31	0	0.93
294	19.3	13.57	0.44	3	4.75E-08	2.70E-04	6	177.92	0	0	0	445.5	14	0.91	1.07	0.33	4.92	508.94	0	1	101.46	0	0.91
295	19.39	13.29	0.4	3	5.09E-08	2.83E-04	6	173.93	0	0	0	430.05	14	0.89	1.04	0.33	4.79	501.73	0	1	109.06	0	0.89
296	19.44	13.19	0.39	3	5.10E-08	2.82E-04	6	172.32	0	0	0	425.86	14	0.88	1.03	0.33	4.74	499.75	0	1	110.8	0	0.88
297	19.49	12.92	0.39	3	4.72E-08	2.55E-04	6	168.58	0	0	0	422.53	14	0.86	1.01	0.33	4.64	498.05	0	1	109.38	0	0.86
298	19.56	12.45	0.38	3	4.09E-08	2.05E-04	6	156.59	0	0	0	417.11	14	0.83	0.97	0.33	4.46	495.24	0	1.04	106.55	32.05	0.83
299	19.62	12.17	0.38	3	3.70E-08	1.77E-04	6	149.02	0	0	0	414.7	14	0.81	0.94	0.33	4.35	493.98	0	1.02	104.36	32.12	0.81
300	19.71	11.99	0.38	3	3.44E-08	1.59E-04	6	143.94	0	0	0	413.48	14	0.79	0.92	0.33	4.27	493.34	0	1.01	102.77	32.08	0.79
301	19.76	11.99	0.38	3	3.48E-08	1.60E-04	6	143.69	0	0	0	412.65	14	0.79	0.92	0.33	4.26	492.98	0	1.01	103.57	32.08	0.79
302	19.86	11.99	0.35	3	4.03E-08	1.86E-04	6	143.82	0	0	0	402.43	14	0.8	0.92	0.33	4.26	488.16	0	1.01	112.58	32.55	0.8
303	19.9	11.99	0.34	3	4.16E-08	1.91E-04	6	143.63	0	0	0	400.16	14	0.8	0.92	0.33	4.25	487.1	0	1.01	114.76	32.58	0.8
304	20	11.52	0.33	3	3.61E-08	1.52E-04	6	131.56	0	0	0	393.37	14	0.76	0.88	0.33	4.07	483.58	0	0.98	112.86	32.52	0.76
305	20.04	11.34	0.34	3	3.24E-08	1.32E-04	6	127.23	0	0	0	394.82	14	0.75	0.86	0.33	4	484.2	0	0.97	108.69	32.63	0.75
306	20.09	11.34	0.35	3	2.98E-08	1.21E-04	6	127.14	0	0	0	400.79	14	0.75	0.86	0.33	3.99	487.11	0	0.97	103.99	32.72	0.75
307	20.16	11.34	0.38	3	2.69E-08	1.11E-04	6	128.3	0	0	0	410.59	14	0.75	0.87	0.33	4.01	491.88	0	0.96	97.73	33.81	0.75
308	20.22	11.34	0.4	3	2.43E-08	9.99E-05	6	128.3	0	0	0	418.55	14	0.76	0.87	0.33	4	495.7	0	0.96	92.56	34	0.76
309	20.31	11.71	0.42	3	2.58E-08	1.13E-04	6	136.65	0	0	0	427.69	14	0.78	0.89	0.33	4.13	500.26	0	0.97	91.94	33.91	0.78
310	20.36	11.99	0.43	3	2.69E-08	1.24E-04	6	143.44	0	0	0	435.4	14	0.8	0.91	0.33	4.22	504.05	0	0.99	91.07	34	0.8
311	20.41	12.36	0.45	3	2.87E-08	1.40E-04	6	152.58	0	0	0	444.18	14	0.83	0.94	0.33	4.35	508.33	0	1	90.62	33.99	0.83
312	20.5	12.54	0.51	3	2.35E-08	1.17E-04	6	156.16	0	0	0	466.43	14	0.84	0.95	0.33	4.4	518.57	0	1.01	80.42	33.6	0.84

313	20.55	12.54	0.52	3	2.24E-08	1.12E-04	6	155.58	0	0	0	469.69	14	0.84	0.95	0.33	4.39	520.05	0	1.01	78.76	33.37	0.84
314	20.6	12.54	0.52	3	2.21E-08	1.10E-04	6	154.72	0	0	0	469.99	14	0.83	0.95	0.33	4.37	520.2	0	1.02	78.51	32.97	0.83
315	20.69	12.54	0.52	3	2.17E-08	1.07E-04	6	153.63	0	0	0	470.36	14	0.83	0.94	0.33	4.35	520.4	0	1.02	78.25	32.48	0.83
316	20.77	12.54	0.57	3	1.82E-08	8.92E-05	6	153.27	0	0	0	485.9	14	0.83	0.94	0.33	4.34	527.35	0	1.02	71.41	32.54	0.83
317	20.82	12.73	0.6	3	1.77E-08	8.97E-05	7	158.35	0	0	0	496.71	14	0.85	0.95	0.33	4.41	532.22	0	1.02	69.07	32.86	0.85
318	20.87	13.19	0.61	3	2.01E-08	1.11E-04	7	171.73	0	0	0	505.63	14	0.88	0.99	0.33	4.59	536.37	0	1.04	70.39	33.82	0.88
319	20.96	14.59	0.62	3	3.06E-08	1.87E-04	7	191.32	0	0	0	518.78	14	0.98	1.1	0.33	5.06	542.67	0	1	77.49	0	0.98
320	21.01	14.96	0.63	3	3.24E-08	2.03E-04	7	195.49	0	0	0	524.45	14	1	1.12	0.33	5.17	545.24	0	1	77.97	0	1
321	21.07	15.15	0.65	3	3.22E-08	2.04E-04	7	197.92	0	0	0	531.6	14	1.01	1.13	0.33	5.22	548.37	0	1	76.71	0	1.01
322	21.13	15.15	0.68	3	2.89E-08	1.83E-04	7	197.77	0	0	0	541.7	14	1.01	1.13	0.33	5.21	552.63	0	1	72.79	0	1.01
323	21.2	14.77	0.72	3	2.27E-08	1.40E-04	7	192.14	0	0	0	549.63	14	0.98	1.09	0.33	5.05	555.8	0	1	66.79	0	0.98
324	21.27	14.4	0.73	3	1.93E-08	1.15E-04	7	186.9	0	0	0	550.95	14	0.95	1.06	0.33	4.9	556.23	0	1	63.57	0	0.95
325	21.33	14.22	0.74	3	1.77E-08	1.05E-04	7	184.33	0	0	0	551.55	14	0.94	1.04	0.33	4.83	556.44	0	1	62.1	0	0.94
326	21.42	15.98	0.32	4	1.44E-07	9.70E-04	7	209.87	0	0	0	429.71	14	1.07	1.19	0.33	5.43	504.36	0	1	165.36	0	1.07
327	21.46	17.47	0.33	4	2.02E-07	1.50E-03	7	231.01	0	0	0	445.04	14	1.18	1.3	0.33	5.95	512.17	0	1	175.86	0	1.18
328	21.53	24.62	0.33	5	8.86E-07	9.38E-03	9	330.8	27	34	389.2	487.8	0	0	0	0.33	0	534.18	-0.04	0	0	0	0.61
329	21.6	31.03	0.33	5	2.32E-06	3.10E-02	10	418.27	30	34	413.53	518.29	0	0	0	0.33	0	549.25	-0.04	0	0	0	0.61
330	21.7	42.09	0.34	5	7.89E-06	2.29E-01	12	907.41	35	34	453.71	568.65	0	0	0	0.33	0	572.68	-0.04	0	0	0	0.62
331	21.73	41.63	0.36	5	6.87E-06	2.02E-01	12	917.87	35	34	458.93	575.2	0	0	0	0.33	0	575.09	-0.05	0	0	0	0.62
332	21.79	48.87	0.4	5	1.16E-05	3.67E-01	14	986.21	38	35	493.1	618.02	0	0	0	0.33	0	593.16	-0.06	0	0	0	0.63
333	21.87	52.41	0.43	5	1.36E-05	4.47E-01	14	1027.08	39	35	513.54	643.63	0	0	0	0.33	0	603.4	-0.06	0	0	0	0.64
334	21.93	53.89	0.45	5	1.39E-05	4.69E-01	15	1051.81	40	35	525.9	659.13	0	0	0	0.33	0	609.38	-0.06	0	0	0	0.64
335	22	55.56	0.5	5	1.35E-05	4.71E-01	15	1092.14	40	35	546.07	684.41	0	0	0	0.33	0	618.85	-0.07	0	0	0	0.65
336	22.05	56.03	0.53	5	1.23E-05	4.43E-01	15	1118.89	40	35	559.45	701.17	0	0	0	0.33	0	624.94	-0.07	0	0	0	0.65
337	22.15	55.56	0.6	5	9.60E-06	3.57E-01	16	1161.01	40	36	580.5	727.56	0	0	0	0.33	0	634.22	-0.08	0	0	0	0.66
338	22.19	54.91	0.64	5	8.13E-06	3.08E-01	16	1182.13	40	36	591.06	740.8	0	0	0	0.33	0	638.76	-0.08	0	0	0	0.67
339	22.25	53.52	0.7	5	6.28E-06	2.43E-01	16	1206.47	39	36	603.23	756.05	0	0	0	0.33	0	643.86	-0.08	0	0	0	0.67
340	22.34	49.06	0.86	5	2.91E-06	6.23E-02	15	668.4	38	37	634.15	794.8	0	0	0	0.33	0	656.49	-0.1	0	0	0	0.69
341	22.38	45.53	0.93	5	1.80E-06	3.58E-02	15	619.02	36	37	640.41	802.65	0	0	0	0.33	0	658.63	-0.1	0	0	0	0.7
342	22.47	39.95	1.04	4	8.09E-07	1.40E-02	14	540.9	0	0	0	810.77	14	2.76	2.97	0.33	13.44	660.49	0	1	129.91	0	2.76
343	22.51	37.82	1.06	4	6.14E-07	1.01E-02	14	511.08	0	0	0	805.28	14	2.61	2.8	0.33	12.71	658.27	0	1	120.67	0	2.61
344	22.61	36.24	1.08	4	4.86E-07	7.62E-03	13	489.17	0	0	0	804.03	14	2.5	2.67	0.33	12.15	657.62	0	1	113.08	0	2.5
345	22.66	36.42	1.09	4	4.92E-07	7.75E-03	14	491.83	0	0	0	806.69	14	2.51	2.68	0.33	12.2	658.58	0	1	113.22	0	2.51
346	22.71	35.22	1.08	4	4.25E-07	6.46E-03	13	474.85	0	0	0	799.76	14	2.42	2.59	0.33	11.78	656.02	0	1	109.57	0	2.42
347	22.79	31.78	0.98	4	3.30E-07	4.51E-03	12	426.62	0	0	0	752.21	14	2.18	2.32	0.33	10.57	638.91	0	1	109.11	0	2.18
348	22.85	34.84	0.87	4	6.20E-07	9.32E-03	13	469.66	0	0	0	738.8	14	2.4	2.55	0.33	11.58	634.86	0	1	134.93	0	2.4
349	22.92	44.88	0.73	5	2.58E-06	5.03E-02	14	610.01	36	36	591.63	741.51	0	0	0	0.33	0	637.76	-0.09	0	0	0	0.69
350	22.98	57.61	0.66	5	9.12E-06	3.55E-01	16	1215.84	41	36	607.92	761.92	0	0	0	0.33	0	646.91	-0.08	0	0	0	0.68
351	23.07	85.48	0.67	6	4.76E-05	2.06E+00	21	1347.59	49	37	673.79	844.49	0	0	0	0.33	0	677.97	-0.1	0	0	0	0.71
352	23.12	95.15	0.67	6	7.47E-05	3.31E+00	22	1385	52	37	692.5	867.93	0	0	0	0.33	0	686.52	-0.11	0	0	0	0.72
353	23.17	105.93	0.65	6	1.24E-04	5.61E+00	24	1408.03	55	38	704.02	882.37	0	0	0	0.33	0	692.15	-0.12	0	0	0	0.73
354	23.25	113.55	0.69	6	1.48E-04	6.94E+00	25	1463.85	57	38	731.92	917.34	0	0	0	0.33	0	703.77	-0.13	0	0	0	0.74
355	23.31	116.05	0.72	6	1.53E-04	7.31E+00	25	1486.46	57	38	743.23	931.51	0	0	0	0.33	0	708.37	-0.13	0	0	0	0.75
356	23.39	119.96	0.72	6	1.75E-04	8.41E+00	26	1500.98	58	38	750.49	940.62	0	0	0	0.33	0	711.51	-0.13	0	0	0	0.75
357	23.44	122	0.71	6	1.90E-04	9.14E+00	26	1504.91	59	38	752.46	943.08	0	0	0	0.33	0	712.45	-0.13	0	0	0	0.76
358	23.53	123.39	0.72	6	1.94E-04	9.42E+00	26	1515.75	59	38	757.88	949.87	0	0	0	0.33	0	714.67	-0.13	0	0	0	0.76
359	23.58	123.35	0.72	6	1.93E-04	9.37E+00	26	1516.88	59	38	758.44	950.58	0	0	0	0.33	0	714.9	-0.13	0	0	0	0.76
360	23.63	123.35	0.72	6	1.92E-04	9.35E+00	26	1517.37	59	38	758.68	950.88	0	0	0	0.33	0	715.02	-0.13	0	0	0	0.76
361	23.71	123.3	0.72	6	1.93E-04	9.37E+00	26	1515.72	59	38	757.86	949.85	0	0	0	0.33	0	714.74	-0.13	0	0	0	0.76
362	23.77	124.79	0.73	6	1.98E-04	9.68E+00	27	1527.59	59	38	763.79	957.29	0	0	0	0.33	0	717.13	-0.13	0	0	0	0.77
363	23.86	127.11	0.76	6	1.99E-04	9.89E+00	27	1555.1	60	39	777.55	974.53	0	0	0	0.33	0	722.55	-0.14	0	0	0	0.77
364	23.9	127.3	0.76	6	1.93E-04	9.66E+00	27	1565.93	60	39	782.96	981.31	0	0	0	0.33	0	724.62	-0.14	0	0	0	0.77
365	23.95	126.37	0.79	6	1.80E-04	9.06E+00	27	1574.16	59	39	787.08	986.47	0	0	0	0.33	0	726.12	-0.14	0	0	0	0.78
366	24.04	123.12	0.82	6	1.50E-04	7.60E+00	27	1584.34	59	39	792.17	992.86	0	0	0	0.33	0	727.83	-0.14	0	0	0	0.78
367	24.08	121.07	0.84	6	1.35E-04	6.85E+00	27	1588	58	38	794	995.15	0	0	0	0.33	0	728.39	-0.13	0	0	0	0.77
368	24.16	116.52	0.86	6	1.08E-04	5.50E+00	26	1589.88	57	38	794.94	996.32	0	0	0	0.33	0	728.46	-0.13	0	0	0	0.77
369	24.23	114.1	0.87	6	9.61E-05	4.89E+00	26	1589.5	56	38	794.75	996.09	0	0	0	0.33	0	728.23	-0.13	0	0	0	0.77
370	24.32	111.59	0.89	6	8.37E-05	4.27E+00	26	1593.43	56	38	796.72	998.55	0	0	0	0.33	0	728.83	-0.13	0	0	0	0.77
371	24.37	110.01	0.9	6	7.70E-05	3.93E+00	26	1594.45	55	38	797.22	999.19	0	0	0	0.33	0	728.93	-0.13	0	0	0	0.77
372	24.44	107.41	0.91	6	6.86E-05	3.49E+00	25	1589.19	55	38	794.59	995.89	0	0	0	0.33	0	727.78	-0.13	0	0	0	0.77
373	24.48	105.65	0.91	6	6.38E-05	3.24E+00	25	1583.38	54	38	791.69	992.25	0	0	0	0.33	0	726.57	-0.12	0	0	0	0.77
374	24.55	102.67	0.9	6	5.70E-05	2.87E+00	25	1569.48	53	38	784.74	983.54	0	0	0	0.33	0	723.75	-0.12	0	0	0	0.77
375	24.62	98.49	0.88	6	4.92E-05	2.43E+00	24	1545.64	52	38	772.82	968.6	0	0	0	0.33	0	718.92	-0.12	0	0	0	0.77
376	24.69	95.61	0.82	6	4.96E-05	2.38E+00	23	1497.4	51	37	748.7	938.37	0	0	0	0.33	0	709.44	-0.11	0	0	0	0.76
377	24.75	92.73	0.81	6	4.44E-05	2.11E+00	23	1481.17	51	37	740.59	928.2	0	0	0	0.33	0	706.07	-0.11	0	0	0	0.76
378	24.83	89.94	0.84	6	3.60E-05	1.72E+00	22	1491.45	50	37	745.73	934.64	0	0	0	0.33	0	707.86	-0.11	0	0	0	0.76
379	24.87	88.09	0.77	6	3.87E-05	1.78E+00	22	1441.25	49	37	720.63	903.18	0	0	0	0.33	0	697.88	-0.11	0	0	0	0.75
380	24.96	79.91	0.87	6	2.04E-05	9.57E-01	21	1465.28	47	37	732.64	918.24	0	0	0	0.33	0	701.88	-0.1	0	0	0	0.75
381	25	74.8	0.94	5	1.32E-05	6.26E-01	20	1482.53	45	37	741.27	929.05	0	0	0	0.33	0	704.79	-0.1	0	0	0	0.76
382	25.07	65.41	1.05	5	5.84E-06	1.68E-01	19	895.78	42	37	749.23	939.03	0	0	0	0.33	0	706.98	-0.11	0	0	0	0.76
383	25.17	50.64	1.23	5	1.40E-06	3.08E-02	17	688.91	37	38	746.58	935.71	0	0	0	0.33	0	704.28	-0.12	0	0	0	0.78
384	25.21	43.58	1.26	4	6.67E-07	1.26E-02	16	590.07	0	0	0	916.04	14	3.01	2.99	0.33	13.7	697.11	0	1	115.64	0	3.01
385	25.31	35.22	1.37	4	2.22E-07	3.36E-03	14	472.96	0	0	0	896.02	14	2.41	2.39	0.33	10.98	689.41	0	1	86.16	0	2.41
386	25.34	32.52	1.41	4	1.45E-07	2.02E-03	14	434.9	0	0	0	889.56	14	2.22	2.19	0.33	10.1	686.84	0	1	76.86	0	2.22
387	25.4	28.06	1.48	3	6.73E-08	8.02E-04	13	372.01	0	0	0	874.46	14	1.9	1.87	0.33	8.64	681.04	0	1	62.74	0	1.9
388	25.46	24.53	1.48	3	3.65E-08	3.77E-04	12	322.46	0	0	0	846.52	14	1.65	1.62	0.33	7.48	671.05	0	1	54.54	0	1.65
389	25.54	21.84	1.32	3	2.70E-08	2.46E-04	11	284.83	0	0	0	789.88	14	1.45	1.43	0.33	6.6	651.19	0	1	53.9	0	1.45
390	25.61	18.86	1.15	3	1.82E-08	1.41E-04	9	243.05	0	0	0	724.12	14	1.24	1.22	0.33	5.62	627.13	0	1	52.93	0	1.24
391	25.68	17.47	1.07	3	1.47E-08	1.05E-04	9	223.66	0	0	0	692.18	14	1.14	1.12	0.33	5.16	615.03	0	1	52.44	0	1.14
392	25.76	16.45	0.96	3	1.36E-08	9.12E-05	9	209.65	0	0	0	658.28	14	1.07	1.04	0.33	4.83	602.03	0	1	54.34	0	1.07
393	25.82	16.17	0.91	3	1.42E-08	9.36E-05	8	205.99	0	0	0	641.76	14	1.05	1.02	0.33	4.73	595.66	0	1	56.75	0	1.05
394	25.86	16.26	0.87	3	1.60E-08	1.06E-04	8	207.37	0	0	0	632.25	14	1.06	1.03	0.33	4.76	592.07	0	1	59.89	0	1.06
395	25.95	16.17	0.77	3	1.96E-08	1.29E-04	8	206.01	0	0	0	605.51	14	1.05	1.02	0.33	4.72	581.66	0	1	67.08	0	1.05
396	26	15.98	0.73	3	2.05E-08	1.34E-04	8	203.37	0	0	0	592.6	14	1.04	1.01	0.33	4.65	576.49	0	1	69.93	0	1.04
397	26.06	15.33	0.69	3	1.89E-08	1.13E-04	8	186.83	0	0	0	575.07	14	0.99	0.96	0.33	4.44	569.21	0	1	70.87	0	0.99
398	26.14	15.05	0.69	3	1.72E-08	9.87E-05	8	178.95	0	0	0	572.89	14	0.97	0.94	0.33	4.34	568.24	0	1	69.43	0	0.97
399	26.18	14.68	0.66	3	1.66E-08	8.97E-05	7	169.28	0	0	0	561.44	14	0.95	0.91	0.33	4.22	563.44	0	1	70.44	0	0.95
400	26.27	14.5	0.64	3	1.62E-08	8.52E-05	7	164.46	0	0	0	556.36	14	0.93	0.9	0.33	4.16	561.32	0	1	70.93	0	0.93
401	26.32	14.68	0.68	3	1.54E-08	8.32E-05	8	168.82	0	0	0	569.15	14	0.95	0.91	0.33	4.21	566.65	0	1	68.04	0	0.95
402	26.41	14.4	0.75	3	1.15E-08	5.96E-05	8	161.46	0	0	0	587.06	14	0.93	0.89	0.33	4.11	573.79	0	1	60.33	0	0.93
403	26.51	14.68	0.83	3	1.04E-08	5.63E-05	8	168.54	0	0	0	611.47	14	0.95	0.91	0.33	4.19	583.65	0	1	55.98	0	0.95
404	26.52	15.24	0.84	3	1.22E-08	7.19E-05	8	183.34	0	0	0	619.68	14	0.99	0.95	0.33	4.37	587.13	0	1	57.78	0	0.99
405	26.59	16.73	0.87	3	1.74E-08	1.20E-04	9	214.58	0	0	0	644.02	14	1.09	1.05	0.33	4.84	597.19	0	1	61.44	0	1.09
406	26.64	17.38	0.84	3	2.24E-08	1.60E-04	9	223.67	0	0	0	641.78	14	1.14	1.09	0.33	5.03	596.61	0	1	66.48	0	1.14
407	26.71	17.47	0.86	3	2.18E-08	1.57E-04	9	224.86	0	0	0	647.99	14	1.15	1.09	0.33	5.05	599.05	0	1	65.4	0	1.15
408	26.78	17.65	0.91	3	2.05E-08	1.49E-04	9	227.58	0	0	0	663.33	14	1.16	1.1	0.33	5.1	604.97	0	1	62.61	0	1.16
409	26.86	17.84	0.92	3	2.08E-08	1.54E-04	9	230.49	0	0	0	669.76	14	1.18	1.12	0.33	5.16	607.5	0	1	62.37	0	1.18
410	26.93	18.03	0.95	3	2.10E-08	1.57E-04	9	233.63	0	0	0	678.23	14	1.19	1.13	0.33	5.22	610.78	0	1	61.69	0	1.19
411	27.01	19.14	1	3	2.46E-08	1.96E-04	9	249.53	0	0	0	703.8	14	1.27	1.2	0.33	5.56	620.65	0	1	62.12	0	1.27
412	27.05	20.07	1.05	3	2.78E-08	2.34E-04	10	262.78	0	0	0	724.79	14	1.34	1.27	0.33	5.85	628.6	0	1	62.36	0	1.34
413	27.11	22.86	1.14	3	4.28E-08	4.15E-04	11	302.32	0	0	0	771.12	14	1.54	1.46	0.33	6.72	645.87	0	1	66.09	0	1.54
414	27.2	26.48	1.34	3	5.94E-08	6.72E-04	12	352.81	0	0	0	848.18	14	1.8	1.69	0.33	7.83	673.05	0	1	65.65	0	1.8
415	27.24	28.15	1.48	3	6.35E-08	7.64E-04	13	375.92	0	0	0	893.08	14	1.92	1.8	0.33	8.33	688.16	0	1	63.41	0	1.92
416	27.34	31.31	1.71	3	7.51E-08	1.01E-03	14	419.6	0	0	0	966.92	14	2.14	2.01	0.33	9.27	712.27	0	1	61.44	0	2.14
417	27.38	32.61	1.72	3	8.85E-08	1.24E-03	14	437.46	0	0	0	978.67	14	2.23	2.09	0.33	9.66	716.17	0	1	63.66	0	2.23

418	27.47	35.68	1.73	3	1.28E-07	1.97E-03	15	479.25	0	0	0	1002.58	14	2.45	2.28	0.33	10.56	724.08	0	1	69.2	0	2.45
419	27.52	36.98	1.74	3	1.48E-07	2.36E-03	15	497.21	0	0	0	1013.1	14	2.54	2.37	0.33	10.94	727.51	0	1	71.46	0	2.54
420	27.6	44.04	1.75	4	3.20E-07	6.11E-03	17	596.24	0	0	0	1057.06	14	3.04	2.83	0.33	13.1	741.76	0	1	85.37	0	3.04
421	27.66	53.89	1.72	4	8.03E-07	1.89E-02	19	733.09	0	0	0	1100.42	14	3.74	3.47	0.33	16.09	755.68	0	1	106.59	0	3.74
422	27.7	59.47	1.64	5	1.37E-06	3.56E-02	20	810.53	39	38	880.95	1104.12	0	0	0	0.33	0	757.34	-0.13	0	0	0	0.86
423	27.79	68.39	1.43	5	3.32E-06	9.94E-02	21	934.56	42	38	865.74	1085.06	0	0	0	0.33	0	752.66	-0.12	0	0	0	0.84
424	27.84	74.24	1.35	5	5.36E-06	1.74E-01	22	1016.03	44	38	863.15	1081.82	0	0	0	0.33	0	752.24	-0.12	0	0	0	0.84
425	27.92	78.42	1.32	5	7.16E-06	3.97E-01	23	1731.97	45	38	865.98	1085.37	0	0	0	0.33	0	753.65	-0.12	0	0	0	0.84
426	27.98	81.3	1.34	5	8.08E-06	4.55E-01	23	1757.91	46	38	878.95	1101.62	0	0	0	0.33	0	758.62	-0.12	0	0	0	0.84
427	28.02	82.33	1.36	5	8.22E-06	4.67E-01	23	1775	46	38	887.5	1112.33	0	0	0	0.33	0	761.81	-0.12	0	0	0	0.85
428	28.1	84.28	1.41	5	8.51E-06	4.93E-01	24	1806.33	47	38	903.16	1131.97	0	0	0	0.33	0	767.62	-0.12	0	0	0	0.85
429	28.17	86.97	1.45	5	9.18E-06	5.41E-01	25	1839.77	47	38	919.88	1152.92	0	0	0	0.33	0	773.79	-0.13	0	0	0	0.86
430	28.25	90.5	0.94	6	2.56E-05	1.30E+00	23	1591.73	48	37	795.87	997.49	0	0	0	0.33	0	728.74	-0.11	0	0	0	0.83
431	28.3	93.01	0.81	6	3.80E-05	1.85E+00	23	1523.36	49	37	761.68	954.64	0	0	0	0.33	0	715.95	-0.1	0	0	0	0.83
432	28.35	97.84	0.78	6	5.11E-05	2.49E+00	24	1520.46	50	37	760.23	952.82	0	0	0	0.33	0	715.82	-0.11	0	0	0	0.83
433	28.44	102.49	0.77	6	6.30E-05	3.10E+00	24	1534.25	52	37	767.13	961.46	0	0	0	0.33	0	718.87	-0.11	0	0	0	0.84
434	28.49	106.86	0.78	6	7.43E-05	3.70E+00	25	1553.89	53	37	776.94	973.77	0	0	0	0.33	0	722.96	-0.11	0	0	0	0.84
435	28.55	97.56	0.77	6	5.08E-05	2.47E+00	24	1517.29	50	37	758.65	950.84	0	0	0	0.33	0	715.28	-0.11	0	0	0	0.83
436	28.62	111.59	0.78	6	8.85E-05	4.46E+00	26	1573.39	54	38	786.7	985.99	0	0	0	0.33	0	727.06	-0.12	0	0	0	0.85
437	28.7	118.19	0.8	6	1.10E-04	5.63E+00	27	1604.39	55	38	802.19	1005.42	0	0	0	0.33	0	733.37	-0.12	0	0	0	0.86
438	28.75	120.7	0.82	6	1.13E-04	5.90E+00	27	1629.75	56	38	814.88	1021.31	0	0	0	0.33	0	738.26	-0.13	0	0	0	0.87
439	28.84	123.39	0.87	6	1.11E-04	5.95E+00	28	1671.69	56	38	835.84	1047.59	0	0	0	0.33	0	745.19	-0.13	0	0	0	0.87
440	28.89	124.6	0.9	6	1.09E-04	5.93E+00	28	1693.81	57	38	846.91	1061.46	0	0	0	0.33	0	750.32	-0.13	0	0	0	0.88
441	28.94	125.72	0.93	6	1.07E-04	5.87E+00	28	1715.95	57	38	857.98	1075.33	0	0	0	0.33	0	754.42	-0.13	0	0	0	0.88
442	29.03	126.65	0.98	6	1.00E-04	5.60E+00	29	1749.83	57	38	874.92	1096.56	0	0	0	0.33	0	760.62	-0.13	0	0	0	0.89
443	29.08	126.83	1	6	9.68E-05	5.46E+00	29	1762.74	57	38	881.37	1104.65	0	0	0	0.33	0	762.96	-0.13	0	0	0	0.89
444	29.16	127.76	1.02	6	9.51E-05	5.43E+00	29	1781.44	57	38	890.72	1116.37	0	0	0	0.33	0	766.39	-0.14	0	0	0	0.89
445	29.21	128.5	1.04	6	9.43E-05	5.42E+00	29	1794.61	57	39	897.3	1124.62	0	0	0	0.33	0	768.79	-0.14	0	0	0	0.89
446	29.31	132.5	1.08	6	9.97E-05	5.85E+00	30	1832.71	58	39	916.35	1148.5	0	0	0	0.33	0	775.78	-0.14	0	0	0	0.9
447	29.34	135.01	1.1	6	1.05E-04	6.22E+00	30	1850.93	59	39	925.47	1159.92	0	0	0	0.33	0	779.12	-0.14	0	0	0	0.91
448	29.4	138.45	1.13	6	1.11E-04	6.68E+00	31	1879.72	60	39	939.86	1177.96	0	0	0	0.33	0	784.33	-0.14	0	0	0	0.91
449	29.49	141.89	1.17	6	1.15E-04	7.07E+00	32	1913.08	60	39	956.54	1198.86	0	0	0	0.33	0	790.3	-0.15	0	0	0	0.92
450	29.54	143.84	1.19	6	1.17E-04	7.27E+00	32	1933.89	61	39	966.95	1211.91	0	0	0	0.33	0	793.99	-0.15	0	0	0	0.92
451	29.63	146.53	1.24	6	1.17E-04	7.39E+00	33	1971.4	61	39	985.7	1235.41	0	0	0	0.33	0	800.55	-0.15	0	0	0	0.93
452	29.66	147.65	1.25	6	1.19E-04	7.56E+00	33	1979.9	61	39	989.95	1240.74	0	0	0	0.33	0	802.06	-0.15	0	0	0	0.93
453	29.74	150.71	1.26	6	1.27E-04	8.12E+00	33	1999.04	62	39	999.52	1252.73	0	0	0	0.33	0	805.46	-0.15	0	0	0	0.94
454	29.81	152.94	1.27	6	1.33E-04	8.58E+00	34	2011.11	63	39	1005.55	1260.29	0	0	0	0.33	0	807.62	-0.16	0	0	0	0.94
455	29.86	155.08	1.28	6	1.39E-04	9.03E+00	34	2022.84	63	40	1011.42	1267.64	0	0	0	0.33	0	809.7	-0.16	0	0	0	0.94
456	29.95	159.35	1.29	6	1.53E-04	1.00E+01	35	2044.14	64	40	1022.07	1281	0	0	0	0.33	0	813.48	-0.16	0	0	0	0.95
457	29.99	161.12	1.3	6	1.60E-04	1.05E+01	35	2051.7	64	40	1025.85	1285.73	0	0	0	0.33	0	814.82	-0.16	0	0	0	0.95
458	30.09	163.35	1.31	6	1.67E-04	1.10E+01	35	2063.31	65	40	1031.66	1293.01	0	0	0	0.33	0	816.88	-0.16	0	0	0	0.96
459	30.14	164.19	1.31	6	1.70E-04	1.12E+01	35	2068.04	65	40	1034.02	1295.97	0	0	0	0.33	0	817.72	-0.16	0	0	0	0.96
460	30.19	165.3	1.31	6	1.74E-04	1.16E+01	36	2071.75	65	40	1035.87	1298.29	0	0	0	0.33	0	818.4	-0.16	0	0	0	0.96
461	30.28	166.79	1.29	6	1.87E-04	1.23E+01	36	2065.17	65	40	1032.59	1294.17	0	0	0	0.33	0	817.4	-0.16	0	0	0	0.96
462	30.32	168.09	1.27	6	1.98E-04	1.30E+01	36	2059.94	65	40	1029.97	1290.89	0	0	0	0.33	0	816.6	-0.16	0	0	0	0.97
463	30.41	171.06	1.24	6	2.22E-04	1.46E+01	36	2052.85	66	40	1026.43	1286.45	0	0	0	0.33	0	815.58	-0.16	0	0	0	0.97
464	30.45	172.55	1.23	6	2.34E-04	1.54E+01	36	2051.16	66	40	1025.58	1285.39	0	0	0	0.33	0	815.37	-0.16	0	0	0	0.97
465	30.55	175.06	1.21	6	2.58E-04	1.69E+01	36	2044.91	67	40	1022.46	1281.48	0	0	0	0.33	0	814.47	-0.17	0	0	0	0.97
466	30.59	175.8	1.2	6	2.69E-04	1.76E+01	36	2038.34	67	40	1019.17	1277.36	0	0	0	0.33	0	813.42	-0.17	0	0	0	0.98
467	30.65	176.82	1.17	6	2.89E-04	1.87E+01	36	2024.6	67	40	1012.3	1268.75	0	0	0	0.33	0	811.2	-0.16	0	0	0	0.98
468	30.72	176.54	1.14	6	3.01E-04	1.93E+01	36	2006.07	67	40	1003.04	1257.14	0	0	0	0.33	0	808.12	-0.16	0	0	0	0.98
469	30.78	176.17	1.11	6	3.12E-04	1.99E+01	36	1988.94	67	40	994.47	1246.4	0	0	0	0.33	0	805.25	-0.16	0	0	0	0.98
470	30.87	175.24	1.08	6	3.21E-04	2.03E+01	36	1967.51	67	40	983.76	1232.98	0	0	0	0.33	0	801.64	-0.16	0	0	0	0.98
471	30.92	174.41	1.07	6	3.20E-04	2.01E+01	35	1959.32	66	40	979.66	1227.84	0	0	0	0.33	0	800.24	-0.16	0	0	0	0.98
472	30.98	173.94	1.05	6	3.23E-04	2.02E+01	35	1950.43	66	40	975.21	1222.27	0	0	0	0.33	0	798.74	-0.16	0	0	0	0.98
473	31.05	174.69	0.82	6	5.19E-04	2.99E+01	34	1798.13	67	40	899.06	1126.83	0	0	0	0.33	0	772.61	-0.16	0	0	0	0.98
474	31.15	178.4	0.77	6	6.43E-04	3.64E+01	34	1766.91	67	40	883.46	1107.26	0	0	0	0.33	0	767.39	-0.17	0	0	0	0.99
475	31.18	181.47	0.76	6	7.05E-04	3.99E+01	34	1767.82	68	40	883.91	1107.83	0	0	0	0.33	0	767.71	-0.17	0	0	0	1
476	31.24	185.37	0.72	6	8.38E-04	4.70E+01	35	1750.88	69	40	875.44	1097.22	0	0	0	0.33	0	764.98	-0.17	0	0	0	1
477	31.33	187.69	0.67	6	1.00E-03	5.52E+01	34	1715.53	69	40	857.77	1075.07	0	0	0	0.33	0	758.95	-0.17	0	0	0	1.01
478	31.37	186.95	0.64	6	1.05E-03	5.69E+01	34	1696.01	69	40	848	1062.83	0	0	0	0.33	0	755.5	-0.17	0	0	0	1.01
479	31.43	187.6	0.62	6	1.13E-03	6.05E+01	34	1679.62	69	40	839.81	1052.56	0	0	0	0.33	0	752.68	-0.17	0	0	0	1.01
480	31.53	187.51	0.63	6	1.07E-03	5.83E+01	34	1692.82	69	40	846.41	1060.83	0	0	0	0.33	0	755.04	-0.17	0	0	0	1.01
481	31.58	186.86	0.66	6	9.94E-04	5.45E+01	34	1710.82	69	40	855.41	1072.11	0	0	0	0.33	0	758.18	-0.17	0	0	0	1.01
482	31.66	182.58	0.7	6	8.07E-04	4.49E+01	34	1735.57	68	40	867.78	1087.62	0	0	0	0.33	0	762.32	-0.17	0	0	0	1.01
483	31.71	178.49	0.74	6	6.67E-04	3.75E+01	34	1755.76	67	40	877.88	1100.28	0	0	0	0.33	0	765.67	-0.16	0	0	0	1
484	31.77	173.48	0.78	6	5.39E-04	3.06E+01	34	1772.82	66	40	886.41	1110.97	0	0	0	0.33	0	768.42	-0.16	0	0	0	1
485	31.85	173.76	0.83	6	4.89E-04	2.83E+01	34	1807.18	66	40	903.59	1132.5	0	0	0	0.33	0	774.47	-0.16	0	0	0	1
486	31.9	173.76	0.85	6	4.61E-04	2.70E+01	34	1827.07	66	40	913.54	1144.97	0	0	0	0.33	0	777.95	-0.16	0	0	0	1
487	31.99	174.03	0.89	6	4.34E-04	2.57E+01	34	1849.81	66	40	924.9	1159.21	0	0	0	0.33	0	781.94	-0.16	0	0	0	1
488	32.03	175.89	0.9	6	4.41E-04	2.63E+01	35	1864.26	66	40	932.13	1168.27	0	0	0	0.33	0	784.53	-0.16	0	0	0	1
489	32.1	177.29	0.94	6	4.24E-04	2.57E+01	35	1892.61	67	40	946.31	1186.04	0	0	0	0.33	0	789.48	-0.16	0	0	0	1.01
490	32.17	172.92	0.98	6	3.45E-04	2.12E+01	35	1915.23	66	40	957.62	1200.21	0	0	0	0.33	0	793.19	-0.16	0	0	0	1
491	32.22	167.62	1.03	6	2.76E-04	1.71E+01	35	1932.53	64	39	966.27	1211.05	0	0	0	0.33	0	795.93	-0.15	0	0	0	1
492	32.31	159.26	1.09	6	1.98E-04	1.24E+01	34	1948.12	63	39	974.06	1220.82	0	0	0	0.33	0	798.27	-0.15	0	0	0	0.99
493	32.36	158.52	1.1	6	1.90E-04	1.19E+01	34	1953	63	39	976.5	1223.88	0	0	0	0.33	0	799.09	-0.15	0	0	0	0.99
494	32.45	165.39	1.09	6	2.31E-04	1.46E+01	35	1968.78	64	39	984.39	1233.77	0	0	0	0.33	0	802.08	-0.15	0	0	0	1
495	32.49	171.8	1.08	6	2.76E-04	1.75E+01	35	1980.45	65	40	990.23	1241.08	0	0	0	0.33	0	804.33	-0.16	0	0	0	1.01
496	32.56	180.72	1.07	6	3.52E-04	2.25E+01	36	1995.49	67	40	997.74	1250.51	0	0	0	0.33	0	807.23	-0.16	0	0	0	1.02
497	32.61	183.14	1.06	6	3.81E-04	2.43E+01	37	1993.77	67	40	996.89	1249.43	0	0	0	0.33	0	807.06	-0.17	0	0	0	1.03
498	32.68	182.77	1.05	6	3.80E-04	2.42E+01	37	1989.78	67	40	994.89	1246.93	0	0	0	0.33	0	806.4	-0.17	0	0	0	1.03
499	32.77	179.8	1.03	6	3.65E-04	2.30E+01	36	1971.59	67	40	985.8	1235.53	0	0	0	0.33	0	803.27	-0.16	0	0	0	1.03
500	32.81	177.84	1.03	6	3.50E-04	2.20E+01	36	1964.66	66	40	982.33	1231.18	0	0	0	0.33	0	802.03	-0.16	0	0	0	1.02
501	32.91	175.34	1.07	6	3.03E-04	1.93E+01	36	1987.98	66	40	993.99	1245.8	0	0	0	0.33	0	805.9	-0.16	0	0	0	1.02
502	32.96	174.22	1.12	6	2.71E-04	1.75E+01	36	2015.27	65	40	1007.64	1262.9	0	0	0	0.33	0	810.45	-0.16	0	0	0	1.02
503	33.01	174.27	1.15	6	2.56E-04	1.67E+01	36	2037	65	40	1018.5	1276.52	0	0	0	0.33	0	814.1	-0.16	0	0	0	1.03
504	33.08	174.27	1.19	6	2.41E-04	1.59E+01	36	2059.6	65	40	1029.8	1290.68	0	0	0	0.33	0	817.88	-0.16	0	0	0	1.03
505	33.15	174.31	1.23	6	2.26E-04	1.51E+01	37	2084.22	65	40	1042.11	1306.11	0	0	0	0.33	0	821.97	-0.16	0	0	0	1.03
506	33.24	177.66	1.29	6	2.23E-04	1.52E+01	37	2128.96	66	40	1064.48	1334.15	0	0	0	0.33	0	829.46	-0.16	0	0	0	1.04
507	33.27	179.05	1.31	6	2.23E-04	1.53E+01	38	2146.16	66	40	1073.08	1344.93	0	0	0	0.33	0	832.33	-0.16	0	0	0	1.04
508	33.34	181.93	1.34	6	2.27E-04	1.58E+01	38	2173.22	67	40	1086.61	1361.88	0	0	0	0.33	0	836.84	-0.17	0	0	0	1.05
509	33.42	183.98	1.39	6	2.21E-04	1.56E+01	39	2209.51	67	40	1104.75	1384.63	0	0	0	0.33	0	842.78	-0.17	0	0	0	1.05
510	33.47	186.3	1.41	6	2.26E-04	1.61E+01	39	2228.87	67	40	1114.43	1396.76	0	0	0	0.33	0	845.97	-0.17	0	0	0	1.06
511	33.55	186.58	1.42	6	2.23E-04	1.60E+01	39	2236.82	67	40	1118.41	1401.74	0	0	0	0.33	0	847.28	-0.17	0	0	0	1.06
512	33.6	187.42	1.42	6	2.27E-04	1.63E+01	39	2239.47	68	40	1119.74	1403.4	0	0	0	0.33	0	847.75	-0.17	0	0	0	1.06
513	33.69	183.51	1.4	6	2.13E-04	1.51E+01	39	2218.99	67	40	1109.5	1390.57	0	0	0	0.33	0	844.39	-0.17	0	0	0	1.06
514	33.74	179.61	1.37	6	2.03E-04	1.42E+01	38	2190.5	66	40	1095.25	1372.72	0	0	0	0.33	0	839.71	-0.17	0	0	0	1.06
515	33.81	175.71	1.32	6	1.98E-04	1.36E+01	37	2151.28	65	40	1075.64	1348.13	0	0	0	0.33	0	833.27	-0.16	0	0	0	1.05
516	33.87	174.41	1.3	6	1.96E-04	1.34E+01	37	2139.8	65	40	1069.9	1340.94	0	0	0	0.33	0	831.38	-0.16	0	0	0	1.05
517	33.93	172.46	1.29	6	1.90E-04	1.29E+01	37	2126.95	65	40	1063.48	1332.89	0	0	0	0.33	0	829.24	-0.16	0	0	0	1.05
518	34.01	172.5	0.95	6	3.45E-04	2.11E+01	35	1909.78	65	39	954.89	1196.79	0	0	0	0.33	0	793.01	-0.15	0	0	0	1.04
519	34.06	172.55	0.93	6	3.57E-04	2.17E+01	35	1898.48	65	39	949.24	1189.71	0	0	0	0.33	0	791.1	-0.15	0	0	0	1.04
520	34.16	179.98	0.95	6	4.11E-04	2.54E+01	36	1930.81	66	40	965.41	1209.98	0	0	0	0.33	0	796.95	-0.16	0	0	0	1.06
521	34.2	185.09	0.94	6	4.71E-04	2.92E+01	36	1937.96	67	40	968.98	1214.46	0	0	0	0.33	0	798.39	-0.16	0	0	0	1.07
522	34.29	193.36	0.92	6	5.94E-04	3.70E+01	37	1942.18	69	40	971.09	1217.1	0	0	0	0.33	0	799.46	-0.17	0	0	0	1.08

523	34.33	191.83	0.92	6	5.74E-04	3.56E+01	37	1938.86	68	40	969.43	1215.02	0	0	0	0.33	0	798.85	-0.17	0	0	0	1.08
524	34.39	190.3	0.92	6	5.52E-04	3.43E+01	37	1936.01	68	40	968.01	1213.24	0	0	0	0.33	0	798.34	-0.17	0	0	0	1.08
525	34.46	192.43	0.94	6	5.56E-04	3.48E+01	37	1955.4	68	40	977.7	1225.38	0	0	0	0.33	0	801.71	-0.17	0	0	0	1.08
526	34.53	190.57	1.04	6	4.43E-04	2.86E+01	38	2017.68	68	40	1008.84	1264.41	0	0	0	0.33	0	812.09	-0.17	0	0	0	1.08
527	34.62	183.42	1.1	6	3.31E-04	2.17E+01	37	2046.18	66	40	1023.09	1282.27	0	0	0	0.33	0	816.6	-0.16	0	0	0	1.07
528	34.67	178.59	1.12	6	2.83E-04	1.86E+01	37	2048.67	65	40	1024.34	1283.83	0	0	0	0.33	0	816.86	-0.16	0	0	0	1.07
529	34.72	172.55	1.13	6	2.40E-04	1.57E+01	36	2036.91	64	39	1019.45	1277.72	0	0	0	0.33	0	815.04	-0.16	0	0	0	1.06
530	34.8	164.37	1.13	6	1.94E-04	1.25E+01	35	2017.13	63	39	1008.56	1264.07	0	0	0	0.33	0	811.13	-0.15	0	0	0	1.06
531	34.86	153.22	1.11	6	1.45E-04	9.21E+00	34	1978.95	60	39	989.48	1240.14	0	0	0	0.33	0	804.3	-0.14	0	0	0	1.04
532	34.91	139.84	1.1	6	9.94E-05	6.15E+00	32	1932.13	57	38	966.06	1210.8	0	0	0	0.33	0	795.79	-0.13	0	0	0	1.03
533	34.99	126.46	1.06	6	6.79E-05	4.06E+00	30	1868.85	54	38	934.42	1171.15	0	0	0	0.33	0	784.28	-0.12	0	0	0	1.01
534	35.04	117.63	1.03	6	5.17E-05	3.02E+00	28	1823.65	52	38	911.82	1142.82	0	0	0	0.33	0	775.94	-0.12	0	0	0	1
535	35.13	101.09	0.98	6	2.87E-05	1.60E+00	26	1737.94	48	37	868.97	1089.11	0	0	0	0.33	0	759.74	-0.11	0	0	0	0.98
536	35.18	93.2	1	6	1.90E-05	1.05E+00	25	1723.04	46	37	861.52	1079.77	0	0	0	0.33	0	756.56	-0.1	0	0	0	0.98
537	35.27	73.03	1.09	5	5.42E-06	1.72E-01	22	993.33	40	37	842.21	1055.57	0	0	0	0.33	0	748.08	-0.1	0	0	0	0.97
538	35.32	62.16	1.08	5	2.61E-06	7.04E-02	20	841.16	37	37	813.73	1019.87	0	0	0	0.33	0	736.57	-0.09	0	0	0	0.97
539	35.4	48.41	1.04	5	8.92E-07	1.85E-02	17	648.51	32	37	762.07	955.13	0	0	0	0.33	0	715.4	-0.09	0	0	0	0.97
540	35.45	41.07	1.03	4	4.32E-07	7.55E-03	15	545.71	0	0	0	916.41	14	2.78	2.12	0.33	10.03	702.32	0	1	133.05	0	2.78
541	35.5	35.49	1.01	4	2.26E-07	3.38E-03	14	467.65	0	0	0	882.95	14	2.39	1.82	0.33	8.52	690.78	0	1	116	0	2.39
542	35.59	25.92	0.98	3	5.48E-08	5.86E-04	12	334.07	0	0	0	815.01	14	1.7	1.3	0.33	5.98	666.48	0	1	85.61	0	1.7
543	35.64	23.32	0.95	3	3.53E-08	3.37E-04	11	297.72	0	0	0	786.29	14	1.52	1.15	0.33	5.33	655.94	0	1	78.58	0	1.52
544	35.72	21.74	0.93	3	2.66E-08	2.35E-04	11	275.79	0	0	0	767.05	14	1.41	1.07	0.33	4.93	648.81	0	1	74.52	0	1.41
545	35.77	22.49	0.9	3	3.26E-08	2.99E-04	11	286.39	0	0	0	767.67	14	1.46	1.11	0.33	5.11	649.31	0	1	79.22	0	1.46
546	35.86	24.07	0.85	3	5.05E-08	5.00E-04	11	308.85	0	0	0	764.59	14	1.58	1.19	0.33	5.5	648.83	0	1	91	0	1.58
547	35.91	24.99	0.83	3	6.23E-08	6.43E-04	11	321.95	0	0	0	767.4	14	1.64	1.24	0.33	5.73	650.13	0	1	96.59	0	1.64
548	35.96	25.46	0.83	3	6.85E-08	7.22E-04	11	329.06	0	0	0	771.02	14	1.68	1.27	0.33	5.86	651.53	0	1	98.77	0	1.68
549	36.05	24.44	0.88	3	5.13E-08	5.18E-04	11	315.28	0	0	0	778.38	14	1.61	1.21	0.33	5.59	653.83	0	1	89.83	0	1.61
550	36.09	23.51	0.95	3	3.71E-08	3.60E-04	11	302.57	0	0	0	792.1	14	1.54	1.16	0.33	5.36	658.27	0	1	79.92	0	1.54
551	36.19	22.02	1.04	3	2.33E-08	2.12E-04	11	283.34	0	0	0	806.82	14	1.45	1.09	0.33	5.01	662.87	0	1	68.27	0	1.45
552	36.23	21.74	1.04	3	2.19E-08	1.96E-04	11	279.46	0	0	0	804.63	14	1.43	1.07	0.33	4.94	662.06	0	1	67.33	0	1.43
553	36.32	21.74	1.05	3	2.13E-08	1.90E-04	11	279.31	0	0	0	808.67	14	1.43	1.07	0.33	4.93	663.47	0	1	66.48	0	1.43
554	36.37	22.49	1.09	3	2.31E-08	2.15E-04	11	289.88	0	0	0	826.63	14	1.48	1.11	0.33	5.11	669.79	0	1	66.49	0	1.48
555	36.42	23.69	1.14	3	2.69E-08	2.64E-04	12	306.64	0	0	0	850.89	14	1.56	1.17	0.33	5.4	678.27	0	1	67.27	0	1.56
556	36.51	26.11	1.21	3	3.72E-08	4.06E-04	12	340.5	0	0	0	890.83	14	1.74	1.3	0.33	5.98	692.05	0	1	70.35	0	1.74
557	36.56	27.32	1.2	3	4.60E-08	5.25E-04	13	356.53	0	0	0	897.84	14	1.82	1.35	0.33	6.26	694.63	0	1	74.25	0	1.82
558	36.65	26.2	1.14	3	4.06E-08	4.39E-04	12	337.92	0	0	0	870.5	14	1.72	1.28	0.33	5.92	685.48	0	1	74.37	0	1.72
559	36.7	25.18	1.12	3	3.43E-08	3.55E-04	12	323.59	0	0	0	859.37	14	1.65	1.23	0.33	5.66	681.56	0	1	71.92	0	1.65
560	36.79	23.69	1.16	3	2.45E-08	2.38E-04	12	303.48	0	0	0	856.61	14	1.55	1.15	0.33	5.3	680.27	0	1	65.52	0	1.55
561	36.84	23.6	1.23	3	2.13E-08	2.07E-04	12	302.37	0	0	0	874.86	14	1.54	1.14	0.33	5.28	686.24	0	1	61.5	0	1.54
562	36.88	23.51	1.29	3	1.93E-08	1.86E-04	12	301.7	0	0	0	889.05	14	1.54	1.14	0.33	5.26	690.85	0	1	58.68	0	1.54
563	36.97	23.32	1.29	3	1.81E-08	1.73E-04	12	298.18	0	0	0	888.59	14	1.52	1.12	0.33	5.19	690.67	0	1	57.79	0	1.52
564	37.02	22.86	1.21	3	1.84E-08	1.72E-04	12	290.59	0	0	0	863.39	14	1.48	1.09	0.33	5.05	682.31	0	1	60.08	0	1.48
565	37.11	21.09	1.07	3	1.57E-08	1.33E-04	11	264.25	0	0	0	811.47	14	1.35	1	0.33	4.6	664.45	0	1	61.71	0	1.35
566	37.16	20.52	1.05	3	1.44E-08	1.15E-04	11	248.68	0	0	0	799.72	14	1.31	0.97	0.33	4.45	660.28	0	1	61.31	0	1.31
567	37.21	19.42	1.02	3	1.18E-08	8.36E-05	10	220.4	0	0	0	780.6	14	1.24	0.91	0.33	4.2	653.34	0	1	59.6	0	1.24
568	37.29	20.67	1	3	1.67E-08	1.37E-04	11	255.41	0	0	0	789.97	14	1.33	0.98	0.33	4.52	657.12	0	1	65.23	0	1.33
569	37.34	19.23	1.01	3	1.19E-08	8.34E-05	10	219.48	0	0	0	779.63	14	1.24	0.91	0.33	4.18	653.06	0	1	59.92	0	1.24
570	37.44	20.81	0.91	3	2.09E-08	1.75E-04	10	261.23	0	0	0	768.39	14	1.35	0.99	0.33	4.56	649.84	0	1	72.34	0	1.35
571	37.48	21.19	0.97	3	2.05E-08	1.77E-04	11	270.03	0	0	0	786.94	14	1.38	1.01	0.33	4.65	656.4	0	1	69.94	0	1.38
572	37.57	22.49	1.12	3	2.03E-08	1.87E-04	11	288.33	0	0	0	841.95	14	1.47	1.07	0.33	4.96	675.45	0	1	64.46	0	1.47
573	37.62	23.6	1.21	3	2.18E-08	2.12E-04	12	303.84	0	0	0	875.92	14	1.55	1.13	0.33	5.22	686.99	0	1	62.93	0	1.55
574	37.71	25.37	1.42	3	2.18E-08	2.30E-04	13	328.48	0	0	0	946.68	14	1.68	1.22	0.33	5.63	710.14	0	1	57.77	0	1.68
575	37.74	21.28	1.48	3	8.81E-09	7.66E-05	12	271.49	0	0	0	921.9	14	1.39	1.01	0.33	4.65	701.09	0	1	45.74	0	1.39
576	37.8	27.78	1.61	3	2.55E-08	2.96E-04	14	361.95	0	0	0	1014.12	14	1.85	1.34	0.33	6.19	731.56	0	1	56.14	0	1.85
577	37.88	29.55	1.72	3	2.91E-08	3.60E-04	14	385.59	0	0	0	1054.79	14	1.97	1.43	0.33	6.58	744.19	0	1	56.01	0	1.97
578	37.97	28.8	1.8	3	2.30E-08	2.75E-04	14	373.52	0	0	0	1066.33	14	1.91	1.38	0.33	6.37	747.44	0	1	51.82	0	1.91
579	38.01	28.25	1.88	3	1.91E-08	2.24E-04	14	365.9	0	0	0	1079.68	14	1.87	1.35	0.33	6.23	751.26	0	1	48.57	0	1.87
580	38.07	28.43	1.98	3	1.78E-08	2.11E-04	14	369.03	0	0	0	1103.08	14	1.88	1.36	0.33	6.28	758.16	0	1	46.59	0	1.88
581	38.13	30.01	2.1	3	2.05E-08	2.58E-04	15	392.42	0	0	0	1143.74	14	2	1.44	0.33	6.66	770.27	0	1	46.77	0	2
582	38.2	33.64	2.18	3	3.21E-08	4.57E-04	16	444.07	0	0	0	1193.37	14	2.27	1.63	0.33	7.53	785.04	0	1	50.97	0	2.27
583	38.29	38.84	2.25	3	5.72E-08	9.47E-04	18	516.8	0	0	0	1251.03	14	2.64	1.89	0.33	8.75	801.89	0	1	57.39	0	2.64
584	38.33	42.28	2.28	3	8.14E-08	1.47E-03	19	563.49	0	0	0	1279.66	14	2.87	2.06	0.33	9.56	810.1	0	1	61.88	0	2.87
585	38.39	49.8	2.32	4	1.65E-07	3.53E-03	20	667.54	0	0	0	1333.95	14	3.41	2.44	0.33	11.43	825.35	0	1	71.89	0	3.41
586	38.48	60.58	2.4	4	3.75E-07	9.83E-03	23	817.49	0	0	0	1408.01	14	4.17	2.98	0.33	14.14	845.53	0	1	85.12	0	4.17
587	38.52	65.41	2.43	4	5.17E-07	1.47E-02	24	884.78	0	0	0	1438.18	14	4.51	3.22	0.33	15.37	853.59	0	1	90.91	0	4.51
588	38.62	80.93	2.46	5	1.33E-06	4.69E-02	27	1100.79	41	39	1203.48	1508.37	0	0	0	0.33	0	872.14	-0.15	0	0	0	1.14
589	38.65	83.81	2.43	5	1.60E-06	5.85E-02	28	1141.04	42	39	1206.15	1511.71	0	0	0	0.33	0	873.13	-0.15	0	0	0	1.14
590	38.76	99.33	2.19	5	4.36E-06	1.89E-01	30	1357.75	46	39	1197.45	1500.8	0	0	0	0.33	0	871.18	-0.14	0	0	0	1.13
591	38.78	104.44	2.1	5	5.98E-06	2.74E-01	31	1429.11	47	39	1190.37	1491.93	0	0	0	0.33	0	869.2	-0.14	0	0	0	1.12
592	38.89	121.82	1.91	5	1.46E-05	1.11E+00	33	2368.82	51	39	1184.41	1484.46	0	0	0	0.33	0	868.05	-0.14	0	0	0	1.13
593	38.94	126.74	1.78	6	2.05E-05	1.52E+00	33	2320.59	52	39	1160.3	1454.24	0	0	0	0.33	0	860.67	-0.14	0	0	0	1.13
594	38.99	128.6	1.73	6	2.33E-05	1.72E+00	33	2301.95	53	39	1150.97	1442.55	0	0	0	0.33	0	857.81	-0.14	0	0	0	1.13
595	39.07	131.76	1.79	6	2.41E-05	1.81E+00	34	2344.59	54	39	1172.3	1469.28	0	0	0	0.33	0	864.67	-0.14	0	0	0	1.13
596	39.12	140.4	1.87	6	2.92E-05	2.26E+00	36	2415.6	55	39	1207.8	1513.78	0	0	0	0.33	0	876.03	-0.14	0	0	0	1.15
597	39.19	150.9	1.96	6	3.62E-05	2.90E+00	38	2500.4	57	39	1250.2	1566.92	0	0	0	0.33	0	889.35	-0.15	0	0	0	1.16
598	39.26	164.84	1.93	6	5.58E-05	4.52E+00	39	2528.32	60	40	1264.16	1584.42	0	0	0	0.33	0	893.99	-0.16	0	0	0	1.18
599	39.31	179.05	1.84	6	9.01E-05	7.28E+00	41	2521.42	63	40	1260.71	1580.09	0	0	0	0.33	0	893.33	-0.16	0	0	0	1.19
600	39.39	194.94	1.59	6	1.78E-04	1.39E+01	42	2429.54	66	40	1214.77	1522.51	0	0	0	0.33	0	879.76	-0.17	0	0	0	1.2
601	39.45	201.91	1.45	6	2.53E-04	1.91E+01	42	2362.68	68	40	1181.34	1480.61	0	0	0	0.33	0	869.63	-0.17	0	0	0	1.21
602	39.54	213.71	1.25	6	4.37E-04	3.17E+01	42	2266.44	70	40	1133.22	1420.3	0	0	0	0.33	0	854.89	-0.18	0	0	0	1.22
603	39.58	220.31	1.22	6	5.28E-04	3.82E+01	43	2258.8	71	41	1129.4	1415.51	0	0	0	0.33	0	853.87	-0.18	0	0	0	1.23
604	39.66	228.11	1.18	6	6.58E-04	4.74E+01	43	2248.37	72	41	1124.18	1408.98	0	0	0	0.33	0	852.45	-0.19	0	0	0	1.25
605	39.72	231.46	1.2	6	6.85E-04	4.97E+01	44	2265.38	73	41	1132.69	1419.64	0	0	0	0.33	0	855.23	-0.19	0	0	0	1.25
606	39.77	231.83	1.22	6	6.64E-04	4.85E+01	44	2281.69	73	41	1140.84	1429.86	0	0	0	0.33	0	857.83	-0.19	0	0	0	1.25
607	39.86	226.07	1.32	6	5.05E-04	3.78E+01	44	2336.8	72	41	1168.4	1464.4	0	0	0	0.33	0	866.33	-0.18	0	0	0	1.25
608	39.91	224.3	1.37	6	4.48E-04	3.40E+01	44	2369.24	71	41	1184.62	1484.72	0	0	0	0.33	0	871.34	-0.18	0	0	0	1.25
609	40	218.26	1.49	6	3.36E-04	2.61E+01	44	2428.31	70	41	1214.15	1521.74	0	0	0	0.33	0	880.33	-0.18	0	0	0	1.24
610	40.05	215.2	1.54	6	2.94E-04	2.31E+01	44	2452.35	70	40	1226.17	1536.81	0	0	0	0.33	0	883.95	-0.18	0	0	0	1.23
611	40.13	212.13	1.62	6	2.46E-04	1.97E+01	44	2496.22	69	40	1248.11	1564.3	0	0	0	0.33	0	890.58	-0.18	0	0	0	1.24
612	40.18	211.29	1.68	6	2.25E-04	1.82E+01	44	2525.57	69	40	1262.79	1582.69	0	0	0	0.33	0	895.01	-0.18	0	0	0	1.24
613	40.23	210.37	1.71	6	2.12E-04	1.73E+01	44	2542.06	69	40	1271.03	1593.02	0	0	0	0.33	0	897.48	-0.18	0	0	0	1.24
614	40.32	211.02	1.73	6	2.07E-04	1.70E+01	45	2560.94	69	40	1280.47	1604.85	0	0	0	0.33	0	900.36	-0.18	0	0	0	1.24
615	40.37	211.11	1.73	6	2.09E-04	1.71E+01	45	2557.71	69	40	1278.85	1602.83	0	0	0	0.33	0	899.9	-0.18	0	0	0	1.24
616	40.45	211.48	1.7	6	2.18E-04	1.78E+01	45	2543.26	69	40	1271.63	1593.78	0	0	0	0.33	0	897.77	-0.18	0	0	0	1.25
617	40.51	211.2	1.68	6	2.21E-04	1.80E+01	44	2532.52	69	40	1266.26	1587.04	0	0	0	0.33	0	896.17	-0.18	0	0	0	1.25
618	40.55	210.09	1.67	6	2.20E-04	1.78E+01	44	2522.16	68	40	1261.08	1580.55	0	0	0	0.33	0	894.61	-0.17	0	0	0	1.25
619	40.63	208.04	1.64	6	2.16E-04	1.73E+01	44	2504.92	68	40	1252.46	1569.75	0	0	0	0.33	0	891.99	-0.17	0	0	0	1.25
620	40.69	205.81	1.63	6	2.09E-04	1.67E+01	44	2492.11	68	40	1246.05	1561.72	0	0	0	0.33	0	890.03	-0.17	0	0	0	1.24
621	40.78	201.45	1.6	6	1.95E-04	1.54E+01	43	2470.04	67	40	1235.02	1547.89	0	0	0	0.33	0	886.61	-0.17	0	0	0	1.24
622	40.83	199.63	1.59	6	1.87E-04	1.47E+01	43	2458.88	66	40	1229.44	1540.9	0	0	0	0.33	0	884.88	-0.17	0	0	0	1.24
623	40.91	195.03	1.58	6	1.72E-04	1.35E+01	42	2444.53	66	40	1222.27	1531.91	0	0	0	0.33	0	882.62	-0.17	0	0	0	1.24
624	40.97	191.5	1.58	6	1.59E-04	1.24E+01	42	2434.18	65	40	1217.09	1525.42	0	0	0	0.33	0	880.98	-0.16	0	0	0	1.23
625	41.01	188.53	1.58	6	1.48E-04	1.15E+01	41	2427.05	64	40	1213.52	1520.95	0	0	0	0.33	0	879.83	-0.16	0	0	0	1.23
626	41.1	185.93	1.35	6	1.93E-04	1.41E+01	40	2282.34	64	40	1141.17	1430.27	0	0	0	0.33	0	857.28	-0.16	0	0	0	1.22
627	41.15	186.21	1.29	6	2.12E-04	1.53E+01	39	2245.93	64	39	1122.96	1407.45	0	0	0	0.33	0	851.53	-0.16	0	0	0	1.22

628	41.24	186.86	1.41	6	1.79E-04	1.33E+01	40	2323.86	64	40	1161.93	1456.29	0	0	0	0.33	0	863.88	-0.16	0	0	0	1.23
629	41.28	187.14	1.49	6	1.61E-04	1.22E+01	41	2373.84	64	40	1186.92	1487.6	0	0	0	0.33	0	871.69	-0.16	0	0	0	1.23
630	41.38	187.79	1.64	6	1.34E-04	1.06E+01	41	2462.64	64	40	1231.32	1543.26	0	0	0	0.33	0	885.4	-0.16	0	0	0	1.24
631	41.41	183.79	1.66	6	1.17E-04	9.26E+00	41	2468.91	63	40	1234.46	1547.18	0	0	0	0.33	0	886.28	-0.16	0	0	0	1.24
632	41.48	179.8	1.71	6	9.99E-05	7.95E+00	41	2485.31	62	40	1242.65	1557.46	0	0	0	0.33	0	888.7	-0.16	0	0	0	1.24
633	41.55	178.31	1.75	6	9.12E-05	7.32E+00	41	2505.34	62	40	1252.67	1570.01	0	0	0	0.33	0	891.73	-0.16	0	0	0	1.24
634	41.64	174.69	1.78	6	7.99E-05	6.43E+00	40	2513.09	61	40	1256.54	1574.87	0	0	0	0.33	0	892.86	-0.16	0	0	0	1.24
635	41.68	171.99	1.77	6	7.53E-05	6.03E+00	40	2500.42	61	39	1250.21	1566.93	0	0	0	0.33	0	890.89	-0.15	0	0	0	1.23
636	41.74	168.55	1.74	6	7.11E-05	5.64E+00	39	2474.83	60	39	1237.41	1550.89	0	0	0	0.33	0	886.94	-0.15	0	0	0	1.23
637	41.81	163.72	1.7	6	6.55E-05	5.12E+00	39	2438.72	59	39	1219.36	1528.26	0	0	0	0.33	0	881.32	-0.15	0	0	0	1.23
638	41.87	158.61	1.65	6	6.03E-05	4.63E+00	38	2397.36	58	39	1198.68	1502.35	0	0	0	0.33	0	874.84	-0.15	0	0	0	1.22
639	41.96	151.73	1.58	6	5.35E-05	4.01E+00	36	2341.82	57	39	1170.91	1467.54	0	0	0	0.33	0	866.04	-0.14	0	0	0	1.21
640	42.01	148.2	1.54	6	5.05E-05	3.74E+00	36	2310.15	56	39	1155.08	1447.69	0	0	0	0.33	0	860.98	-0.14	0	0	0	1.21
641	42.07	142.26	1.49	6	4.50E-05	3.26E+00	35	2262.71	55	38	1131.35	1417.96	0	0	0	0.33	0	853.31	-0.13	0	0	0	1.2
642	42.15	138.82	1.48	6	4.06E-05	2.92E+00	34	2248.61	54	38	1124.3	1409.13	0	0	0	0.33	0	850.99	-0.13	0	0	0	1.2
643	42.2	135.1	1.47	6	3.62E-05	2.59E+00	34	2233.43	53	38	1116.72	1399.62	0	0	0	0.33	0	848.46	-0.13	0	0	0	1.19
644	42.29	128.23	1.48	6	2.81E-05	1.99E+00	33	2217.17	52	38	1108.58	1389.42	0	0	0	0.33	0	845.66	-0.12	0	0	0	1.19
645	42.34	122.56	1.55	6	2.07E-05	1.48E+00	32	2237.89	50	38	1118.95	1402.41	0	0	0	0.33	0	848.81	-0.12	0	0	0	1.19
646	42.41	109.83	1.69	5	1.04E-05	7.51E-01	31	2266.16	47	38	1133.08	1420.13	0	0	0	0.33	0	852.92	-0.12	0	0	0	1.18
647	42.46	101.28	1.76	5	6.58E-06	4.78E-01	30	2264.46	45	38	1132.23	1419.06	0	0	0	0.33	0	852.34	-0.12	0	0	0	1.18
648	42.52	87.62	1.82	5	3.11E-06	1.19E-01	27	1192.09	41	38	1117.65	1400.79	0	0	0	0.33	0	847.12	-0.12	0	0	0	1.19
649	42.6	72.57	1.89	5	1.19E-06	3.75E-02	25	981.36	37	38	1094.32	1371.55	0	0	0	0.33	0	838.85	-0.12	0	0	0	1.19
650	42.66	65.14	1.95	4	6.70E-07	1.88E-02	23	877.35	0	0	0	1360.94	14	4.48	2.92	0.33	14.11	835.69	0	1	112.26	0	4.48
651	42.72	58.26	2.02	4	3.69E-07	9.22E-03	22	781.2	0	0	0	1349.98	14	3.99	2.6	0.33	12.4	832.41	0	1	96.7	0	3.99
652	42.79	55.1	2.11	4	2.58E-07	6.10E-03	22	737.01	0	0	0	1358.25	14	3.76	2.45	0.33	11.59	834.4	0	1	87.52	0	3.76
653	42.89	52.78	2.16	4	1.98E-07	4.48E-03	21	704.3	0	0	0	1361.36	14	3.59	2.33	0.33	11	835.09	0	1	81.58	0	3.59
654	42.94	51.94	2.12	4	1.91E-07	4.24E-03	21	692.44	0	0	0	1347.33	14	3.53	2.29	0.33	10.79	831.37	0	1	81.76	0	3.53
655	42.98	50.55	2.07	4	1.77E-07	3.81E-03	21	672.82	0	0	0	1327.74	14	3.43	2.23	0.33	10.46	826.12	0	1	81.41	0	3.43
656	43.05	49.8	1.98	4	1.80E-07	3.83E-03	20	662.17	0	0	0	1302.22	14	3.38	2.19	0.33	10.29	819.29	0	1	83.65	0	3.38
657	43.11	49.34	1.79	4	2.13E-07	4.47E-03	20	655.65	0	0	0	1251.13	14	3.35	2.16	0.33	10.21	805.48	0	1	91.46	0	3.35
658	43.2	49.15	1.43	4	3.36E-07	7.02E-03	19	652.62	0	0	0	1146.81	14	3.33	2.15	0.33	10.24	776.42	0	1	114.25	0	3.33
659	43.25	47.85	1.29	4	3.65E-07	7.41E-03	18	634.21	0	0	0	1098.04	14	3.24	2.09	0.33	9.96	762.28	0	1	123.06	0	3.24
660	43.32	41.72	1.16	4	2.35E-07	4.13E-03	17	547.88	0	0	0	1026.96	14	2.8	1.8	0.33	8.52	740.66	0	1	118.54	0	2.8
661	43.4	35.03	1.05	4	1.22E-07	1.78E-03	15	453.97	0	0	0	957.81	14	2.32	1.49	0.33	6.95	718.68	0	1	108.2	0	2.32
662	43.48	28.62	0.97	3	5.38E-08	6.28E-04	13	364.36	0	0	0	891.81	14	1.86	1.19	0.33	5.51	696.57	0	1	93.79	0	1.86
663	43.52	26.3	0.95	3	3.77E-08	4.00E-04	12	331.6	0	0	0	865.78	14	1.69	1.09	0.33	5.01	687.46	0	1	87.51	0	1.69
664	43.58	23.97	0.95	3	2.39E-08	2.24E-04	12	292.77	0	0	0	848.22	14	1.53	0.98	0.33	4.52	680.96	0	1	78.41	0	1.53
665	43.67	23.93	1.05	3	1.99E-08	1.86E-04	12	292.15	0	0	0	876.5	14	1.53	0.98	0.33	4.51	690.23	0	1	71.44	0	1.53
666	43.72	23.93	1.13	3	1.71E-08	1.60E-04	12	292.29	0	0	0	901.6	14	1.53	0.98	0.33	4.51	698.33	0	1	66.04	0	1.53
667	43.81	23.88	1.32	3	1.26E-08	1.18E-04	12	291.28	0	0	0	951.97	14	1.53	0.97	0.33	4.5	714.25	0	1	56.71	0	1.53
668	43.86	29.64	1.47	3	2.85E-08	3.46E-04	14	380.07	0	0	0	1043.95	14	1.94	1.24	0.33	5.71	743.94	0	1	64.84	0	1.94
669	43.9	43.67	1.62	4	1.43E-07	2.65E-03	18	577.09	0	0	0	1183.24	14	2.94	1.88	0.33	8.78	786.56	0	1	88.92	0	2.94
670	43.98	61.42	1.92	4	4.97E-07	1.31E-02	23	825.09	0	0	0	1350.63	14	4.21	2.68	0.33	12.88	833.36	0	1	107.24	0	4.21
671	44.03	70.71	2.07	4	8.16E-07	2.49E-02	25	954.05	0	0	0	1428.04	14	4.87	3.09	0.33	15.04	853.94	0	1	115.29	0	4.87
672	44.13	84.55	2.21	5	1.61E-06	5.92E-02	28	1146.87	40	38	1210.76	1517.49	0	0	0	0.33	0	877.09	-0.13	0	0	0	1.25
673	44.18	88.09	2.16	5	2.05E-06	7.86E-02	29	1196.14	41	38	1208.95	1515.22	0	0	0	0.33	0	876.69	-0.13	0	0	0	1.25
674	44.27	99.05	1.99	5	4.26E-06	1.82E-01	30	1349.16	44	38	1197.78	1501.22	0	0	0	0.33	0	873.68	-0.13	0	0	0	1.24
675	44.31	109.46	1.86	5	7.71E-06	5.87E-01	31	2378.12	46	38	1189.06	1490.29	0	0	0	0.33	0	871.35	-0.12	0	0	0	1.23
676	44.36	113.08	1.7	5	1.09E-05	8.05E-01	31	2310.15	47	38	1155.07	1447.69	0	0	0	0.33	0	860.81	-0.12	0	0	0	1.23
677	44.45	103.6	1.4	5	1.09E-05	7.34E-01	29	2111.97	45	37	1055.99	1323.5	0	0	0	0.33	0	828.48	-0.11	0	0	0	1.2
678	44.5	99.79	1.59	5	6.92E-06	4.89E-01	29	2204.61	44	37	1102.31	1381.56	0	0	0	0.33	0	843.5	-0.11	0	0	0	1.22
679	44.56	104.02	1.61	5	8.16E-06	5.84E-01	30	2233.35	45	37	1116.68	1399.57	0	0	0	0.33	0	848.33	-0.11	0	0	0	1.22
680	44.63	95.52	1.77	5	4.52E-06	1.88E-01	29	1299.45	43	38	1138.24	1426.6	0	0	0	0.33	0	854.95	-0.12	0	0	0	1.23
681	44.72	104.44	1.87	5	6.01E-06	2.74E-01	31	1423.96	45	38	1184.77	1484.91	0	0	0	0.33	0	870.01	-0.12	0	0	0	1.24
682	44.79	123.02	1.89	5	1.26E-05	9.91E-01	34	2452.26	49	38	1226.13	1536.75	0	0	0	0.33	0	883.45	-0.13	0	0	0	1.26
683	44.84	135.19	1.86	6	2.00E-05	1.59E+00	36	2481.6	52	38	1240.8	1555.13	0	0	0	0.33	0	888.3	-0.13	0	0	0	1.27
684	44.88	143.93	1.83	6	2.78E-05	2.22E+00	37	2493.91	54	39	1246.96	1562.85	0	0	0	0.33	0	890.42	-0.14	0	0	0	1.27
685	44.95	153.78	1.82	6	3.80E-05	3.07E+00	38	2520.62	56	39	1260.31	1579.59	0	0	0	0.33	0	894.74	-0.14	0	0	0	1.29
686	45.02	162.14	1.82	6	4.84E-05	3.94E+00	39	2546.4	57	39	1273.2	1595.75	0	0	0	0.33	0	898.84	-0.14	0	0	0	1.3
687	45.11	171.53	1.89	6	5.72E-05	4.79E+00	41	2615.69	59	39	1307.85	1639.17	0	0	0	0.33	0	909.43	-0.15	0	0	0	1.31
688	45.15	175.8	1.96	6	5.93E-05	5.06E+00	42	2664.55	60	39	1332.28	1669.79	0	0	0	0.33	0	916.75	-0.15	0	0	0	1.32
689	45.25	185.74	2.09	6	6.66E-05	5.88E+00	44	2758.71	62	40	1379.36	1728.79	0	0	0	0.33	0	930.7	-0.16	0	0	0	1.34
690	45.3	190.02	2.08	6	7.39E-05	6.55E+00	44	2770.83	62	40	1385.41	1736.39	0	0	0	0.33	0	932.55	-0.16	0	0	0	1.34
691	45.34	194.57	2.09	6	8.19E-05	7.31E+00	45	2785.65	63	40	1392.83	1745.67	0	0	0	0.33	0	934.78	-0.16	0	0	0	1.35
692	45.43	204.14	2.11	6	9.92E-05	8.97E+00	46	2824.75	65	40	1412.38	1770.18	0	0	0	0.33	0	940.58	-0.17	0	0	0	1.36
693	45.48	213.25	2.11	6	1.21E-04	1.11E+01	47	2847.46	66	40	1423.73	1784.41	0	0	0	0.33	0	943.98	-0.17	0	0	0	1.38
694	45.58	224.58	2.1	6	1.55E-04	1.42E+01	49	2871.19	68	41	1435.6	1799.28	0	0	0	0.33	0	947.55	-0.18	0	0	0	1.39
695	45.62	228.95	2.05	6	1.79E-04	1.64E+01	49	2850.67	69	41	1425.34	1786.42	0	0	0	0.33	0	944.72	-0.18	0	0	0	1.39
696	45.68	234.71	1.97	6	2.17E-04	1.96E+01	49	2823.3	70	41	1411.65	1769.27	0	0	0	0.33	0	940.93	-0.18	0	0	0	1.4
697	45.75	236.1	1.87	6	2.50E-04	2.22E+01	49	2769.38	70	41	1384.69	1735.48	0	0	0	0.33	0	933.25	-0.18	0	0	0	1.4
698	45.8	233.13	1.81	6	2.53E-04	2.21E+01	48	2728.52	70	41	1364.26	1709.87	0	0	0	0.33	0	927.32	-0.18	0	0	0	1.4
699	45.89	224.21	1.73	6	2.31E-04	1.97E+01	47	2665.49	68	40	1332.75	1670.37	0	0	0	0.33	0	918.03	-0.17	0	0	0	1.39
700	45.94	219.1	1.71	6	2.15E-04	1.82E+01	46	2638.27	67	40	1319.14	1653.32	0	0	0	0.33	0	913.96	-0.17	0	0	0	1.38
701	46.03	207.11	1.65	6	1.77E-04	1.46E+01	45	2581.32	65	40	1290.66	1617.63	0	0	0	0.33	0	905.35	-0.16	0	0	0	1.37
702	46.08	202.93	1.66	6	1.60E-04	1.32E+01	44	2574.89	65	40	1287.44	1613.6	0	0	0	0.33	0	904.33	-0.16	0	0	0	1.37
703	46.13	195.31	1.67	6	1.32E-04	1.08E+01	43	2564.77	63	40	1282.39	1607.26	0	0	0	0.33	0	902.7	-0.16	0	0	0	1.36
704	46.22	187.32	1.7	6	1.05E-04	8.60E+00	42	2562.42	62	39	1281.21	1605.78	0	0	0	0.33	0	902.23	-0.15	0	0	0	1.35
705	46.26	184.44	1.72	6	9.52E-05	7.83E+00	42	2566.7	61	39	1283.35	1608.47	0	0	0	0.33	0	902.83	-0.15	0	0	0	1.35
706	46.35	181.56	1.74	6	8.57E-05	7.07E+00	42	2574.31	61	39	1287.16	1613.23	0	0	0	0.33	0	903.95	-0.15	0	0	0	1.35
707	46.4	181.75	1.73	6	8.70E-05	7.16E+00	42	2570.09	61	39	1285.04	1610.59	0	0	0	0.33	0	903.33	-0.15	0	0	0	1.35
708	46.49	185.09	1.68	6	1.01E-04	8.24E+00	42	2548.77	61	39	1274.38	1597.23	0	0	0	0.33	0	900.24	-0.15	0	0	0	1.36
709	46.54	188.16	1.62	6	1.17E-04	9.48E+00	42	2521.76	62	39	1260.88	1580.3	0	0	0	0.33	0	896.26	-0.15	0	0	0	1.36
710	46.63	197.36	1.51	6	1.67E-04	1.33E+01	43	2482.38	64	40	1241.19	1555.62	0	0	0	0.33	0	890.52	-0.16	0	0	0	1.37
711	46.68	202.1	1.48	6	1.95E-04	1.55E+01	43	2473.26	64	40	1236.63	1549.91	0	0	0	0.33	0	889.24	-0.16	0	0	0	1.37
712	46.73	206.56	1.45	6	2.26E-04	1.78E+01	43	2463.17	65	40	1231.59	1543.59	0	0	0	0.33	0	887.81	-0.16	0	0	0	1.38
713	46.81	210.64	1.45	6	2.45E-04	1.95E+01	44	2474.14	66	40	1237.07	1550.46	0	0	0	0.33	0	889.58	-0.16	0	0	0	1.39
714	46.86	209.9	1.47	6	2.33E-04	1.86E+01	44	2487.88	66	40	1243.94	1559.07	0	0	0	0.33	0	891.67	-0.16	0	0	0	1.39
715	46.95	203.21	1.56	6	1.78E-04	1.44E+01	44	2527.22	64	40	1263.61	1583.72	0	0	0	0.33	0	897.51	-0.16	0	0	0	1.38
716	47	197.17	1.68	6	1.32E-04	1.09E+01	44	2588.65	63	40	1294.32	1622.22	0	0	0	0.33	0	906.61	-0.16	0	0	0	1.38
717	47.09	179.05	2	6	5.79E-05	5.05E+00	43	2724.46	60	39	1362.23	1707.33	0	0	0	0.33	0	926.3	-0.15	0	0	0	1.37
718	47.14	166.51	2.18	6	3.41E-05	3.04E+00	42	2785.07	57	39	1392.54	1745.31	0	0	0	0.33	0	934.86	-0.15	0	0	0	1.36
719	47.19	152.66	2.31	5	2.01E-05	1.81E+00	40	2804.87	54	39	1402.44	1757.72	0	0	0	0.33	0	937.47	-0.15	0	0	0	1.36
720	47.28	122.56	2.53	5	5.87E-06	3.15E-01	36	1675.33	48	39	1400.11	1754.8	0	0	0	0.33	0	936.17	-0.14	0	0	0	1.35
721	47.33	109.83	2.63	5	3.24E-06	1.55E-01	34	1497.07	45	39	1393.11	1746.03	0	0	0	0.33	0	933.85	-0.14	0	0	0	1.35
722	47.41	99.51	2.69	5	1.92E-06	8.31E-02	33	1352.55	42	39	1383.69	1734.23	0	0	0	0.33	0	930.88	-0.14	0	0	0	1.36
723	47.46	109.32	2.71	5	2.94E-06	1.40E-01	34	1489.9	44	39	1410.58	1767.93	0	0	0	0.33	0	938.93	-0.14	0	0	0	1.36
724	47.51	102.49	2.72	5	2.15E-06	9.62E-02	33	1394.4	43	39	1397.01	1750.92	0	0	0	0.33	0	934.86	-0.14	0	0	0	1.36
725	47.6	108.81	2.69	5	2.90E-06	1.38E-01	34	1482.97	44	39	1407.48	1764.04	0	0	0	0.33	0	938.08	-0.14	0	0	0	1.36
726	47.65	110.85	2.2	5	4.97E-06	2.41E-01	33	1511.42	45	38	1301.37	1631.05	0	0	0	0.33	0	907.1	-0.13	0	0	0	1.33
727	47.74	104.63	1.55	5	8.03E-06	5.78E-01	30	2248.65	44	37	1124.33	1409.15	0	0	0	0.33	0	852.2	-0.11	0	0	0	1.29
728	47.78	102.77	1.49	5	8.00E-06	5.66E-01	29	2208.9	43	37	1104.45	1384.24	0	0	0	0.33	0	845.76	-0.11	0	0	0	1.28
729	47.87	102.49	1.41	5	8.78E-06	6.09E-01	29	2165.81	43	37	1082.91	1357.24	0	0	0	0.33	0	838.79	-0.1	0	0	0	1.28
730	47.92	105.83	1.38	5	1.06E-05	7.37E-01	29	2161.89	44	37	1080.94	1354.78	0	0	0	0.33	0	838.29	-0.1	0	0	0	1.28
731	47.97	109.92	1.36	5	1.32E-05	9.14E-01	30	2161.98	45	37	1080.99	1354.84	0	0	0	0.33	0	838.47	-0.1	0	0	0	1.28
732	48.04	113.64	1.35	5	1.57E-05	1.09E+00	31	2169.36	46	37	1084.68	1359.46	0	0	0	0.33	0	839.83	-0.11	0	0	0	1.29

733	48.12	122.65	1.33	6	2.28E-05	1.60E+00	32	2190.99	48	37	1095.49	1373.02	0	0	0	0.33	0	843.66	-0.11	0	0	0	1.3
734	48.18	129.62	1.27	6	3.22E-05	2.25E+00	33	2177.88	50	37	1088.94	1364.8	0	0	0	0.33	0	841.78	-0.11	0	0	0	1.3
735	48.25	131.29	1.2	6	3.87E-05	2.65E+00	32	2134.57	50	37	1067.29	1337.67	0	0	0	0.33	0	834.81	-0.11	0	0	0	1.3
736	48.3	132.13	1.16	6	4.26E-05	2.88E+00	32	2110.98	50	37	1055.49	1322.88	0	0	0	0.33	0	830.99	-0.11	0	0	0	1.3
737	48.39	132.22	1.13	6	4.45E-05	2.99E+00	32	2096.38	50	37	1048.19	1313.73	0	0	0	0.33	0	828.63	-0.11	0	0	0	1.3
738	48.43	131.57	1.14	6	4.28E-05	2.88E+00	32	2100.08	50	37	1050.04	1316.05	0	0	0	0.33	0	829.23	-0.11	0	0	0	1.3
739	48.52	130.64	1.18	6	3.87E-05	2.63E+00	32	2123.14	50	37	1061.57	1330.5	0	0	0	0.33	0	833.02	-0.11	0	0	0	1.31
740	48.57	129.81	1.2	6	3.61E-05	2.47E+00	32	2136.46	50	37	1068.23	1338.85	0	0	0	0.33	0	835.19	-0.11	0	0	0	1.31
741	48.62	129.06	1.23	6	3.33E-05	2.30E+00	32	2154.23	49	37	1077.11	1349.98	0	0	0	0.33	0	838.09	-0.11	0	0	0	1.31
742	48.71	129.11	1.23	6	3.34E-05	2.31E+00	32	2153.95	49	37	1076.98	1349.81	0	0	0	0.33	0	838.08	-0.11	0	0	0	1.31
743	48.76	129.11	1.22	6	3.37E-05	2.32E+00	32	2150.59	49	37	1075.29	1347.7	0	0	0	0.33	0	837.55	-0.11	0	0	0	1.31
744	48.84	129.16	1.2	6	3.51E-05	2.40E+00	32	2135.36	49	37	1067.68	1338.16	0	0	0	0.33	0	835.1	-0.11	0	0	0	1.31
745	48.89	129.34	1.18	6	3.63E-05	2.47E+00	32	2125.41	50	37	1062.7	1331.92	0	0	0	0.33	0	833.5	-0.11	0	0	0	1.31
746	48.98	130.08	1.17	6	3.80E-05	2.58E+00	32	2120.97	50	37	1060.49	1329.14	0	0	0	0.33	0	832.83	-0.11	0	0	0	1.31
747	49.04	129.9	1.19	6	3.63E-05	2.48E+00	32	2134.86	50	37	1067.43	1337.85	0	0	0	0.33	0	835.12	-0.11	0	0	0	1.32
748	49.13	129.53	1.23	6	3.32E-05	2.30E+00	32	2163.11	49	37	1081.55	1355.55	0	0	0	0.33	0	839.75	-0.11	0	0	0	1.32
749	49.17	129.53	1.25	6	3.22E-05	2.24E+00	33	2176.02	49	37	1088.01	1363.64	0	0	0	0.33	0	841.86	-0.11	0	0	0	1.32
750	49.22	129.53	1.26	6	3.17E-05	2.21E+00	33	2181.9	49	37	1090.95	1367.32	0	0	0	0.33	0	842.83	-0.11	0	0	0	1.32
751	49.31	132.04	1.26	6	3.46E-05	2.43E+00	33	2190.04	50	37	1095.02	1372.42	0	0	0	0.33	0	844.26	-0.11	0	0	0	1.33
752	49.36	134.73	1.26	6	3.79E-05	2.67E+00	33	2198.81	50	37	1099.41	1377.92	0	0	0	0.33	0	845.77	-0.11	0	0	0	1.33
753	49.44	139.75	1.27	6	4.44E-05	3.15E+00	34	2218.34	51	38	1109.17	1390.16	0	0	0	0.33	0	849.08	-0.12	0	0	0	1.34
754	49.5	142.35	1.26	6	4.72E-05	3.38E+00	35	2235.79	52	38	1117.9	1401.1	0	0	0	0.33	0	851.97	-0.12	0	0	0	1.35
755	49.55	143.74	1.29	6	4.82E-05	3.48E+00	35	2248.81	52	38	1124.4	1409.25	0	0	0	0.33	0	854.1	-0.12	0	0	0	1.35
756	49.63	145.32	1.31	6	4.97E-05	3.60E+00	35	2262.08	53	38	1131.04	1417.57	0	0	0	0.33	0	856.29	-0.12	0	0	0	1.36
757	49.68	146.62	1.31	6	5.14E-05	3.74E+00	35	2268.18	53	38	1134.09	1421.39	0	0	0	0.33	0	857.31	-0.12	0	0	0	1.36
758	49.77	148.95	1.31	6	5.54E-05	4.04E+00	36	2274.11	53	38	1137.05	1425.11	0	0	0	0.33	0	858.34	-0.12	0	0	0	1.36
759	49.81	149.78	1.3	6	5.75E-05	4.18E+00	36	2271.89	53	38	1135.94	1423.72	0	0	0	0.33	0	858.03	-0.12	0	0	0	1.37
760	49.91	154.52	1.27	6	6.97E-05	5.05E+00	36	2265.03	54	38	1132.51	1419.42	0	0	0	0.33	0	857.1	-0.12	0	0	0	1.37
761	49.96	156.01	1.29	6	7.05E-05	5.16E+00	37	2282.24	55	38	1141.12	1430.2	0	0	0	0.33	0	859.87	-0.13	0	0	0	1.38
762	50	156.29	0	0	0.00E+00	0.00E+00	0	220.01	0	0	0	137.87	0	0	0	0.33	0	318.63	0	0	0	0	0
763	50.09	154.61	0	0	0.00E+00	0.00E+00	0	217.59	0	0	0	136.36	0	0	0	0.33	0	316.87	0	0	0	0	0
764	50.14	153.22	0	0	0.00E+00	0.00E+00	0	215.59	0	0	0	135.1	0	0	0	0.33	0	315.41	0	0	0	0	0
765	50.23	151.08	0	0	0.00E+00	0.00E+00	0	212.51	0	0	0	133.17	0	0	0	0.33	0	313.15	0	0	0	0	0
766	50.28	149.6	0	0	0.00E+00	0.00E+00	0	210.38	0	0	0	131.84	0	0	0	0.33	0	311.58	0	0	0	0	0
767	50.34	128.5	0	0	0.00E+00	0.00E+00	0	180.09	0	0	0	112.85	0	0	0	0.33	0	288.27	0	0	0	0	0

MAJOR DIVISION			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL, SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINE (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

KEY:

 Indicates 2.5-inch Inside Diameter. Ring Sample.

 Indicates 2-inch OD Split Spoon Sample (SPT).

 Indicates Shelby Tube Sample.

 Indicates No Recovery.

 Indicates SPT with 140# Hammer 30 in. Drop.

 Indicates Bulk Sample.

 Indicates Small Bag Sample.

 Indicates Non-Standard

 Indicates Core Run.

COMPONENT PROPORTIONS

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace	1 - 5%
Few	5 - 10%
Little	10 - 20%
Some	20 - 35%
And	35 - 50%

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074 mm)

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
DAMP	Some perceptible moisture; below optimum
MOIST	No visible water; near optimum moisture content
WET	Visible free water, usually soil is below water table.

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N -VALUE

COHESIONLESS SOILS		COHESIVE SOILS		
Density	N (blows/ft)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	Very Soft	0 to 2	< 250
Loose	4 to 10	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	Very Stiff	15 to 30	2000 - 4000
		Hard	over 30	> 4000

JYL Logistics LLC
24727-24

Log of Boring B-1

Boring Location: 7321-7441 Lincoln Way, Garden Grove

Date of Drilling: 7/10/2024 | **Groundwater Depth:** None Encountered

Drilling Method: Simco 2800HS

Hammer Weight: 140 lbs | **Drop:** 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Silty (fine to medium grained) SAND Brown, loose, damp					
		Alluvium Silty (fine to medium grained) SAND Brown, medium dense, moist					
5		Sandy SILT Brown, medium stiff, moist					
		Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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24727-24

Log of Boring B-2

Boring Location: 7321-7441 Lincoln Way, Garden Grove	
Date of Drilling: 7/10/2024	Groundwater Depth: None Encountered
Drilling Method: Simco 2800HS	
Hammer Weight: 140 lbs	Drop: 30"
Surface Elevation:	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Silty (fine to medium grained) SAND Brown, loose, moist; with occasional gravel					
		Alluvium Clayey SILT Brown, medium stiff, moist					
5		Sandy SILT Brown, medium stiff, moist Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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Log of Boring B-3

Boring Location: 7321-7441 Lincoln Way, Garden Grove

Date of Drilling: 7/10/2024 | Groundwater Depth: 9'

Drilling Method: Simco 2800HS

Hammer Weight: 140 lbs | Drop: 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		Asphalt pavement, base material (5"/5")					
		FILL Clayey SILT Brown, stiff, moist					
		Alluvium Clayey SILT Brown, medium stiff, moist		2/3/5	17.9		41
5		Silty (fine to coarse grained) SAND Light brown, medium dense to dense, moist to wet; slightly silty					
		Groundwater encountered at 9' bgs					
10				4/6/8	24.1		10
		Silty CLAY Grey brown, firm, wet					
15				3/4/4	31.6		78
20				2/3/4	31.1		80
		Sandy SILT Grey brown, medium stiff, wet					
25				5/7/9	23.8		53
		Silty (fine to medium grained) SAND Brown to brown grey, dense, wet; slightly silty to silty					
30				7/14/16	23.9		10
35							

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24727-24

Log of Boring B-3

Boring Location: 7321-7441 Lincoln Way, Garden Grove

Date of Drilling: 7/10/2024 | Groundwater Depth: 9'

Drilling Method: Simco 2800HS

Hammer Weight: 140 lbs | Drop: 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
35		Silty (fine to medium grained) SAND Brown to brown grey, dense, wet; slightly silty to silty		12/17/20	26.4		15
40				10/15/28	21.2		11
45				12/17/32	25.9		30
50				15/18/38	21.5		19
		Boring completed at depth of 51.5'					
55							
60							
65							
70							

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JYL Logistics LLC
24727-24

Log of Boring B-4

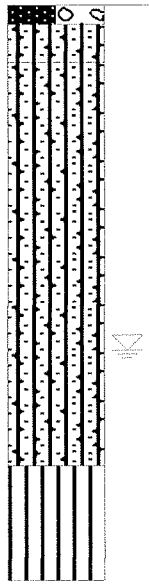
Boring Location: 7321-7441 Lincoln Way, Garden Grove

Date of Drilling: 7/10/2024 | Groundwater Depth: 9'

Drilling Method: Simco 2800HS

Hammer Weight: 140 lbs | Drop: 30"

Surface Elevation:



Depth (feet)	Lithology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		Asphalt pavement, base material (5"/3")					
		FILL					
		Silty (fine to medium grained) SAND	■		11.1	86.6	
		Brown, dense, moist					
		Alluvium					
5		Silty (fine to medium grained) SAND	■	5/5	7.6	93.1	
		Brown, medium dense, moist to wet					
		Groundwater encountered at 9' bgs	■	5/6	27.4	98.2	
10		Clayey SILT					
		Grey brown, firm, wet	■	3/4	29.5	95.8	
15		Boring completed at depth of 15'					
20							
25							
30							
35							

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NorCal Engineering

JYL Logistics LLC
24727-24

Log of Boring B-5

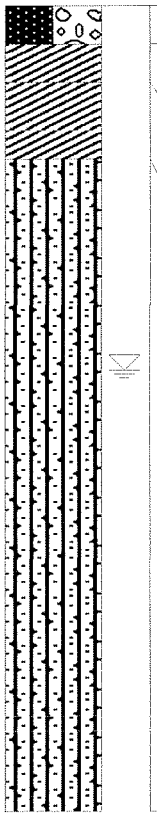
Boring Location: 7321-7441 Lincoln Way, Garden Grove

Date of Drilling: 7/10/2024 | Groundwater Depth: 9.5'

Drilling Method: Simco 2800HS

Hammer Weight: 140 lbs | Drop: 30"

Surface Elevation:



Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		Asphalt pavement, base material (4"/7")					
		FILL Clayey SILT Brown, medium stiff, moist			22.2	99.8	
		Alluvium Clayey SILT Brown, medium stiff, moist		5/5	7.0	97.9	
5		Silty (fine to medium grained) SAND Brown to light brown, medium dense, moist to wet					
		Groundwater encountered at 9.5' bgs		3/4	26.9	97.3	
10							
				3/6	25.6	93.7	
15							
				8/10	22.7	94.9	
20		Boring completed at depth of 21'					
25							
30							
35							

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Log of Boring B-6

Boring Location: 7321-7441 Lincoln Way, Garden Grove

Date of Drilling: 7/10/2024 | **Groundwater Depth:** 9'

Drilling Method: Simco 2800HS

Hammer Weight: 140 lbs | **Drop:** 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		Asphalt pavement, base material (5"/6")					
		FILL Clayey SILT Brown, medium stiff, moist	■	3/4	20.4	94.4	
		Alluvium Clayey SILT Brown, medium stiff, moist	■	3/6	8.3	92.5	
5		Silty (fine to medium grained) SAND Light brown to grey brown, medium dense, damp to wet Slightly silty to silty Groundwater encountered at 9' bgs					
10			■	4/6	22.8	98.2	
			■	5/9	20.9	103.5	
15		Boring completed at depth of 15'					
20							
25							
30							
35							

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24727-24

Log of Boring B-7

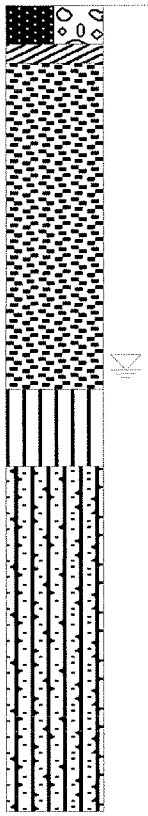
Boring Location: 7321-7441 Lincoln Way, Garden Grove

Date of Drilling: 7/10/2024 | Groundwater Depth: 9.5'

Drilling Method: Simco 2800HS

Hammer Weight: 140 lbs | Drop: 30"

Surface Elevation:



Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		Asphalt pavement, base material (4"/7")					
		FILL Clayey SILT Brown, medium stiff, moist		7/13	2.2	101.3	
		Alluvium Silty (fine to medium grained) SAND Light brown, medium dense, damp to moist; slighlty silty		4/5	7.5	98.2	
5		Groundwater encountered at 9.5' bgs					
10		Sandy SILT Brown, firm, wet		3/4	34.2	88.4	
		Silty (fine to medium grained) SAND Grey brown, medium dense, wet		7/7	27.3	98.3	
15							
20				8/12	24.2	102.4	
		Boring completed at depth of 21'					
25							
30							
35							

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Appendix B
Laboratory Tests

TABLE I
MAXIMUM DENSITY TESTS

Sample	Classification	Optimum Moisture (%)	Maximum Dry Density (lbs/cu.ft)
B-5 @ 2'	Clayey SILT	15.0	112.0
B-7 @ 2'	Silty SAND	10.5	114.0

TABLE II
EXPANSION TESTS

Sample	Classification	Expansion Index
B-5 @ 2'	Clayey SILT	74

TABLE III
ATTERBERG LIMITS

Sample	Liquid Limit	Plastic Limit	Plasticity Index
B-3 @ 5'	25	18	7
B-3 @ 15'	32	23	9
B-3 @ 20'	32	21	11

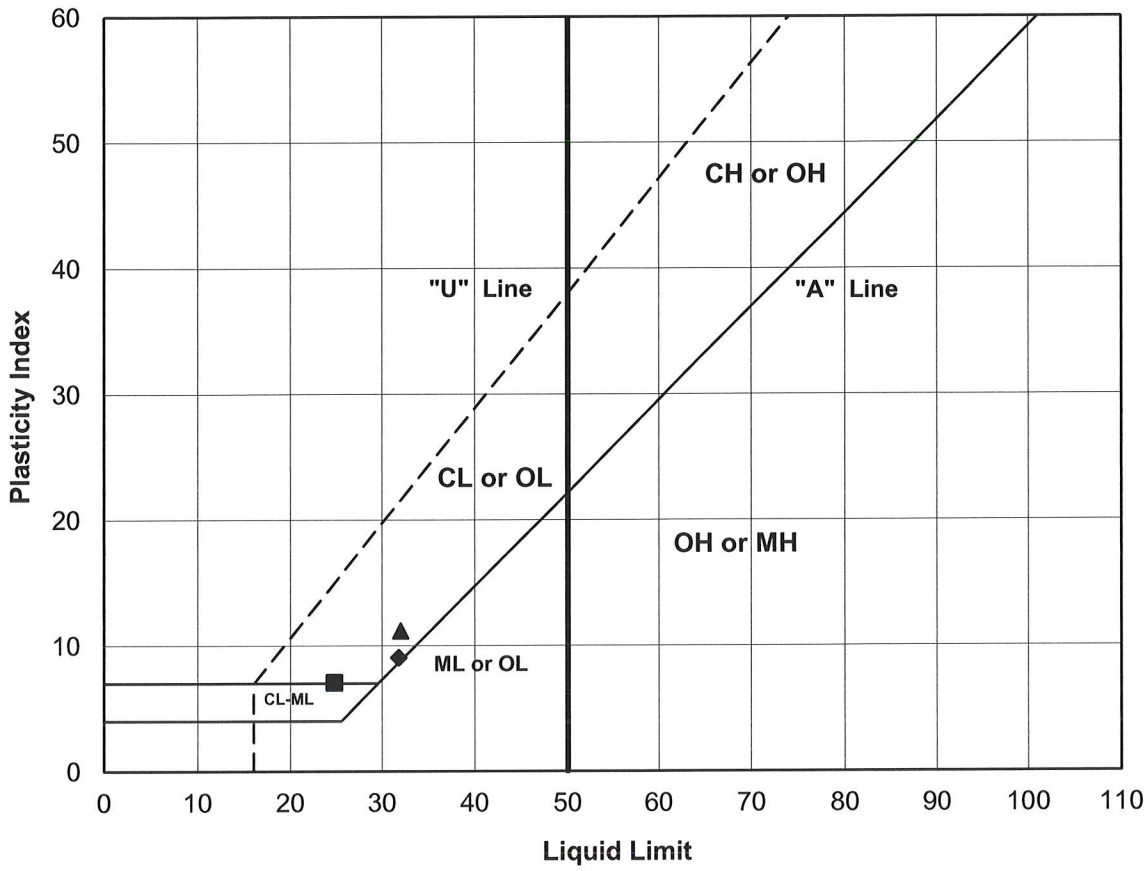
TABLE IV
CORROSION TESTS

Sample	pH	Electrical Resistivity	Sulfate (%)	Chloride (ppm)
B-3 @ 2'	7.1	4,785	0.012	332

% by weight
ppm – mg/kg

PLASTICITY INDEX

ASTM D4318



Symbol	Sample	Depth	LL	PL	PI	USCS	Soil Description
■	B3	5'	**25**	**18**	**7**	CL	Lean Clay with Sand
◆	B3	15'	**32**	**23**	**9**	CL	Lean Clay
▲	B3	20'	**32**	**21**	**11**	CL	Lean Clay
□							
◇							
△							

NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

JYL Logistics, LLC

PROJECT NUMBER: 24727-24 DATE: 7/23/2024

PLASTICITY INDEX

ASTM D4318

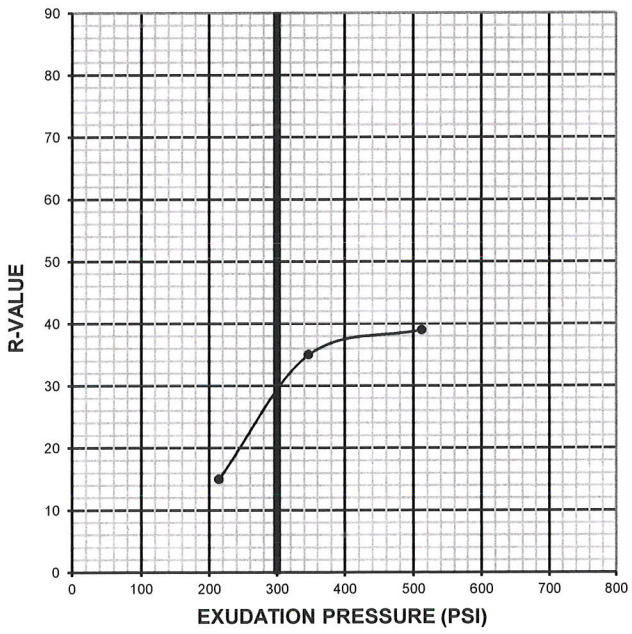
R-VALUE TEST REPORT

☑ CT-301 ☐ ASTM-D2844

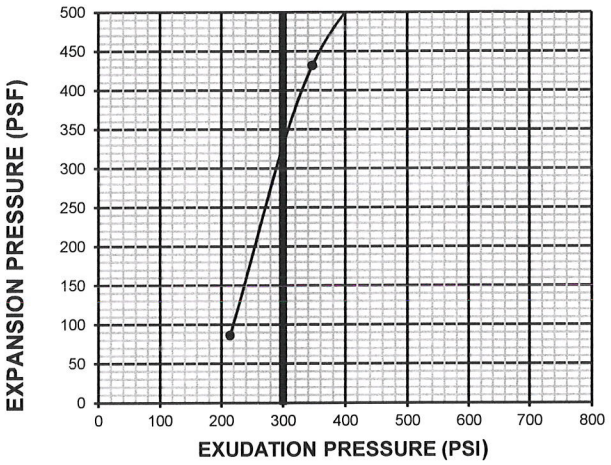
PROJECT NAME:	Norcal: JYL Logistics LLC (#24727-24)	PROJECT NUMBER:	L-240701 (#24727-24)
SAMPLE LOCATION:	7321 to 7441 Lincoln Way, Garden Grove, CA	SAMPLE NUMBER:	B3
SAMPLE DESCRIPTION:	ELASTIC SILT (MH) w/ SAND , olive brown	SAMPLE DEPTH:	1'
SAMPLED BY:	Norcal 7/10/24	TESTED BY:	JPG
		DATE TESTED:	7/23/2024

TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	22.5	19.6	18.5
WEIGHT OF SAMPLE, grams	1060	1046	1049
HEIGHT OF SAMPLE, Inches	2.58	2.51	2.44
DRY DENSITY, pcf	101.7	105.6	110.0
COMPACTOR AIR PRESSURE, psi	100	150	200
EXUDATION PRESSURE, psi	214	347	512
EXPANSION, Inches x 10exp-4	20	100	138
STABILITY Ph 2,000 lbs (160 psi)	127	84	77
TURNS DISPLACEMENT	4.05	4.25	4.00
R-VALUE UNCORRECTED	14	35	40
R-VALUE CORRECTED	15	35	39
EXPANSION PRESSURE (psf)	86.4	432.0	596.2

R-VALUE VS. EXUDATION PRESSURE



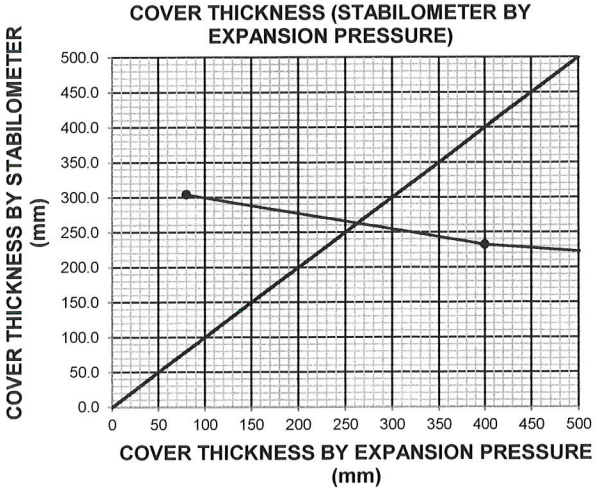
EXPANSION PRESSURE VS. EXUDATION PRESSURE



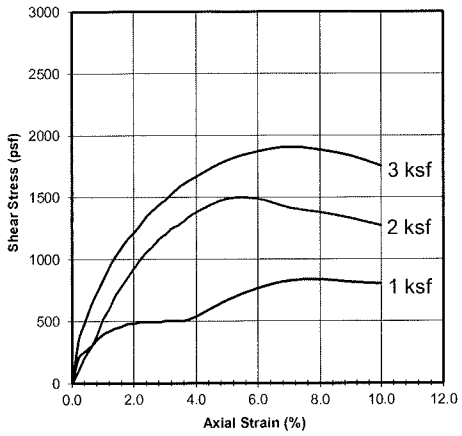
R-VALUE AT EQUILIBRIUM:	27

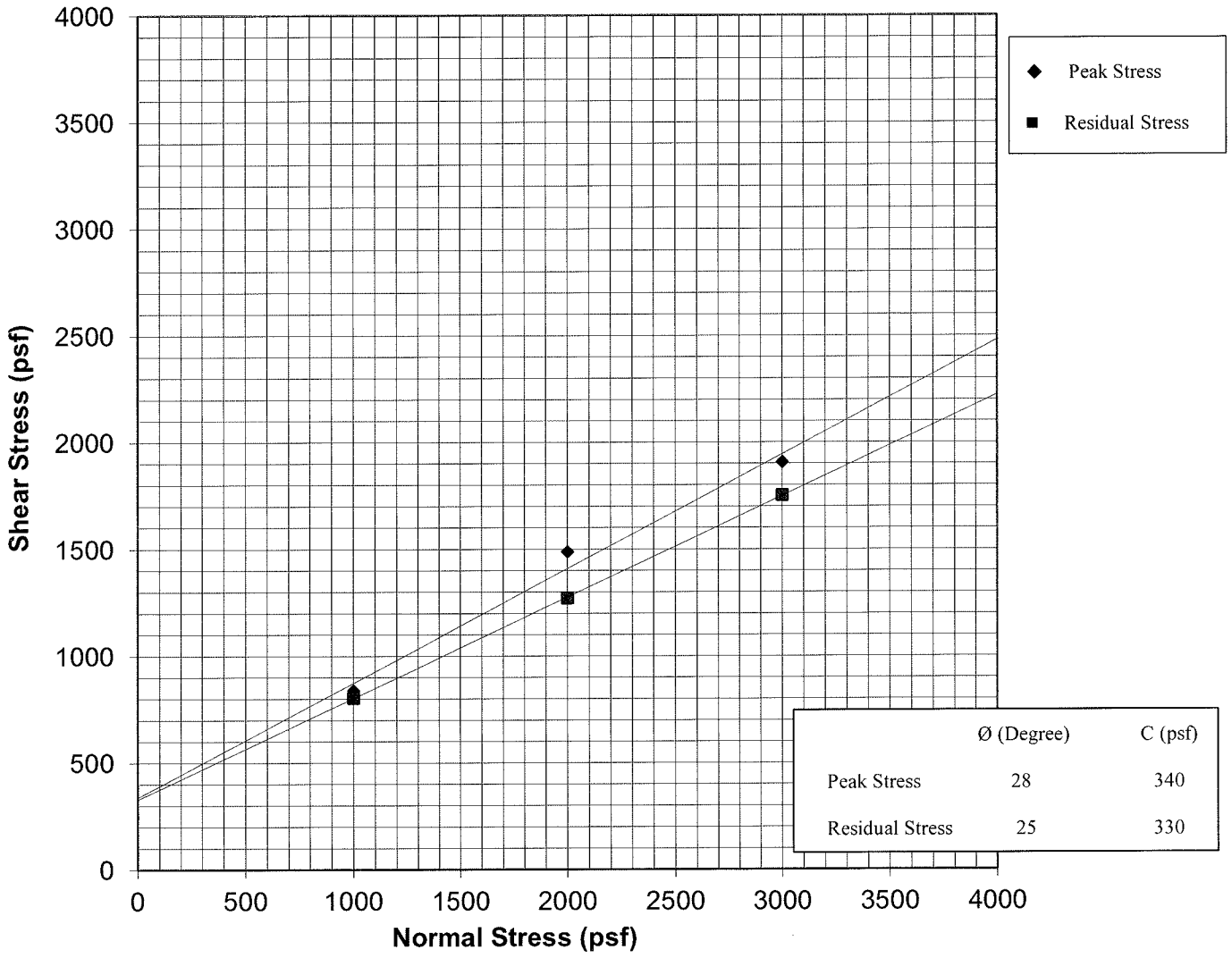
R-VALUE BY EXUDATION PRESSURE:	29
R-VALUE BY EXPANSION PRESSURE:	27
EXPANSION PRESSURE AT 300 PSI EXUDATION:	330
TRAFFIC INDEX (Assumed):	5.5
GRAVEL FACTOR (Assumed):	1.5
UNIT MASS OF COVER MATERIAL, kg/m^3 (Assumed):	2100.0

COVER THICKNESS (STABILOMETER BY EXPANSION PRESSURE)



Sample No.		B5@3'		
Sample Type:		Undisturbed/Saturated		
Soil Description:		Sandy Silt w/ Clay		
		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	840	1488	1908
Displacement	(in)	0.200	0.125	0.175
Residual Stress	(psf)	804	1272	1752
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	99.8	99.8	99.8
In Situ Water Content	(%)	22.2	22.2	22.2
Saturated Water Content	(%)	25.5	25.5	25.5
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Degree)	C (psf)
Peak Stress	28	340
Residual Stress	25	330

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SOILS AND GEOTECHNICAL CONSULTANTS

JYL Logistics, LLC

PROJECT NUMBER: 24727-24 DATE: 7/23/2024

DIRECT SHEAR TEST

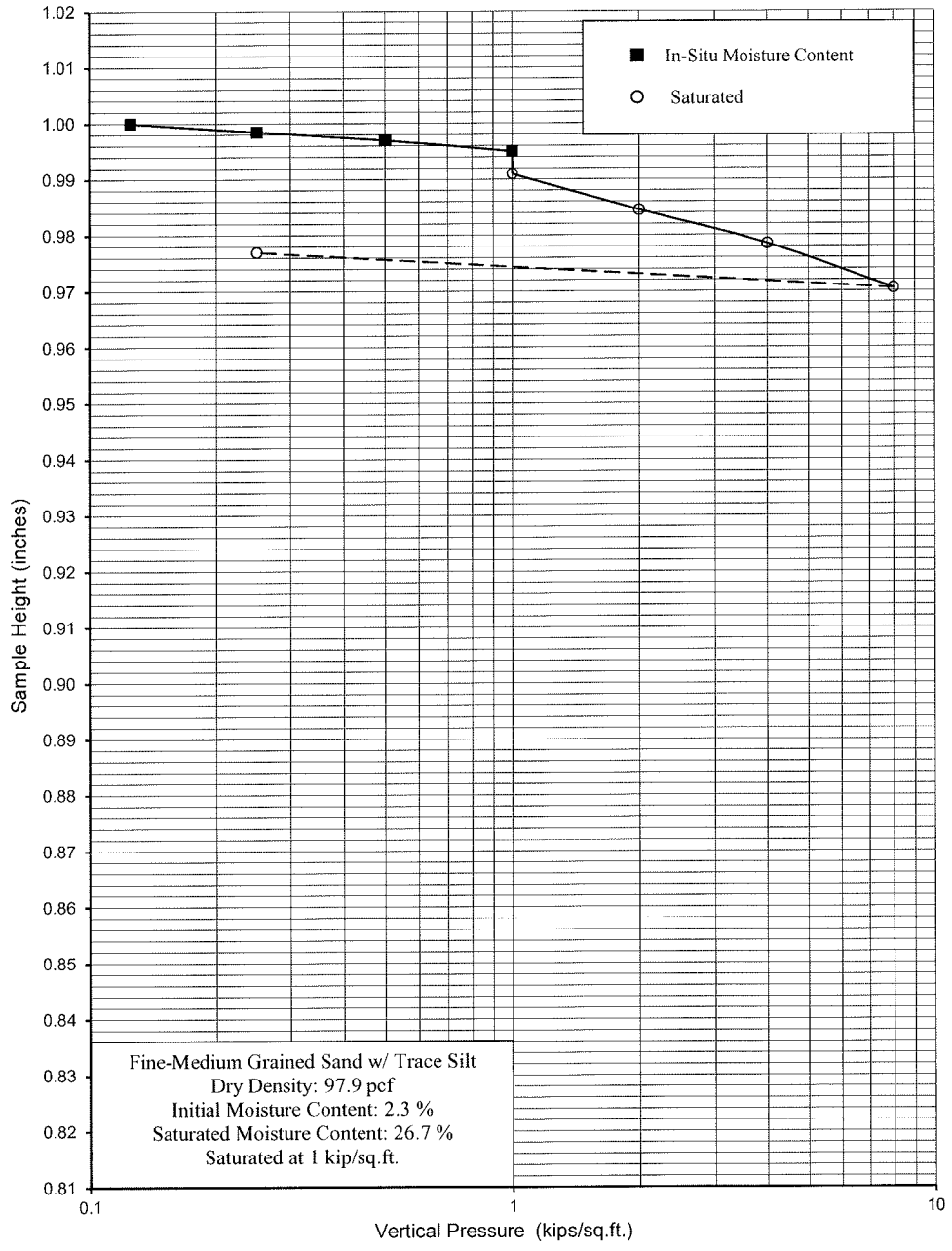
ASTM D3080

Plate A

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9985	0.2	
0.5	0.9970	0.3	
1	0.9950	0.5	
1	0.9910	0.9	
2	0.9845	1.6	
4	0.9785	2.2	
8	0.9705	3.0	
0.25	0.9770	2.3	Saturated

Sample No.	B5	Depth	5'	Date	7/23/2024

Date Tested: 7/22/2024
Sample: B5
Depth: 5'



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JYL Logistics, LLC

PROJECT NUMBER: 24727-24 DATE: 7/23/2024

CONSOLIDATION TEST

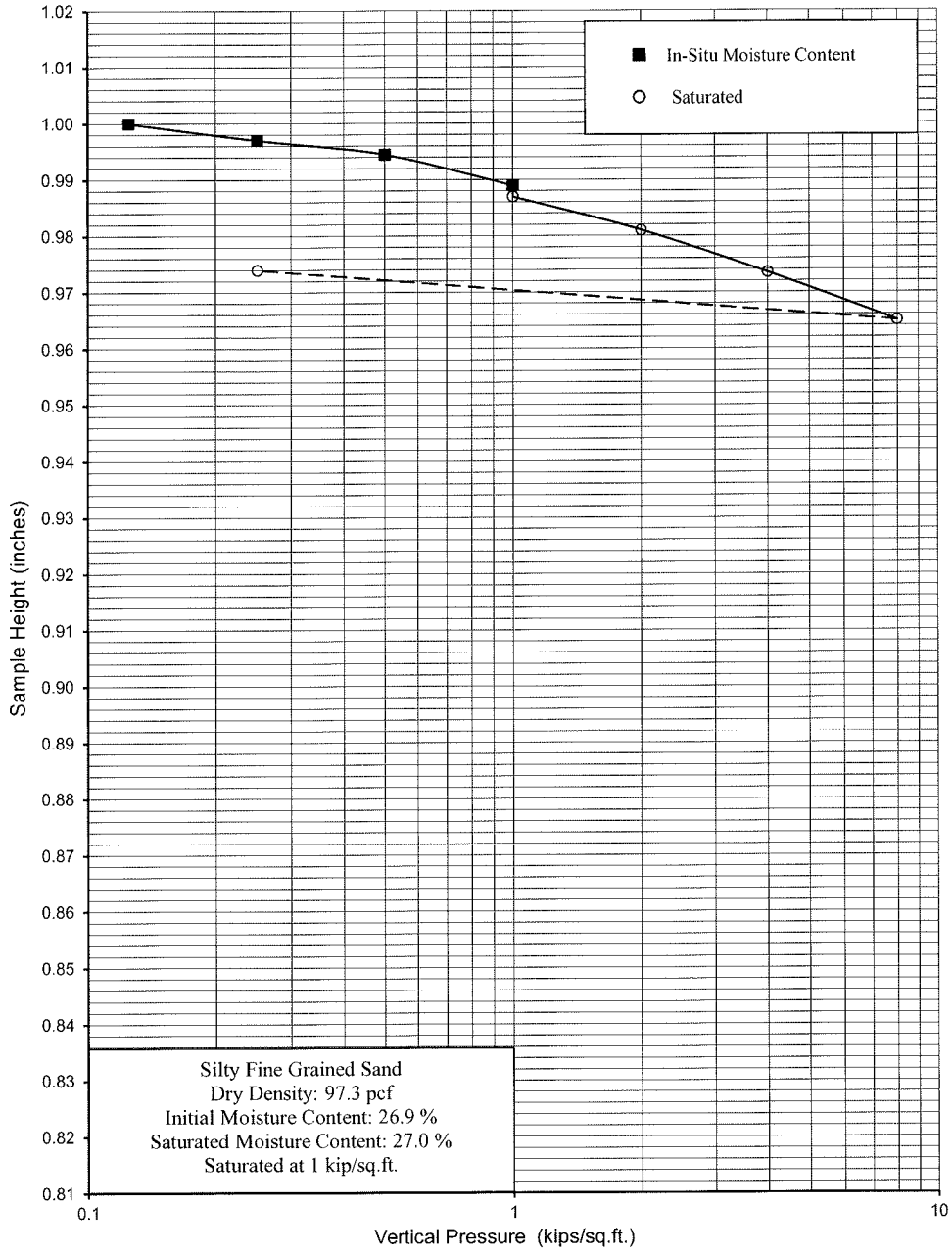
ASTM D2435

Plate B

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9970	0.3	
0.5	0.9945	0.6	
1	0.9890	1.1	
1	0.9870	1.3	
2	0.9810	1.9	
4	0.9735	2.7	
8	0.9650	3.5	Saturated
0.25	0.9740	2.6	

Sample No.	B5	Depth	10'	Date	7/23/2024

Date Tested: 7/22/2024
Sample: B5
Depth: 10'



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JYL Logistics, LLC

PROJECT NUMBER: 24727-24 DATE: 7/23/2024

CONSOLIDATION TEST

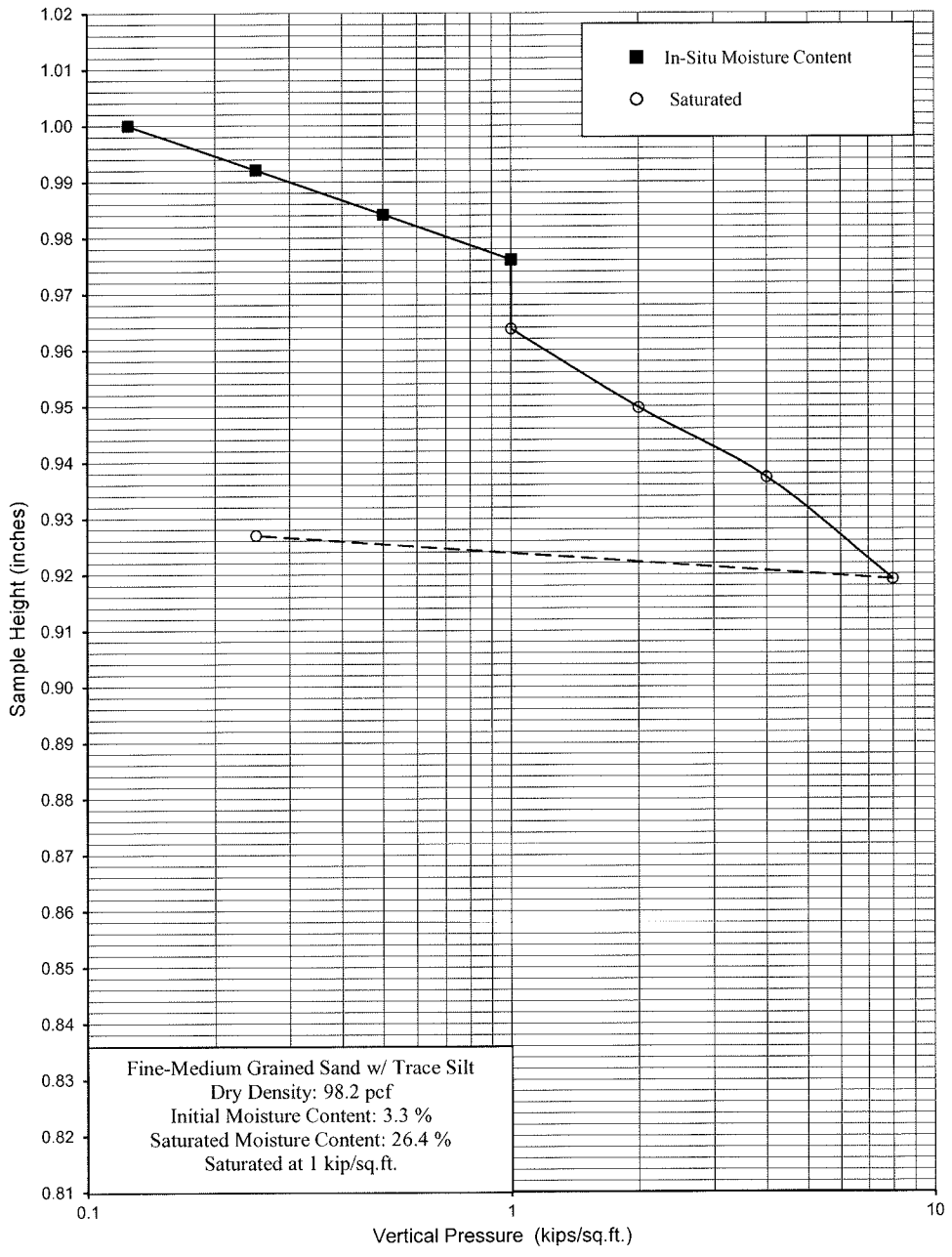
ASTM D2435

Plate C

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	Sample No.	B7	Depth	5'	Date	7/23/2024

0.125	1.0000	0.0	
0.25	0.9921	0.8	
0.5	0.9842	1.6	
1	0.9761	2.4	
1	0.9638	3.6	
2	0.9497	5.0	
4	0.9373	6.3	
8	0.9191	8.1	Saturated
0.25	0.9270	7.3	

Date Tested: 7/22/2024
Sample: B7
Depth: 5'



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SOILS AND GEOTECHNICAL CONSULTANTS

JYL Logistics, LLC

PROJECT NUMBER: 24727-24 DATE: 7/23/2024

CONSOLIDATION TEST

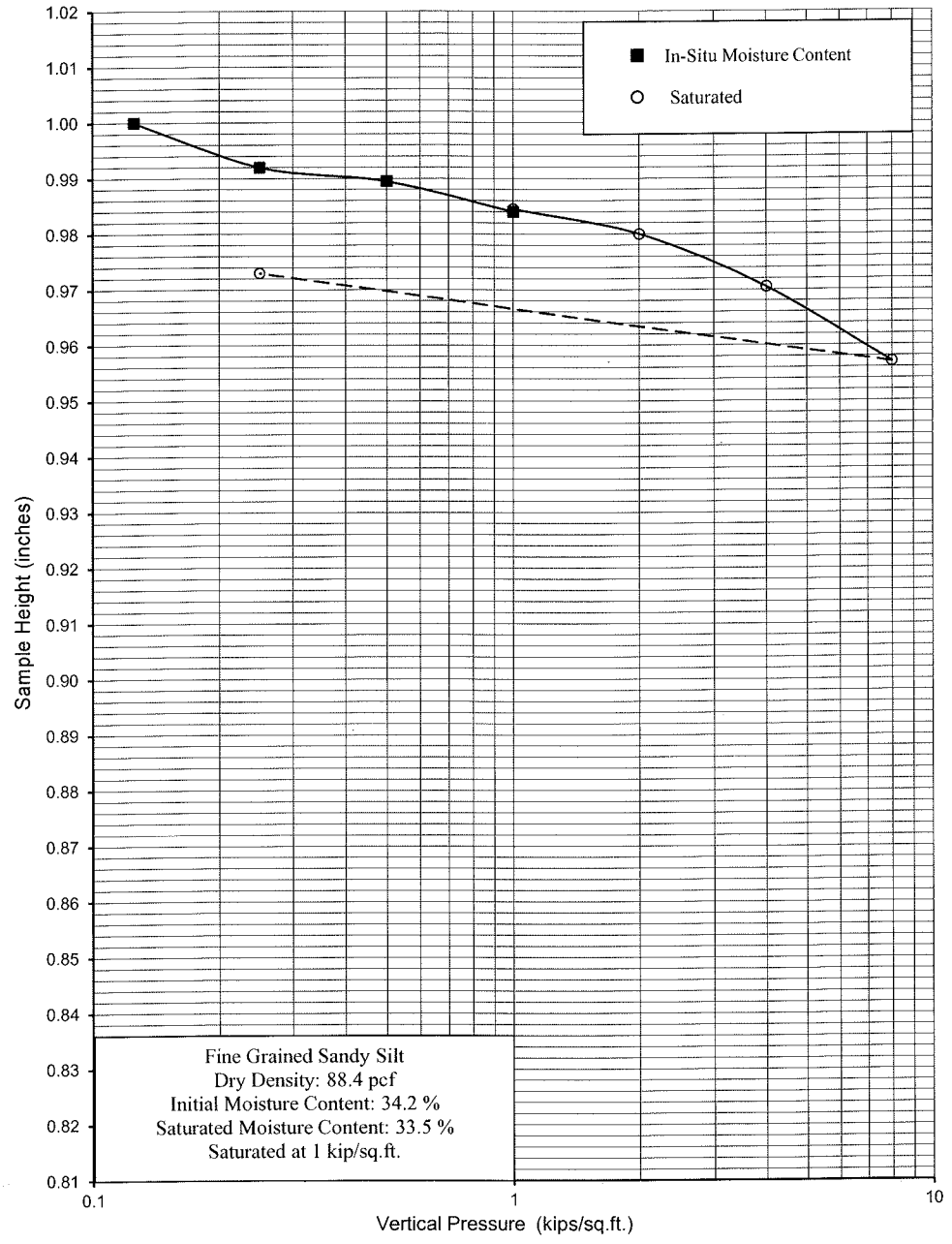
ASTM D2435

Plate D

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9920	0.8	
0.5	0.9895	1.1	
1	0.9840	1.6	
1	0.9845	1.6	
2	0.9800	2.0	
4	0.9705	3.0	
8	0.9570	4.3	Saturated
0.25	0.9730	2.7	

Sample No.	B7	Depth	10'	Date	7/30/2024

Date Tested: 7/29/2024
Sample: B7
Depth: 10'



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SOILS AND GEOTECHNICAL CONSULTANTS

JYL Logistics, LLC

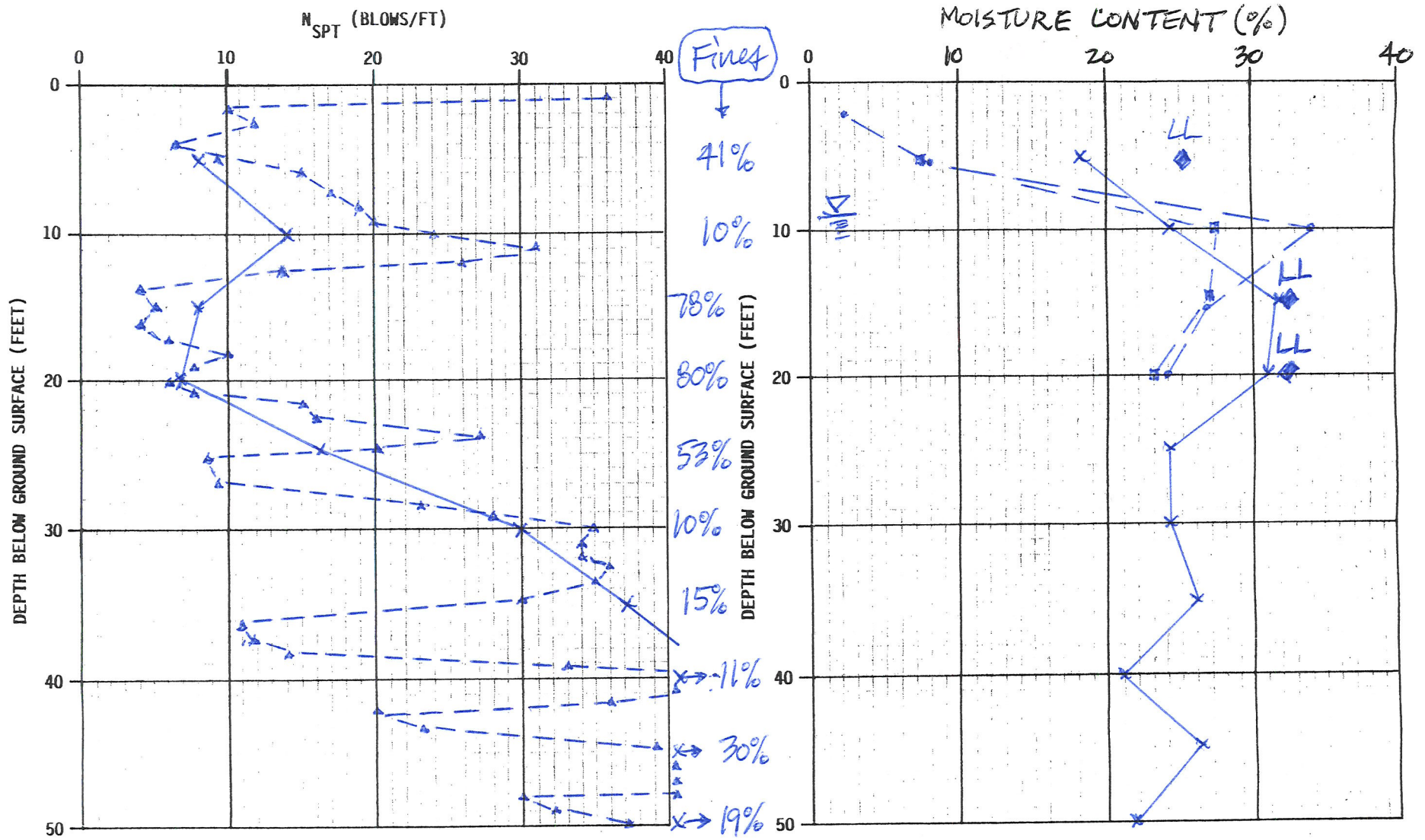
PROJECT NUMBER: 24727-24 DATE: 7/30/2024

CONSOLIDATION TEST

ASTM D2435

Plate E

Appendix C
Liquefaction Analysis



NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

PROJECT | DATE

STANDARD PENETRATION TEST (SPT)
RESULTS AND MOISTURE CONTENT VERSUS DEPTH

SITE LOCATION: _____

GEOTECHNICAL REPORT: _____

GEOLOGY REPORT: _____

DEPTH TO WATER TABLE = 9'

EARTHQUAKE MAGNITUDE = 6.9

PEAK GROUND ACCELERATION = 0.67g

DEPTH BELOW FINAL GRADE (FEET)	MOIST DENSITY (PCF)	σ_o TOTAL STRESS (PSF)	$\bar{\sigma}_o$ EFFECTIVE STRESS (PSF)	$\sigma_o/\bar{\sigma}_o$ (-)	r_d (-)	① $\tau_h/\bar{\sigma}_o$ (-)	N VALUE (BLOWS/FT)	RELATIVE DENSITY (%)	C_N (-)	C_E (-)	C_B (-)	C_R (-)	C_S (-)	$(N_1)_{60}$ (BLOWS/ft)	FINES (%)	CRR M=7.5	MSF (-)	CRR M=6.9	LIQ. F.S.
5	105	525	Same	1.00	0.99	0.44	8	65	>1.6	1.00	1.05	0.70	1.20	>11	41	>0.20	1.3	>0.26	>0.6
10	120	1125	1063	1.06	0.96	0.45	14	70	1.35			0.75		18	10	0.23		0.30	0.7
15	125	1750	1376	1.27	0.92	0.51	8	60	1.2			0.85		10	78	>0.19		>0.25	>0.5
20		2375	1689	1.41	0.87	0.54	7	50	1.1			0.90		9	80	>0.18		>0.23	>0.4
25		3000	2002	1.50	0.80	0.53	16	65	1.0			0.95		19	53	>0.35		>0.46	>0.9
30		3625	2315	1.57	0.74	0.51	30	85	0.93			1.00		35	10	>0.50		>0.65	>1.3
35		4250	2628	1.62	0.68	0.48	37	90	0.88					41	15				
40		4875	2941	1.66	0.64	0.47	43	>90	0.85					46	11				
45		5500	3254	1.69	0.61	0.45	49	>90	0.82					51	30				
50		6125	3567	1.72	0.58	0.44	56	>90	0.79					56	19				

① INDUCED CYCLIC STRESS RATIO = $\tau_{ave}/\bar{\sigma}_o = 0.65 \cdot \frac{a_{max}}{g} \cdot \frac{\sigma_o}{\bar{\sigma}_o} \cdot r_d$

- C_E = Corr. - Energy Ratio = Energy Ratio / 60%
- C_B = Corr. - Borehole Dia. = 1.15 for 8" dia. borehole
- C_R = Corr. - Rod Length
- C_S = Corr. - Sampling Method

Actual Energy Ratio = 0.67-1.17 (Safety Hammer)
= 0.50-1.00 (Donut Hammer)

Sampling Method = 1.0 Standard sampler
= 1.2 ~~Sampler w/o liners~~

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SOILS AND GEOTECHNICAL CONSULTANTS

PROJECT | DATE

EVALUATION OF LIQUEFACTION POTENTIAL

SEISMIC SETTLEMENT EVALUATION → GWT @ 15'

EQ Magnitude = 7.0, Hor. Ground Acceleration = 0.86g

Depth (ft)	$N_{1,60}$ (Blows/ft)	Fines (%)	EQ CSR	M_{design} $M_{7.5}$	Design CSR	Vert. Strain	Seismic Settle	Liquefaction F.S.
9-10'	18 (19)	10 (5)	0.45	1.30	0.35	1.6%	0.2"	0.7
10-15'	10 (15)	78 (5)	0.51		0.39	1.9%	1.1"	>0.5
15-20'	9 (14)	80 (5)	0.54		0.42	2.0%	1.2"	>0.4
20-25'	19 (29)	53 (5)	0.53		0.41	0.8%	0.5"	>0.9

$\Sigma S = 3.0"$

Say $\Delta_{EQ} = 3"$ ←

NL - Non liquefiable soil layers with LL > 39% and PL > 18%

NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

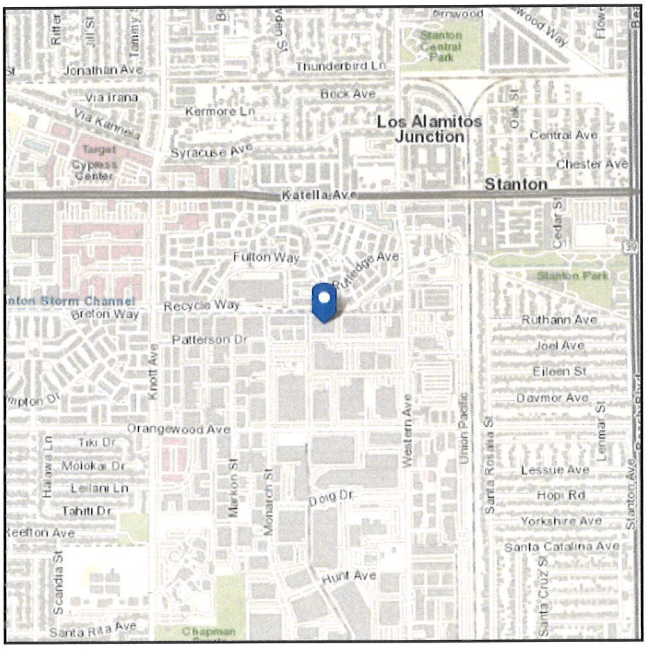
DATE

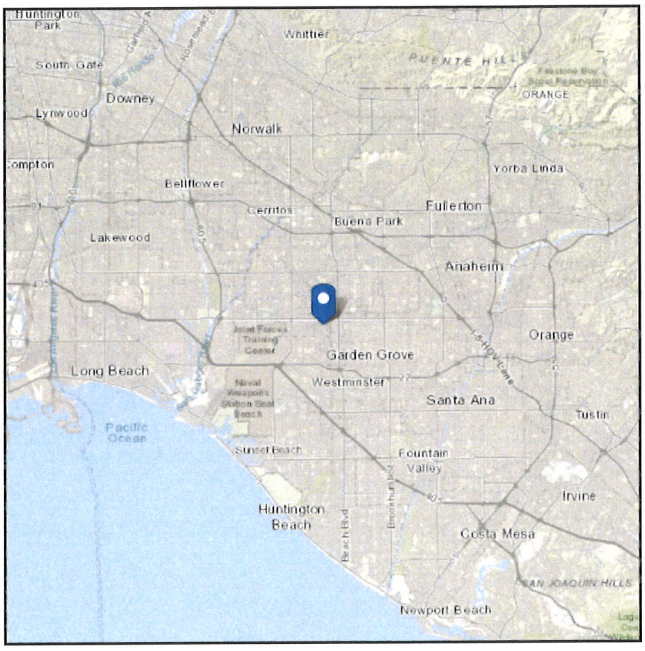
ASCE Hazards Report

Address:
7321 Lincoln Way
Garden Grove, California
92841

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 33.79882
Longitude: -118.004718
Elevation: 57.05660905022087 ft (NAVD 88)





ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.427	S_{D1} :	N/A
S_1 :	0.505	T_L :	8
F_a :	1	PGA :	0.61
F_v :	N/A	PGA_M :	0.671
S_{MS} :	1.427	F_{PGA} :	1.1
S_{M1} :	N/A	I_e :	1
S_{DS} :	0.951	C_v :	1.385

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Mon Jul 15 2024

Date Source: USGS Seismic Design Maps

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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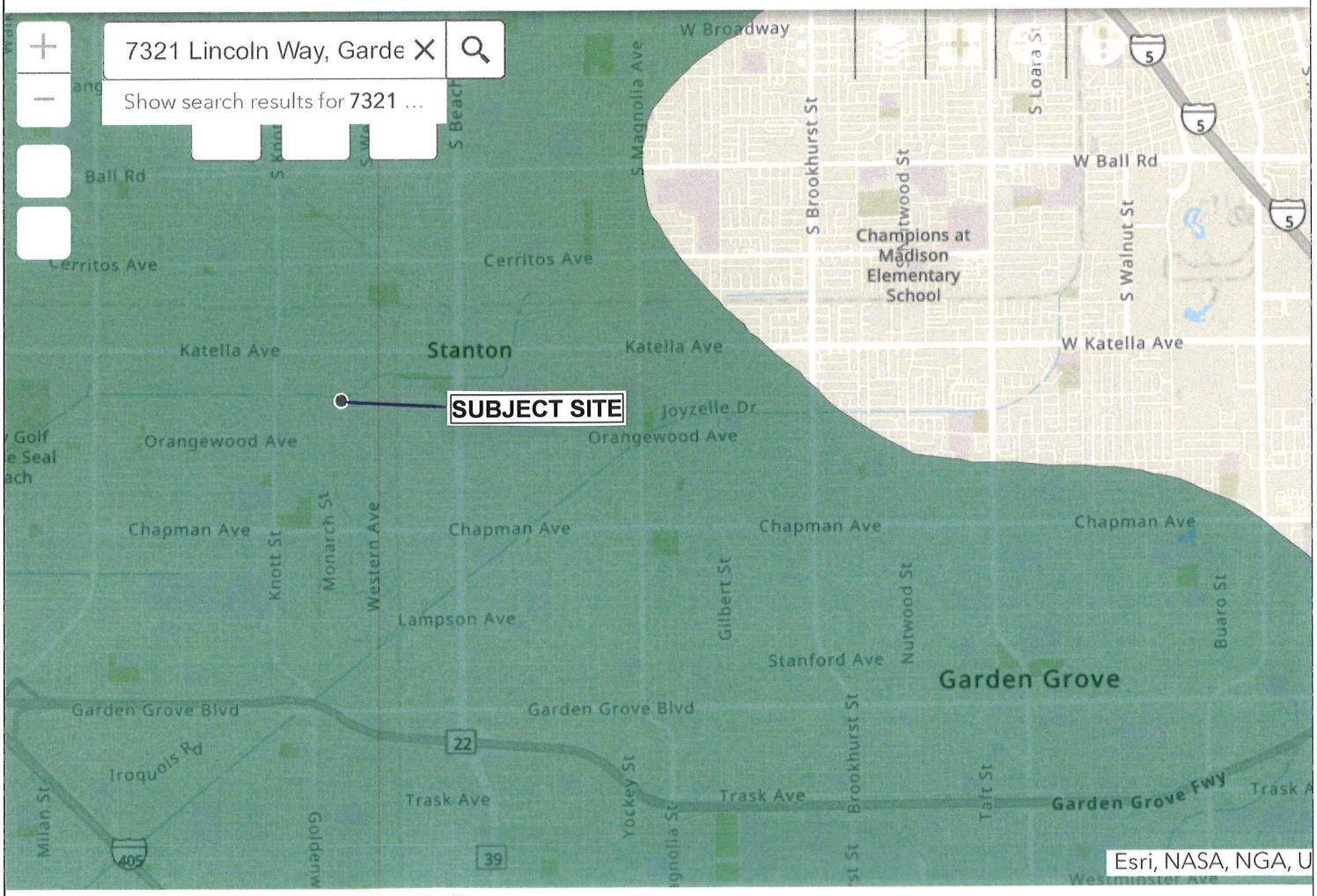
California
Department of Conservation

Earthquake Zones of Required Investigation

CGS Homepage



MAP EXPLANATION

EARTHQUAKE FAULT ZONES

Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required

Active Fault Traces
Faults considered to have been active during Holocene time and to have potential for surface rupture. Solid Line in Black or Red where Accurately Located; Long Dash in Black or Solid Line in Purple where Approximately Located; Short Dash in Black or Solid Line in Orange where Inferred. Dotted Line in Black or Solid Line in Rose where Concealed. Query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

SEISMIC HAZARD ZONES

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required

Overlapping Liquefaction and Earthquake-Induced Landslide Zones
Areas that lie within zones of required investigation for both liquefaction and earthquake-induced landslides

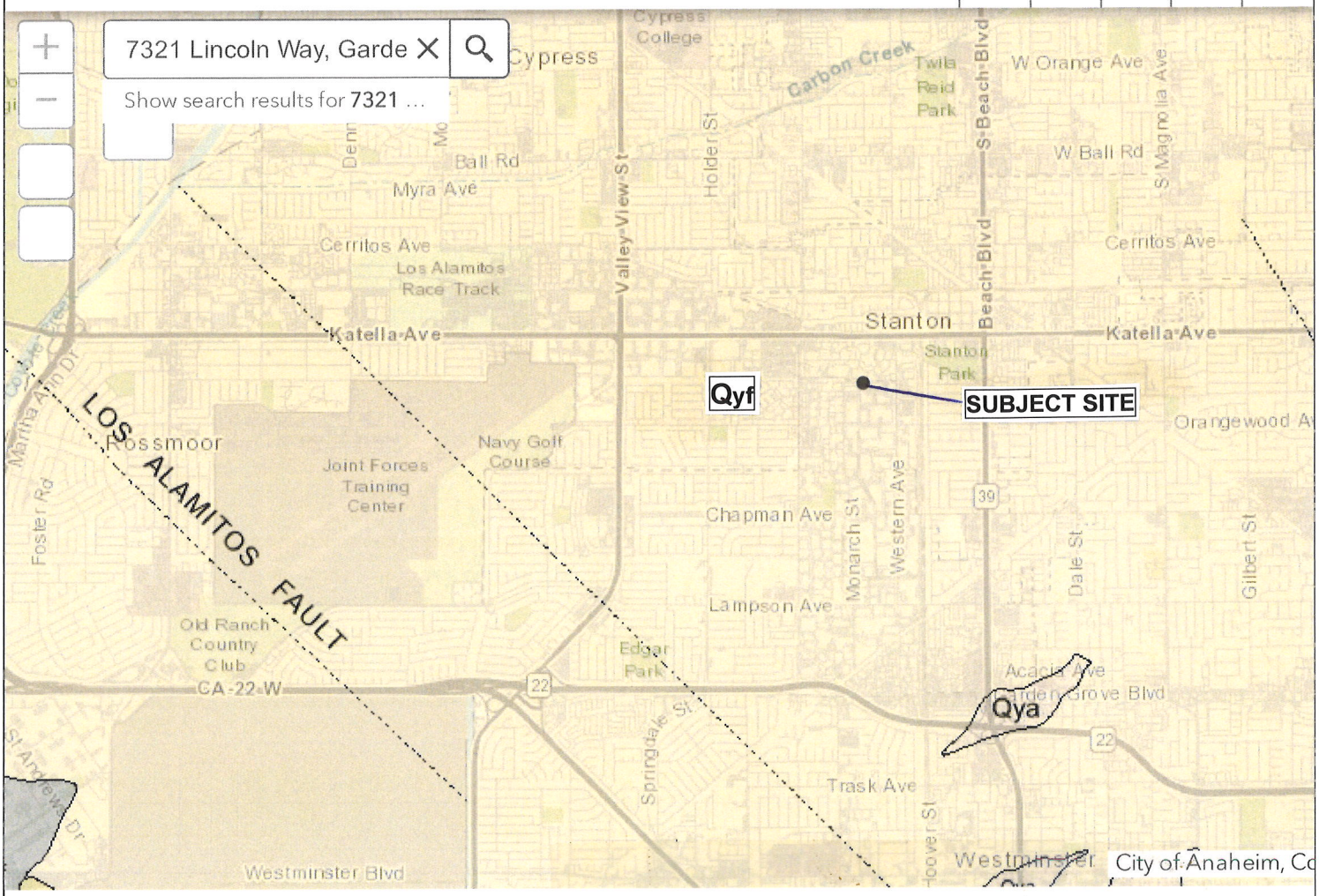
NORTH

1mi

-117.928 33.795 Degrees

California
Department of Conservation

Compilation of Quaternary Surficial Deposits



NORTH

1mi

-117.979 33.794 Degrees

PType	Qyf
Name	Young Alluvial Fan Deposits
Source Quadrangle	Long Beach 30' x 60'
Source	CGS
Reference Document	long_beach_30x60_reference.pdf

Appendix D
Soil Infiltration Data

NORCAL ENGINEERING
SOILS AND GEOTECHNICAL CONSULTANTS

PERCOLATION TEST DATA

Client: JYL Logistics LLC	**Date**: 7/10/2024
Project No.: 24727-24	**Tested By**: J.S.
Test Hole: 1	**USCS Soil Classification**:
Depth of Test Hole: 5' 60"	**Sides (if rectangular)**:
Diameter of Test Hole: 6"	**Length**:
Sandy Soil Criteria Test*:	**Width**:

TRIAL NO.	START TIME	STOP TIME	TIME INTERVAL (MIN)	INITIAL DEPTH TO WATER (IN)	FINAL DEPTH TO WATER (IN)	CHANGE IN WATER LEVEL (IN)	GREATER THAN OR EQUAL TO 6"
1	7:35	8:00	25	43.5	48.0	4.5	
2	8:00	8:25	25	43.5	47.5	4.0	

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30-minute intervals) with a precision of at least 0.25".

TRIAL NO	START TIME	STOP TIME	ΔT TIME INTERVAL (MIN)	Do INITIAL DEPTH TO WATER (IN)	Df FINAL DEPTH TO WATER (IN)	ΔD CHANGE IN WATER LEVEL (IN)	PERCOLATION RATE (MIN/IN)
1	7:00	7:30	30	43.0	47.0	4.0	
2	7:30	8:00	30	43.0	47.0	4.0	
3	8:00	8:30	30	44.0	48.0	4.0	
4	8:30	9:00	30	45.0	49.0	4.0	
5	9:00	9:30	30	45.0	49.0	4.0	
6	9:30	10:00	30	43.0	46.0	3.0	
7	10:00	10:30	30	44.5	47.5	3.0	
8	10:30	11:00	30	45.0	48.0	3.0	
9	11:00	11:30	30	44.0	47.0	3.0	
10	11:30	12:00	30	44.0	47.0	3.0	
11	12:00	12:30	30	45.0	48.0	3.0	
12	12:30	1:00	30	45.0	48.0	3.0	
13							
14							
15							
COMMENTS:							

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

PERCOLATION TEST DATA

Client: JYL Logistics LLC	**Date:** 7/10/2024
Project No.: 24727-24	**Tested By:** J.S.
Test Hole: 2	**USCS Soil Classification:**
Depth of Test Hole: 5' 60"	**Sides (if rectangular):**
Diameter of Test Hole: 6"	**Length:**
Sandy Soil Criteria Test*:	**Width:**

TRIAL NO.	START TIME	STOP TIME	TIME INTERVAL (MIN)	INITIAL DEPTH TO WATER (IN)	FINAL DEPTH TO WATER (IN)	CHANGE IN WATER LEVEL (IN)	GREATER THAN OR EQUAL TO 6"
1	8:35	9:00	25	45.0	50.0	5.0	
2	9:00	9:25	25	45.0	50.0	5.0	

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30-minute intervals) with a precision of at least 0.25".

TRIAL NO	START TIME	STOP TIME	ΔT TIME INTERVAL (MIN)	Do INITIAL DEPTH TO WATER (IN)	Df FINAL DEPTH TO WATER (IN)	ΔD CHANGE IN WATER LEVEL (IN)	PERCOLATION RATE (MIN/IN)
1	7:15	7:45	30	45.0	50.0	5.0	
2	7:45	8:15	30	45.0	50.0	5.0	
3	8:15	8:45	30	45.0	49.0	4.0	
4	8:45	9:15	30	45.0	49.0	4.0	
5	9:15	9:45	30	45.0	49.0	4.0	
6	9:45	10:15	30	45.0	49.0	4.0	
7	10:15	10:45	30	44.5	48.5	4.0	
8	10:45	11:15	30	45.0	49.0	4.0	
9	11:15	11:45	30	44.0	47.5	3.5	
10	11:45	12:15	30	45.0	48.5	3.5	
11	12:15	12:45	30	44.0	47.5	3.5	
12	12:45	1:15	30	45.0	48.5	3.5	
13							
14							
15							

COMMENTS:

SOIL INFILTRATION RATE CALCS ⇒ PORCHET METHOD

Location:	TH-1	TH-2
• Depth of Hole =	5.0'	5.0'
• Hole Radius =	3"	3"
• Drop = Δh	3"	3.5"
• Time = Δt Interval	30 min	30 min
• Initial Water Depth = H_o	13"	16"
• Final Water Depth = H_t	10"	12.5"
• Average Water Head = H_{avg}	11.5"	14.25"
• INFILTRATION RATE	0.7 in/hr	0.7 in/hr

$$\text{Infiltration Rate} = \frac{\Delta h\,(60)(r)}{\Delta t\,(r + 2 \cdot H_{avg})}$$

$$\text{Average Water Head} = \tfrac{1}{2}(H_t - H_o)$$

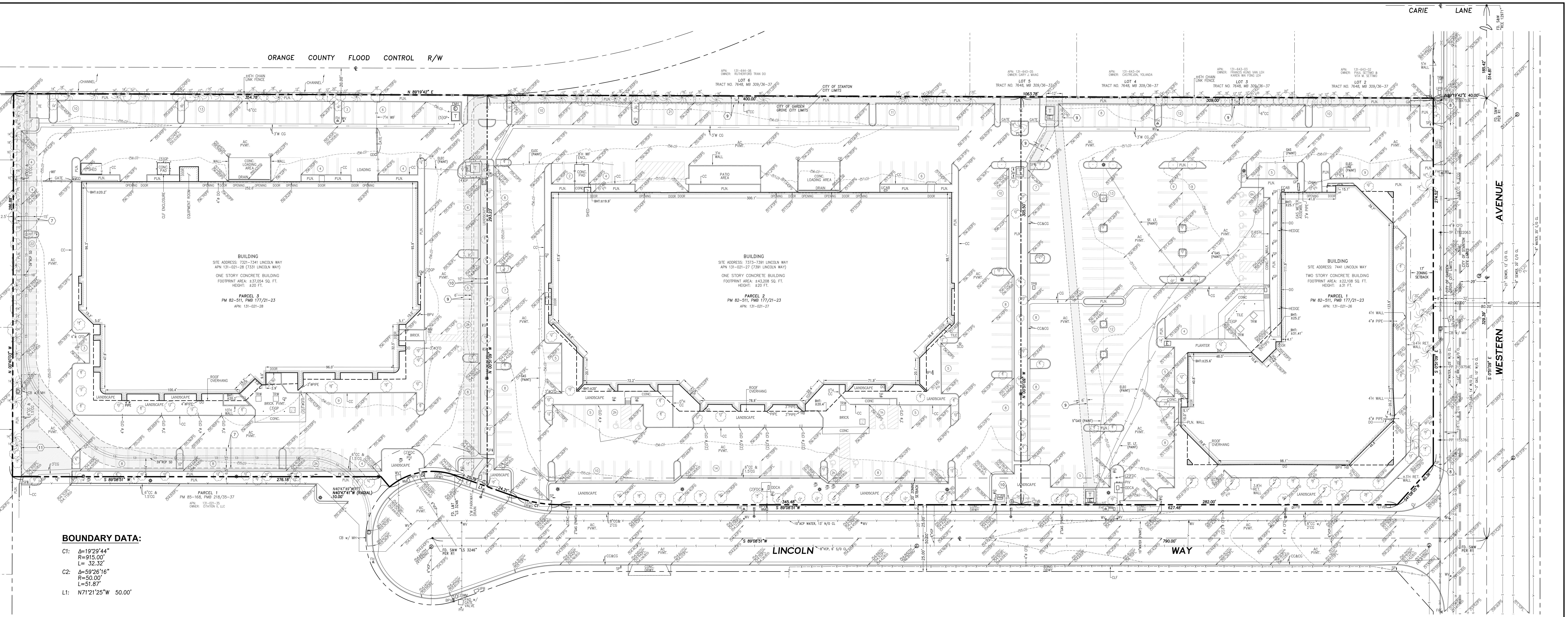
NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

DATE

Attachment E

Survey

2239 State Ave, #B
Costa Mesa, California 92627
(818) 800 6991
Kyle@pacificconsultinginc.com

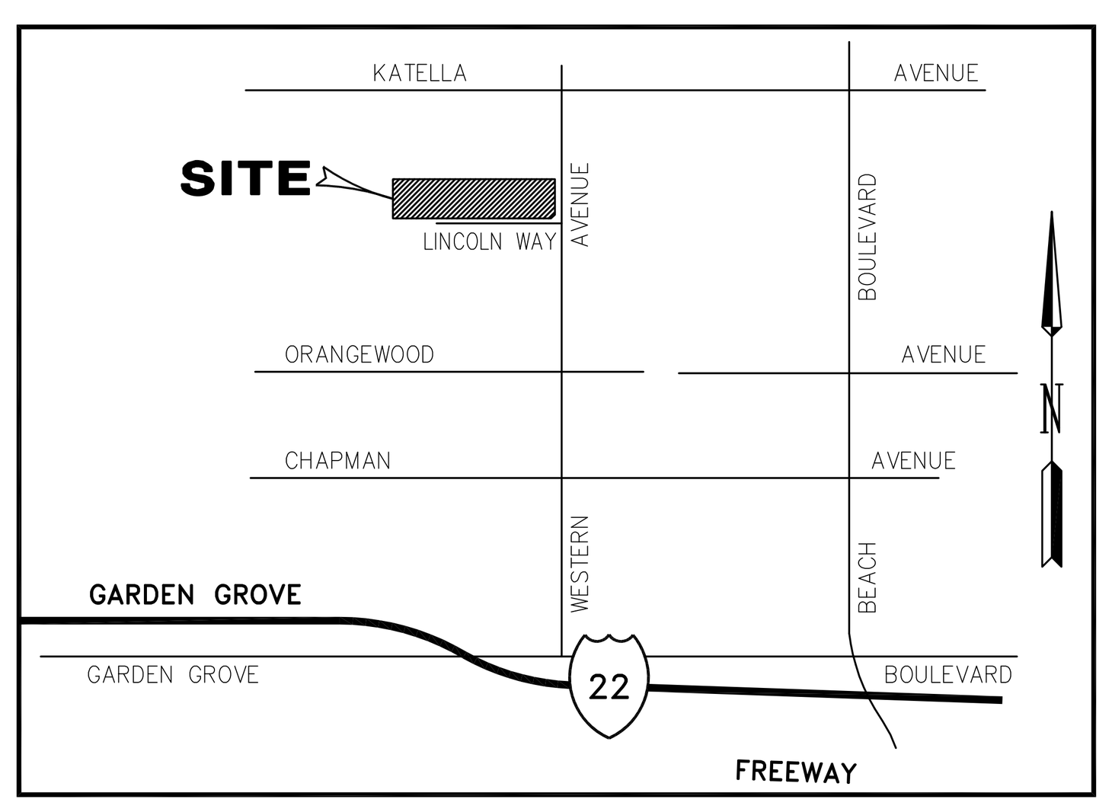


BOUNDARY DATA:

C1: Δ=19°29'44"
R=915.00'
L= 32.32'

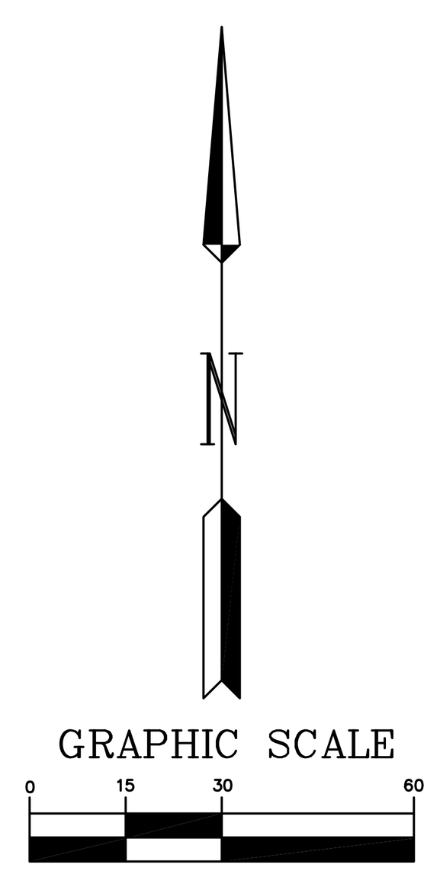
C2: Δ=59°26'16"
R=50.00'
L=51.87'

L1: N71°21'25"W 50.00'



VICINITY MAP

NOT TO SCALE
(THOMAS GUIDE PAGE 797/H-2)



(IN FEET)
1 inch = 30 ft.

LEGAL DESCRIPTION:

REAL PROPERTY IN THE CITY OF GARDEN GROVE, COUNTY OF ORANGE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCELS 1, 2 AND 3, OF PARCEL MAP 82-511, IN THE CITY OF GARDEN GROVE, COUNTY OF ORANGE, STATE OF CALIFORNIA, RECORDED IN **BOOK 177 PAGES 21, 22 AND 23 OF PARCEL MAPS**, IN THE OFFICE OF THE COUNTY RECORDER OF ORANGE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM ALL OIL, OIL RIGHTS, MINERALS, MINERAL RIGHTS, NATURAL GAS, NATURAL GAS RIGHTS AND OTHER HYDROCARBONS BY WHATSOEVER NAME KNOWN, GEOTHERMAL STEAM AND ALL PRODUCTS DERIVED FROM ANY OF THE FOREGOING, THAT MAY BE WITHIN OR UNDER THE PARCEL OF LAND HEREINABOVE DESCRIBED, TOGETHER WITH THE PERPETUAL RIGHT OF DRILLING, MINING, EXPLORING AND OPERATING THEREFOR AND STORING IN AND REMOVING THE SAME FROM SAID LAND OR ANY OTHER LAND, INCLUDING THE RIGHT TO WHIPSTOCK OR DIRECTIONALLY DRILL AND MINE FROM LANDS OTHER THAN THOSE HEREINABOVE DESCRIBED, OIL OR GAS WELLS, TUNNELS AND SHAFTS INTO, THROUGH OR ACROSS THE SUBSURFACE OF THE LAND HEREINABOVE DESCRIBED, AND TO BOTTOM SUCH WHIPSTOCKED OR DIRECTIONALLY DRILLED WELLS, TUNNELS AND SHAFTS UNDER AND BENEATH OR BEYOND THE EXTERIOR LIMITS THEREOF, AND TO REDRILL, RETUNNEL, EQUIP, MAINTAIN, REPAIR, DEEPEN AND OPERATE ANY SUCH WELLS OR MINES, WITHOUT, HOWEVER, THE RIGHT TO DRILL, MINE, STORE, EXPLORE AND OPERATE THROUGH THE SURFACE OR THE UPPER FIVE HUNDRED (500) FEET OF THE SUBSURFACE OF THE LAND HEREINABOVE DESCRIBED, AS RESERVED BY THE IRVINE COMPANY, A MICHIGAN CORPORATION, IN THE DEED RECORDED IN BOOK 1177, PAGE 540 AND RECORDED AUGUST 15, 1977 IN BOOK 12336, PAGE 195, BOTH OF OFFICIAL RECORDS.

ALSO EXCEPT THEREFROM ALL WATER RIGHTS OR INTERESTS IN WATER RIGHTS NO MATTER HOW ACQUIRED BY THE GRANTOR THEREIN AND OWNED OR USED BY THE GRANTOR THEREIN IN CONJUNCTION WITH OR WITH RESPECT TO THE PROPERTY CONVEYED THEREBY, WHETHER SUCH WATER RIGHTS SHALL BE RIPARIAN, OVERLYING, APPROPRIATIVE, PERCOLATING, PRESCRIPTIVE OR CONTRACTUAL; PROVIDED, HOWEVER, THAT THE EXCEPTION AND RESERVATION MADE THEREIN SHALL NOT RESERVE TO OR FOR THE BENEFIT OF THE GRANTOR THEREIN ANY RIGHT TO ENTER UPON THE SURFACE OF THE PROPERTY DESCRIBED THEREIN IN THE EXERCISE OF SUCH RIGHTS, ALL AS RESERVED BY THE IRVINE COMPANY, A MICHIGAN CORPORATION, IN THE DEED RECORDED AUGUST 15, 1977 IN BOOK 12336, PAGE 195 OF OFFICIAL RECORDS.

LAND AREA / ASSESSOR'S PARCEL NUMBER:

PARCEL 1:	**93,842 SQ. FT.**	OR	**2.154 ACRES**	(A.P.N. 131-021-26)
PARCEL 2:	**122,178 SQ. FT.**	OR	**2.805 ACRES**	(A.P.N. 131-021-27)
PARCEL 3:	**101,751 SQ. FT.**	OR	**2.336 ACRES**	(A.P.N. 131-021-28)
TOTAL:	**317,771 SQ. FT.**	OR	**7.295 ACRES**	

BASIS OF BEARING:

THE BEARING **NORTH 89°08'51" EAST** OF THE **CENTERLINE OF LINCOLN WAY** AS SHOWN ON **PARCEL MAP NO. 82-511**, AS PER MAP FILED IN **BOOK 177 PAGES 21 THROUGH 23 OF PARCEL MAPS**, RECORDS OF LOS ANGELES COUNTY, WAS USED AS THE BASIS OF BEARINGS FOR THIS SURVEY.

REFERENCE DOCUMENT:

FIRST AMERICA TITLE INSURANCE COMPANY'S PRELIMINARY REPORT **ORDER NO. NCS-1225951**, DATED **JULY 2, 2024**.

EASEMENT SCHEDULE:

ITEM NO.	GRANTEE	PURPOSE	REFERENCE	REMARKS
6	---	DECLARATION RESPECTING WATER & PIPE LINES	BOOK 1164, PAGE 447 REC. 11/23/1942, O.R.	BLANKET IN NATURE
7	CITY OF GARDEN GROVE	STORM DRAIN	PM 82-511, PMB 177/21-23 REC. 02/10/1983	SHOWN HEREON (15' WIDE)
8	CITY OF GARDEN GROVE	ABUTTER'S RIGHTS OF INGRESS & EGRESS	PM 82-511, PMB 177/21-23 REC. 02/10/1983	SHOWN HEREON (ALONG WESTERN AVENUE R/W)
9	SOUTHERN CALIF. EDISON COMPANY	UNDERGROUND LINES, CONDUITS, ABOVE-GROUND FIXTURES & INCIDENTAL	INST. NO. 1983-555671 REC. 12/06/1983, O.R.	SHOWN HEREON
10	GENERAL TELEPHONE COMPANY OF CALIF.	UNDERGROUND LINES & INCIDENTAL	INST. NO. 1984-31174 REC. 01/23/1984, O.R.	SHOWN HEREON
11	---	DRAINAGE & INCIDENTAL	INST. NO. 1985-429771 REC. 11/06/1985, O.R.	SHOWN HEREON (5' & 10' WIDE)
12	---	RECIPROCAL PARKING EASEMENT	INST. NO. 2019-17572 REC. 01/18/2019, O.R.	w/in THE PARKING AREAS

BENCHMARK: (ORANGE COUNTY PUBLIC WORKS)

DESIGNATION: 1B-74-69
OCS INDEX MAP: Q05-12
CITY/LOCATION: STANTON
LINE #/SSN: 152/150
ESTABLISHED BY: OCS 1969
MONUMENT TYPE: ORANGE COUNTY SURVEYOR'S 3 3/4" ALUMINUM DISK
ELEVATION: 59.20 FT. (NAVD 88 DATUM)
YEAR LEVELED: 2005

SURVEYOR'S NOTES:

1. IF UNDERGROUND UTILITIES AND OTHER SUBSTRUCTURES, ZONING, SET BACK, FLOOD ZONE, ASSESSOR PARCEL INFORMATION AND UTILITY INFORMATION ARE SHOWN HEREON, IT IS FOR GENERAL INFORMATIONAL PURPOSES ONLY, HAVING BEEN OBTAINED FROM A GENERAL REQUEST AT THE LOCAL AGENCIES PUBLIC COUNTER AND/OR SOURCES NOT CONNECTED WITH THIS COMPANY. NO REPRESENTATION IS MADE AS TO THE ACCURACY, CURRENCY OR COMPLETENESS OF SAID INFORMATION AND ANY USERS OF SAID INFORMATION ARE URGED TO CONTACT THE UTILITY OR LOCAL AGENCY DIRECTLY.
   ZONING RESTRICTIONS ARE SUBJECT TO DEVELOPMENTAL REVIEW AND APPROVAL.

LEGEND:

AC – ASPHALT CONCRETE
BHT – BUILDING HEIGHT
BPV – BACKFLOW PRESSURE VALVE
CC – CONCRETE CURB
CFD – CURB FACE DRAIN
CG – CONCRETE GUTTER
℄/CL – CENTERLINE
CLF – CHAIN LINK FENCE
CLR – CLEAR/CLEARANCE
CONC – CONCRETE
DDCA – DOUBLE DETECTOR CHECK ASSEMBLY
ECAB – ELECTRIC CABINET
ELEC – ELECTRIC
EP – EDGE OF PAVEMENT
EVT – ELECTRIC VAULT
FD – FOUND
GD – GATE (MOTOR) DEVICE
GR – GUARD RAIL
HC – HANDICAP
HCR – HANDICAP RAMP
IRR – IRRIGATION
L.S. – LAND SURVEYOR
L&T – LEAD & TACK
MH – MANHOLE
MON – MONUMENT
N/O – NORTH OF
℘/PL – PROPERTY LINE
PLN – PLANTER
PVMT – PAVEMENT
PWFB – PUBLIC WORKS FIELD BOOK
(R1) – PM 82-511, PMB 177/21-23
RCE – REGISTERED CIVIL ENGINEER
RET – RETAINING WALL
R/W – RIGHT OF WAY
S/O – SOUTH OF
S&W – SPIKE & WASHER
TE – TRASH ENCLOSURE
TRANSF– TRANSFORMER
TRW – TREE WELL
TYP – TYPICAL
UCAB – UTILITY CABINET
WIF – WROUGHT IRON FENCE
W/O – WEST OF
WVT – WATER VAULT

EXISTING ELEVATIONS:

( )BW - BACK OF WALK
( )EG - EDGE OF GUTTER
( )EP - EDGE OF PAVEMENT
( )FG - FINISH GRADE
( )FL - FLOW LINE
( )FS - FINISH SURFACE
( )INV - INVERT
( )TC - TOP OF CURB
( )TP - TOP OF PAD
( )TM - TOP OF MANHOLE
-----( )----- CONTOUR LINE

SYMBOLS:

SP – SIGN POST
GP – GUARD POST
P – POST
FH – FIRE HYDRANT
AREA LIGHT w/ CONC. BASE
STREET LIGHT
PP – POWER POLE
TP – TELEPHONE POLE
GA – GUY ANCHOR
GM – GAS METER
WM – WATER METER
SCO – SEWER CLEANOUT
FDC – FIRE DEPARTMENT CONNECTION
PIV – POST INDICATOR VALVE
WV – WATER VALVE
CB – GRATE INLET
CTVB – CABLE TV BOX
DO – DRAIN OUTLET
EPB – ELECTRIC PULL BOX
TPB – TELEPHONE PULL BOX
UPB – UTILITY PULL BOX
Vt – VENT
E – ELECTRIC VAULT
T – TRANSFORMER
E – ELECTRIC MANHOLE
D – STORM DRAIN MANHOLE
S – SEWER MANHOLE
T – TELEPHONE MANHOLE
TREE
PALM TREE
(No) – NUMBER OF MARKED PARKING STALLS
HANDICAPPED SPACE
(No) – ITEM NO. PER TITLE REPORT
PROPERTY LINE
CENTERLINE
LOT/PARCEL LINE
BUILDING LINE
WALL
—x—x— CHAIN LINK FENCE
—□—□— WROUGHT IRON FENCE
—I—I— METAL FENCE
HANDRAIL
ENCLOSURE
—OHE— OVERHEAD ELECTRIC LINE
—OHT— OVERHEAD TELEPHONE LINE
—E— UNDERGROUND ELECTRIC LINE
—G— UNDERGROUND GAS LINE
—IR— UNDERGROUND IRRIGATION LINE
—S— UNDERGROUND SEWER LINE
—SD— UNDERGROUND STORM DRAIN LINE
—SL— UNDERGROUND STREET LIGHT LINE
—W— UNDERGROUND WATER LINE

REVISIONS:

NO.	DESCRIPTION	DATE
1	ADD UTILITY LINES PER CITY PLANS	08/01/24

PROFESSIONAL LAND SURVEYOR
MARITES A. DIZON
No. 9246
STATE OF CALIFORNIA

TITLE	**SITE & TOPOGRAPHIC SURVEY** **7321-7341, 7373-7391 & 7441 LINCOLN WAY** **GARDEN GROVE, CA 92841**		
CLIENT	**JYJ LOGISTICS, LLC**		
SCALE 1"=30'	SEABOARD ENGINEERING CO. 1415 E. COLORADO STREET, STE 205 GLENDALE, CALIFORNIA 91205 TEL. (310)277-7337 (818)550-0337 FAX (818)550-0339 SEABOARD@SEABOARDENGCO.COM	JOB NO. 24-24	
SURVEY BY N.A.		DATE 07/26/2024 08/01/2024	
PREPARED BY E.P.		SHEET 1	
CHECKED BY M.D.	BY MARITES A. DIZON PLS 9246	OF 1 SHEETS	

Attachment F

BMP Fact Sheets

2239 State Ave, #B
Costa Mesa, California 92627
(818) 800 6991
Kyle@pacificconsultinginc.com

XIV.2. Miscellaneous BMP Design Element Fact Sheets (MISC)

MISC-1: Planting/Storage Media

Planting and storage media is a critical design element for several common BMP types, including bioretention, bioinfiltration, swales, filter strips, and greenroofs. This fact sheet is intended to be used as referenced from these fact sheets.

Also known as:

- *Bioretention soil media (BSM)*

Street-end biofiltration with planting/storage media
Source: City of Portland

General Design Criteria

- Planting/storage media should be designed to achieve the long term hydraulic design requirements associated with the design of the facility (i.e., design K_{sat}).
- The planting media shall be designed to address pollutants of concern at the design hydraulic capacity.
- Bioretention soil shall also support vigorous plant growth.
- Planting media should consist of 60 to 80% fine sand and 20 to 40% compost.
- Planting media for projects draining to nutrient sensitive receiving water should adhere to recommendations for nutrient sensitive planting media provided below.

Sand

- Sand should be free of wood, waste, coating such as clay, stone dust, carbonate, etc., or any other deleterious material. All aggregate passing the No. 200 sieve size should be non-plastic. Sand for bioretention should be analyzed by an accredited lab using #200, #100, #40, #30, #16, #8, #4, and 3/8 sieves (ASTM D 422 or as approved by the local permitting authority) and meet the following gradation (Note: all sands complying with ASTM C33 for fine aggregate comply with the gradation requirements below):

Sieve Size (ASTM D422)	% Passing (by weight)	
	Minimum	Maximum
3/8 inch	100	100
#4	90	100
#8	70	100
#16	40	95
#30	15	70
#40	5	55
#100	0	15
#200	0	5

- Note: the gradation of the sand component of the media is believed to be a major factor in the hydraulic conductivity of the media mix. If the desired hydraulic conductivity of the media cannot be achieved within the specified proportions of sand and compost (#2), then it may be necessary to utilize sand at the coarser end of the range specified in the table above ("minimum" column).

Compost

Compost should be a well decomposed, stable, weed free organic matter source derived from waste materials including yard debris, wood wastes, or other organic materials not including manure or biosolids meeting standards developed by the US Composting Council (USCC). The product shall be certified through the USCC Seal of Testing Assurance (STA) Program (a compost testing and information disclosure program). Compost quality should be verified via a lab analysis to be:

- Feedstock materials shall be specified and include one or more of the following: landscape/yard trimmings, grass clippings, food scraps, and agricultural crop residues.
- Organic matter: 35-75% dry weight basis.
- Carbon and Nitrogen Ratio: 15:1 < C:N < 25:1
- Maturity/Stability: shall have dark brown color and a soil-like odor. Compost exhibiting a sour or putrid smell, containing recognizable grass or leaves, or is hot (120 F) upon delivery or rewetting is not acceptable.
- Toxicity: any one of the following measures is sufficient to indicate non-toxicity:
    - NH4:NH3 < 3
    - Ammonium < 500 ppm, dry weight basis
    - Seed Germination > 80% of control
    - Plant trials > 80% of control
- Solvita® > 5 index value
- Nutrient content:
    - Total Nitrogen content 0.9% or above preferred
    - Total Boron should be <80 ppm, soluble boron < 2.5 ppm
- Salinity: < 6.0 mmhos/cm
- pH between 6.5 and 8 (may vary with plant palette)
- Compost for bioretention should be analyzed by an accredited lab using #200, ¼ inch, ½ inch, and 1 inch sieves (ASTM D 422 or as approved by the local permitting authority) and meet the following gradation:

Sieve Size (ASTM D422)	% Passing (by weight)	
	Minimum	Maximum
1 inch	99	100
½ inch	90	100
¼ inch	40	90
#200	2	10

- Tests should be sufficiently recent to represent the actual material that is anticipated to be delivered to the site. If processes or sources used by the supplier have changed significantly since the most recent testing, new tests should be requested.
- Note: the gradation of compost used in bioretention media is believed to play an important role in the saturated hydraulic conductivity of the media. To achieve a higher saturated hydraulic conductivity, it may be necessary to utilize compost at the coarser end of this range ("minimum" column). The percent passing the #200 sieve (fines) is believed to be the most important factor in hydraulic conductivity. In addition, a coarser compost mix provides more heterogeneity of the bioretention media, which is believed to be advantageous for more rapid development of soil structure needed to support health biological processes. This may be an advantage for plant establishment with lower nutrient and water input.

Mulch

- Planting area should generally be covered with 2 to 4 inches (average 3 inches) of mulch at the start and an additional placement of 1 to 2 inches of mulch should be added annually. *The intention is that to help sustain the nutrient levels, suppress weeds, retain moisture, and maintain infiltration capacity*.
- For nutrient-sensitive planting/storage media design, inorganic mulch such as gravel, may be used.

Planting/Storage Media Design for Nutrient Sensitive Receiving Waters

Where the BMP discharges to receiving waters with nutrient impairments or nutrient TMDLs, the planting media placed should be designed with the specific goal of minimizing the potential for initial and long term leaching of nutrients from the media.

- In general, the potential for leaching of nutrients can be minimized by:
  - Utilizing stable, aged compost (as required of media mixes under all conditions).
  - Utilizing other sources of organic matter, as appropriate, that are safe, non-toxic, and have lower potential for nutrient leaching than compost.
  - Reducing the content of compost or other organic material in the media mix to the minimum amount necessary to support vigorous plant growth and healthy biological processes.
- A landscape architect should be consulted to assist in the design of planting/storage media to balance the interests of plant establishment, water retention capacity (irrigation demand), and the potential for nutrient leaching. The following practices should be considered in developing the media mix design:
  - The actual nutrient content and organic content of the selected compost source should be considered when specifying the proportions of compost and sand. The compost specification allows a range of organic content over approximately a factor of 2 and nutrient content may vary more widely. Therefore determining the actual organic content and nutrient content of the compost expected to be supplied is important in determining the proportion to be used for amendment.
  - A commitment to periodic soil testing for nutrient content and a commitment to adaptive management of nutrient levels can help reduce the amount of organic amendment that must be provided initially. Generally, nutrients can be added planting areas through the addition of organic mulch, but cannot be removed.
  - Plant palettes and the associated planting mix should be designed with native plants where possible. Native plants generally have a broader tolerance for nutrient content, and can be longer lived in leaner/lower nutrient soils. An additional benefit of lower nutrient levels is that native plants will generally have less competition from weeds.

- Nutrients are better retained in soils with higher cation exchange capacity (CEC). CEC can be increased through selection of organic material with naturally high CEC, such as peat, and/or selection of inorganic material with high CEC such as some sands or engineered minerals (e.g., low P-index sands, zeolites, rhyolites, etc). Including higher CEC materials would tend to reduce the net leaching of nutrients.
- Soil structure can be more important than nutrient content in plant survival and biologic health of the system. If a good soil structure can be created with very low amounts of compost, plants survivability should still be provided. Soil structure is loosely defined as the ability of the soil to conduct and store water and nutrients as well as the degree of aeration of the soil. While soil structure generally develops with time, planting/storage media can be designed to promote earlier development of soil structure. Soil structure is enhanced by the use of amendments with high hummus content (as found in well-aged organic material). In addition, soil structure can be enhanced through the use of compost/organic material with a distribution of particle sizes (i.e., a more heterogeneous mix). Finally, inorganic amendments such as polymer beads may be useful for promoting aeration and moisture retention associated with a good soil structure. An example of engineered soil to promote soil structure can be found here:

  http://www.hort.cornell.edu/uhi/outreach/pdfs/custructuralsoilwebpdf.pdf
- Younger plants are generally more tolerant of lower nutrient levels and tend to help develop soil structure as they grow. Starting plants from smaller transplants can help reduce the need for organic amendments and improve soil structure. The project should be able to accept a plant mortality rate that is somewhat higher than starting from larger plants and providing high organic content.

- With these considerations, it is anticipated that less than 10 percent compost amendment could be used, while still balancing plant survivability and water retention.

We wish to express our gratitude to following individuals for their feedback on the design of planting/storage media for nutrient sensitive receiving waters in Southern California.

Deborah Deets, City of Los Angeles Bureau of Sanitation

Drew Ready, LA and San Gabriel Rivers Watershed Council

Rick Fisher, ASLA, City of Los Angeles Bureau of Engineering

Dr. Garn Wallace, Wallace Laboratories

Glen Dake, GDML

Jason Schmidt, Tree People

The guidance provided herein does not reflect the individual opinions of any individual listed above and should not be cited or otherwise attributed to those listed.

Selecting Plants for Planting/Storage Media

- Plant materials should be tolerant of summer drought, ponding fluctuations, and saturated soil conditions for 48 to 96 hours.
- It is recommended that a minimum of three types of tree, shrubs, and/or herbaceous groundcover species be incorporated to protect against facility failure due to disease and insect infestations of a single species.
- Native plant species and/or hardy cultivars that are not invasive and do not require chemical inputs should be used to the maximum extent feasible.

XIV.5. Biotreatment BMP Fact Sheets (BIO)

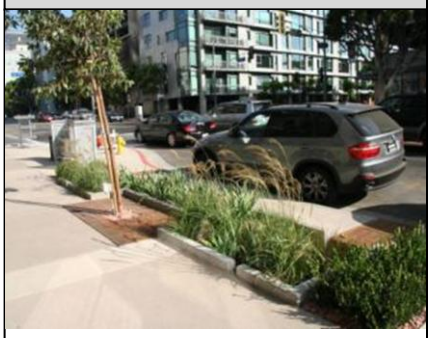
Conceptual criteria for biotreatment BMP selection, design, and maintenance are contained in **Appendix XII**. These criteria are generally applicable to the design of biotreatment BMPs in Orange County and BMP-specific guidance is provided in the following fact sheets. [24]

*Note: Biotreatment BMPs shall be designed to provide the maximum feasible infiltration and ET based on criteria contained in **Appendix XI.2**.*

BIO-1: Bioretention with Underdrains

Also known as:

- *Rain gardens with underdrains*
- *Vegetated media filter*
- *Downspout planter boxes*



Bioretention
Source: Geosyntec Consultants

Bioretention stormwater treatment facilities are landscaped shallow depressions that capture and filter stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, planting soils, and plants. As stormwater passes down through the planting soil, pollutants are filtered, adsorbed, biodegraded, and sequestered by the soil and plants. Bioretention with an underdrain are utilized for areas with low permeability native soils or steep slopes where the underdrain system that routes the treated runoff to the storm drain system rather than depending entirely on infiltration. **Bioretention must be designed without an underdrain** in areas of high soil permeability.

Feasibility Screening Considerations

- If there are no hazards associated with infiltration (such as groundwater concerns, contaminant plumes or geotechnical concerns), **bioinfiltration facilities**, which achieve partial infiltration, should be used to maximize infiltration.

[24] Not all BMPs presented in this section are considered "biofiltration BMPs" under the South Orange County Permit Area. Biofiltration BMPs are vegetated treat-and-release BMPs that filter stormwater through amended soil media that is biologically active, support plant growth, and also promote infiltration and/or evapotranspiration. For projects in South Orange County, the total volume of storage in surface ponding and pores spaces is required to be at least 75% of the remaining DCV that the biofiltration BMP is designed to address. This prevents significant down-sizing of BMPs which otherwise may be possible via routing calculations. Biotreatment BMPs that do not meet this definition are not considered to be LID BMPs, but may be used as treatment control or pre-treatment BMPs. See Section III.7 and Worksheet SOC-1 for guidance.

- Bioretention with underdrain facilities should be lined if contaminant plumes or geotechnical concerns exist. If high groundwater is the reason for infiltration infeasibility, bioretention facilities with underdrains do not need to be lined.

Opportunity Criteria

- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Bioretention may also be applied in parking lot islands, cul-de-sacs, traffic circles, road shoulders, road medians, and next to buildings in planter boxes.
- Drainage area is ≤ 5 acres.
- Area is available for infiltration.
- Site must have adequate relief between land surface and the stormwater conveyance system to permit vertical percolation through the soil media and collection and conveyance in underdrain to stormwater conveyance system.

OC-Specific Design Criteria and Considerations

☐ Ponding depth should not exceed 18 inches; fencing may be required if ponding depth is greater than 6 inches to mitigate drowning.

☐ The minimum soil depth is 2 feet (3 feet is preferred).

☐ The maximum drawdown time of the bioretention ponding area is 48 hours. The maximum drawdown time of the planting media and gravel drainage layer is 96 hours, if applicable.

☐ Infiltration pathways may need to be restricted due to the close proximity of roads, foundations, or other infrastructure. A geomembrane liner, or other equivalent water proofing, may be placed along the vertical walls to reduce lateral flows. This liner should have a minimum thickness of 30 mils.

☐ If infiltration in bioretention location is hazardous due to groundwater or geotechnical concerns, a geomembrane liner must be installed at the base of the bioretention facility. This liner should have a minimum thickness of 30 mils.

☐ The planting media placed in the cell shall be designed per the recommendations contained in MISC-1: Planting/Storage Media

☐ Plant materials should be tolerant of summer drought, ponding fluctuations, and saturated soil conditions for 48 hours; native place species and/or hardy cultivars that are not invasive and do not require chemical inputs should be used to the maximum extent feasible

☐ The bioretention area should be covered with 2-4 inches (average 3 inches) or mulch at the start and an additional placement of 1-2 inches of mulch should be added annually.

☐ Underdrain should be sized with a 6 inch minimum diameter and have a 0.5% minimum slope. Underdrain should be slotted polyvinyl chloride (PVC) pipe; underdrain pipe should be more than 5 feet from tree locations (if space allows).

☐ A gravel blanket or bedding is required for the underdrain pipe(s). At least 0.5 feet of washed aggregate must be placed below, to the top, and to the sides of the underdrain pipe(s).

☐ An overflow device is required at the top of the bioretention area ponding depth.

☐ Dispersed flow or energy dissipation (i.e. splash rocks) for piped inlets should be provided at basin inlet to prevent erosion.

☐ Ponding area side slopes shall be no steeper than 3:1 (H:V) unless designed as a planter box BMP with appropriate consideration for trip and fall hazards.

Simple Sizing Method for Bioretention with Underdrain

If the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** is used to size a bioretention with underdrain facility, the user selects the basin depth and then determines the appropriate surface area to capture the DCV. The sizing steps are as follows:

Step 1: Determine DCV

Calculate the DCV using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1**.

Step 2: Verify that the Ponding Depth will Draw Down within 48 Hours

The ponding area drawdown time can be calculated using the following equation:

$DD_P = (d_P / K_{MEDIA}) \times 12$ in/ft

Where:

DD_P = time to drain ponded water, hours

d_P = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)

K_{MEDIA} = media design infiltration rate, in/hr (equivalent to the media hydraulic conductivity with a factor of safety of 2; K_{MEDIA} of 2.5 in/hr should be used unless other information is available)

If the drawdown time exceeds 48 hours, adjust ponding depth and/or media infiltration rate until 48 hour drawdown time is achieved.

Step 3: Determine the Depth of Water Filtered During Design Capture Storm

The depth of water filtered during the design capture storm can be estimated as the amount routed through the media during the storm, or the ponding depth, whichever is smaller.

$d_{FILTERED}$ = Minimum [$((K_{MEDIA} \times T_{ROUTING})/12)$, d_P]

Where:

$d_{FILTERED}$ = depth of water that may be considered to be filtered during the design storm event, ft

K_{MEDIA} = media design infiltration rate, in/hr (equivalent to the media hydraulic conductivity with a factor of safety of 2; K_{MEDIA} of 2.5 in/hr should be used unless other information is available)

$T_{ROUTING}$ = storm duration that may be assumed for routing calculations; this should be assumed to be no greater than 3 hours. If the designer desires to account for further routing effects, the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) should be used.

d_P = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)

Step 4: Determine the Facility Surface Area

$A = DCV / (d_P + d_{FILTERED})$

Where:

A = required area of bioretention facility, sq-ft

DCV = design capture volume, cu-ft

$d_{FILTERED}$ = depth of water that may be considered to be filtered during the design storm event, ft

d_P = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)

In South Orange County, the provided ponding plus pore volume must be checked to demonstrate that it is greater than 0.75 of the remaining DCV that this BMP is designed to address. See Section III.7 and Worksheet SOC-1.

Capture Efficiency Method for Bioretention with Underdrains

If the bioretention geometry has already been defined and the user wishes to account more explicitly for routing, the user can determine the required footprint area using the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) to determine the fraction of the DCV that must be provided to manage 80 percent of average annual runoff volume. This method accounts for drawdown time different than 48 hours.

Step 1: Determine the drawdown time associated with the selected basin geometry

$DD = (d_p / K_{DESIGN}) \times 12$ in/ft

Where:

DD = time to completely drain infiltration basin ponding depth, hours

d_P = bioretention ponding depth, ft (should be less than or equal to 1.5 ft)

K_{DESIGN} = design media infiltration rate, in/hr (assume 2.5 inches per hour unless otherwise proposed)

If drawdown is less than 3 hours, the drawdown time should be rounded to 3 hours or the Capture Efficiency Method for Flow-based BMPs (See **Appendix III.3.3**) shall be used.

Step 2: Determine the Required Adjusted DCV for this Drawdown Time

Use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix III.3.2**) to calculate the fraction of the DCV the basin must hold to achieve 80 percent capture of average annual stormwater runoff volume based on the basin drawdown time calculated above.

Step 3: Determine the Basin Infiltrating Area Needed

The required infiltrating area (i.e. the surface area of the top of the media layer) can be calculated using the following equation:

$A = \text{Design Volume} / d_p$

Where:

A = required infiltrating area, sq-ft (measured at the media surface)

Design Volume = fraction of DCV, adjusted for drawdown, cu-ft (see Step 2)

d_p = ponding depth of water stored in bioretention area, ft (from Step 1)

This does not include the side slopes, access roads, etc. which would increase bioretention footprint. If the area required is greater than the selected basin area, adjust surface area or adjust ponding depth and recalculate required area until the required area is achieved.

In South Orange County, the provided ponding plus pore volume must be checked to demonstrate that it is greater than 0.75 of the remaining DCV that this BMP is designed to address. See Section III.7 and Worksheet SOC-1.

Configuration for Use in a Treatment Train

- Bioretention areas may be preceeded in a treatment train by HSCs in the drainage area, which would reduce the required design volume of the bioretention cell. For example, bioretention could be used to manage overflow from a cistern.
- Bioretention areas can be used to provide pretreatment for underground infiltration systems.

Additional References for Design Guidance

- CASQA BMP Handbook for New and Redevelopment: **http://www.cabmphandbooks.com/Documents/Development/TC-32.pdf**

- SMC LID Manual (pp 68):
  http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCalLID_Manual_FINAL_040910.pdf
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 5:
  http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf
- San Diego County LID Handbook Appendix 4 (Factsheet 7):
  http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf

  Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4:
  http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850
- County of Los Angeles Low Impact Development Standards Manual, Chapter 5:
  http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf

BIO-7: Proprietary Biotreatment

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

Also known as:

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

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

Feasibility Screening Considerations

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

Opportunity Criteria

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

OC-Specific Design Criteria and Considerations

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

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

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

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

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

Computing Sizing Criteria for Proprietary Biotreatment Device

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

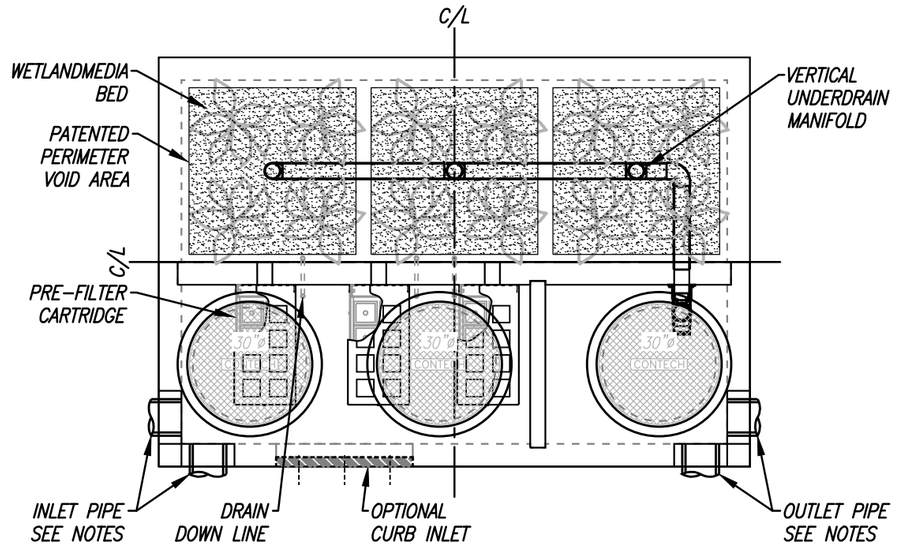
In South Orange County, the provided ponding plus pore volume must be checked to demonstrate that it is greater than 0.75 of the remaining DCV that this BMP is designed to address. Many propretary biotreatment BMPs will not be able to meet the definition of "biofiltration" that applies in South Orange County. See Section III.7 and Worksheet SOC-1.

Additional References for Design Guidance

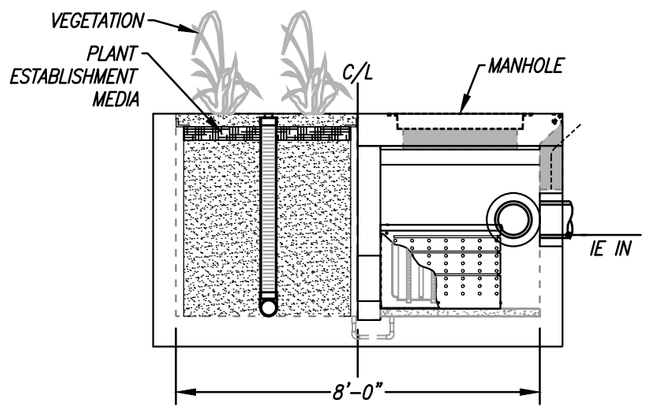
- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: **http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850**
- Los Angeles County Stormwater BMP Design and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

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.290
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			5.7(CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

* PRELIMINARY ONLY - NOT FOR CONSTRUCTION



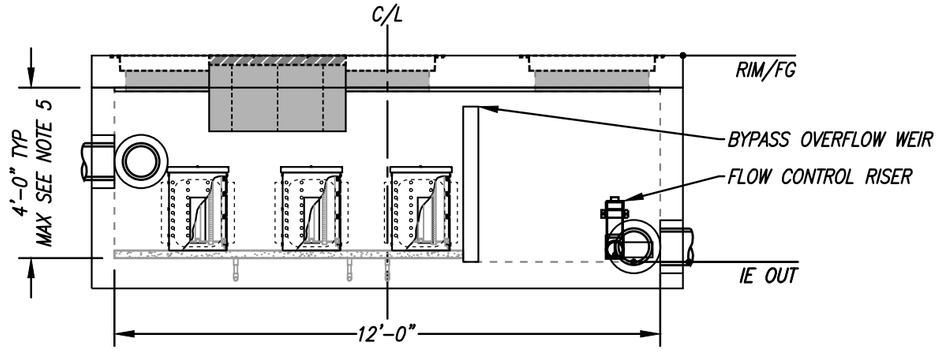
PLAN VIEW



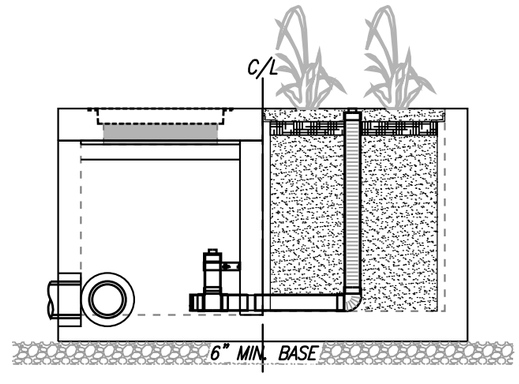
LEFT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
4. CONTRACTOR RESPONSIBLE FOR CONTACTING CONTECH FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH REPRESENTATIVE.
5. VERTICAL HEIGHT VARIES BASED ON SITE SPECIFIC REQUIREMENTS.



ELEVATION VIEW



RIGHT END VIEW

MWS-L-8-12-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

8/14/23SCOTT.SERTICH

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Attachment G

WQMP Calculations

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Design Capture Volume (DCV) Calculation

Simple Sizing Method

DMA ID	85th % Storm Depth (in)	Drainage Area (Ac)	Impervious %	DCV (cu-ft)	BMP Type
A**,*	0.8	1.40	93%	3,446	Propreitary
B	0.8	0.27	78%	576	Bioretention with underdrain
C	0.8	0.27	81%	594	Bioretention with underdrain
D	0.8	0.25	70%	490	Bioretention with underdrain
TOTAL	0.8	2.19	86%	12,274	

*Indicated DMA to be designed using capture efficiency method for flow bases BMPs. See Worksheet D for calculation.

** indicates DMA to include off-site run-on. Offsite run-on is an addition of 1,709 SF of impervious area which is to be added to the project limit of the DMA which is 1.36 Ac totaling 1.40 Ac for the design.

Simple Method Runoff Coefficient for Volume-Based BMP Sizing

This hydrologic method shall be used to calculate the runoff volume associated with LID and water quality design storms.

The runoff volume shall be calculated as: **V = C × d × A × 43560 sf/ac × 1/12 in/ft**

Where:

V = runoff volume during the design storm event, cu-ft

C = runoff coefficient = (0.75 × imp + 0.15)

imp = impervious fraction of drainage area (ranges from 0 to 1)

d = storm depth (inches)

A = tributary area (acres)

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DMA B

Step 1: Determine DCV
See Calculation above.
576 Cu-ft

Step 2: Verify that the Ponding Depth will Draw Down within 48 Hours
The ponding area drawdown time can be calculated using the following equation:
DDP = (dP / KMEDIA) × 12 in/ft
Where:
DDP = time to drain ponded water, hours
dP = depth of ponding above bioretention area, ft (not to exceed 1.5 ft) **1ft used for calculation**
KMEDIA = media design infiltration rate, in/hr (equivalent to the media hydraulic conductivity with a factor of safety of 2; KMEDIA of 2.5 in/hr should be used unless other information is available)
If the drawdown time exceeds 48 hours, adjust ponding depth and/or media infiltration rate until 48 hour drawdown time is achieved.
DDP=(1 ft/ 2.5 in/hr) * 12 in/ft = 4.8 hours < 48 hours

Step 3: Determine the Depth of Water Filtered During Design Capture Storm
The depth of water filtered during the design capture storm can be estimated as the amount routed through the media during the storm, or the ponding depth, whichever is smaller.
dFILTERED = Minimum [((KMEDIA × TROUTING)/12), dP] Where:
dFILTERED = depth of water that may be considered to be filtered during the design storm event, ft
KMEDIA = KMEDIA of 2.5 in/hr should be used unless other information is available)
TROUTING = storm duration that may be assumed for routing calculations; this should be assumed to be no greater than 3 hours.
dP = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)
dFILTERED = Minimum [((2.5 in/hr × 3hrs)/12), 1 ft] 0.625 ft

Step 4: Determine the Facility Surface Area
A = DCV/ (dP + dFILTERED)
Where:
A = required area of bioretention facility, sq-ft
DCV = design capture volume, cu-ft
dFILTERED = depth of water to be considered to be filtered during the design storm event, ft
dP = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)
A = 576 Cu-ft/ (1ft + 0.625ft) = 354 Sq-ft

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DMA C

Step 1: Determine DCV

See Calculation above.

594 Cu-ft

Step 2: Verify that the Ponding Depth will Draw Down within 48 Hours

The ponding area drawdown time can be calculated using the following equation:

DDP = (dP / KMEDIA) × 12 in/ft

Where:

DDP = time to drain ponded water, hours

dP = depth of ponding above bioretention area, ft (not to exceed 1.5 ft) **1ft used for calculation**

KMEDIA = media design infiltration rate, in/hr (equivalent to the media hydraulic conductivity with a factor of safety of 2; KMEDIA of 2.5 in/hr should be used unless other information is available)

If the drawdown time exceeds 48 hours, adjust ponding depth and/or media infiltration rate until 48 hour drawdown time is achieved.

DDP=(1 ft/ 2.5 in/hr) * 12 in/ft = 4.8 hours < 48 hours

Step 3: Determine the Depth of Water Filtered During Design Capture Storm

The depth of water filtered during the design capture storm can be estimated as the amount routed through the media during the storm, or the ponding depth, whichever is smaller.

dFILTERED = Minimum [((KMEDIA × TROUTING)/12), dP] Where:

dFILTERED = depth of water that may be considered to be filtered during the design storm event, ft

KMEDIA = KMEDIA of 2.5 in/hr should be used unless other information is available)

TROUTING = storm duration that may be assumed for routing calculations; this should be assumed to be no greater than 3 hours.

dP = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)

dFILTERED = Minimum [((2.5 in/hr × 3hrs)/12), 1 ft] 0.625 ft

Step 4: Determine the Facility Surface Area

A = DCV/ (dP + dFILTERED)

Where:

A = required area of bioretention facility, sq-ft

DCV = design capture volume, cu-ft

dFILTERED = depth of water to be considered to be filtered during the design storm event, ft

dP = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)

A = 594 Cu-ft/ (1ft + 0.625ft) = 365 Sq-ft

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DMA D

Step 1: Determine DCV

See Calculation above.

490 Cu-ft

Step 2: Verify that the Ponding Depth will Draw Down within 48 Hours

The ponding area drawdown time can be calculated using the following equation:

DDP = (dP / KMEDIA) × 12 in/ft

Where:

DDP = time to drain ponded water, hours

dP = depth of ponding above bioretention area, ft (not to exceed 1.5 ft) **1ft used for calculation**

KMEDIA = media design infiltration rate, in/hr (equivalent to the media hydraulic conductivity with a factor of safety of 2; KMEDIA of 2.5 in/hr should be used unless other information is available)

If the drawdown time exceeds 48 hours, adjust ponding depth and/or media infiltration rate until 48 hour drawdown time is achieved.

DDP=(1 ft/ 2.5 in/hr) * 12 in/ft = 4.8 hours < 48 hours

Step 3: Determine the Depth of Water Filtered During Design Capture Storm

The depth of water filtered during the design capture storm can be estimated as the amount routed through the media during the storm, or the ponding depth, whichever is smaller.

dFILTERED = Minimum [((KMEDIA × TROUTING)/12), dP] Where:

dFILTERED = depth of water that may be considered to be filtered during the design storm event, ft

KMEDIA = KMEDIA of 2.5 in/hr should be used unless other information is available)

TROUTING = storm duration that may be assumed for routing calculations; this should be assumed to be no greater than 3 hours.

dP = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)

dFILTERED = Minimum [((2.5 in/hr × 3hrs)/12), 1 ft] 0.625 ft

Step 4: Determine the Facility Surface Area

A = DCV/ (dP + dFILTERED)

Where:

A = required area of bioretention facility, sq-ft

DCV = design capture volume, cu-ft

dFILTERED = depth of water to be considered to be filtered during the design storm event, ft

dP = depth of ponding above bioretention area, ft (not to exceed 1.5 ft)

A = 490 Cu-ft/ (1ft + 0.625ft) = 302 Sq-ft

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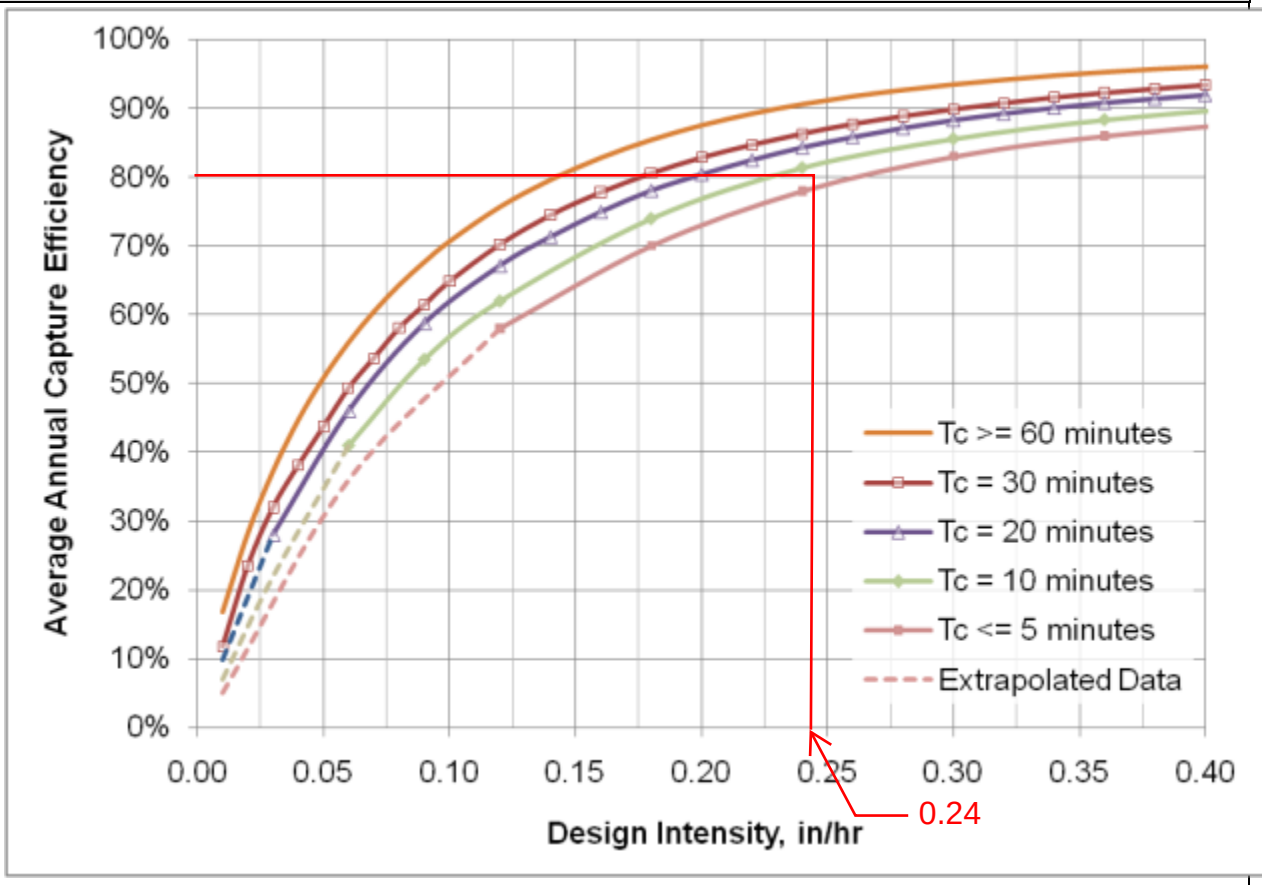
Worksheet D: Capture Efficiency Method for Flow-Based BMPs

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter the time of concentration, T_c (min) (See **Appendix IV.2**)	T_c=	5.8 min	
2	Using **Figure III.4**, determine the design intensity at which the estimated time of concentration (T_c) achieves 80% capture efficiency, I_1	I_1=	0.24	in/hr
3	Enter the effect depth of provided HSCs upstream, d_{HSC} (inches) (**Worksheet A**)	d_{HSC}=	0	inches
4	Enter capture efficiency corresponding to d_{HSC}, Y_2 (**Worksheet A**)	Y_2=	0	%
5	Using **Figure III.4**, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_2), I_2	I_2=	0	
6	Determine the design intensity that must be provided by BMP, $I_{design}= I_1-I_2$	I_{design}=	0.24	
Step 2: Calculate the design flowrate				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	1.40	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	93%	
3	Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$	C=	0.85	
4	Calculate design flowrate, $Q_{design}= (C \times i_{design} \times A)$	Q_{design}=	0.29	cfs
Supporting Calculations				
Describe system:				
Provide time of concentration assumptions: Time of Concentration was calculated using Orange County Hydrology Manual Time of concentration nomograph. See attached.				

Worksheet D: Capture Efficiency Method for Flow-Based BMPs

Graphical Operations



Provide supporting graphical operations. See Example III.7.

Worksheet F: Determining Capture Efficiency of a Flow-based BMP based on Treatment Capacity

Step 1: Determine the design intensity used for calculating design flowrate				
1	Determine the design flowrate of the BMP, *Q* (cfs)	Q=	0.29	cfs
2	Enter Project Imperviousness, *imp* (unitless)	imp=	93%	
3	Calculate runoff coefficient, *C= (0.75 x imp) + 0.15*	C=	0.84	
4	Back calculate the equivalent intensity of rainfall treated in the BMP (cfs), $i_{provided}$=*Q/C*	$i_{provided}$=	0.34	in/hr
Step 2: Calculate the capture efficiency of the flow-based BMP			0	
1	Enter the time of concentration, T_c (min) (Section **IV.2**)	T_c=	5.8	
2	Enter the effect of provided HSCs upstream, d_{HSC} (inches) **Worksheet A**	d_{HSC}=	0	inches
3	Enter the upstream capture efficiency corresponding to d_{HSC} from Table III.1 (regionally based), Y_1 **Worksheet A**	Y_1=	0	%
4	Using **Figure III.4**, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_1), I_1	I_1=	0	in/hr
5	Determine the cumulative design intensity that is provided by upstream and project BMPs, $I_2 = I_{provided} + I_1$	I_2=	0.34	in/hr
6	Using **Figure III.4**, determine the capture efficiency corresponding to the total intensity captured (I_2) for time of concentration (T_c) for upstream and Project BMPs, Y_2	Y_2=	86	%

Supporting Calculations

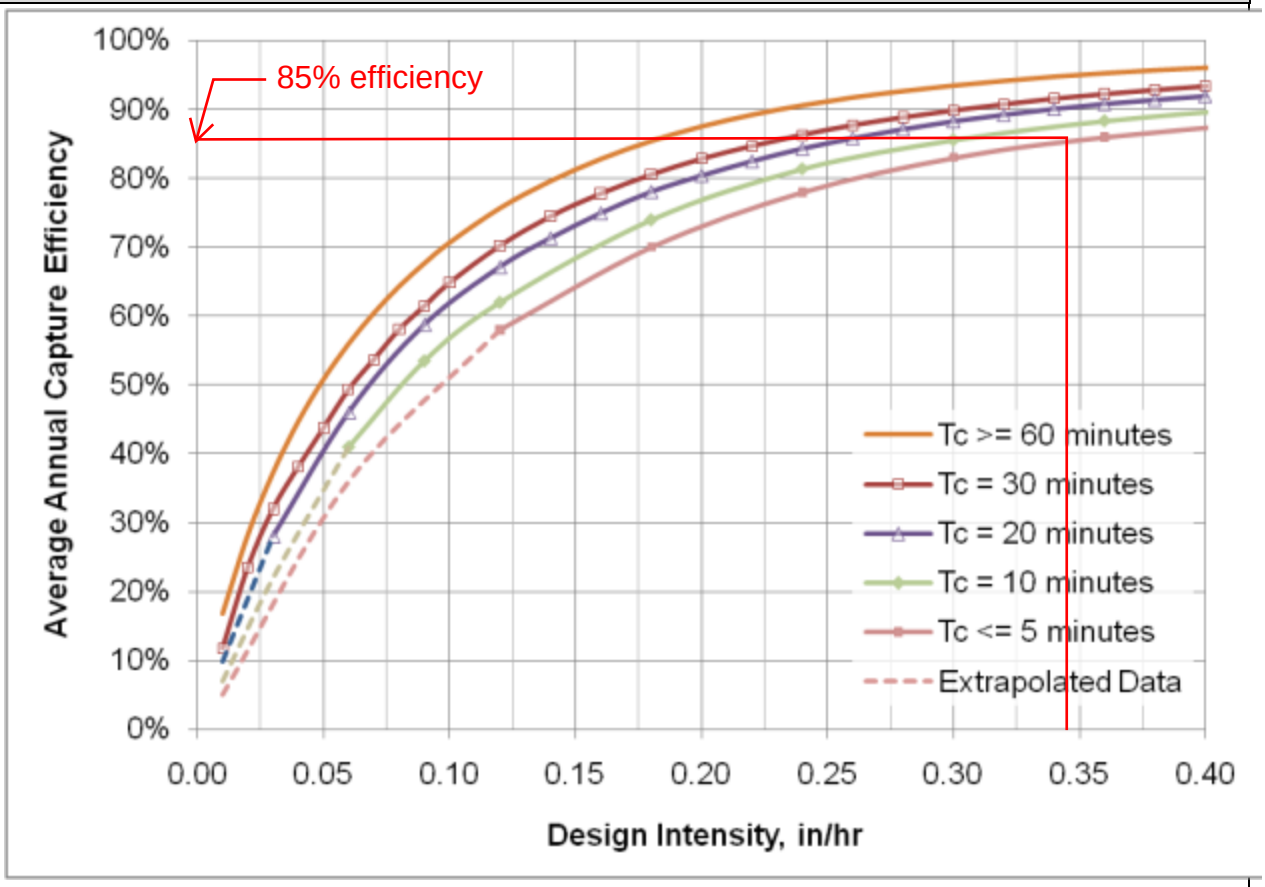
Describe system:

Provide time of concentration assumptions:

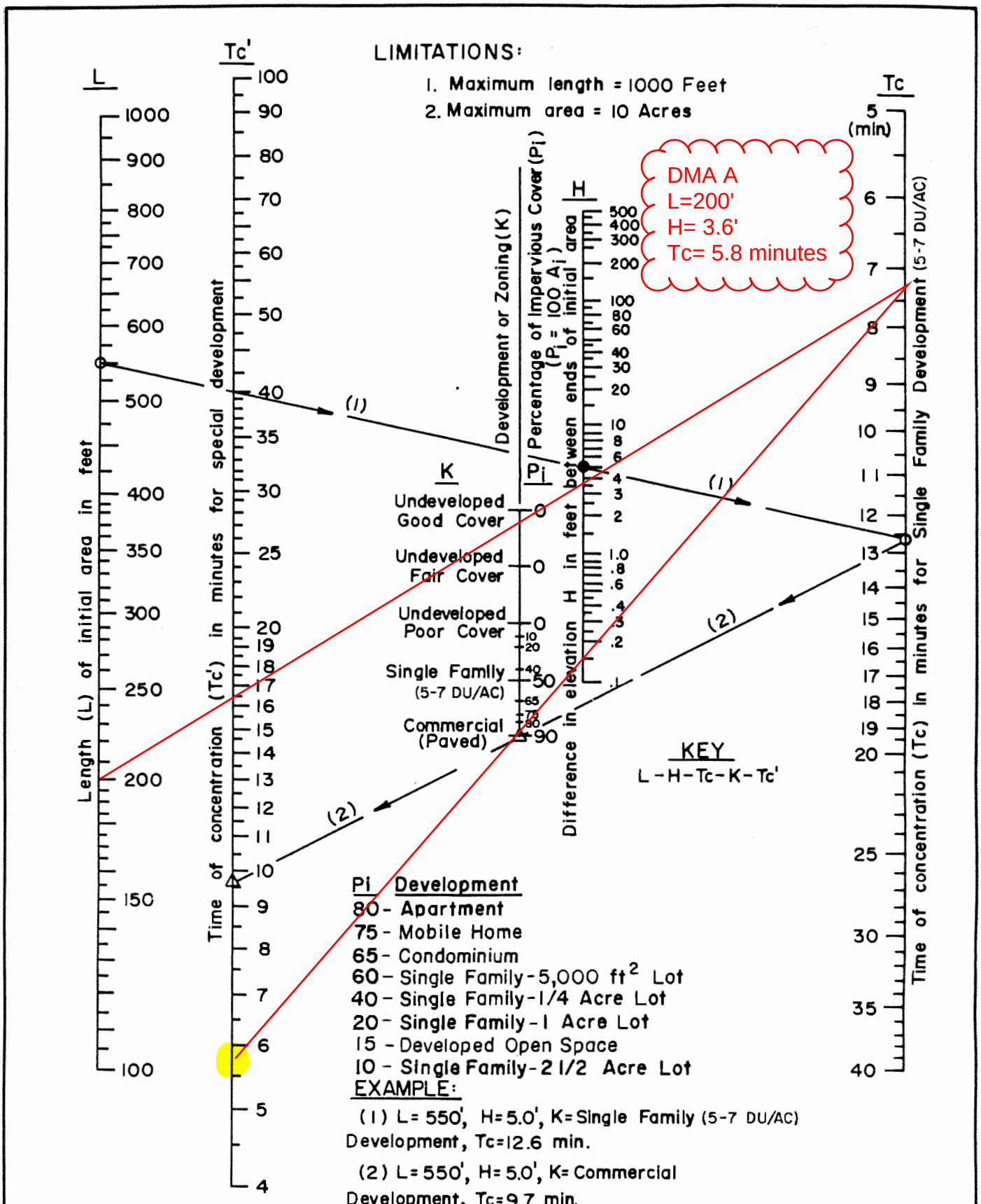
Time of Concentration was calculated using Orange County Hydrology Manual Time of concentration nomograph. See attached.

Worksheet F: Determining Capture Efficiency of a Flow-based BMP based on Treatment Capacity

Graphical Operations



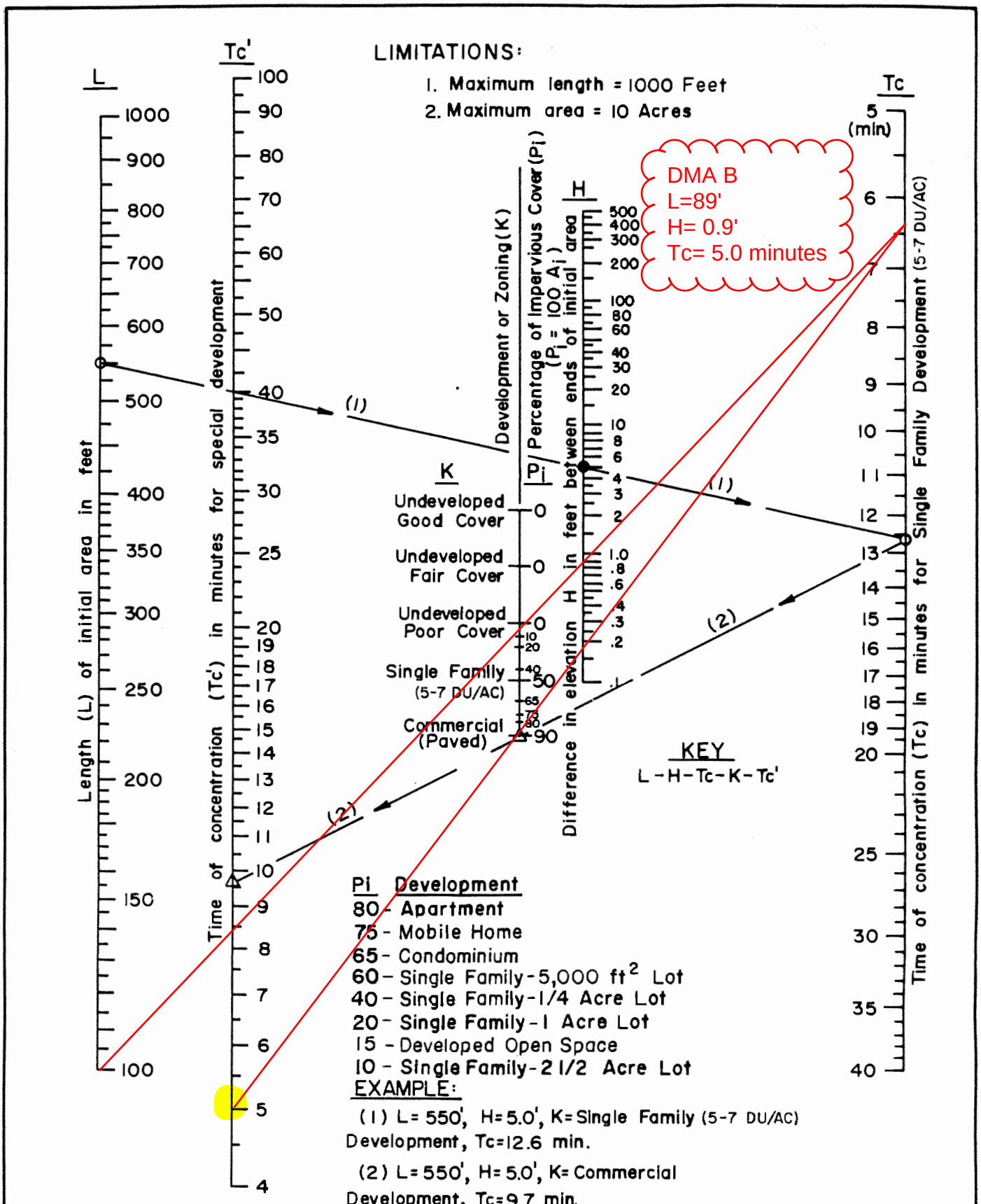
Provide supporting graphical operations.



ORANGE COUNTY
HYDROLOGY MANUAL

TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

Figure D-1



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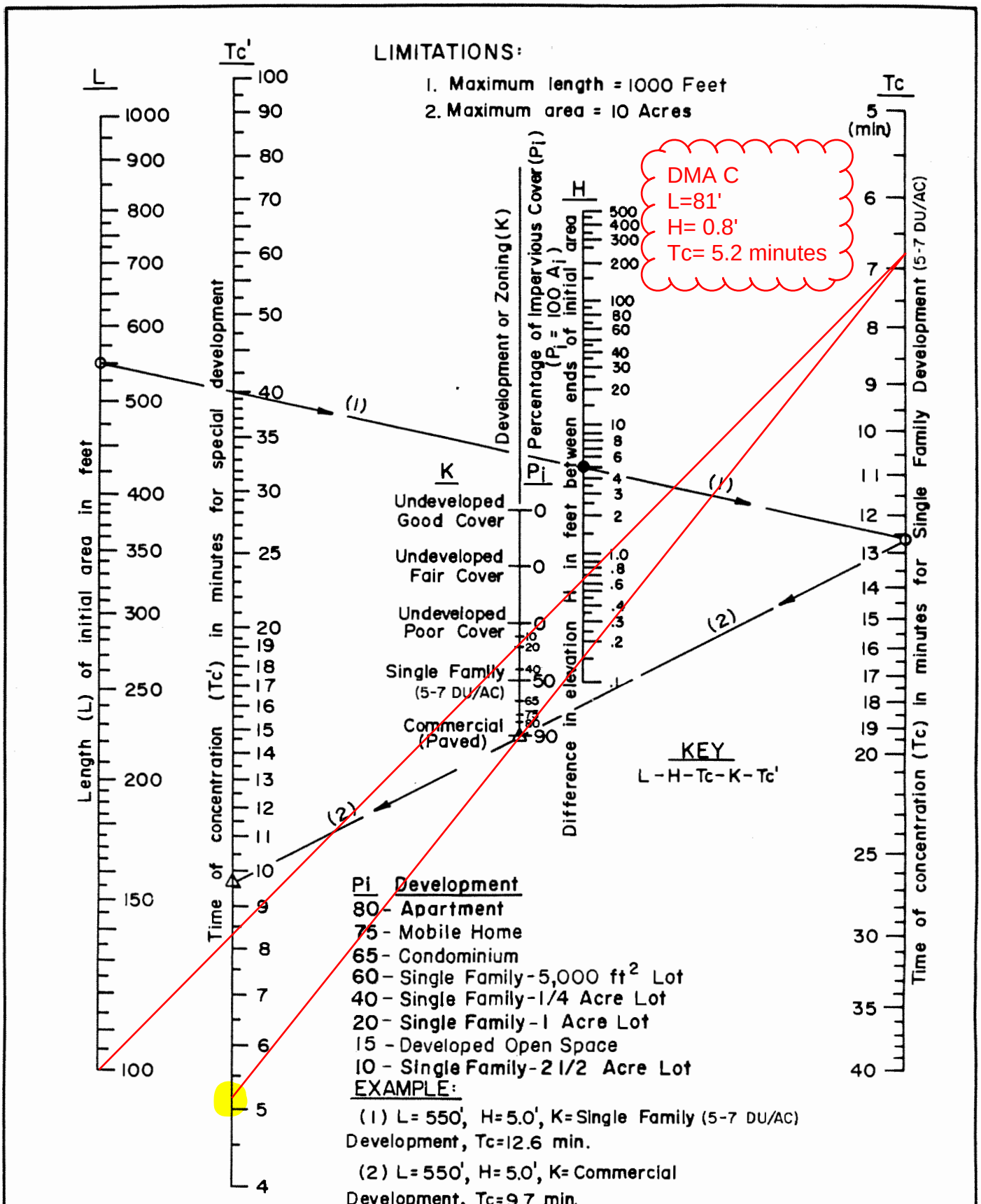
TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

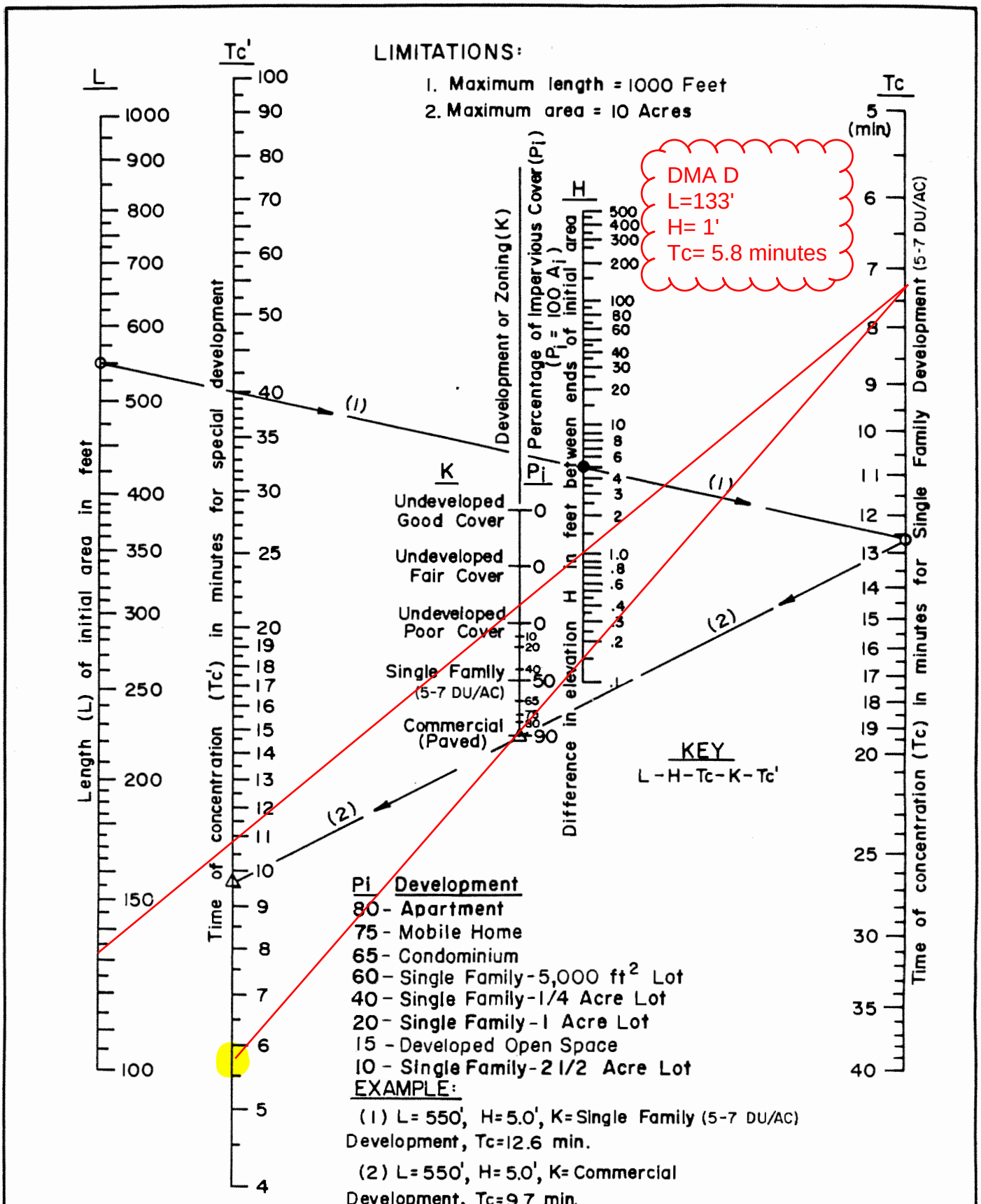
Figure D-1



ORANGE COUNTY
HYDROLOGY MANUAL

TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

Figure D-1



ORANGE COUNTY
HYDROLOGY MANUAL

TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

Figure D-1