City of Cypress

Preliminary
Water Quality Management Plan
(PWQMP)

Project Name:

GCC CYPRESS BUILDING 3

Record Number:

WQMP 23-X

Prepared for:

GLC CYPRESS LLC.

5665 PLAZA DRIVE

CYPRESS, CA 90630

949-407-0118

Prepared on: September 20, 2023

Prepared by:
PBLA ENGINEERING, INC.
Engineer STEVEN D. LEVISEE Registration No. 45926
1809 E. DYER ROAD, SUITE 301
SANTA ANA, CA 92705
888-714-9642

Project Owner's Certification

WQMP Record No.	WQMP 23-x	Grading Permit No.	GP - Pending
Tract/Parcel Map No.	N/A	Building Permit No.	BS--Pending
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract)			SPR 2022-05 241-101-25 PCL 2 LLA 2000-03

This Water Quality Management Plan (WQMP) has been prepared for GLC CYPRESS LLC by PBLA ENGINEERING, INC. The WQMP is intended to comply with the requirements of the local NPDES Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan 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. <u>After approval, any changes to the site plan will require resubmittal of an amended WQMP and approval by the City</u>. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

Owner:			
Title			
Company	GLC CYPRESS LLC		
Address	3333 Michelson Drive, Suite 1050 Irvine, CA 92612		
Email			
Telephone #	949-407-0118		
Signature		Date	

Project Engineer's Certification

WQMP Record No.	WQMP 23-x	Grading Permit No.	GP -Pending
Tract/Parcel Map No.	N/A	Building Permit No.	BS-Pending
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract)			SPR 2022-05 241-101-25 PCL 2 LLA 2000-03

I, STEVEN D. LEVISEE certify that this Water Quality Management Plan (WQMP) has been prepared under my responsible charge and as the engineer of record, I have read and understood the requirements of the Regional Board Order R8-2009-0030 as amended by Order No. R8-2010-0062, Section XII-B, the 2003 and 2007 Drainage Area Management Plan (DAMP), the City of Cypress Local Implementation Plan (LIP), Section 13-23 of the City of Cypress Municipal Code, and prepared this WQMP in compliance with all requirements thereto.
Furthermore, I attest that the WQMP for the development includes, but is not limited to the following:

1) Prioritization of the use of Low Impact Development principles as follows:
   a. Preserves natural features;
   b. Minimizes runoff and reduces impervious surfaces;
   c. Utilizes infiltration of runoff as the method of pollutant treatment.
2) Incorporation of the applicable Routine Source and Structural Control BMPs as defined in the Drainage Area Management Plan (DAMP).
3) Matching time of concentration, runoff, velocity, volume and hydrograph for a 2-year storm event, providing no increase in downstream erosion and avoids downstream impacts to physical structures, aquatic and riparian habitat.
4) Using alternative treatment controls (in lieu of standard) that meet the requirements of section 7.6.5 of the DAMP, and are equally or more effective in pollutant reduction than comparable BMPs.

Additionally, this WQMP contains information that:

1) Describes the long-term operation and maintenance requirements for structural and Treatment Control BMPs.
2) Identifies the entity or employees that will be responsible for long-term operation, maintenance, repair and or replacement of the structural and Treatment Control BMPs, and the training that qualifies such entity or employees to operate and maintain the BMPs.
3) Describes the recordkeeping requirements and contains a copy of the forms to be used in conducting maintenance and inspection activities.
4) Describes the mechanism for funding the long-term operation and maintenance of all structural and Treatment Control BMPs.

Engineer:			
Name	STEVEN D. LEVISEE		
Company	PBLA ENGINEERING, INC.		
Email	STEVEL@PBLA.BIZ		
Telephone #	888-714-9642 EXT. 2001		
Signature		Date	8/23/23

Registered Engineer's Seal

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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.	WQMP 23-x	Tract/Parcel Map No.	N/A
Additional Information/ Comments:	PLAZA DRIVE at DOUGLAS DRIVE – APN 241-101-25		
Water Quality Conditions			
Water Quality Conditions (list verbatim)	Will be provided in Final WQMP		
Watershed-Based Plan Conditions			
Provide applicable conditions from watershed - based plans including WIHMPs and TMDLS.	Anaheim Bay / Huntington Harbor Watershed – Bolsa Chica Channel WHIMPS: None TDML: None Listed		

Section II Project Description

II.1 Project Description

Provide a detailed project description including:

- Project areas;
- 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):	DEVELOPMENT CATEGORY #8 – All significant redevelopment projects, where significant redevelopment is defined as the addition or replacement of 5,000 or more square feet of impervious surface on an already developed site. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of the facility, or emergency redevelopment activity required to protect public health and safety. If the redevelopment results in the addition or replacement of less than 50 percent of the impervious area on-site and the existing development was not subject to WQMP requirement, the numeric sizing criteria discussed in Section 7.II-2.0 only applies to the addition or replacement area. If the addition or replacement accounts for 50 percent or more of the impervious area, the Project WQMP requirements apply to the entire development.	
Project Area (ft²): 354,584 SF	Number of Dwelling Units: 0	SIC Code: 4225
Narrative Project Description:	The project entails select areas of demolition including the existing office building, existing curb, gutter, pavement and landscaping. existing utilities to the extent that they will interfere with the proposed project. The total site entails 8.45 acres. The proposed project will construct 1 concrete tilt industrial building along with site improvements such as truck courts, drive aisles, parking, sidewalks, and trash enclosures. Paving material for truck operations as well as automobile drives and parking will likely be entirely concrete. This buildings are speculative at this time so exact uses are not known; however, the buildings are typical of a logistics type of use. There will be no food preparation, cooking, or eating areas external to the buildings. Loading docks are designed as "dock high" and paving will be concrete. No materials are anticipated to be stored external to the buildings. Activity external to the building will be limited to	

<table>
<tr><td></td><td colspan="4">trucking operations, trailer storage, automobile driving & parking, There will be no vehicle or equipment maintenance or washing/cleaning. There will be no fueling operations at this site.
Landscaping will be drought tolerant plantings w/ drip system irrigation and will comply with City requirements.
The existing onsite storm drain will be removed.</td></tr>
<tr><td rowspan="2">Project Area</td><td colspan="2">Pervious</td><td colspan="2">Impervious</td></tr>
<tr><td>Area (ac or sq ft)</td><td>Percentage</td><td>Area (ac or sq ft)</td><td>Percentage</td></tr>
<tr><td>Pre-Project Conditions (8.14 ac)</td><td>58,068 SF</td><td>16%</td><td>296,516 SF</td><td>84%</td></tr>
<tr><td>Post-Project Conditions (8.45 ac)</td><td>29,718 SF</td><td>8%</td><td>338,276 SF</td><td>92%</td></tr>
<tr><td>Drainage Patterns/Connections</td><td colspan="4">The current drainage pattern for the existing site drains generally from the existing building and drains in all directions to the perimeter, then is to various area drains and catch basins in the project parking lot area. flows are then conveyed with storm drains to a main storm drain system in the southern parking lot eventually connecting to an existing storm drain that comes from Plaza Drive and drains to the west in south side of the proposed parking area.

The proposed drainage pattern will remain effectively the same by starting at the buildings and sheet flowing to the perimeter. Inlets and storm drains will convey runoff to a proposed underground storge box in the south-westerly parking lot area.
Hydrodynamic separators will be installed just upstream of each connection to the underground storage box to serv as pre-treatment before flows enter the storage system. These units remove large trash, debris and sediments to help reduce maintenance efforts for the storage system.
The underground storage chamber will be a cast-in-place reinforced concrete box (RCB) and will capture the DCV for the project. That DCV will then be pumped to a Modular Wetlands Unit(s) for treatment and discharged to the existing storm drain system. any overflow in excess of the DCV will be directed to the existing storm drain in the southern parking lot. Once the DCV is captured in the underground storage system, any excess flows will bypass the underground storage and be diverted directly to the existing storm drain system. Bypass will occur due to the storage system will be full, and storm flows will continue to the outlet as the invert of the underground system will</td></tr>
</table>

	be set to the soffit of the underground array. See the "Overflow and MWU Schematic" on the WQMP Site Plan.

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	
Nutrients	E	N	
Heavy Metals	E	N	
Pathogens (Bacteria/Virus)	E	N	
Pesticides	E	N	
Oil and Grease	E	N	
Toxic Organic Compounds	E	N	
Trash and Debris	E	N	

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.*

☐ No – Show map

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

The site is tributary to Bolsa Chica Channel which has sections that are not concrete lined.

Existing vs Developed condition 2yr-24 hour storm analysis was performed utilizing the TR-55 hydrology program. The developed condition does not increase the storm volume or the Time of Concentration.

The calculations are based on analyzing the entire area of development and any tributary areas in both existing and developed states. The TR-55 output is provided in the Attachments.

The Runoff volume for the existing (V_{EXIST}) and developed (V_{PROP}) condition are equal, therefore V_{PROP} / V_{EXIST} is ≤ 1.05. The runoff volume difference (Δ) [2YR, 24HR] between the existing and developed states equals zero. The Design Capture Volume determined using the 85th Percentile Storm event equals 0.6 ac-ft. Therefore runoff Δ[2YR, 24HR] is not greater than 85th Percentile Storm (DCV). The Time of Concentration for the existing (Tc_{EXIST}) and developed (Tc_{PROP}) condition are 0.132 and 0.100, respectively, therefore Tc_{PROP} / Tc_{EXIST} is ≤ 1.05. As a result of the runoff volume and time of concentration being managed to meet these criteria, HCOC are mitigated.

II.4 Post Development Drainage Characteristics

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

Generally, the Site will maintain a very similar drainage pattern as the existing condition. The site will drain toward the perimeter and runoff will be directed to U/G storage. The ultimate discharge from the Site will be to the same Storm Drain as the existing condition. The existing storm drain outlets from the Site at the Southwest corner of the Site near the proposed driveway at Plaza Dr.

The proposed LID BMPs are limited to Biotreatment utilizing underground detention and treatment via Modular Wetlands Unit(s). A Hydrodynamic Separator will be utilized as pre-treatment for storm water entering the underground system.

The storm drain is tributary to the Bolsa Chica Channel, which in turn drains to the Anaheim Bay / Huntington Harbor and the Pacific Ocean.

II.5 Property Ownership/Management

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

OWNER: GLC CYPRESS LLC will perform all maintenance and repair functions for all proposed BMPs and general site maintenance.

Person responsible for maintenance:

Mr. Bryant Mork
3333 Michelson Dr
Suite 1050
Irvine, CA 92612
Bryant.mork@goodman.com
949.407.0100

There is no intent to transfer any responsibility to any other entity, POA or agency.

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	McDonnell Center Specific Plan
Location/Address	5665 PLAZA DRIVE
	CYPRESS, CA 90630
Land Use	PC-3 PLANNED COMMUNITY ZONE
Zoning	PC-3 PLANNED COMMUNITY ZONE
Acreage	8.45 ac - ENTIRE PARCEL
Predominant Soil Type	B

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	*0.85*
Topography	The project site is currently being used as an office facility with site parking, drive aisle, and landscape improvements typical of these type of developments. The building is currently unoccupied. The site drains generally in all directions to the perimeter. Existing pavement slopes within the existing site are generally between 0.5% to approximately 3%. Elevations of the site range between 34 to 38. There are no environmentally sensitive areas in the area of the project or near the site.
Drainage Patterns/Connections	The current drainage pattern for the existing site is generally in all directions to the perimeter, then is to various area drains and catch basins in the project parking lot area. Flows are then piped to a main storm drain system in the southern parking lot eventually connecting to an existing drain in plaza dr. The proposed drainage pattern will remain effectively the same and will capture the majority of the project area by flowing to underground storm

	drain by way of proposed curbs and gutters. These drains will connect to underground storage box to capture dcv for the project. That dcv will then be treated with a modular a wetlands unit and discharged to the existing storm drain system. Any overflow in excess of the dcv will be directed to the existing storm drain in the southern parking lot.
Soil Type, Geology, and Infiltration Properties	Artificial fill soils were encountered beneath the pavements at all boring locations, extending from depths of 2½ to 7± feet below ground surface. The fill soils generally consist of loose to medium Dense silty fine sands and fine sands with variable medium to coarse sand and clay content. The fill soils possess a disturbed and mottled appearance, resulting in their classification as artificial fill.

Site Characteristics (continued)

Hydrogeologic (Groundwater) Conditions	Free water was encountered during the drilling at all boring locations. Water was encountered at depths between 6 and 9½± feet below existing site grades. A delayed groundwater measurement Was taken at boring no. B-2 about, 5½ hours after the augers were withdrawn from the boring. At this time, free water was measured within the open borehole at a depth of 7½± feet below the existing ground surface.
Geotechnical Conditions (relevant to infiltration)	Mounded seasonally high groundwater conditions exist onsite. Due to the high groundwater, the use of infiltration BMPs is not feasible. As part of the geotechnical report research, they reviewed available groundwater data in order to determine the historic high groundwater level for the site. The primary reference used to determine the historic groundwater depths in this area is the California geological survey (cgs) open file report 98-10, the seismic hazard zone report for the Los Alamitos 7.5-minute quadrangle, which indicates that the historic high groundwater level for the site was about 10 feet below the ground surface. Recent water level data was obtained from the California state water resources control board, Geotracker, website, https://geotracker.waterboards.ca.gov/. Three monitoring wells on record are located 1,600± northeast of the site. Water level readings within these monitoring wells indicate a high groundwater level of 6½± feet below the ground surface in September 2004.
Off-Site Drainage	There is no run-on into the project area.
Utility and Infrastructure Information	*All existing utilities within the re-construction area will be removed.*

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	BOLSA CHICA CHANNEL / ANAHEIM BAY-HUNTINGTON HARBOR / PACIFIC OCEAN
303(d) Listed Impairments	Bolsa Chica Channel: Ammonia (Unionized) (73788), pH (77494), Indicator Bacteria (77714) Huntington Harbor: Chlordane (68183), Copper (68882), PCBs (Polychlorinated biphenyls) (70200), Toxicity (76729), Lead (80431), Indicator Bacteria (97909) Anaheim Bay: Nickel (69290), Toxicity (69325), PCBs (Polychlorinated biphenyls) (78840)
Applicable TMDLs	NONE
Pollutants of Concern for the Project	Suspended-Solid/ Sediment Nutrients Heavy Metals Pathogens (Bacteria/Virus) Pesticides Oil and Grease Toxic Organic Compounds Trash and Debris
Environmentally Sensitive and Special Biological Significant Areas	NONE

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.	N/A	

Project Performance Criteria (continued)

If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP)	HCOC is a concern for the Bolsa Chica Channel. Attachment H provides pre-developed and developed condition hydrology calculations for the 2 hour storm event. The Runoff volume for the existing (V_{EXIST}) and developed (V_{PROP}) condition are equal, therefore V_{PROP} / V_{EXIST} is ≤ 1.05. The runoff volume difference (Δ) [2YR, 24HR] between the existing and developed states equals zero. The Design Capture Volume determined using the 85th Percentile Storm event equals 0.6 ac-ft. Therefore runoff Δ[2YR, 24HR] is not greater than 85th Percentile Storm (DCV). The Time of Concentration for the existing (Tc_{EXIST}) and developed (Tc_{PROP}) condition are 0.132 and 0.100, respectively, therefore Tc_{PROP} / Tc_{EXIST} is ≤ 1.05. As a result of the runoff volume and time of concentration being managed to meet these criteria, HCOC are mitigated.
List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)	Priority projects must infiltrate, harvest and use, evapotranspire, or biotreat/biofilter, the 85th percentile, 24-hour storm event (design capture volume).
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.	25,766 cu-Ft Total – See DCV Worksheets In Attachments For Individual DMA DCV

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.

Due to the high and seasonally mounded groundwater, traditional infiltration BMPs are not feasible for this project.

Site design will incorporate capture and treat BMPs. A cast-in-place RCB storage box or approved equal will separate the storm water runoff from the existing high ground water.

The total site area is 8.45 acres, and the entirety of the site is tributary to the underground storage and treatment system. and will be 92% impervious in the developed condition. The area will sheet flow to area catch basins and be directed to underground storage.

Pre-treatment to capture debris and pollutants before entering the collection system will be accomplished with Hydrodynamic Separators prior to stormwater entering the underground storage system.

The DCV calculations are given in the attachments and is 25,766 cu-ft. total.

The DCV will be treated by pumping the stored volume though a Proprietary Biotreatment System in accordance with Fact Sheet BIO-7 (Modular Wetlands Unit) to treat the volume within 48 hrs.

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:	☐

Retention met with the proposed storage / biotreatment system – HSCs not required

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.

Infiltration BMPs cannot be used due to high and mounded groundwater. Infiltration BMPs can only be considered if mounded groundwater elevations are at least 10 feet below the bottom elevation of infiltration system. Per the Geotechnical Investigation Report, Ground water is well above any proposed infiltration system. Raising the site elevations to attain elevation conducive to infiltration was studied and was found to be not feasible. See soils report for documentation, and Worksheet I in the Attachments.
Proposed design is to capture the required DCV, treat with Proprietary Biotreatment and release.

Please see the following Attachments:
C – DCV Calculations
D – Groundwater Feasibility

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. – NONE – See worksheet "J" in Appendix

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.

These BMPs are not feasible as indicated on Worksheet "J" in the Appendix

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 Storm 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.

1. PRETREATMENT | Stormwater enters the pretreatment chamber where total suspended solids settle, and trash and debris are contained within the chamber. Stormwater then travels through the pretreatment filter boxes that provide additional treatment.
2. BIOFILTRATION | As water enters the biofiltration chamber, it fills the void space in the chamber's perimeter. Horizontal forces push the water inward through the biofiltration media, where nutrients and metals are captured. Modular Wetlands System (BIO-7) is a proprietary Vegetated Biotreatment System that will be specified for this Project.
The treated water then enters the drain pipe downstream of the Modular Wetlands System to be discharged.
3. DISCHARGE | The specially designed vertical drain pipe and orifice control plate control the flow of water through
the media to a level lower than the media's capacity, ensuring media effectiveness. The water then enters the horizontal drain pipe to be discharged.
4. BYPASS | During peak flows, an internal weir in the side-by-side configuration allows high flows to bypass treatment, eliminating flooding and the need for a separate bypass structure. Bypass is not provided in the end-to end configuration.

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. – N/A

Hydromodification Control BMPs	
BMP Name	**BMP Description**
N/A	

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
N/A

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
Inlet Filters (AbTech Ultra Urban – Filter CO for curb opening, and Ultra Urban – Filter DI for graded basins)	Catch Basin inserts for pre-treatment upstream of U/G storage
Hydrodynamic Separator (ADS Barracuda Max Model S4)	Barracuda HDS units will be placed upstream of u/g storage entrances.

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)	☐	☒	N/A
N6	Local Industrial Permit Compliance	☐	☒	Spec Building – Exact use unknown
N7	Spill Contingency Plan	☐	☒	Spec Building – Exact use unknown
N8	Underground Storage Tank Compliance	☐	☒	NONE PROPOSED
N9	Hazardous Materials Disclosure Compliance	☐	☒	NO HAZARDOUS MATERIALS WILL BE USED
N10	Uniform Fire Code Implementation	☐	☒	N/A
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	☐	☒	NONE PROPOSED

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	☐	☒	NONE 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	☐	☒	NONE PROPOSED
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☒	NONE PROPOSED
S6	Dock areas	☒	☐	
S7	Maintenance bays	☐	☒	NONE PROPOSED
S8	Vehicle wash areas	☐	☒	NONE PROPOSED
S9	Outdoor processing areas	☐	☒	NONE PROPOSED
S10	Equipment wash areas	☐	☒	NONE PROPOSED
S11	Fueling areas	☐	☒	NONE PROPOSED
S12	Hillside landscaping	☐	☒	NONE PROPOSED
S13	Wash water control for food preparation areas	☐	☒	NONE PROPOSED
S14	Community car wash racks	☐	☒	NONE 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.*

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

☐Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.	☐ Developments in a city center area.	☐ Developments in historic districts or historic preservation areas.	☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.	☐In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.

Calculation of Water Quality Credits (if applicable)	Project does not qualify for Water Quality Credits

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. 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. Include the costs of installation and maintenance of all structural post construction BMPs.*

BMP Inspection/Maintenance			
BMP	**Reponsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
Education for Property Owners, Tenants and Occupants	GLC Cypress, LLC	Educational materials will be provided to tenants, including brochures and restrictions to reduce pollutants from reaching the storm drain system. Examples include tips for pet care, household tips, and proper household hazardous waste disposal. Additional materials are available through the County of Orange Stormwater Program website (http://ocwatersheds.com/PublicEd/) and the California Stormwater Quality Association's (CASQA) BMP Handbooks (http://www.casqa.org/resources/bmphandbooks).	Tenants will be provided with these materials by the property management prior to occupancy, and periodically thereafter. Refer to Section VII for a list of materials available and attached to this WQMP.
Activity Restrictions	GLC Cypress, LLC	The Owner/HOA shall develop ongoing activity restrictions that include those that have the potential to create adverse impacts on water quality. Activities include, but are not limited to: handling and disposal of contaminants, fertilizer and pesticide application restrictions, litter control and pick-up, and vehicle or equipment repair and maintenance in non-designated areas, as well as any other activities that may potentially contribute to water pollution.	Ongoing

BMP Maintenance	GLC Cypress, LLC	Maintenance of structural BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP (Appendix D). Records of inspections and BMP maintenance shall be kept by the Owner/HOA and shall be available for review upon request.	Ongoing
Common Area Landscape Management	GLC Cypress, LLC	Maintenance shall be consistent with City requirements. Fertilizer and/or pesticide usage shall be consistent with County Management Guidelines for Use of Fertilizers (OC DAMP Section 5.5) as well as local requirements. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting, and replacement of mulch shall be performed on an as-needed basis to prevent exposure of erodible surfaces. Trimmings, clippings, and other landscape wastes shall be properly disposed of in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and storm drain inlets.	Monthly
Common Area Litter Control	GLC Cypress, LLC	The Owner will be responsible for performing trash pickup and sweeping of littered common areas. Responsibilities will also include noting improper disposal materials by the public and reporting such violations for investigation.	Weekly or as necessary
Employee Training	GLC Cypress, LLC	All employees and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not be limited to, spill cleanup procedures, proper waste disposal, housekeeping practices, etc.	Annually
Housekeeping of Loading Docks	GLC Cypress, LLC	Inspect loading dock for litter, spills, broken containers, and broken containers. Remove litter and debris and sweep docking area. Check that loading dock is covered and isolated with no run-on or run-off to other areas or the storm drain system. Repair, redesign, regrade, etc. to correct deficiencies. If spills of hazardous materials occur, clean up spill, but prevent wash water from entering storm drain system.	Quarterly
Design and construct trash and waste storage areas to reduce pollution introduction	GLC Cypress, LLC	Sweep trash area at least once per week and before October 1st each year. Maintain area clean of trash and debris at all times.	Weekly

Common Area Catch Basin Inspection	GLC Cypress, LLC	On-site catch basin inlets and other drainage facilities shall be inspected at least once per year, prior to the start of the rainy season (October 1st). Inlets and other facilities shall be cleaned when the sump is 40% full and annually at a minimum.	Must be inspected and cleaned as needed prior to October 1 of each year (Beginning of rainy season)
Street Sweeping Private Streets and Parking Lots	GLC Cypress, LLC	Streets, parking areas and alleyways within the project shall be swept at a minimum frequency quarterly as well as once per year prior to the storm season, no later than October 1 each year.	Quarterly
Provide Storm Drain System Stenciling and Signage	GLC Cypress, LLC	On-site storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1 each year. Those determined to be illegible will be re-stenciled as soon as possible.	Annually
Modular Wetlands	GLC Cypress, LLC	The Modular Wetland units shall be maintained in accordance with manufacturer's specifications. The system shall be inspected at a minimum of once every six months, prior to the start of the rainy season (October 1) each year, and after major storm events. Typical maintenance includes: ▪ Removing trash & debris from the catch basin screening filter (by hand). ▪ Removal of sediment and solids in the settlement chamber (vacuum truck). ▪ Replacement of the BioMediaGREENTM filter cartridge and drain-down filter (if equipped) ▪ Trim plants within the wetland chamber as needed in conjunction with routine landscape maintenance activities. No fertilizer shall be used. ▪ Wetland chamber should be inspected during rain events to verify flow through the system. If little to no flow is observed from the lower valve or orifice plate, the wetland media may require replacement.	Must be inspected and cleaned as needed prior to October 1 of each year (Beginning of rainy season) and Inspection should be made twice per calendar year
Underground Storage System (RCB)	GLC Cypress, LLC	Inspect system via the maintenance port for infiltration of collected runoff after major rain events and at least semi-annually, once prior to the rainy season and once after the rainy season. Ensure that facility drains within 48 hours. Should drawdown times get significantly reduced due to sediment buildup, flush system by injecting high pressure water via	Must be inspected and cleaned as needed prior to October 1 of each year (Beginning

		the maintenance port and remove sediment laden water via sump pump.	of rainy season) and Inspection should be made twice per calendar year
Hydrodynamic Separator (ADS Barracuda Max)	GLC Cypress, LLC	Typical maintenance includes inspecting the system at a minimum of once every six months. The cleaning and debris removal maintenance from the settling chamber a minimum of once year and replacement of hydrocarbon booms once a year. The procedure is easily done with the use of any standard vacuum truck. Media shall be replaced when it has become 75% clogged, typically once per year at a minimum.	Must be inspected and cleaned as needed prior to October 1 of each year (Beginning of rainy season) and Inspection should be made twice per calendar year
Storm Drain Ejector Pump System – Primary & Secondary	GLC Cypress, LLC	Proper operation and inspection would include the following: 1) Automatic operation of the system by float activation. One pump starting at lead on levels, second pump starting at high level conditions; manual operation by use of the selector switches. 2) Inspect floats for proper elevation and for proper movement. Correct any obstructions. 3) Check incoming power for proper voltage. Check voltage at motor connections. 4) Check amperage of each motor. 5) Hose down lift station to clean the walls of the wet well, pumps and floats.	Must be inspected and cleaned as needed prior to October 1 of each year (Beginning of rainy season) and Inspection should be made twice per calendar year

Notes:
1) Rainy season begins October 1 of each year.
2) Annual budget for maintenance is approximately $12,000/yr
3) U/G storage system will be emptied within 48 hours after any given rain event, thereby minimizing vector potential.
4) In the event of a pump failure, O.C. Vector Control (714) 971-2421 shall be contacted if underground storage volume cannot be emptied withing 48 hours after the end of any given rain event.

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 with GPS coordinates in decimal degrees (DD) format
- Drainage delineations and flow information
- Drainage connections
- BMP details

VI.2 ELECTRONIC DATA SUBMITTAL

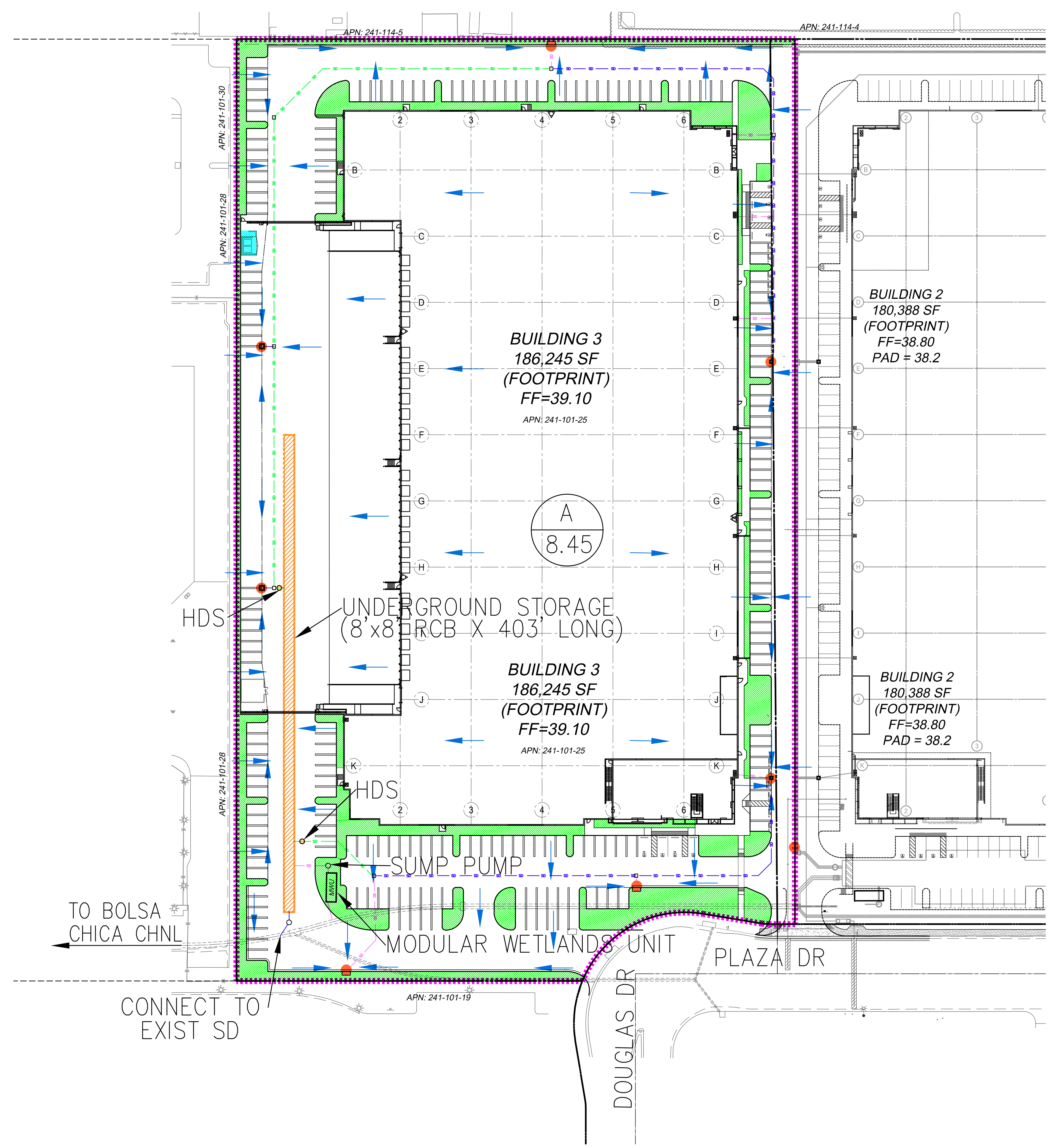
The minimum requirement is to provide submittal of PDF exhibits in addition to hard copies after approval. Format must not require specialized software to open.

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.

Site Specific Details:

1) **WQMP Site Plan**
2) **Modular Wetlands System Details**
3) **Storm Drain Pump System Details**
4) **Hydrodynamic Separator Details**
5) **Inlet Filter Details**
6) **Trench Drain Details**

WQMP SITE PLAN

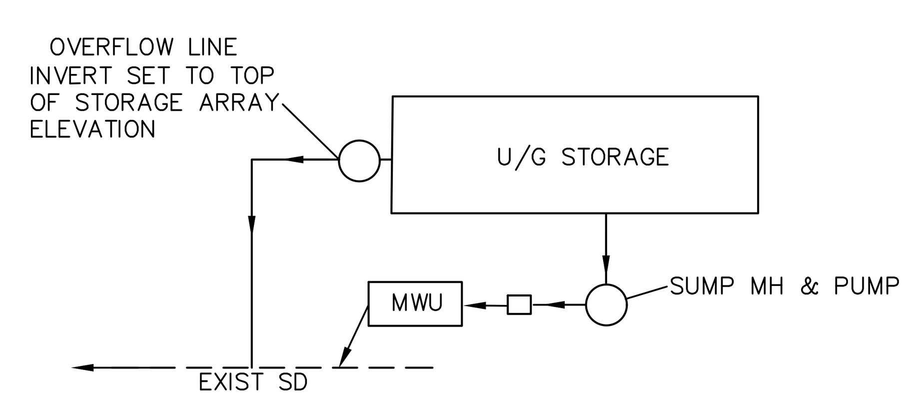


NOTE: ALL CATCH BASIN INLETS SHALL BE STENCILED WITH "NO DUMPING–DRAINS TO OCEAN"

STENCIL DETAIL

N.T.S.

NOTE: ALL INLETS SHALL BE FITTED WITH AN APPROPRIATE INLET FILTER AND AFFIXED WITH A STENCIL PER DETAIL ABOVE –7 EA



OVERFLOW AND MWU SCHEMATIC

NTS

NOTE: PUMP AND MWU ARE SIZED TO PROVIDE 72 GPM TO EMPTY THE U/G STORAGE VOLUME WITHIN 48 HOURS

SEE SHEET 2 FOR DETAILS

NON–STRUCTURAL BMPS

PROPERTY OWNER EDUCATION
ACTIVITY RESTRICTIONS
COMMON AREA LANDSCAPE MAINTENANCE
BMP MAINTENANCE
LOCAL INDUSTRIAL PERMIT COMPLIANCE
SPILL CONTINGENCY PLAN
UNIFORM FIRE CODE IMPLEMENTATION
COMMON AREA LITTER CONTROL
EMPLOYEE TRAINING
ACTIVITY RESTRICTIONS
HOUSEKEEPING OF LOADING DOCKS
COMMON AREA CATCH BASIN INSPECTION
PARKING LOT SWEEPING

PROJECT DATA:

EXISTING SITE AREA = 354,584 SF (8.14 AC)
ADDED BY LOT LINE ADJ = 13,410 SF (0.31 AC)
TOTAL SITE AREA = 367,994 (8.45 AC)

CURRENT USE: OFFICE / INDUSTRIAL
PROPOSED USE: LIGHT INDUSTRIAL

WATERSHED:
SANTA ANA REGION
BOLSA CHICA CHANNEL
HUNTINGTON HARBOR
ANAHEIM BAY
PACIFIC OCEAN

DMA "A" DATA

TOTAL AREA TRIBUTARY TO TREATMENT
= 367,994 SF (8.45 AC)

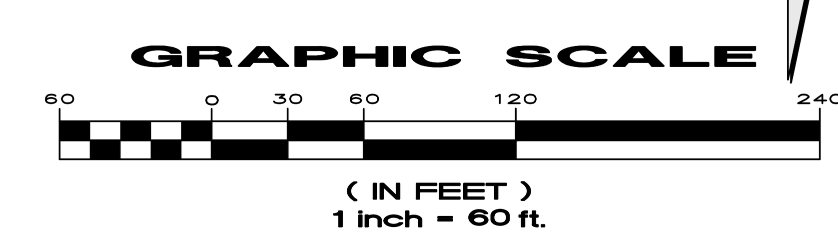
ROOF AREA: 186,245 SF
PAVED AREA: 152,031 SF
ONSITE LANDSCAPE: 29,718 SF

0.920 IMPERVIOUS RATIO

DESIGN CAPTURE VOLUME:
= 25,766 CF

LEGEND — STRUCTURAL / TREATMENT BMPS

UNDERGROUND STORM WATER STORAGE SYSTEM (CAPACITY = 25,766 CF)
PROPOSED DROUGHT TOLERANT LANDSCAPING WITHIN DMA "A"
COVERED TRASH ENCLOSURE AREA
HYDRO DYNAMIC SEPARATOR (HDS) (ADS BARRACUDA MAX)
STENCIL & INLET FILTER
DMA LIMITS
SD — PROPOSED STORM DRAIN SYSTEM
SURFACE FLOW DIRECTION



PREPARED BY:
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SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

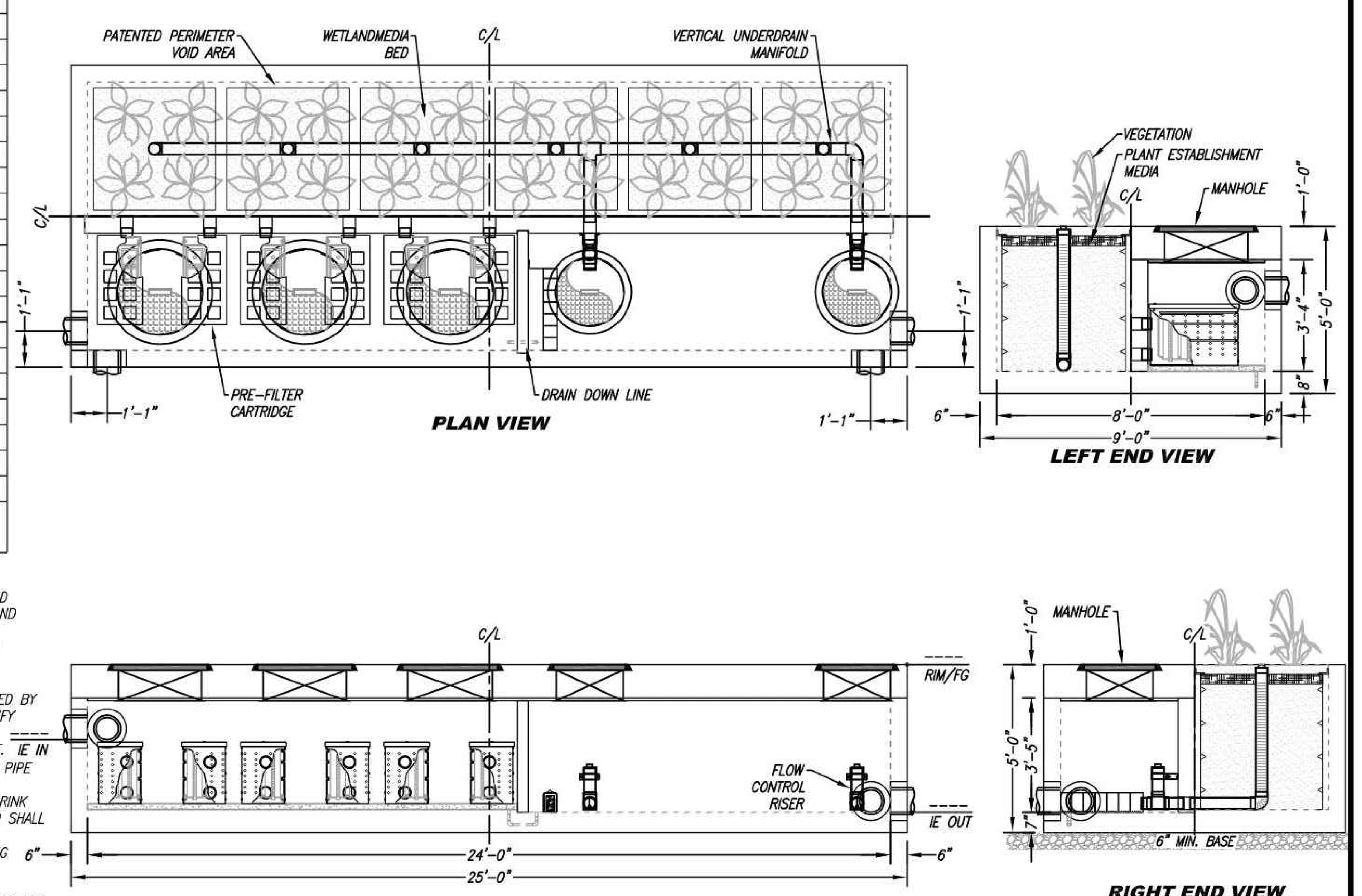
Sep 20 2023

SITE PLAN

PRELIM WATER QUALITY MANAGEMENT PLAN
GCC - CYPRESS BLD 3
PLAZA DRIVE - CYPRESS, CA

SITE SPECIFIC DATA

PROJECT NUMBER	----		
PROJECT NAME	----		
PROJECT LOCATION	----		
STRUCTURE ID	----		
TREATMENT REQUIRED			
VOLUME BASED (CF)	FLOW BASED (CFS)		
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	----	PVC	8"
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	----	PVC	8"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	----	----	----
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	3 EA ø30"	N/A	2 EA ø24"
WETLANDMEDIA VOLUME (CY)			TBD
WETLANDMEDIA DELIVERY METHOD			PER CONTRACT
ORIFICE SIZE (DIA. INCHES)			TBD
NOTES:			



TREATMENT FLOW (CFS)	0.693
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

INSTALLATION NOTES

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

GENERAL NOTES

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

1/31/17/HAYDEN

MODULAR WETLANDS
www.ModularWetlands.com | (866) 6MOD-WET

MWS-L-8-24-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

MODULAR WETLANDS UNIT DETAIL
NTS

ADS® Barracuda™ Max

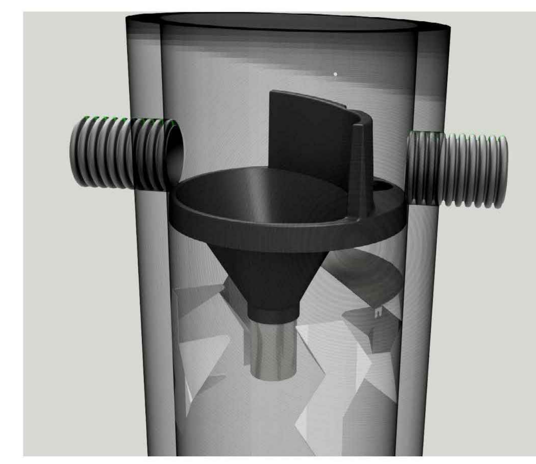
The Barracuda Max is market-changing stormwater quality technology. This high-performance vortex hydrodynamic separator is designed to remove total suspended solids in order to protect our precious receiving waters. The Barracuda Max is also an outstanding value that offers multiple pipe configurations, and quick installation. The "Max" version of the Barracuda is built on the base platform of the original ADS Barracuda with improved removal efficiencies and installation components.

Features

- Single manhole design
- No elevation loss between the inlet and outlet
- Variable inlet/outlet angle configurations (not just 180 degree orientation)
- Internal bypass for inline installation (where applicable)
- Revolutionary, patent-pending "teeth" mitigate turbulence in the sump area to prevent re-suspension of captured contaminants and an added deflector plate and bowl extension enhance the unit's removal capabilities

Benefits

- Internal components are in stock for quick delivery
- The S3, S4, S6, and S8 can be installed in a standard 36" (900 mm), 48" (1200 m), 72" (1800 m), and 96" (2400 m) precast manhole, respectively
- The S3 & S4 can be provided factory installed within a 36" (900 mm) and 48" (1200 mm) ADS HP manhole and delivered to the jobsite
- The Barracuda Max "teeth" and deflector plate apparatus are fabricated and designed for quick and easy field assembly
- Designed for easy maintenance using a vacuum truck or similar equipment.
- Inspection and maintenance are performed from the surface with no confined space entry



ADS

Barrucuda Specification

Materials and Design

- Concrete Structures: Designed for H-20 traffic loading and applicable soil loads or as otherwise determined by a Licensed Professional Engineer. The materials and structural design of the devices shall be per ASTM C857 and ASTM C858.
- 36" (900 mm) and 48" (1200 mm) HP Manhole Structures: Made from an impact modified copolymer polypropylene meeting the material requirements of ASTM F2764. The eccentric cone reducer shall be manufactured from polyethylene material meeting ASTM D3350 cell class 213320C. Gaskets shall be made of material meeting the requirements of ASTM F477.
- Separator internals shall be substantially constructed of stainless steel, polyethylene or other thermoplastic material approved by the manufacturer.

Performance

- The stormwater treatment unit shall be an inline unit capable of conveying 100% of the design peak flow. If peak flow rates exceed maximum hydraulic rate, the unit shall be installed offline.
- The Barracuda Max unit shall be designed to remove at least 80% of the suspended solids on an annual aggregate removal basis. Said removal shall be based on full-scale third party testing using OK-110 media gradation or equivalent and 300 mg/L influent concentration. Said full scale testing shall have included sediment capture based on actual total mass collected by the stormwater treatment unit.

  \- OR -

  The Barracuda Max unit shall be designed to remove at least 50% of TSS using a media mix with d_{50}=75 micron and 200 mg/L influent concentration.

  \- OR -

  The Barracuda Max unit shall be designed to remove at least 50% of TSS per current NJDEP/NJCAT HDS protocol.
- The stormwater treatment unit internals shall consist of (1) separator cone assembly, and (1) sump assembly, which includes the "teeth".

Barracuda Max Model	Manhole Diameter	NJDEP (50% removal)	OK-110 (80% removal)
S3	36" (900 mm)	0.85 CFS (24.1 L/s)	0.86 CFS (24.1 L/s)
S4	48" (1200 mm)	1.52 CFS (43.0 L/s)	1.52 CFS (43.0 L/s)
S6	72" (1800 mm)	3.40 CFS (96.3 L/s)	3.42 CFS (96.8 L/s)
S8	96" (2400 mm)	6.08 CFS (172.2 L/s)	6.08 CFS (172.2 L/s)

* Peak bypass flows are dependent on final design

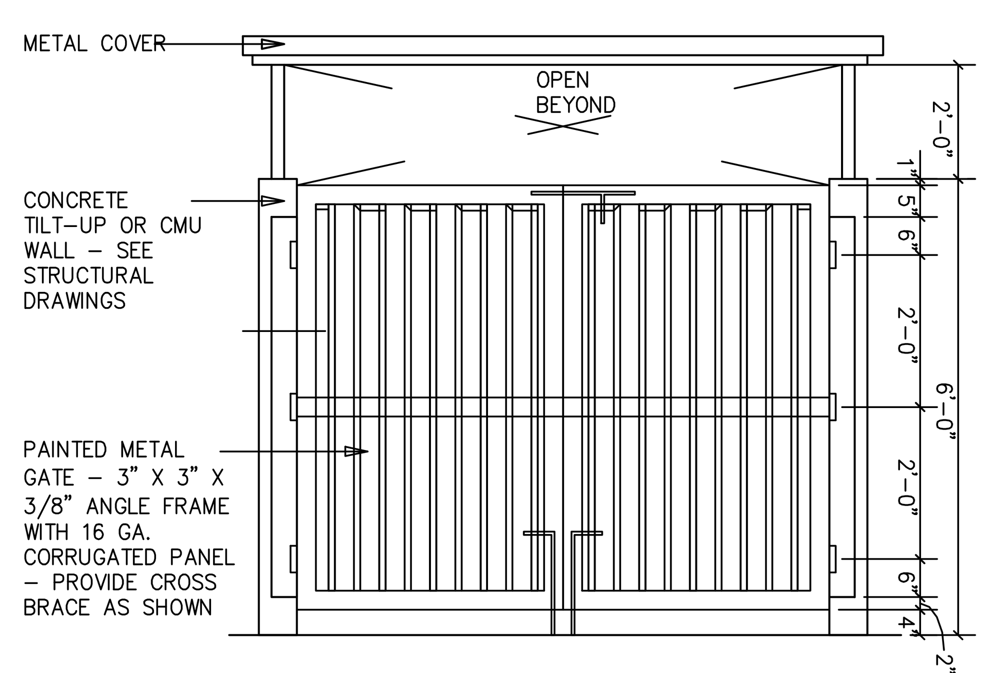
Installation

Installation of the stormwater treatment unit(s) shall be performed per manufacturer's installation instructions. Such instructions can be obtained by calling Advanced Drainage Systems at 800-821-6710 or by logging on to www.adspipe.com.

ADS

adspipe.com
800-821-6710

MODEL S6 HYDRODYNAMIC SEPARATOR INFORMATION
NTS



TYPICAL TRASH ENCLOSURE
NTS

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SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

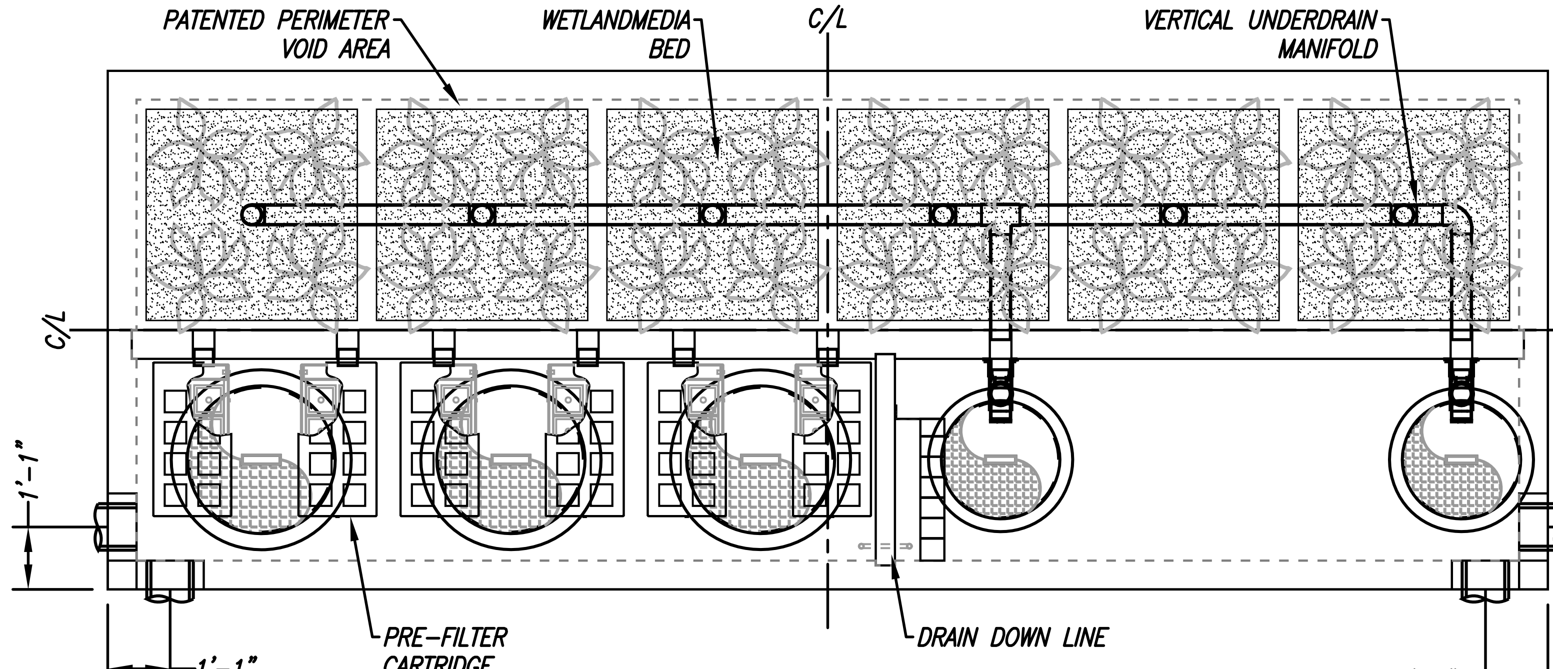
Aug 29 2023

SITE PLAN
FINAL WATER QUALITY MANAGEMENT PLAN
GCC - CYPRESS
PLAZA DRIVE - CYPRESS, CA

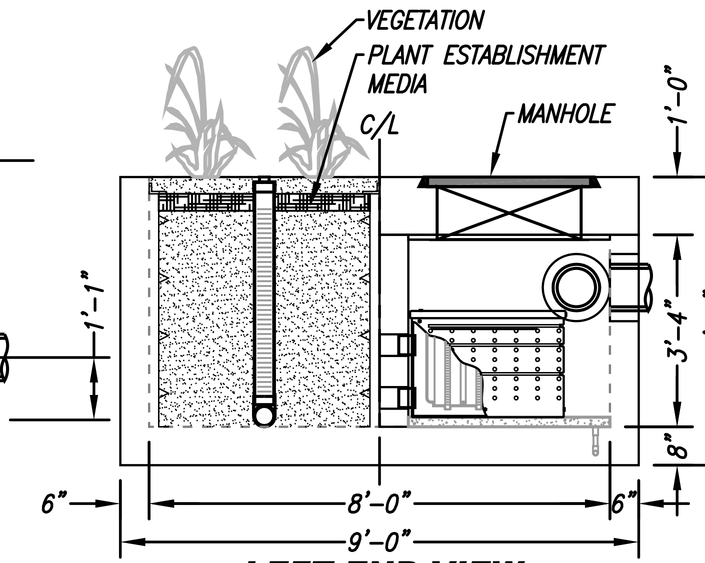
MODULAR WETLANDS SYSTEM DETAILS

SITE SPECIFIC DATA

PROJECT NUMBER	----		
PROJECT NAME	----		
PROJECT LOCATION	----		
STRUCTURE ID	----		
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	----	PVC	8"
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	----	PVC	8"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	----	----	----
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	3 EA ø30"	N/A	2 EA ø24"
WETLANDMEDIA VOLUME (CY)			TBD
WETLANDMEDIA DELIVERY METHOD			PER CONTRACT
ORIFICE SIZE (DIA. INCHES)			TBD
NOTES:			



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 MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
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3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON-SHRINK GROUT PER MANUFACTURERS STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
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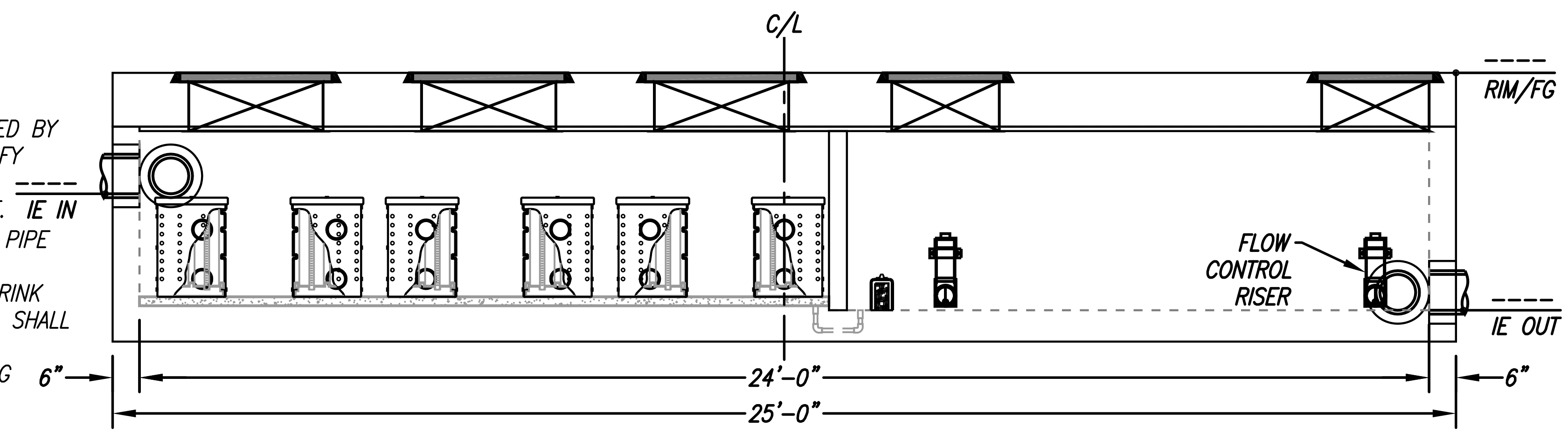
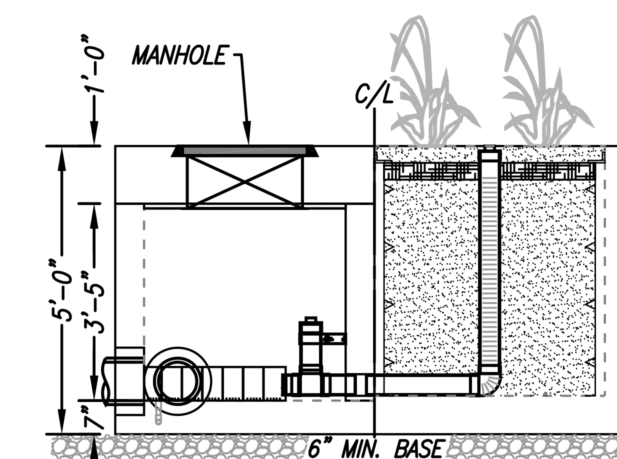


ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.693
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

GENERAL NOTES

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

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

MWS-L-8-24-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

1/31/17 JHAYDEN

STORM DRAIN PUMP SYSTEM DETAILS

HYDRODYNAMIC SEPARATOR DETAILS

ADS® Barracuda® Concrete

Installation Guide

ADS Barracuda Max & Barracuda S4, S6, S8 Concrete Installation Guide

This installation guide is reference for installing the Barracuda Max S4, S6, S8 Water Quality Units into a precast concrete structure in the field.

(1) Deflector Plate

(1) Center Funnel Extender

(2) A/C Stainless Steel Tooth Set

(2) B/D Stainless Steel Tooth Set

(1) Barracuda Max Plastic Funnel

S4

(4) Stainless Steel Funnel Mounting Flanges

(1) Roll of Conseal®

(16) Concrete Anchor ¼ x 2¼"

S6

(4) Stainless Steel Funnel Mounting Flanges

(3) Roll of Conseal®

(16) Concrete Anchor ¼ x 2¼"

S8

(8) Stainless Steel Funnel Mounting Flanges

(4) Roll of Conseal®

(22) Concrete Anchor ¼ x 2¼"

Please check that all components are on site. Below is a list of tools that may be required for installation.

- ☐ 1/4" Diameter Carbide Tipped Concrete Bit
- ☐ Standard Electrical or Battery Operated Drill
- ☐ Adjustable Wrench
- ☐ Marker for writing on the concrete wall
- ☐ Hammer Drill for Concrete (Fits the 1/4" Diameter Concrete Drill Bit)
- ☐ 7/16" Driver or deep socket for installation of provided ¼" Concrete Wedge Anchors
- ☐ Hammer
- ☐ Level
- ☐ Ladder that will extend to bottom of the structure
- ☐ Safety Glasses
- ☐ Hard Hat
- ☐ Protective Gloves
- ☐ Site Drawings
- ☐ ADS Design Layout

Installation Instructions (These directions assume the manhole base and riser have been assembled, but that the top slab/cone has not been set).

*Do not insert the inlet or outlet pipes until after the Barracuda Max internals have been installed. If pipes must be inserted in advance, the pipes should not protrude into the structure as they will interfere with installation of the bowl.

1. Install mounting flanges for the Barracuda Max plastic funnel. These flanges need to be installed at the same height, as indicated by model in Table 1. For example, the anchor holes for S4 flanges should be drilled 77” (1925 mm) from the sump floor. S4 and S6 models have four flanges and they need to be evenly spaced at 12, 3, 6, and 9 o’clock positions. S8 funnels require eight flanges that also need to be evenly spaced (i.e., forty-five degrees on a circle) around the inside of the manhole. This flange points are typically located in the third manhole section from the sump and also contain the pipe openings for the Barracuda Max unit. Use the same anchor procedure as you will when mounting the teeth (see step #4 below), using the ¼” (6.25 mm) concrete drill bit to drill 1¼” (31.25 mm) deep holes. Do not over drill the depth of the anchors. Lightly hammer the anchors in place and use locking nuts to firmly secure the flanges (Figure 1).
2. Next, mount the four sets of teeth vertically inside the manhole sump. Using the engineer’s plans or the ADS layout, determine the correct orientation for the plastic funnel outlet hole in relation to the outlet pipe (Figures 2 and 5). The first set of teeth (marked as “A” on the teeth part) will be mounted under the center of the outlet hole from the Bowl. Mark that location with a plumb vertical line, this will serve as the “12 o’ clock” landmark in the manhole (Figure 3). Repeat this process to mark lines at the 3, 6, and 9 o’ clock positions for a total of four.
3. Each kit includes four sets of teeth. Two of these sets are stamped with the letters A and C. The other two sets are stamped B and D. The ADS shop drawing layout will label the teeth letters and all designs will be the A/B configuration (Figure 5). You will install each set of teeth in the correct location, with the indicated letter facing up (Figure 4). See Table 1 for the correct elevation for the top anchor location of each tooth set, measured from the sump floor for each Barracuda Max Unit. The teeth anchors are all at the same elevation. For example, for an S4 Barracuda the top anchor of an A or B indicated set of teeth will be 60” (1500 mm) off the sump floor. Mark the top anchor elevations on each of your four vertical lines (Figure 3), noting that A and B sets of teeth will be at the same height.

Figure 1

Figure 2

Figure 3

Figure 4

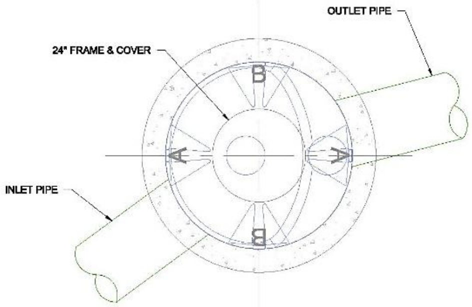


Figure 5

adspipe.com

1-800-821-6710

4. To fasten the sets of the teeth to the manhole, use the ¼” concrete drill bit and drill holes approximately 1¼” (31.25 mm) deep at your marked top anchor locations. Do not over drill into the concrete wall. Using a hammer, lightly tap the concrete anchors into the drilled holes (Figure 4). Hang the tooth set on the top anchor with the correct letter facing up and use a locking nut to loosely secure the tooth set to the wall (do not fully tighten the locking nut at this point). With the set of teeth hanging from the top anchor, line up and mark the bottom anchor location and drill the hole. Then hammer the bottom anchor in place and secure the teeth with a lock nut. Use an adjustable or socket wrench to tighten all the top and bottom locking nuts, except for the top nut on the outlet set of teeth (see step #5 below for the deflector plate installation, which will share the top anchor post), so that the teeth are firmly secured to the wall.
5. To attach the deflector plate to the concrete manhole you will use the exit tooth’s top concrete anchor and share that linking point with the center tab of the deflector plate. Place the center tab of the deflector plate over the anchor bolt “post” on the outlet set of teeth and hand tighten the nut. Ideally, the plate will be held in place by this center point. Mark the location of the additional mounting tabs for the deflector plate while holding the plate relatively level. All deflector plate concrete anchors will be at the same elevation as the top tooth linking points and the anchors will be installed like the description in step #4. Once the two outer deflector plate linking points have been located, the installer can draw a vertical line and measure the exact location corresponding to the “high” teeth anchoring elevation. Once the deflector plate concrete anchors are installed tighten the nuts to complete the fastening of the deflector plate to the wall of the structure. See Figure 6 to show this more clearly.
6. Lower the plastic funnel into the structure (Figure 7), orienting the weir and outlet hole as depicted in the ADS layout (as identified in step 1). S6 and S8 units have eyebolts threaded holes on the top of the funnel to assist in lifting, and the eyebolts are provided in the equipment kit. If the eyebolts are misplaced, S6 units have ⅜” (9 mm) -16 threads and S8 units utilize ½” (12 mm) -13 threads. After the bowl is in place, install the center funnel extender through the hole and seat it until the tabs of the extender touch the bowl itself (Figure 8). This is a friction-based attachment and no fasteners are needed.
7. Next, you’ll use Conseal to fill any gaps around the funnel. S6 and S8 units are provided with a metal funnel plug. This plug is placed in the funnel opening for worker safety and must be utilized ANYTIME SOMEONE ENTERS THE STRUCTURE. Unroll the Conseal and wedge it between the funnel and manhole to create a seal (Figure 9). Conseal should also be used to seal between the vertical edges of the weir wall and the manhole. The plastic funnel can expand with high temperature. Install the funnel during cooler parts of the day, or keep the funnel shaded until installation can mitigate fitment issues. Once the Conseal is installed, the internal component installation is complete. The funnel plug may be discarded (if applicable), and the top slab can be set. If the application calls for a grated inlet, orient the slab so the grate is above the inlet (large bowl) side of the plastic funnel.

For maintenance details, please refer to the Barracuda Max Maintenance Manual. If the application requires a trash rack or oil boom, reference the appropriate supplementary installation instructions.

Figure 6

Figure 7

Figure 8

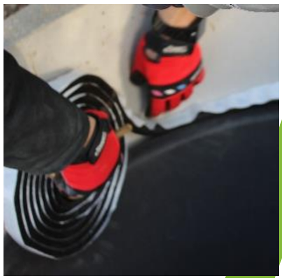


Figure 9

Table 1

	S4	S6	S8
Top Anchor Elevation from Sump Floor (A and B tooth indication)	60” (1270 mm)	68” (1475 mm)	90” (1880 mm)
Funnel Flange Anchor Elevation from Sump Floor	77” (1960 mm)	77” (1960 mm)	127” (3220 mm)

Note: Distances can be +/- 1-2 inches (25-50 mm) from these locations for the A, and B teeth, but flange elevations should be adhered to as much as possible and can only be lowered a maximum of 1 inch (25 mm) from these values listed above.

This guide is intended for field installations of Barracuda Max S4, S6, and S8 water quality units into precast manholes. For pre-casters installing internal components prior to job site delivery, contact ADS for possible modifications to component elevations.

Barracuda® Max™ & Barracuda

Maintenance Guide

One of Barracuda's advantages is the ease of maintenance. Like any system that collects pollutants, the Barracuda must be maintained for continued effectiveness. Maintenance is a simple procedure performed using a vacuum truck or similar equipment. The systems were designed to minimize the volume of water removed during routine maintenance, reducing disposal costs.

Contractors can access the pollutants stored in the manhole through the manhole cover. This allows them to gain vacuum hose access to the bottom of the manhole to remove sediment and trash. There is no confined space entry necessary for inspection or maintenance.

The entire maintenance procedure typically takes 2 to 4 hours, depending on the system's size, the captured material, and the vacuum truck's capacity.

Local regulations may apply to the maintenance procedure. Safe and legal disposal of pollutants is the responsibility of the maintenance contractor. Maintenance should be performed only by a qualified contractor.

Inspection and Cleaning Cycle

Periodic inspection is needed to determine the need for and frequency of maintenance. You should begin inspecting as soon as construction is complete and then on an annual basis. Typically, the system needs to be cleaned every 1-3 years.

Excessive oils, fuels or sediments may reduce the maintenance cycle. Periodic inspection is important.

Determining When to Clean

To determine the sediment depth, the maintenance contractor should lower a stadia rod into the manhole until it contacts the top of the captured sediment and mark that spot on the rod. Then push the probe through to the bottom of the sump and mark that spot to determine sediment depth.

Maintenance should occur when the sediment has reached the levels indicated in the Storage Capacity Chart.

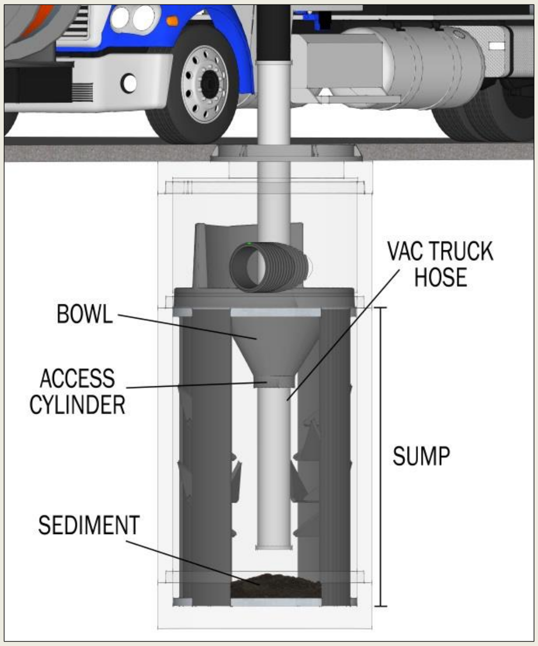
Barracuda Storage Capacities

Model	Manhole Diameter in. (mm)	Total System Volume Gallons (Liters)	Treatment Chamber Capacity Gallons (Liters)	Standard Sediment Capacity (20” depth) Yards^3 (meters^3)	NJDEP Sediment Capacity (50% of standard depth) Yards^3 (meters^3)
S3	36 (900)	264 (999)	212 (803)	0.44 (0.34)	0.22 (0.17)
S4	48 (1200)	665 (2517)	564 (2135)	0.78 (0.60)	0.39 (0.30)
S5	60 (1500)	1040 (3937)	881 (3335)	1.21 (0.93)	0.61 (0.47)
S6	72 (1800)	1497 (5667)	1269 (4804)	1.75 (1.34)	0.88 (0.67)
S8	96 (2400)	4196 (15884)	3835 (14517)	3.10 (2.37)	1.55 (1.19)
S10	120 (3000)	7976 (30192)	7496 (28375)	4.85 (3.71)	2.43 (1.86)

Maintenance Instructions

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the bowl assembly visible from the surface. Access this area through the 8” (200 mm), 10” (250 mm), 15” (375 mm) or 20” (500 mm) diameter access cylinder.
2. Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment. See figure 1.
3. Use a high pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the cleaned manhole with water until the level reaches the invert of the outlet pipe.
5. Replace the manhole cover.
6. Dispose of the polluted water, oils, sediment and trash at an approved facility.
    a. Local regulations prohibit the discharge of solid material into the sanitary system. Check with the local sewer authority for authority to discharge the liquid.
    b. Some localities treat the pollutants as leachate. Check with local regulators about disposal requirements.
    c. Additional local regulations may apply to the maintenance procedure.

Figure 1



ADVANCED DRAINAGE SYSTEMS, INC. ("ADS") HAS PREPARED THIS DETAIL BASED ON INFORMATION PROVIDED TO ADS. THIS DRAWING IS INTENDED TO DEPICT THE COMPONENTS AS REQUESTED. ADS HAS NOT PERFORMED ANY ENGINEERING OR DESIGN SERVICES FOR THIS PROJECT, NOR HAS ADS INDEPENDENTLY VERIFIED THE INFORMATION SUPPLIED. THE INSTALLATION DETAILS PROVIDED HEREIN ARE GENERAL RECOMMENDATIONS AND ARE NOT SPECIFIC FOR THIS PROJECT. THE DESIGN ENGINEER SHALL REVIEW THESE DETAILS PRIOR TO CONSTRUCTION. IT IS THE DESIGN ENGINEERS RESPONSIBILITY TO ENSURE THE DETAILS PROVIDED HEREIN MEETS OR EXCEEDS THE APPLICABLE NATIONAL, STATE, OR LOCAL REQUIREMENTS AND TO ENSURE THAT THE DETAILS PROVIDED HEREIN ARE ACCEPTABLE FOR THIS PROJECT.

STANDARD DETAIL
BARRACUDA MAX
FLAT TOP INSTALLATION

DRAWIMG NUMBER STD-520

ADS

4640 TRUEMAN BLVD
HILLIARD, OH 43026

DRAWN BY:	NMH
DATE:	9/13/22
OK'S BY:	
SCALE:	NTS
SHEET:	1 OF 1

INLET FILTER DETAILS

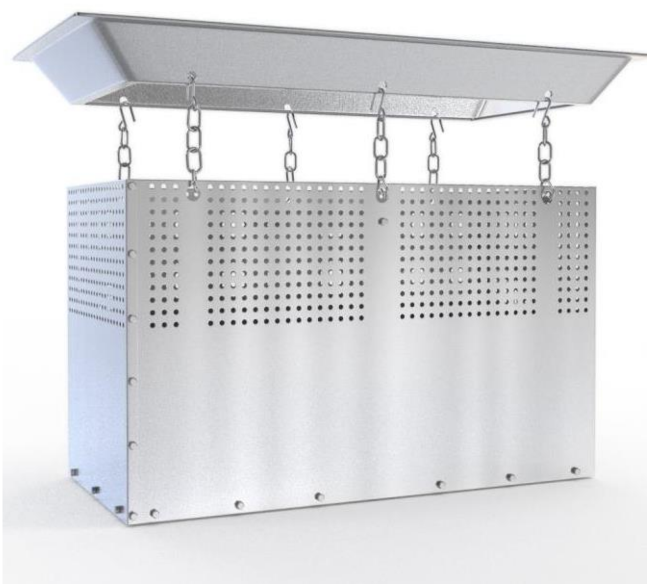
Ultra-Urban® Filter Chester DI

CATCH BASIN STORMWATER FILTRATION FOR DROP INLET (DI)

AbTech

DESCRIPTION

The UUF Chester DI is a stainless-steel version of AbTech's UUF series. With a 20-year warranty, it serves as a long-term solution for stormwater catch-basin filtration. In addition to removing trash, debris, and sediment, by including a SmartPak® the unit will also remove fine sediment (TSS) and a wide range of other harmful and dissolved contaminates.



BENEFITS

- Made from 304 stainless-steel
- 20-year warranty
- Full Trash Capture Certified by California Water Board
- Upgradeable for emerging regulatory needs
- Simple installation, inspection and maintenance
- Will extend the maintenance interval for downstream BMPs like rain-gardens, bio-filtration, and detention facilities

PURIFICATION CAPABILITIES

By including Smart Sponge media (SmartPak®), the UUF Chester DI can also remove up to:

- 80% Total Petroleum Hydrocarbons (TPH)
- 80% Total Suspended Solids (TSS)
- 95% Total Phosphorus (Particulate and Dissolved)
- Total Metals (Particulate and Dissolved)
- Coliform bacteria redcution is possible with Smart Sponge Plus media*

APPLICATIONS AND MARKETS

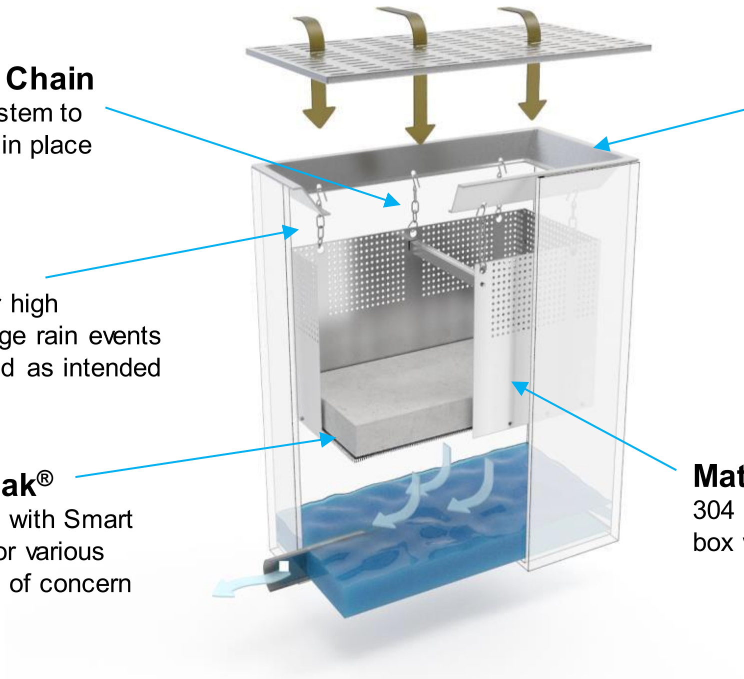
- Catch-basins and storm drains
- Roadways, highways, and streets
- Parking lots, structures and garages
- Airports and ports
- Fueling and transportation depots
- Commercial and industrial facilities
- Residential areas
- Watersheds and recreational areas

4110 N Scottsdale Rd #235, Scottsdale, AZ 85251
Tel: 480.874.4000 Email: info@abtechindustries.com
Website: www.abtechindustries.com

The Leader in Stormwater Purification

Ultra-Urban® Filter Chester DI

CATCH BASIN STORMWATER FILTRATION FOR DROP INLET (DI)



STANDARD SIZING

Product Code	Size
DI1212N	12” x 12” x 19”
DI1212H	12” x 12” x 11”
DI1414N	14” x 14” x 19”
DI1414H	14” x 14” x 11”
DI1616N	16” x 16” x 19”
DI1616H	16” x 16” x 11”
DI2020N	20” x 20” x 19”
DI2020H	20” x 20” x 11”
DI2814N	28” x 14” x 19”
DI2814H	28” x 14” x 11”
DI3216N	32” x 16” x 19”
DI3216H	32” x 16” x 11”

Other sizes available upon request.

DISPOSAL AND SERVICE

- Easy installation, inspection and maintenance
- Can be cleaned from surface by hand or vacuum
- O&M manual available upon request
- Filter media disposal/recycling options
    - Waste-to-Energy Facilities
    - Cement Kilns
    - Landfills (passes EPA TCLP)

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The Leader in Stormwater Purification

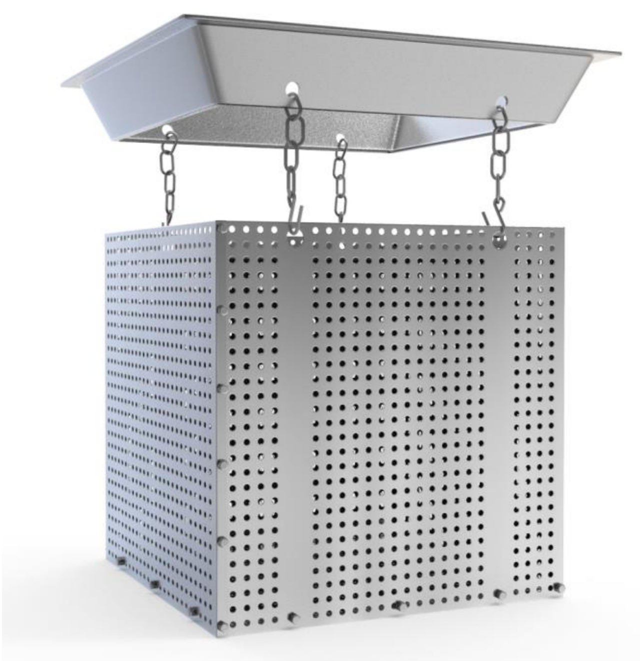
Ultra-Urban® Filter TSS

CATCH-BASIN STORMWATER FILTRATION

AbTech

DESCRIPTION

The Ultra-Urban Filter TSS (UUF TSS) uses a stainless-steel filter box and screening technology to attain 3rd party lab verification for total suspended solids removal (TSS). This simple and effective permanent BMP can be used to improve water quality with minimal upfront and long-term cost.



BENEFITS

- Made from 304 stainless-steel
- 20-year warranty
- Full Trash Capture Certified by California Water Board
- NJCAT 3rd party verification
- Simple instillation, inspection, and maintenance
- Extends the maintenance interval for downstream BMPs like rain-gardens, bio-filtration and detention facilities

PURIFICATION CAPABILITIES

NJCAT 3rd party lab test protocols show the UUF TSS model can remove 99.5% TSS from stormwater

APPLICATIONS AND MARKETS

- Catch-basins, storm drains
- Roadways, highways, streets
- Parking lots and garages
- Ports and Airports
- Fueling and transportation depots
- Commercial facilities
- Residential areas
- Urban runoff

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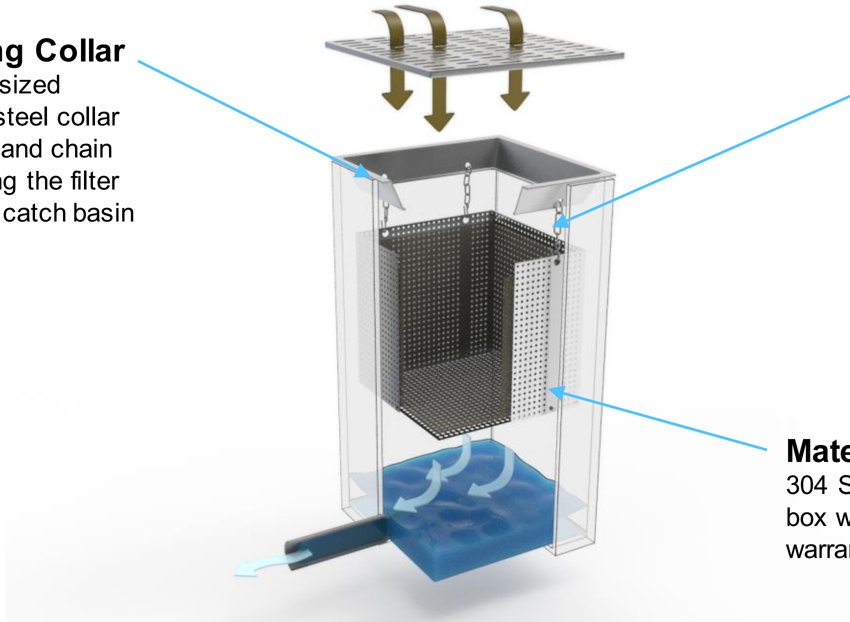
The Leader in Stormwater Purification

Ultra-Urban® Filter TSS

AbTech

CATCH-BASIN STORMWATER FILTRATION

Mounting Collar
A custom sized stainless-steel collar with hook and chain for securing the filter box in the catch basin



Bypass
Air gap used for high flow bypass. Large rain events travel unimpeded as intended

Material
304 Stainless Steel filter box with 20-year warranty

STANDARD SIZING

Product Code	Size
DI1212N	12” x 12” x 19”
DI1212H	12” x 12” x 11”
DI1414N	14” x 14” x 19”
DI1414H	14” x 14” x 11”
DI1616N	16” x 16” x 19”
DI1616H	16” x 16” x 11”
DI2020N	20” x 20” x 19”
DI2020H	20” x 20” x 11”
DI2814N	28” x 14” x 19”
DI2814H	28” x 14” x 11”
DI3216N	32” x 16” x 19”
DI3216H	32” x 16” x 11”

Other sizes available upon request.

DISPOSAL AND SERVICE

- Easy installation, inspection, and maintenance
- Can be cleaned from surface by hand or vacuum
- O&M manual available upon request

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The Leader in Stormwater Purification

Ultra-Urban® Filter CO

CATCH-BASIN FILTRATION

AbTech

DESCRIPTION

The Ultra-Urban® Filter Curb Opening (CO) is a recycled plastic version of AbTech's UUF series. It is designed for use in catch basins with no metal grate. It is a low-cost best management practice (BMP) that helps meet NPDES requirements. In addition to removing trash, debris, and sediment, AbTech's Smart Sponge® media can also help remove dissolved contaminants.

BENEFITS

- Helps meet NPDES permit and MS4 objectives
- "Source" control BMP
- Smart Sponge media is non-leaching and non-leaking
- Can be manufactured to any size or shape

PURIFICATION CAPABILITIES

- Full trash and debris capture greater than 5 mm.
- More than 80% Total Petroleum Hydrocarbons (TPH)
- More than 80% Total Suspended Solids (TSS)
- More than 50% Total Phosphorus (Particulate and Dissolved)
- More than 50% Total Metals (Particulate and Dissolved)
- Microbial Pathogens Reduction (Based on Coliform Bacteria data)

APPLICATIONS AND MARKETS

- Catch-basins and storm drains
- Protection of watersheds and recreational areas
- Roadways, highways, and streets
- Parking structures, lots, and garages
- Airports
- Fueling and transportation depots
- Urban and Agricultural runoff
- Commercial and industrial facilities
- Residential areas

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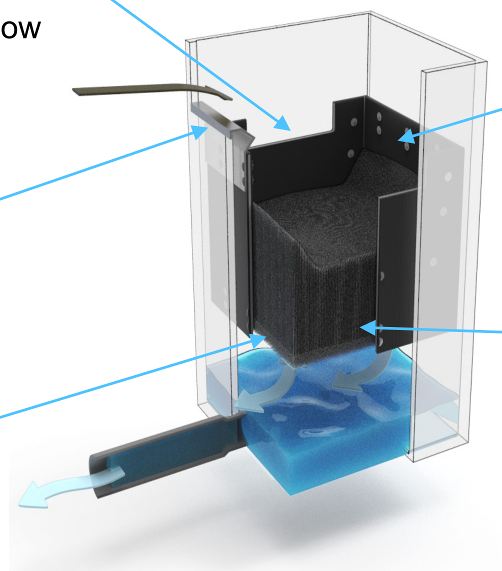
Ultra-Urban® Filter CO

CATCH-BASIN FILTRATION



STANDARD SIZING

Product Code	Size
CO1414N	13.25” x 14.25” x 21”
CO1414H	13.25” x 14.25” x 13”

Other sizes available upon request.

DISPOSAL AND SERVICE

- Easy installation and maintenance
- Clean out by hand or by traditional vacuum truck processes
- Inspection and maintenance schedule should be followed – minimum 1x annually
- Media disposal/recycling options
    - Waste-to-Energy Facilities
    - Cement Kilns
    - Landfills (passes EPA TCLP)

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Tel: 480.874.4000 Email: info@abtechindustries.com
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Ultra-Urban® Filter DI

CATCH-BASIN FILTRATION

AbTech

DESCRIPTION

The Ultra-Urban Filter Drop In (DI) is a recycled plastic version of AbTech's UUF series. It is designed for use in catch basins with a metal grate. It is a low-cost best management practice (BMP) that helps meet NPDES requirements. In addition to removing trash, debris, and sediment, AbTech's Smart Sponge® media can also help remove dissolved contaminants.

BENEFITS

- Helps meet NPDES permit and MS4 objectives
- "Source" control BMP
- Smart Sponge media is non-leaching and non-leaking
- Can be manufactured to any size or shape

PURIFICATION CAPABILITIES

- Full trash and debris capture greater than 5 mm
- More than 80% Total Petroleum Hydrocarbons (TPH)
- More than 80% Total Suspended Solids (TSS)
- More than 50% Total Phosphorus (Particulate and Dissolved)
- More than 50% Total Metals (Particulate and Dissolved)
- Microbial Pathogens Reduction (Based on Coliform Bacteria data)

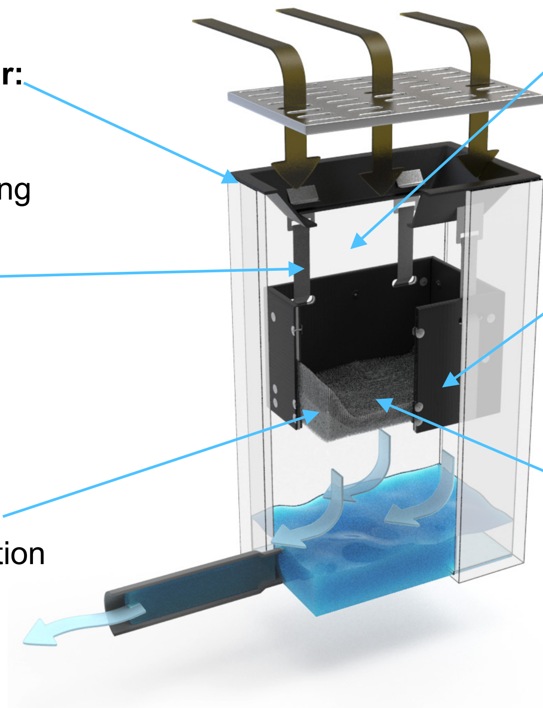
APPLICATIONS AND MARKETS

- Catch-basins and storm drains
- Protection of watersheds and recreational areas
- Roadways, highways, and streets
- Parking structures, lots, and garages
- Airports
- Fueling and transportation depots
- Urban and Agricultural runoff
- Commercial and industrial facilities
- Residential areas

Ultra-Urban® Filter DI

CATCH-BASIN FILTRATION

AbTech



STANDARD SIZING

Product Code	Size
DI1309H	13.25" x 14.25" x 21"
DI1414H	13.25" x 14.25" x 13"
DI1420H	14" x 19.25" x 13"
DI1616H	16" x 16" x 13"
DI2020H	19.25" x 19.25" x 13"
DI1309N	13" x 8.5" x 13"
DI1414N	13.25" x 14.25" x 21"
DI1420N	14" x 19.25" x 21"
DI1616N	16" x 16" x 21"
DI2020N	19.25" x 19.25" x 21"

Other sizes available upon request.

DISPOSAL AND SERVICE

- Easy installation and maintenance
- Clean out by hand or by traditional vacuum truck processes
- Inspection and maintenance schedule should be followed – minimum 1x annually
- Media disposal/recycling options
  - Waste-to-Energy Facilities
  - Cement Kilns
  - Landfills (passes EPA TCLP)

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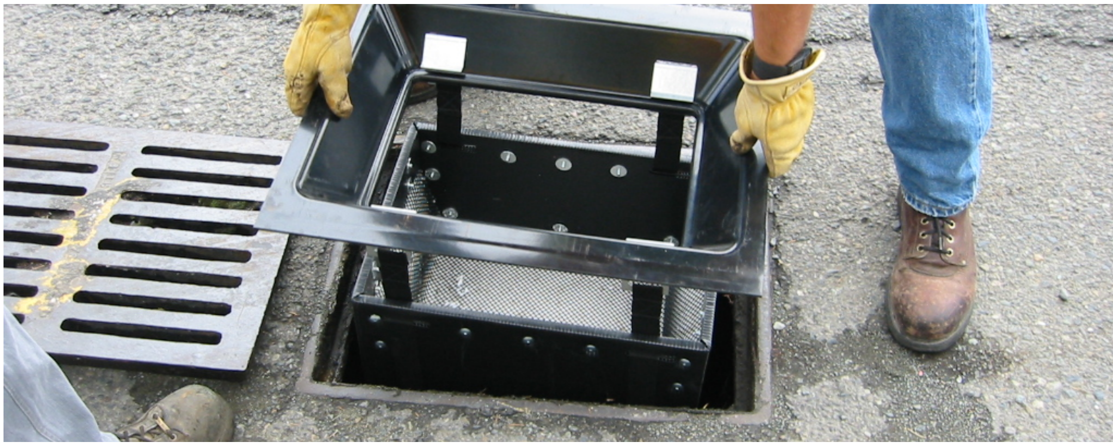
The Ultra-Urban® Filter with Smart Sponge® Filtration Media

REDUCTION OF HEAVY METALS, BACTERIA AND HYDROCARBONS IN STORMWATER RUNOFF

SMART SPONGE TECHNOLOGY IS BASED ON A PROPRIETARY BLEND OF SYNTHETIC POLYMERS AIMED AT THE REMOVAL OF HYDROCARBONS AND OIL DERIVATIVES FROM WATER.



SMART SPONGE®
Is chemically selective to hydrocarbons and capable of removing up to 1.5 times its own weight in hydrocarbons contamination. The Smart Sponge is capable of transforming hydrocarbons into a stable solid per the EPA's Toxicity Characteristic Leaching Procedure (TCLP).

SMART SPONGE® PLUS
Is registered with the EPA (Registration # 86256-1) for the reduction of total coliform bacteria. Smart Sponge Plus features an antimicrobial agent that is chemically and permanently bound to its polymer surface.

SMART SPONGE® HM
Reduces Cadmium, Copper, Chromium, Lead, Zinc, Iron, Arsenic, Selenium and Orthophosphate. Smart Sponge HM also inhibits growth of mildew and mold in a variety of applications.

The Ultra-Urban Filter with Smart Sponge, developed and manufactured by AbTech Industries, is an innovative low-cost BMP that helps meet NPDES requirements with effective filtration, efficient application, simple installation, and low maintenance.

APPLICATION

Smart Sponge fully encapsulates recovered oil, resulting in a substantially more effective response that prevents absorbed oil from leaching. It is also capable of successfully removing sheen. In addition, the Smart Sponge remains buoyant in calm or agitated water, permitting it to remain in place until fully saturated, resulting in no wasted product.

Once oil is absorbed, the Smart Sponge transforms the pollutants into a stable solid for easy recycling, providing a closed-loop solution. Smart Sponge technology is a cost-effective BMP with low installation and maintenance labor costs. In comparison to other products, the Smart Sponge technology allows for less expensive and less problematic handling and disposal of the waste product designed not to deteriorate in water, allowing for a longer product life.

HYDROCARBON REMOBAL

The Smart Sponge technology is deployed in products that offer customized solutions for stormwater pollution prevention, oil spill response, process water filtration and other industrial applications to meet specific environmental needs. AbTech Industries offers an extensive product line that is upgradeable to meet evolving community needs and regulatory requirements.

ANTIMICROBIAL REDUCTION

AbTech Industries has successfully deployed its patented antimicrobial technology, Smart Sponge Plus, which features an antimicrobial agent chemically and permanently bound to the Smart Sponge polymer surface. The antimicrobial mechanism is based on the patented agent's interaction with the microorganism cell membrane, causing the microorganism disruption – but no chemical or physical change in the agent. Antimicrobial activity does not reduce the agent's capability or cause its depletion and, therefore, maintains long-term effectiveness. Additionally, the hydrocarbon absorption capability is not inhibited. When properly installed and maintained, Smart Sponge Plus provides a significant reduction in coliform bacteria.

HEAVY METALS REMOVAL

AbTech Smart Sponge Heavy Metals (HM) media uses renewable resource based metal nanocomposites extruded into a macro-porous sponge. The media is in the form of hematite/magnetite and will bind to phosphorus resulting in removal rates as high as 98%. Smart Sponge HM media can be regenerated to its full adsorptive capacity and is ready for reuse immediately. When applied as tertiary treatment, Smart Sponge HM presents low capital cost, small footprint and significantly lower operating costs than conventional treatment systems.

Phosphorus is one of the major nutrients contributing in the increased eutrophication of lakes and natural waters. Its presence causes many water quality problems including increased purification costs, decreased recreational and conservation value of impoundments, loss of livestock and the possible lethal effect of algal toxins on drinking water.

Experts in Water

THE EXPERTISE TO CONSULT BUSINESSES ON COMPREHENSIVE WATER SOLUTIONS

SPECIFICATIONS

Part Number	Description	Dimensions	Gross Weight Approx. with Smart Sponge	Gross Weight Approx. Trash and Debris Only
Curb Opening Modules				
CO1414N	UUF, Normal Size	13.25"x14.25"x22.5"	20 Lbs.	5.5 lbs.
CO1414H	UUF, Half Size	13.25"x14.25"x13"	13 lbs.	4.5 lbs.
Drain Insert Modules				
DI1414N	UUF, Normal Size	13.25"x14.25"x21.125"	20 lbs.	5.6 lbs.
DI1414H	UUF, Half Size	13.25"x14.25"x13"	13 lbs.	4.5 lbs.
DI1420N	UUF, Normal Size	14"x19.25"x21.125"	24 lbs.	6.5 lbs
DI1420H	UUF, Half Size	14"x19.25"x13.375"	18 lbs.	5.0 lbs
DI1616N	UUF, Normal Size	16"x16"x21.125"	24 lbs.	6.5 lbs.
DI1616H	UUF, Half Size	16"x16"x13.375"	18 lbs.	5,0 lbs.
DI2020N	UUF, Normal Size	19.25"x19.25"x21.125"	30 lbs	7.5 lbs.
DI2020H	UUF, Half Size	19.25"x19.25"x13.375"	18 lbs.	6.0 lbs.

BEST MANAGEMENT PRACTICE (BMP)

The Ultra-Urban filter with Smart Sponge meets or exceeds Stormwater Best Management Practices (BMP). AbTech offers non-point source pollution prevention and potential for long-standing remediation. The Ultra-Urban filter does not require modification of existing structures and is effective in fresh or salt water temperatures ranging from 32°F to 130°F.

INSTALLATION

Installation time varies depending upon mounting devices selected. The Drain Inlet (DI) series Ultra-Urban Filter will suspend vertically from the drain into the catch basin through a structural mount and funnel mechanism. A single mounting bracket made of 16-gauge galvanized steel is required for the installation of the Curb Opening (CO) series. The Ultra-Urban Filter should not be installed where modules obstruct the drain pipe outlet. The size of the drain should allow room for stormwater overflow.

The Ultra-Urban Filter should be serviced as needed to remove sediment and debris, according to expected debris accumulation at a minimum once per year. The sediment and debris can be quickly vacuumed out of the modules through the opening of the drain with conventional maintenance equipment. For example, a curb inlet with four to five Ultra-Urban Filter modules can typically be serviced in 10 minutes or less.

ABOUT ABTECH

AbTech offers innovative solutions for Stormwater Management and Industrial Water Treatment. AbTech integrates its own advanced technologies along with third-party technologies and systems to provide customers with effective and economical solutions. AbTech products include advanced filtration media technologies and various water treatment systems.

4110 N. Scottsdale Rd., Suite 235 Scottsdale AZ 85251 480-874-4000 info@abtechindustries.com

ABTECH'S PROCESS CREATES A VERY POROUS STRUCTURE WITH HYDROPHOBIC AND OLEOPHILIC CHARACTERISTICS CAPABLE OF SELECTIVELY REMOVING HYDROCARBONS WHILE ALLOWING FOR HIGH FLOW THROUGH RATES.

MAINTENANCE

The Ultra-Urban filter should be serviced as needed to removed sediment and debris, according to expected debris accumulation. The sediment and debris can be quickly vacuumed out of the modules though the openings of the drain with conventional maintenance equipment. For example, a curb inlet with four to five Ultra-Urban filter modules can be typically serviced in 10 minutes or less.

Under normal operating conditions the Ultra-Urban filters should replaced every 1-3 years.

DISPOSAL

The Smart Sponge samples saturated with hydrocarbons both in the lab and in the field have been tested according to the EPA's Toxicity Characteristic Leaching Procedure ("TCLP"). These tests show that Smart Sponge is a "non-leaching" (i.e., non-detect or "N.D.") product. As a result, Smart Sponge technology can afford many cost effective and environmentally friendly disposal options.

Waste-to-Energy Facilities - A specialized segment of the solid waste industry has used spent Smart Sponge as an alternative fuel in the production of electricity.

Cement Kilns - This industry has used the spent Smart Sponge as an alternative fuel in the production process of Portland Cement. This process is considered a beneficial reuse of waste products. The BTU value of spent Smart Sponge is consistently above the average acceptable levels set for this high temperature.

Landfills - As discussed above, spent Smart Sponge products have been classified as a solid waste and have been accepted at Subtitle D Landfills.

WWW.ABTECHINDUSTRIES.COM

AbTech INDUSTRIES

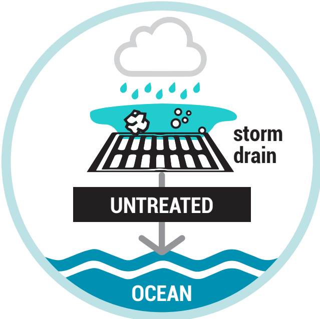
TRENCH DRAIN DETAILS

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	☐		☐

Attachments



Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is **not treated or cleaned** before entering our waterways and should never contain any pollutants.

This brochure will help you protect our water quality by using BMPs appropriate to your facility.

← **Learn more inside**

Who is H_2OC?

H_2OC is YOU! H_2OC is also a cooperative stormwater program which includes all 34 cities in Orange County, the County of Orange, and Orange County Flood Control District (OCFCD). Clean and healthy beaches, creeks, rivers, bays, wetlands, and ocean are important to Orange County. H_2OC provides resources to residents and businesses to encourage personal action and prevent polluted runoff from entering our waterways.

Join Us

Visit **h2oc.org** to learn more about runoff, water pollution, and how you can be the solution to runoff pollution and protect our water resources!

Contact

24-hour Pollution Reporting Hotline:
1-877-89-SPILL (1-877-897-7455)

24-hour Reporting Website:
myOCeServices.ocgov.com

For emergencies, dial 911

* Some industrial facilities are also required to obtain coverage under the State's Industrial General Permit (IGP). To determine if your facility requires a permit, contact the State Water Resources Control Board at waterboards.ca.gov

** For more information about recycling and collection centers, visit oclandfills.com.

BEST MANAGEMENT PRACTICES FOR BUSINESSES

WATER POLLUTION AND COMMERCIAL & INDUSTRIAL FACILITIES

YOU ARE THE SOLUTION TO RUNOFF POLLUTION

H_2OC®
STORMWATER PROGRAM

How is Water Quality Affected By Your Business?

Commercial and industrial facilities can generate a variety of waste products which can become pollutants. These can include metals, plastics, toxic chemicals, oil, grease, and bacteria. If not properly managed, these pollutants can be transported to Orange County's creeks, rivers, and ocean through our storm drain system.

As a business owner or manager, you are responsible for overseeing the work of employees and outside contractors to prevent runoff pollution.

By law, commercial and industrial facilities are required to implement best management practices (BMPs) to prevent runoff pollution.*

Best Management Practices for Commercial & Industrial Sites

Implement these required best management practices (BMPs) to be in compliance and avoid enforcement actions:

Inspect

- Periodically inspect irrigation systems for leaks, overspray, and runoff. Repair and maintain as needed.
- Periodically check parking lots for discharges from leaking vehicles.
- Ensure lids on dumpsters are properly closed when not in use and sweep and pick up all debris daily.

Locate

- Locate and protect all area drains, yard drains, and catch basins where washwater could potentially enter the storm drain system.
- When working outdoors, conduct operations away from storm drains and waterbodies.
- Mix paint and clean tools in a contained area.

Contain

- Never allow washwater, sweepings, or sediment to enter storm drains.
- Store materials indoors or under cover and away from storm drains.
- Control, contain, and clean up all spills immediately with absorbents, rags, or mops. Never hose a spill.
- Follow the manufacturer's directions when applying fertilizers and pesticides. Never apply 48 hours before a forecasted rain event.

Collect

- Properly collect all washwater generated during business maintenance activities for disposal.
- Collect grass clippings, leaves, and other debris and dispose in covered containers.
- Use drop cloths underneath outdoor painting, scraping, and sandblasting work.
- Regulary sweep areas like corners and along curbs, where debris tends to accumulate, and dispose in covered containers.

Dispose

- Contact your waste hauler for proper waste, hazardous waste, and green waste disposal options.
- Contact your waste and recycling service to repair or replace leaking or damaged dumpsters.
- Recycle and dispose of materials as outlined by your local jurisdiction.**

What Pollutants Are Generated By Commercial & Industrial Sites?

Landscape Maintenance

When performing landscape maintenance, pollutants generated can include organic debris, trash, dirt, fertilizers, and pesticides.

Building Maintenance

When performing building maintenance, various types of pollutants can be generated including washwater, paint or paint chips, bacteria, and other toxic materials.

Parking Lots & Outdoor Areas

Pollutants in parking lots, patios, and outdoor areas can include trash, oil, grease, landscape debris, and bacteria.

Waste & Storage Area Management

Pollutants in waste and storage areas can include trash, oil, grease, bacteria, dirt, and other toxic materials.

Scan for more information about Commercial & Industrial site-specific BMPs or visit https://ocerws.ocpublicworks.com/service-areas/oc-environmental-resources/oc-watersheds/documents/best-management-practices-bmp-2

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).

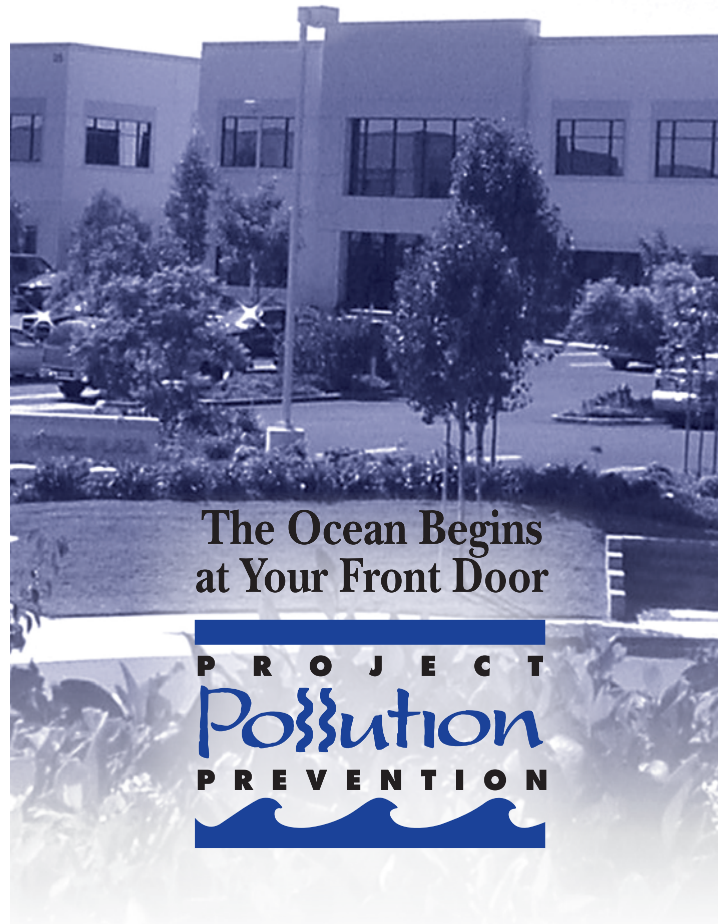
For emergencies, dial 911.

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

The Ocean Begins at Your Front Door

PROJECT
Pollution
PREVENTION

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

The Ocean Begins at Your Front Door

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

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

Orange County Stormwater Program

California Environmental Protection Agency
www.calepa.ca.gov

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

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

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

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

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

Stormwater Best Management Practice Handbook
Visit www.cabmphandbooks.com

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

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

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

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

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

Printed on Recycled Paper

Goodman
18201 Von Karman Avenue, Suite 1170
Irvine, California 92612

May 4, 2022
Project No. 1-1209

Attention: Mr. Blair Dahl

Subject: Geotechnical Investigation and Report Update
Proposed Goodman Commerce Center
5665 and 5757 Plaza Drive
Cypress, California

References: See attached List of Selected References

Dear Mr. Dahl,

Pursuant to your request and authorization, G3SoilWorks, Inc. (G3), has prepared this geotechnical investigation report update for the proposed commercial / industrial development to be located at 5665 and 5757 Plaza Drive, in the city of Cypress, California. This report update was prepared based on our review of available documents and plans provided by your office, preliminary assessment and independent analysis of the data presented in the referenced reports by others, desktop site research and onsite reconnaissance, supplemental field subsurface exploration, laboratory testing, and engineering geologic evaluation / geotechnical engineering analysis of our field findings. A summary of our evaluation / findings and geotechnical recommendations for site development are included and presented herein.

SITE LOCATION / DESCRIPTION

The project site is located at the subject address (5665 and 5757 Plaza Drive) in the City of Cypress, California. As shown on Figure 1 (attached), Plaza Drive partially bounds the site to the south / southeast and is accessed via intersections with Katella Avenue and Valley View Street, south and east of the site, respectively. Currently, the site is understood to be occupied by the Cypress Technology Center which includes an existing approximately 5-story office building associated with the 5665 property address, a large commercial / industrial building and office complex associated with the 5757 property address, and associated parking areas concentrated near the northwest corner of the site and around the perimeters of the existing buildings.

The 5665 property is approximately 450 feet by 800 feet in area and occupies the westerly 8.3± acres of the site with the existing office complex occupying an "L"-shaped footprint of approximately 0.82 acres. The 5757 property is larger (approximately 750 feet by 950 feet) and comprises the easterly 16.4± acres of the site with the existing commercial / industrial building complex occupying a rectangular area of about 7.2 acres. The topography of the site is relatively flat to very gently sloping. Site elevations in feet above the North American Vertical Datum of 1988 (NAVD88) are estimated to range from approximately Elevation (El.) 38± feet near the northeast and southeast corners of the site, El. 39± feet near the center of the site, and El. 35-36± feet near the northwest and southwest corners of the site, respectively.

PROJECT UNDERSTANDING

Three (3) commercial / industrial buildings are currently proposed across this project site, with each building including 1st and 2nd floor office areas and a warehouse with attendant loading docks and associated paved parking and driveway areas. A Concept Grading Plan (Reference No. 1) for the easterly 5757 property shows Building 1 (199,909 square feet) and Building 2 (180,359 square feet) occupying the easterly and westerly portions of the property. Conceptual plans for the 5665 property were not available at the time of this report, but we understand that Building 3 (185,412 square feet) will be of a similar type of construction (i.e., concrete tilt-up frame construction) with similar appurtenances relative to Buildings 1 / 2.

Structural details were not available at the time of this report update. For the purposes of this report, it is assumed that the planned structures will consist of concrete tilt-up frame construction with associated truck docks. Maximum column and wall loadings not exceeding about 200 kips and 5 kips per lineal foot, respectively, have been assumed for preliminary design purposes. Should the planned design / construction loadings vary from those indicated herein, this office should be notified in order to provide comment and/or updated geotechnical recommendations for design, as appropriate.

PROJECT BACKGROUND AND PREVIOUS STUDIES

Previous studies for the project were performed by Southern California Geotechnical (SCG), the findings of which were presented in SCG's Geotechnical Feasibility Study dated June 7, 2021 (Reference No. 2) and subsequent Geotechnical Investigation Report dated September 29, 2021 (Reference No. 3). Field subsurface investigation for both properties was performed by SCG as part of their Geotechnical Feasibility Study and included the drilling of four (4) soil borings (B-1 through B-4) and four (4) Cone Penetration Tests (CPT-1 through CPT-4) to depths of 50 feet below existing ground surface. SCG's subsequent study / Geotechnical Investigation Report included nine (9) additional borings (B-5 through B-14) and four (4) additional CPTs (CPT-4 through CPT-8) with recommendations provided for buildings located on the 5757 property (now referred to as Buildings 1 and 2, respectively, per Concept Grading Plan; Reference No. 1). Actual logs of borings B-5 through B-7 and CPT-5/-6, including associated laboratory test results, were not available for our review. The CPT data files were also not available for our review and re-evaluation.

SCG identified shallow groundwater levels at 5 to 9.5 feet below existing ground surface and potentially liquefiable soil conditions at depths between 5 and 50 feet below existing ground surface. Recommendations for remedial grading combined with or without specialized ground improvement techniques to depths of 15 feet were provided with the intent of supporting the planned structures on shallow conventional foundations. Conventional foundation criteria were provided when considering remedial grading to 15 feet depth, with reported post-construction settlements expected to be within tolerable limits for conventional foundations. However, based on our review of the previous studies by SCG, estimated total and differential settlement potentials were not provided for design, and settlements due to potential soil liquefaction below the proposed 15-feet-depth of remedial grading did not appear to have been addressed. Additionally, the proposed remedial grading would intercept shallow groundwater, requiring extensive dewatering.

In view of the above, G3 was retained to review and evaluate the findings / recommendations of the previous geotechnical consultant (SCG), perform supplemental subsurface exploration, and develop alternative recommendations for the proposed development. G3 has completed this additional phase of study and summarized our findings / recommendations herein as the new / current Geotechnical Consultant of Record (see below).

CHANGE OF GEOTECHNICAL CONSULTANT OF RECORD

G3SoilWorks, Inc. (G3), has been retained and should be considered as the current Geologic / Geotechnical Consultant of Record for the subject project. As the Consultant of Record, G3 has reviewed the referenced reports prepared by Southern California Geotechnical (SCG; Reference Nos. 2-3), accepts the data, and generally concurs with their conclusions and recommendations, with the exception of those superseded herein.

PURPOSE AND SCOPE

The purpose of our geotechnical investigation was to re-assess and evaluate the findings / evaluation / recommendations for the deep removal / recompaction remedial grading scheme presented by the previous geotechnical consultant and provide alternative in-situ ground improvement considerations for structure support.

Our scope of work included the following tasks:

- Review of available pertinent geologic and geotechnical reports and maps specific to the project site and vicinity
- Preliminary site reconnaissance and boring layout;
- The drilling of 5 borings to depths of 25 to 51.5 feet below existing grade utilizing a truck-mounted drilling rig equipped with an eight-inch diameter hollow-stem auger, and associated soil sampling and logging by our geologist / engineer to substantiate the subsurface findings reported by the previous consultant and obtain additional subsurface information.
- A total of five (5) monitoring wells were installed to determine static water levels and provide a means of groundwater monitoring in advance of and during construction.
- Review of the liquefaction analyses performed by the previous consultant and perform two (2) additional Cone Penetrometer Tests to depths of 50 feet below grade for liquefaction evaluation;

- Laboratory testing, including moisture content and dry density of relatively undisturbed samples obtained in the field, maximum density / optimum moisture relationship, expansion index, hydrometer, classification, consolidation, direct shear, and Atterberg limits;
- Engineering geologic / geotechnical evaluation and analysis of the findings by our office and those presented in the referenced reports relative to the existing site conditions / proposed development, including geologic hazards and re-evaluation of potential site liquefaction;
- Consultation with our ground improvement design / build specialist to develop criteria for use in ground stabilization and preliminary recommendations for remedial grading / ground improvement, and foundation design criteria;
- Preparation of this written report presenting a summary of our field findings, laboratory test results, and updated recommendations for grading, preliminary criteria for ground improvement, foundation design and construction, and utility trench excavation considerations.

GEOLOGY

Regional Geologic Setting

The Los Angeles and Orange County coastal areas are adjacent to what is referred to as California's "Continental Borderland" geomorphic province – representing an area of transition between continental and marine environments associated with the geologic development of the Los Angeles Basin (LA Basin, Figure A). Over the past 20 million years of geologic time, tectonic reorganization of the southern California landscape along the “Big Bend” of the San Andreas Fault Zone (SAFZ) caused areas associated with the LA Basin to subside / down-drop, forming a major structural depression / sedimentary basin during early to middle Miocene time (15-20 million years ago). This depression initially formed an offshore marine environment that persisted for millions of years and filled with marine sediments sourced from the rapidly evolving highlands. Within the last 2-3 million years, tectonic uplifts that developed along the Newport-Inglewood / Rose Canyon Fault Zone (NIRCFZ) to the west and Whittier Fault Zone (WFZ) to the north caused the basin to uplift and fill with terrestrial and marine sediments, eventually becoming an evolving emergent plain. The source of the infill sediments was a combination of both marine and terrestrial sediments deposited by the ancestral Santa Ana, Los Angeles, and San Gabriel River systems. Over the last approximate 120-thousand years of geologic time, alluvial sedimentary fans have built-out / prograded southwestward toward the Pacific Ocean from the mouth of Santa Ana Canyon, forming the upland areas of the Orange County coastal plain. The Orange County coastal plain, City of Cypress, and project site are located within the southeasterly margins of the LA Basin, west of the historic Santa Ana River Channel, and are underlain by thousands of feet of Tertiary sediments and crystalline basement rocks of the Peninsular Ranges Geomorphic Province of southern California.

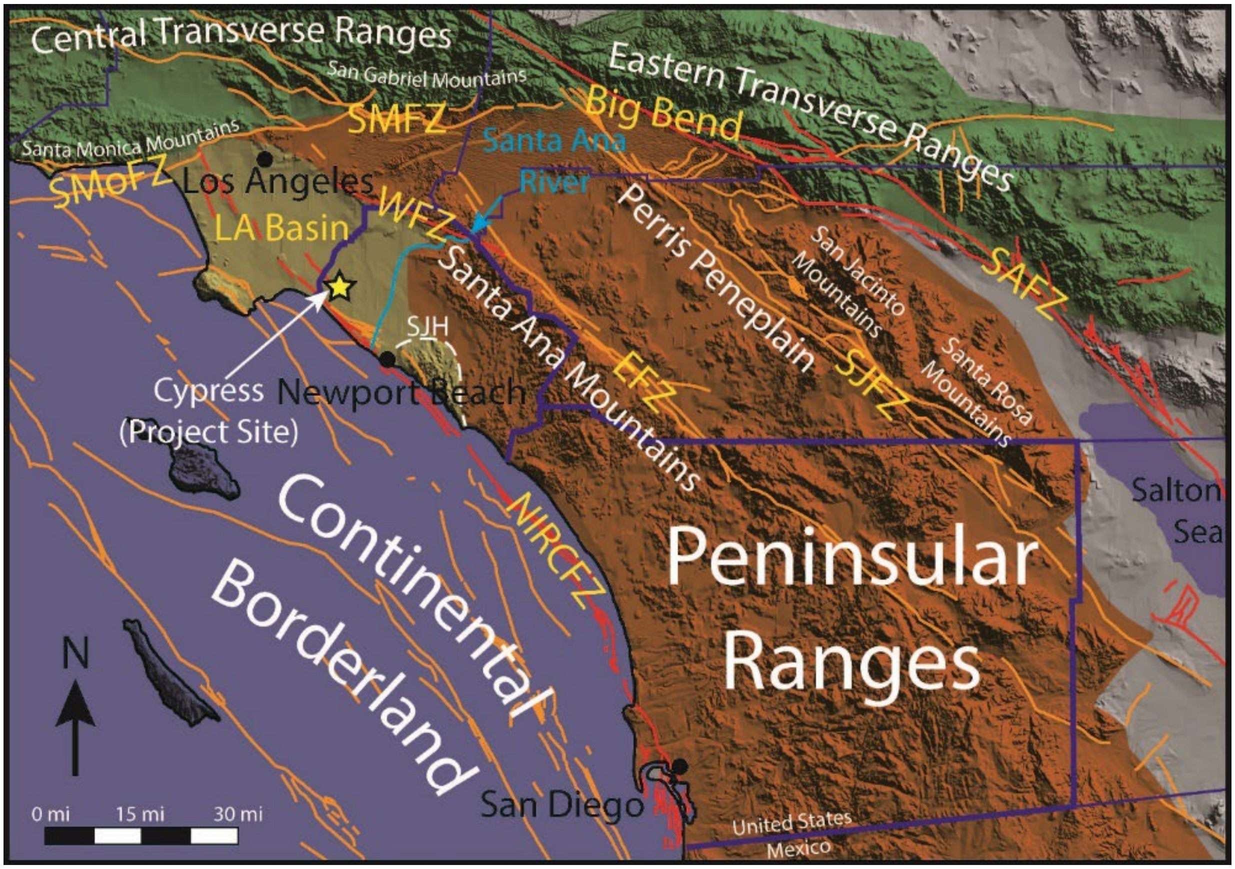


Figure A. Map of Local Geomorphic Provinces, Regional Fault Lines, and Related Landforms including: the Peninsular Ranges (orange), Continental Borderland (blue), and Transverse Ranges (green); the San Andreas, Newport-Inglewood / Rose Canyon, and Whittier fault zones (SAFZ, NIRCFZ, and WFZ, respectively; red lines); the San Jacinto (SJFZ), Elsinore (EFZ), Santa Monica (SMoFZ), and Sierra Madre (SMFZ) fault zones (orange lines). The project site (yellow star) is located along within the southeasterly interior margins of the Los Angeles Basin (LA Basin; yellow), a geomorphic sub-province forming the "join" between the three surrounding provinces. The San Joaquin Hills (dashed, white outline) represent the uplifted southeastern extension of the LA Basin to the southeast. County lines shown in dark blue with the project site located in Orange County. Approximate alignment of Santa Ana River is shown in light blue.

Local Geology / Geomorphology

Review of historic topographic maps dating back to the early 1900's (Figure B, below) indicates that the site is located near the terminus of the abandoned northern branch of the ancestral Santa Ana River and the headwaters of Anaheim Creek, which historically drained into the wetlands of Seal Beach (now known as the Seal Beach National Wildlife Refuge). Regional geologic mapping (Figure 3, attached) indicates that the site is underlain by Quaternary young alluvial deposits – Unit 2 (Qya_2) of late Pleistocene to Holocene age. The local alluvial deposits are described as, "*Poorly consolidated, poorly sorted, permeable flood-plain deposits consisting of soft clay, silt and loose to moderately dense sand and silty sand*". Sediments underlying the site / vicinity are understood to be fluvial in origin, having been transported by floodwaters of the ancestral San Gabriel and Santa Ana River drainages, deposited as broad sheets and anastomosing lobes of sediment across an ancient flood plain. These relatively ancient flood-plain deposits, now at elevations of 35-40 feet above sea level, likely began accumulating in a low-lying wetland, similar to the historic wetlands of Seal Beach to the southwest. During the late Pleistocene / early Holocene climatic transition (10- to 20-thousand years ago), local relative sea level was more than 300 feet below its modern level, but rapidly rose in response to climate change and influx of glacial meltwater into Earth's oceans. This rapid sea level rise essentially drowned the coastal zone and flooded former wetland areas that would subsequently infill and be buried by terrestrial alluvium transported and deposited by the Santa Ana and San Gabriel Rivers. As these sediments continued to accumulate, they developed into broad alluvial fans that prograded / built-out from ancient stream channels, displacing and/or maintaining the Pacific Coastline to the southwest. The result of this apparently rapid depositional history is an elevated, alluvial flood-plain that buried / infilled an ancient wetland, creating the relatively flat / low-lying terrain and alluvial deposits present under the site.

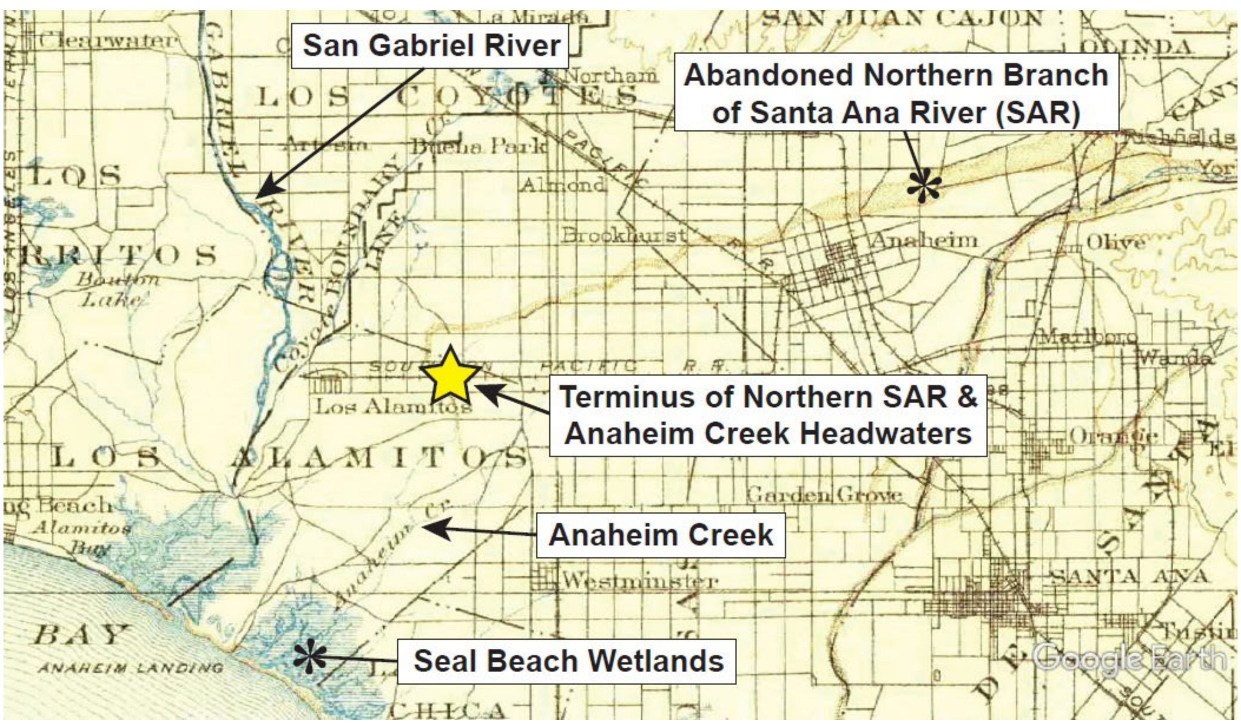


Figure B. Historic Topographic Map of Southern California from U.S. Geological Survey – Southern California Sheet No. 1, 1:250,000 Scale, 250-feet Contour Interval, May 15, 1910 Edition. Note that the site (yellow star) is located near the terminus of the ancestral Santa Ana River's abandoned north branch, and the headwaters of historic Anaheim Creek, which ultimately drains into wetlands of Seal Beach (Note: Not to Scale; For Illustrative Purposes Only).

Site History

According to PropertyShark and LoopNet commercial real estate website, the existing structures that currently occupy the 5665 and 5757 properties were reportedly constructed in 1988 and 1991, respectively. Review of vintage topographic maps and historic aerial photos dating back to the early 1900s indicates that the site originated as part of a largely undeveloped, rectangular parcel, with the majority of the local area either similarly undeveloped or agricultural. By the early 1930s, some housing and limited urbanization, including a petroleum tank farm to the northwest, is scattered throughout the greater vicinity. As of 1950 (Figure C, below), the site was part of a group of agricultural parcels proximal to the Southern Pacific Rail Line, the Los Alamitos Race Track and Army Airfield Complex, and other developments can be seen in the area. By 1960, the airfield had expanded to near its modern configuration and much of the surrounding vicinity had become urbanized. The site area remained agricultural through 1970, but much of the surrounding area was urbanized and developed by 1980. The site and immediate vicinity however remained agricultural until about 1985. In 1990, the site's configuration was apparently established similar to today.

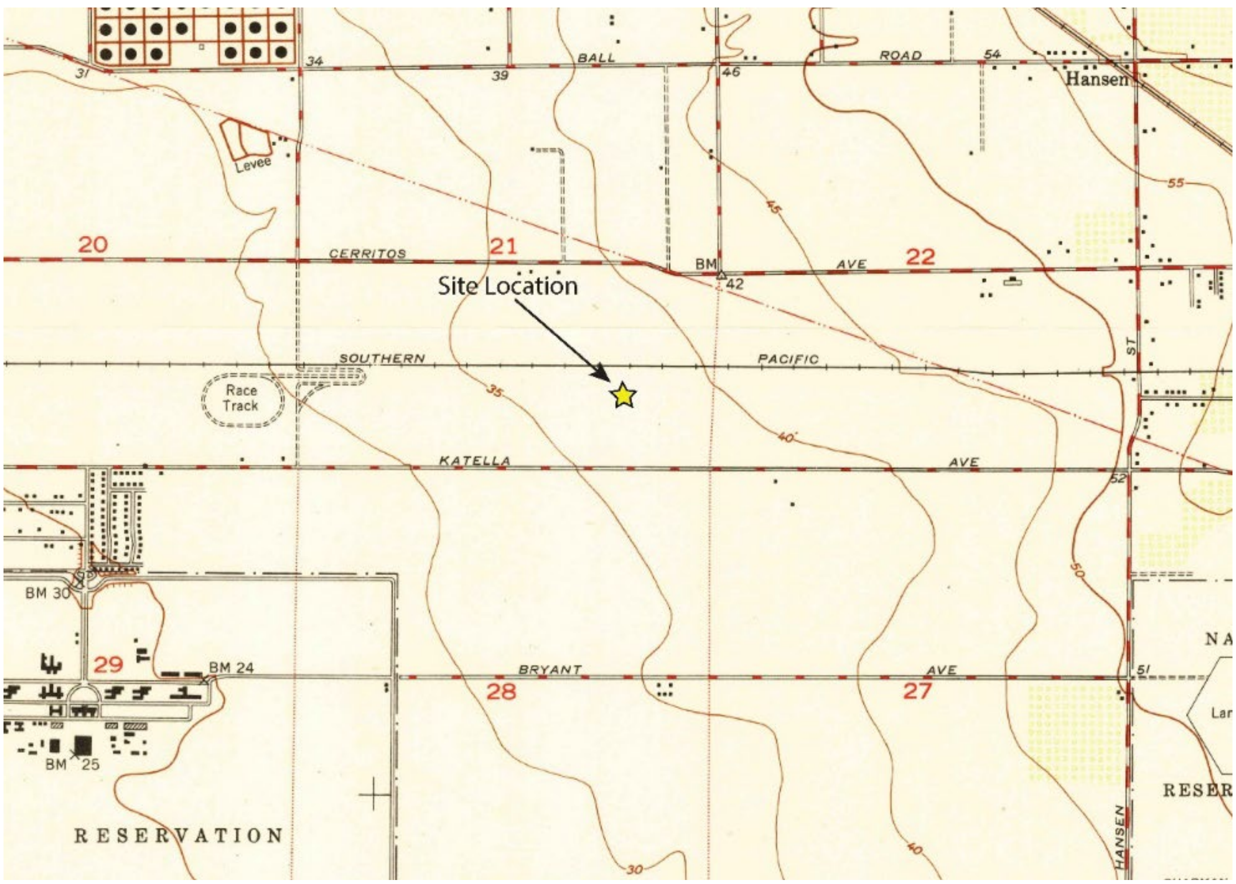


Figure C. Excerpt from U.S. Geological Survey 1950 topographic map of the Los Alamitos Quadrangle (1:24,000 scale; 5-foot contour interval) showing approximate location of project site at Elevation 37± feet above mean sea level (not to scale; site location is approximate; for illustrative purposes only).

With regards to the above, no buildings or other meaningful development were noted on or very near the site until the current development. The agricultural uses, based on historical review, indicate only "open ranch" replaced later by basic row crops. With respect to anthropological development, the general area was open space that served as a mix of rural and agricultural development. This continued through the early to mid-20th century. During that time, agricultural processing and use may have influenced the upper few to possibly locally several feet of onsite soils. Since that time, the area has been subject to heavy urbanization. This has likely created minor fills and modifications to the topography. The modifications include roadways, building pads and similar in support of development. This results in local fills and cuts of a few to locally several feet. The area has been heavily urbanized. Locally, the majority of the area is built out. The existing conditions onsite are part of a larger commercial development ("Cypress Technology Center") that includes commercial buildings and associated paved parking areas.

Flood Hazards

The major drainages – namely the San Gabriel and Santa Ana Rivers – have been largely channelized, along with storm water controls effectively "stabilizing" the area from further fluvial activity. Review of FEMA Flood Hazard Mapping (06059C0116J) indicates that the site is outside the 100-year flood plain but within the 500-year flood plain (i.e., in a zone assigned a 0.2-percent chance of being flooded in any given year or once every 500 years on average).

Local Faulting / Seismicity

Our desktop research indicates that the site is not underlain by any known active faults (i.e., Holocene faults that have ruptured in last 11,700 years and are likely to rupture in the future per the Alquist-Priolo Earthquake Fault Zoning Act). According to the Cypress General Plan, the nearest zoned "active" fault includes the Newport-Inglewood Fault Zone (5.1 miles southwest of the project site). Other nearby "active" faults include the Whittier-Elsinore Fault Zone (11.6 miles northeast of the project site). Nearby Quaternary faults includes an inferred portion of the Los Alamitos fault, located 2.2 miles southwest of the site, the faults in West Coyotes Hills, 8.2 miles northeast of the site, and the El Modena fault and Peralta Hills fault, located 10.2 and 11.3 miles easterly of the site, respectively. A nearby pre-Quaternary fault is the Norwalk fault, located 5.2 miles northeast of the site. Another concealed fault line (presumed inactive) is located approximately 0.85 miles southwest of the site, parallel to trend of the Los Alamitos Fault.

The local area is seismically active and subject to being impacted by large / damaging earthquakes. Recent historic damaging earthquakes affecting the local area include the 1987 magnitude (Mw) 5.9 Whittier Narrows earthquake and 1994 Mw 6.7 Northridge earthquake, caused by blind thrust faults located in the northern Puente Hills and San Fernando Valley, respectively. These earthquakes generated moderate to strong ground shaking in the local area and slight damage to local structures (Modified Mercalli Intensity V-VI at the subject site). The 1933 magnitude (M_w) 6.4 Long Beach Earthquake reportedly caused severe ground shaking (Modified Mercalli Intensity VIII) and moderate to heavy damage to structures in the local area according to the California Department of Conservation, based on the work of Barrows (1970, Reference No. 4), Trifunac (2003, Reference No. 5), and others. Larger / more damaging earthquakes have the potential to affect the local area in association with seismic events on the San Andreas, San Jacinto, Elsinore, Newport-Inglewood, and other regional fault lines affecting southern California.

The Los Alamitos Quadrangle is a Seismic Hazards Zone and is discussed in SHZR 019. The SHZR notes that the vicinity of the site is susceptible to liquefaction. This is described in more detail in the Seismic Hazards section of this report.

GEOTECHNICAL INVESTIGATION

Field and Laboratory Investigation

On December 13th, 2021, two CPT borings (CPT-1 and CPT-2) were advanced to depths of approximately 50 feet below existing site grade. Between January 3, 2022, and January 4, 2022, five hollow-stem augured borings (B-1 through B-5) were advanced to depths of approximately 31.5 feet and 51.5 feet below existing site grades, respectively. The approximate location of these borings and CPTs by G3 are shown on the attached Boring / CPT Location and Groundwater Map (Figure 2), along with the locations of previous borings / CPTs by SCG. Soil samples were obtained at selected depths and transported to the laboratory for testing.

Geotechnical boring logs for the hollow-stem auger borings and CPT results are included in Appendix A and Appendix B, respectively. Laboratory testing was performed on representative soil samples obtained during the field exploration to determine geotechnical properties of the site's subsurface materials, and the results of this testing are included in Appendix C. Boring logs, CPT results, and related information excerpted from SCG's previous reports (Reference Nos. 2 and 3) are included in Appendix D and Appendix E, respectively.

Subsurface Conditions

Based on the findings of our subsurface exploration, the project site is underlain, in general, by shallow fills and Quaternary alluvial deposits (Qal; synonymous with Unit Qya_2 of Figure 3, described in Local Geology / Geomorphology section). Artificial fill was noted within the upper 5± feet and generally consisted of dark grayish brown, moist to very moist, medium-dense, silty sands. Below about 5 feet depth, the native alluvial materials consisted primarily of very moist to wet silty sands / sandy silts with interbeds / discontinuous lenses of clayey silt / silty clay and poorly-graded sands noted between 35 and 40 feet. A distinct / apparently widespread layer of clayey silt / silty clay was noted at about 15± feet and 32.5 feet in Borings B-1 through B-5, consistent with previous borings by SCG. In general, the relative density and consistency of the alluvial materials, based on SPT / Cal-Mod blow counts, was noted to be predominantly loose to medium-dense and soft to firm. The fine-grained soils were generally low to very low / non-plastic in terms of apparent plasticity. It is likely that some of the fill materials, particularly the lower portions, are of an agricultural nature. Although we did not have opportunity to review any engineering information about the grading of the original development, based on available subsurface information, this agricultural fill may have been processed to varying degrees to accommodate the current development. No adverse organics were noted, however scattered roots and similar were reported in both our and the prior consultant SCG's work. Shallow groundwater conditions are present at the site, with first water occurring at depths of about 6-9 feet below existing surface elevations. Additional information regarding groundwater conditions is provided below.

Groundwater

Monitoring Well Installation / Recent Water Levels

Groundwater was initially encountered / noted in borings B-1 through B-5 between 7 feet and 8 feet below ground surface, which is generally consistent with groundwater levels of between 5 feet and 9.5 feet reported by the previous consultant (SCG; Reference Nos. 1 and 2). As part of our work, a total of five (5) monitoring wells permitted through Orange County Environmental Health Care Agency – Environmental Health Division were installed in borings B-1 through B-5 for the purposes of determining static water levels and as a means of ongoing monitoring for the project. The completed / approved well permit application and supporting documents are included in Appendix F. As-built well diagrams are referenced in the attached Geotechnical Boring Logs (Appendix A) and included as attachments in Appendix G. Estimated groundwater elevations as of January 7th and April 4th (2022) are summarized below and on the attached Figure 2.

Table 1. Estimated Groundwater Elevations / Depths – Wells B-1 through B-5

Well #	Est. Surface Elev. (feet above NAVD88)	Est. GW Elev. (1/7/22) (feet above NAVD 88)	Est. GW Elev. (4/4/22) (feet above NAVD 88)	Change (feet)	Depth to Water (4/4/22) (feet below ground surface)
B-1	38	31.4	31.6	0.2	6.4
B-2	38	31.4	31.5	0.1	6.5
B-3	36	28.9	28.8	-0.1	7.2
B-4	35	28.4	28.6	0.2	6.4
B-5	39	30.3	30.2	-0.1	8.8

Notes: Surface Elevations estimated from Google Earth to nearest 1-foot. Groundwater Depths / Elevations rounded to nearest 0.1 feet. See Figure 2 (attached) additional notes / information.

Hydrogeology / Structure

Groundwater associated with the site / local vicinity is not a singular body but likely comprised of multiple anastomosed zones that are inferred to be locally / partially interconnected and fed by regional and local sources of recharge, including surface infiltration, storm drain leakage, and other shallow / surficial sources. An Upper Zone of “first water” occurs in predominantly silty sands of moderate permeability, and inferred to be largely unconfined / perched on top of a relatively low permeability clay / silt layer noted at 15± feet in Borings B-1 through B-5. An Intermediate Zone, centered at approximately 20-30 feet, generally occurs in silty sands and is inferred to be semi-confined / leaky. Below about 35 feet, a Lower Zone occurring in poorly-graded sands centered at approximately 35-40 feet is inferred to be confined / semi-confined (i.e., “pressurized") based on the presence of confining layers (clayey silts / silty clays) above and below. In general, the sediments controlling groundwater flow occur as sub-horizontal, semi-continuous layers / lenses that generally conduct water horizontally and/or through vertically leakage between zones.

Groundwater Considerations

In general, groundwater associated with the site is shallow and understood to be of incidental / non-beneficial use. The ongoing regional series of droughts may influence the groundwater by tending to depress it. During periods of heavy rains and particularly “wet” rainy seasons, groundwater may be expected to rise and may mound in areas of concentrated influx. This condition may influence the use of infiltration and other stormwater controls.

The influence of the groundwater on overlying soils is likely to complicate earthwork / excavations, as the groundwater may rise into the work zone by “pumping” effects of heavy equipment, and by capillarity. Where semi-confined groundwater bodies exist, their phreatic head may be higher than their physical occurrence. This condition can exert a pressure on excavation bottoms, creating a “quick” condition, and other adverse effects. This typically requires a zone of isolation of up to several feet between the groundwater surface and the excavation to mitigate.

Shallow groundwater conditions and dewatering should be factored accordingly as part of the design and construction of the proposed development, including its effect on utility installations and general earthwork / construction. Shallow groundwater may be expected to influence utilities and related where they are close to or intersect the water table. The potential effects include flooding / groundwater intrusion, possible bottom heave, and decreased sidewall stability should be accounted for accordingly. Spoils near or below the water table are expected to be relatively wet and may require additional processing (aeration / drying) for use as engineered fill.

Specific details regarding groundwater / dewatering approaches, if needed, are beyond the scope of this report. Once the development plans are firmed up, this office should be consulted on how to proceed with formulating dewatering plans and/or other forms of ground stabilization that may be required to accommodate the proposed development and related appurtenances.

The groundwater at the site may present another hazard that could affect the property long-term in the form of wicking and capillarity, particularly during heavy seasonal rain or transient rise in groundwater. This condition may be expected to cause potential for elevated moisture / vapor intrusion risks to interior structures. Mitigations for such hazards include a robust capillary break and high-quality engineered vapor retarder system underlying a relatively thick slab assembly made of high-strength, low water cement ratio concrete, preferably with a hydrophobic additive (i.e., Xypex / Hycrete). Providing interior ventilation, appropriate exterior drainage, eliminating planters next to / proximal to buildings, and similar can also help mitigate risks associated with moisture / vapor intrusion. This is discussed in more detail in the Recommendations section of this report.

SEISMIC HAZARDS

General

Seismic hazards are typically categorized into two classes: primary and secondary. Primary seismic hazards are those directly related to a seismic event and include strong ground motion and surface rupture due to regional earthquakes and related surface displacements along fault lines. Secondary seismic hazards occur as a result of the primary hazards and include responses of the local ground to seismic shaking like liquefaction, lateral spreading, earthquake-induced landslides, etc. Additional hazards associated with coastal settings and open water bodies include tsunamis and seiche. These hazards and associated risk potentials are described below.

Surface Rupture and Strong Ground Motion

As previously described, active faults do not appear to be present across or very near the subject property. According to the California Geological Survey's web-based application (EQ Zapp), the nearest zoned active faults include the Newport-Inglewood and Whittier fault zones located approximately 5.1 miles southwest and 11.6 miles northeast of the site, respectively. The Fault Activity Map of California (CDMG Map No. 6, 2010) also indicates that the site is not located in an Earthquake Fault Zone of Required Investigations. A small area of recent activity in the Coyote Hills (Fault 433) is present in between the Norwalk Fault and Whittier Fault about 8.25 miles northeast of the site. The local area does include the Los Alamitos Fault Zone (Fault 442) about 2.2 miles southwesterly that is of Late Quaternary age, and not considered active. The Norwalk Fault (Fault 443) is located about 5.3 miles north easterly of the site, along with splay segments of unnamed faults situated about 4.25 miles south-southeast and 3.8 miles easterly of the site. Risk of onsite fault-related ground rupture associated with activity of a known active fault is considered unlikely. However, it should be noted that incidental ground cracking and other phenomena can occur due to high seismic accelerations and regional seismic activity, including effects associated with liquefaction and lateral spread– which should be expected throughout project's design life. Risks associated with seismic shaking and strong ground motion are considered moderate but can be mitigated through appropriate geotechnical / structural design and construction practices. Seismic design parameters based on ASCE 7-16 are included in Appendix H.

Liquefaction / Seismic Settlement

Liquefaction is a phenomenon in which saturated, cohesionless soils lose strength during relatively severe earthquake ground motions, with potential for adversely affecting buildings and road structures. In general, during ground motion, saturated fine sands and silty sands tend to compact and decrease in volume, resulting in an increase in pore water pressure if drainage is impeded. If the pore water pressure becomes equivalent to the overburden pressure, the effective stress becomes zero and, consequently, the cohesionless soil loses its strength and is considered to be in a liquefied state. Factors known to influence the potential for liquefaction include soil type and depth, grain-size, relative density, groundwater level, degree of saturation, and both the intensity and duration of ground shaking.

According to California Geological Survey's web-based application (EQ Zapp), the site is located in Liquefaction Hazards Zone of required investigations and our subsurface exploration, as well as that of the previous consultant (SCG; Reference Nos. 2 and 3), has verified the presence of potentially liquefiable soils to depths of 50 feet. Liquefaction analyses performed by the previous consultant based on the results of their CPT test data (in their Feasibility Study; Reference No. 2) indicated potential dynamic settlements ranging from 5.08 inches to 7.62 inches under a major seismic event. In their Preliminary Geotechnical Investigation Report (Reference No. 3), repeat liquefaction analyses were performed using different analysis methods resulting in dynamic settlements ranging from 2.80 inches to 3.29 inches, including an additional liquefaction analysis of secondary CPT test data resulting in 4.56 inches of settlement.

Site liquefaction potential was evaluated utilizing the computer program LiquefyPro developed by CivilTech Software, based on the subsurface conditions encountered in our CPT-1 and CPT-2 (Appendix B). The results of this analysis indicate potential dynamic settlements on the order of 2.90 inches to 5.27 inches during a severe seismic event. This dynamic settlement is expected to occur over a large area and would result in areal subsidence, and the potential differential settlement is expected to be significantly less over any relatively small segment. However, given the nature of the proposed development, being comprised large-scale industrial warehouse facilities, differential settlements under current conditions could be significant. Remedial grading / foundation considerations and/or in-situ ground improvement measures are recommended hereinafter to help mitigate potential adverse effects due to soil liquefaction. The results of our liquefaction analysis are included in Appendix I.

Lateral Spread

Liquefaction induced lateral spreading is defined as the finite lateral displacement of gently sloping ground as a result of pore pressure build-up or liquefaction in a shallow underlying deposit during an earthquake. Factors known to contribute to lateral spreading include gentle surface slope, free-face conditions, shallow water table, and liquefiable cohesionless soils under a major seismic event. Lateral spreading is typically confined to the displacement of large, surficial blocks of soil in the downslope direction as a result of liquefaction in a subsurface layer.

Commonly associated with lateral spreading are slumping of embankments overlying liquefiable soils, resulting in settlements, lateral displacements, and surface cracks or scarps oriented near parallel to the top of slope. Although these slumps are the result of soil liquefaction, the slope failure can better be characterized as a rotational slide or slump. On flat terrain, lateral spread is limited by lack of topographic differential. During very high ground motion events, lateral spread may occur locally and in conjunction with other more widespread liquefaction mechanisms, and is likely to focus on weak susceptible ground adjacent to channels, excavations, and other locations with topographic discontinuities.

Given the character of the area surrounding the site, and considering the ground improvements afforded by remedial grading that will be associated with the proposed development, and based on performance in prior significant earthquakes, heavy lateral spread is considered a low risk, ground cracking and displacements and localized spread, particularly adjacent to channels, etc. is considered a moderate risk. This risk is improved by ground treatment and dewatering, as well as providing a capping of engineered fill.

Tsunami

Tsunamis are long-period ocean waves generated by the displacement of ocean water resulting from submarine landslides and/or fault rupture during large earthquakes. Coastal inundation / flooding as a result of tsunami can be caused by local and/or distant sources distributed throughout the Pacific Ocean. Tsunamigenic sources include local seismic sources like the Catalina Fault, Newport-Inglewood Fault and submarine landslides associated with the Palos

Verdes Peninsula. More distant sources include subduction-related faulting around the Pacific Rim near Alaska and Chile.

Topographic and regional maps indicate that the subject site is more than 6 miles inland from the coast / Pacific Ocean. The site sits at an elevation of approximately 37± feet above sea level and is not located in an area of known tsunami hazards according to Reference No. 8. Based on the above, risk of tsunami from the known sources described above is considered low.

Seiche

Seiche is defined as a standing wave oscillation effect generated in a closed or semi-closed body of water caused by wind, tidal current, and earthquake. Seiche potential is highest in large, deep, steep-sided reservoirs or water bodies (OFR 79-8). The nearest such bodies are the ponds located at the Los Alamitos racetrack, located 0.6 miles from the site, the El Dorado Park lakes, which are located approximately 3 miles from the site, and Carbon Creek, Coyote Creek, and San Gabriel River located as near as 0.7 miles from the site. Considering the relative distances and the various topographic obstructions, the potential for Seiche effects to the project site due to off-site reservoirs, etc., is considered nil.

It is important to note that in our experience, moderate to high ground motion occurrences can cause seiche effects in pools, spas, and ponds. If pools or other water features are planned near the residence or on the property, consideration for Seiche effects should be accounted for – as nuisance sloshing as a result of earthquake forces may cause localized flooding and related damage in their immediate vicinity.

CONCLUSIONS AND RECOMMENDATIONS

From an engineering geologic standpoint, it is our opinion that the proposed development is feasible, provided that the recommendations provided herein and the City of Cypress grading requirements are incorporated in the design and implemented during construction.

Presented below are general guidelines and preliminary recommendations for incorporation into the project design and construction based on our findings, analyses, reviews and overall experience with similar conditions. These include grading / in-situ ground improvement, structure foundations, seismic design, structure setbacks, exterior flatwork, moisture / vapor retarder system for structures, soil expansion, corrosion considerations, retaining walls, asphaltic concrete pavements, storm water infiltration, utility trench backfills, site drainage, landscape irrigation and maintenance, and plan reviews, observations and testing.

Geotechnical Considerations

The major geotechnical factors that should be considered during project design include the following:

- Soil disturbance resulting from the demolition and removal of existing structures, ancillary elements, and underground utilities;
- Presence of existing fill soils to general depths of about 5 feet, locally more;

- Shallow groundwater levels at depths ranging from approximately 6 to 9 feet below existing site grades, with zones of overlying wetness that may be present;
- Static settlement due to foundation / improvement loading and dynamic settlement resulting from earthquake-induced liquefaction and shallow dry sand settlement;
- Constraints to remedial grading due to shallow groundwater levels;
- High ground accelerations / seismic shaking may be experienced at the site during its design life – therefore, the proposed structures should be designed and constructed to the prevailing standards and seismic design requirements;
- Soil exposure issues related to control of external influences on the structure – including water / moisture / vapor, vegetation (landscaping), soil chemistry (i.e. sulfate / pH issues), exposure to rain and weather.
- Typical measures to mitigate the potential adverse effects due to site liquefaction include the following, in order of decreasing effectiveness:
    - Improvement of liquefiable soils (e.g. dynamic compaction, compaction grouting, removal and replacement with approved compacted fill) would minimize the potential for dynamic settlement of the underlying soils and associated adverse effects to structures.
    - Structures supported on deep foundations (e.g. pile/grade beam system with structurally supported floor slab) would help mitigate temporary loss of foundation support due to liquefaction of the underlying site soils, although there may be some temporary loss of lateral support.
    - Structures supported on mat foundations may suffer distress in the form of differential movement due to temporary loss of foundation support during a major seismic event. However, it may be feasible to re-level mat supported structures utilizing compaction grouting / mud jacking procedures. Mat foundations typically outperform conventional footings in reducing the adverse effects associated with dynamic differential settlement.
    - Structures supported on strengthened conventional foundations (i.e., continuous and spread footings) incorporating some foundation redundancy would provide some measure of mitigation against the adverse effects due to site liquefaction. However, the structure may experience extensive distress.

Considering the type of development (i.e., warehouse / distribution center comprised of concrete tilt-up construction), shallow groundwater levels and associated constraints to remedial grading to mitigate static / dynamic structure settlements, structure sensitivity to differential settlements, and overall site area, recommendations for ground improvement to mitigate potential adverse effects due to soil liquefaction are provided herein. The in-situ ground improvement considerations recommended herein will provide some measure of mitigation and should provide suitable levels of protection with regard to bearing failure, settlements, and limit lateral displacements, but will not eliminate the potential adverse effects to structures associated with soil liquefaction / dynamic settlement.

The following recommendations are specific to the currently proposed construction. Any deviation from the assumed loads and proposed construction is subject to review by the Project Geotechnical Engineer.

Ground Improvement Considerations

General Discussion

Considerations were given to in-situ ground improvement to mitigate potential site soil liquefaction to provide acceptable support of the planned structures, with limited remedial grading operations considered to provide support for planned pavement construction.

Preliminary assessment for in-situ ground improvement options were performed by Advanced Geosolutions, Inc. – design-build geotechnical contractor, utilizing the field findings available in the referenced Southern California Geotechnical reports and those findings obtained during our geotechnical exploration phase. Based on their assessment, viable ground improvement systems for the subject building include vibro-stone columns or deep soil mixing.

Ground improvement systems are installed under design-build contracts by specialty contractors. The required size, spacing, length, and strength of the ground improvement elements should be determined by the specialty contractor based on the proposed structural loads and desired level of improvement. Prior to submittal, our office will review the geotechnical aspects of the ground improvement program for concurrence with our findings and recommendations and provide comments / revisions as appropriate. The capacities of the ground improvement elements should be determined by the design-build contractor that installs the system; however, for planning purpose, it may be assumed that both ground improvement alternatives will extend to a depth ranging from 20 to 30 feet contingent upon desired structural performance. Based on the chosen ground improvement technique, the upper 12 to 18 inches or more of the working pad may need to be re-compacted after ground improvement installation, due to surface disturbance and potential ground heave. For this reason, we do not recommend preparation of the final pad or the construction of utilities prior to ground improvement.

Preliminary discussions of the two alternate approaches are presented in the following sections.

Stone Column

Stone columns would provide reinforcement within and to the surrounding soil via densification thereby increasing soil shear strengths and associated increased bearing capacities, decrease seismic deformations and associated structure settlements, resulting in reduced foundation costs. The construction process consists of utilizing pre-augered methods. The augered cavities are backfilled with aggregate that is compacted in place using static crowd pressure augmented with a high frequency, low amplitude, vibratory hammer. The impact hammer densifies aggregate vertically while the tamper foot forces aggregate laterally into cavity sidewalls resulting in stiff stone column elements and stiffened matrix soil.

Stone columns can be installed at generally uniform spacings across the building footprint and to a lateral distance on the order of 15 feet beyond the structure footprints with a total coverage area of approximately 10 to 12 percent. Following installation, the planned structures may be supported by shallow conventional foundations with concrete floor slab.

Alternately, stone columns can be strategically placed at concentrated foundation load conditions, footing locations with input from the project Structural Engineer. For this alternative, conventional footings with structural floor slab would be used.

When considering stone columns, crushed/ processed concrete from demolition operations can be incorporated into the stone mix if the material meets certain criteria, and soil spoil materials generated from the drilling operations can be reused on-site to achieve planned grades and/ or dock height fill placements.

<u>Deep Soil Mixing</u>

Deep soil mixing (DSM) is a ground improvement technique through blending of hardening agent (usually cement grout) with the native soils. The process improves the strength and stiffness of the soil to increase bearing capacity, decrease settlement, and mitigate seismic issues. A revolving hollow shaft with mixing paddles and/or a section of auger (mixing tool) is advanced into the soil. As the mixing tool is advanced into the soil by a combination of rotation and crowd force, a grout slurry (comprised of cement and water) is injected through the hollow-stem and blended with the soil mix, creating a series of soilcrete columns. DSMs can also be amended to provide uplift capacity by introduction of tie-down rebar.

The DSM columns are typically separated from the bottom of the foundation using a minimum 6-inch layer of crushed rock or other similar “cushion material”. No direct structural connection between the DSM columns and the overlying structural element is allowed. Lateral resistance is provided by footing bottom friction at the “cushion” layer interface or passive resistance of the side walls. The target strengths of the DSM soils are usually between 100 to 300 psi at 28 days, depending on load demands. The strength is tested using ASTM D2166 “Standard Test Method for Unconfined Compressive Strength of Cohesive Soils”.

When considering deep soil mixing ground improvement, conventional footings with structural floor slab would be used. Excess soil spoil materials generated can be reused on-site to achieve planned grades and/ or dock height fill placements.

Grading / In-situ Ground Improvements

<u>General</u>

Presented below are recommendations to address site clearing/ preparation and remedial grading associated with the pavement/ ancillary construction and completion of structure pads. The actual design and magnitude of remedial grading and ground improvement will be refined and presented under separate reporting.

Site Clearing and Preparation

- Site preparation and grading should be made under the observation of the Project Geotechnical Engineer or Geologist, Project Engineering Geologist, and/or their field representative.
- Proper measures should be implemented during the performance of grading work to protect the work site, particularly excavated areas, from flooding, ponding and inundation due to poor or improper temporary surface drainage. During periods of impending inclement weather, temporary provisions should be made to adequately direct surface drainage, from all sources, away from and off the work site and to provide adequate pumps and sumps to handle any flow into the excavations.
- Prior to the start of the required earthwork and grading, all vegetation, surface trash, debris, and other deleterious materials should be removed from areas of planned grading and wasted away from the site. Vegetation removal should include root-balls and attendant root systems.
- Removal of existing structures should include foundations, concrete flatwork, and any remaining buried obstructions. Concrete fragments and construction debris from site demolition operations should be disposed of off-site.
- Any pipelines or conduits encountered within the zone of planned grading that are designated for abandonment should be removed from the construction area and ends cut and plugged according to the applicable Code requirements but not less than 10 feet outside the perimeter of the proposed construction area, or as property line considerations dictate. Non-reinforced concrete or clay pipes may be crushed in-place and incorporated in the fill.

Local ordinances relative to abandonment of underground utilities, if more restrictive, will supersede the above minimum requirements.

Remedial Earthwork

The following remedial grading recommendations were developed with consideration for ground improvement (Stone column or Deep Soil Improvement) to provide acceptable processing of the interface between the treatment zone and the overlying building envelop and support for the proposed structures within the development.

1. For planned building pad areas receiving new fill soils to achieve planned grades where the underlying soils were treated as described herein, remedial grading should consist, as a minimum, of an 8-inch scarification of the exposed soils and recompaction to at least 90 percent relative compaction at 2 to 3 percentage points wet of optimum moisture conditions (ASTM: D1557). Should unstable bottom conditions be experienced, additional site overexcavation and recompaction and/or bottom stabilization methods may be warranted and should be performed in accordance with our field recommendations based on the actual conditions encountered at the time of grading.

2. For planned building pad locations in areas of planned grade cuts, remedial grading should be performed, as necessary, to provide a working platform for stone column installation and deep soil mixing. During aggregate pier installation, it is anticipated that the upper approximately 12 to 18 inches of pad grade soils will become disturbed. Disturbed materials extending below proposed subgrade elevations will need to be reworked as engineered compacted fill. Additional remedial grading efforts should be performed, as necessary, based on the actual conditions exposed at the time of remedial grading efforts and to the satisfaction of the ground improvement specialist.

3. In areas extending beyond the zone of in-situ ground improvement, the existing site soils should be over-excavated to a 5 feet (minimum) depth below planned finish or existing site grades, whichever depth is greater. For ancillary foundation support, additional over-excavation should be performed, as necessary, to provide minimum of 3 feet of engineered compacted fill beneath footings, and to a lateral distance of 3 feet beyond footing edges.

4. Should undocumented fill soils outside the limits of the recommended ground improvement be exposed at depths greater than 5 feet the condition of the fills exposed should be evaluated in order to enable our office to provide additional recommendations, as appropriate.

5. As discussed in the Groundwater section of this report, the site is underlain by relatively shallow groundwater. A dewatering plan should be considered to mitigate this in construction. Even with an appropriate dewatering program, some excavation areas may experience wetness and or soft ground that may require supplemental means and methods to address, including local sumping and pumping, rock / lime / cent treatment, and top-loading.

6. Note that the groundwater at the site has likely been influenced by long-term regional drought and may be affected as a result. The effect would be expected as a sympathetic lowering. Therefore the water level may be higher in response to wet weather periods.

7. Dewatering, as may be required, should be performed in advance of the planned work, it may take considerable time to lower groundwater significantly. Note that once the ground in an excavation bottom is damaged by pumping and or turning quick, it can be difficult to regain control.

8. Dewatering may assist in ground improvement. It may be possible to integrate the dewatering with other ground improvement work planned for the site.

9. A study based dewatering program is recommended. Dewatering and disposal of developed water will likely require a permit from the State Regional Water Quality Control Board, and possibly other jurisdictions.

10. The shallow groundwater may adversely influence infiltration and other stormwater management options. An evaluation of storm drainage management and infiltration should be considered.

Excavation Procedures

Temporary excavations performed 4 feet or deeper in vertical should be shored or sloped in accordance with Cal OSHA requirements. Special construction techniques, such as slot cutting, may be utilized if excavations are greater than 4 feet vertical and site constraints preclude use of temporary slope cuts.

Excavations located along property lines and adjacent to existing structures (i.e. buildings, walls, fences, etc.) should not be permitted within two (2) feet from the existing foundations. Temporary slopes, if utilized, should be no steeper than 1.5:1 (horizontal: vertical) gradient with maximum height of slope not exceeding 20 feet. A representative of this firm should be present on-site during excavations to verify acceptability of temporary slopes. Acceptability will be dependent upon the soil conditions encountered, construction procedures and schedule.

Excavation slopes and cuts daylighting seepage, or seepage occurring at or near the base of these excavations may develop instability, raveling and piping. These should be addressed in the field by the geotechnical consultant on an actual conditions case-by-case basis.

It is imperative that grading schedules be coordinated to minimize the exposure time of these unsupported excavations. Once started, these excavations and subsequent fill operations should be maintained to completion without intervening delays imposed by avoidable circumstances. In cases where five-day workweeks comprise a normal schedule, grading should be planned to avoid exposing a grade or near-grade excavation through a non-work weekend. Where improvements may be affected by temporary instability, either on / or offsite, further restrictions such as slot cutting, extending workday-weekend schedules, and/or other requirements considered critical to serving specific circumstances may be imposed. Removal of unsuitable materials also may be affected by the above requirements.

Excavation Bottom Preparation

The acceptability of excavation bottoms should be evaluated by the Project Geotechnical Consultant prior to placing approved fill soils. Excavation bottoms should be thoroughly moisture conditioned, as necessary, to 2-3 percentage points above optimum moisture content depending on the soil type exposed, scarified to a depth of about 8 inches and compacted to minimum 90 percent of the laboratory maximum dry density (ASTM: D 1557). Should severe pumping and heaving conditions be experienced during excavation bottom preparation, it may be necessary to stabilize the bottom with a one to two feet layer of aggregate base material placed in a single lift rolled lightly with static equipment to achieve a firm and unyielding condition. The method of stabilization would be determined by a representative of our office at the time of grading and would be dependent upon the actual conditions encountered, equipment used, etc.

Fill Placement and Compaction

Fill materials should be placed in loose lifts not exceeding thickness that can be adequately and thoroughly processed and compacted by the equipment and methods utilized. These materials should be processed by blending and moisture conditioning to 2-3 percentage points above optimum moisture content, depending on the soil type, and compacted to at least 90 percent relative compaction based on the laboratory maximum dry density assigned – to the satisfaction of the Project Geotechnical Consultant. All grading should be performed under the observation and testing of the Project Geotechnical Consultant or his representative.

Fill Materials

Fill materials should consist of clean onsite soil and imported soils and should be free of vegetation, reinforcing steel, hazardous materials, rocks greater than 6 inches in maximum dimension, and any other organic or deleterious materials.

It may be feasible to incorporate inert construction debris (concrete, brick, and asphalt) in the fill materials. The acceptability of this material for incorporation into the fill, and in particular when placed beneath the structure footprints, will be subject to the review and approval by the project environmental consultant. In general, said construction debris should be processed to 1.5" maximum sizes, and be blended with sufficient granular soils to infill void space, with resulting soil blend exhibiting less than 30 percent retained on the 3/4" sieve size. Crushed material blends should be reviewed by our office for acceptability prior to use as engineered fill.

Import soils, if required, should exhibit engineering properties similar to or better than the on-site material. The import soils should be approved by a representative of this firm, at the borrow site, at least 48 hours prior to importing.

Shrinkage and Subsidence

Based on the available field and laboratory test data obtained by the previous consultants and during the course of this geotechnical investigation, soil shrinkage factors within the upper 5 to 6 feet of existing grade are anticipated to generally vary from about 5 to 20 percent, when recompacted as structural fill. This range in soil shrinkage values most likely reflects variation in soil types relative to available maximum density test results, non-uniform fill soil conditions, and other factors. A shrinkage factor range of between 10 to 15 percent, with consideration for the upper bound limits of this range may be assumed for preliminary design purposes. Losses due to stripping of vegetation, demolition, unsuitable soil disposals, subsidence, etc. should also be accounted for in volume estimates.

Ground subsidence due to the removal / replacement of the site soils as recommended above is expected to be variable and would occur as a result of soil consolidation of the underlying natural soils due to increased loading from additional fill placements to achieve planned finish grades, as well as increased loading from excavated / recompacted soil materials. Some ground subsidence should be anticipated in areas to receive additional fills, and settlement monuments may be considered in those areas receiving new fills greater than about 4 feet above current site grades outside the limits of in-situ ground improvement.

Testing and Observations

Site preparation, grading, compaction, and backfill operations should be performed under the observation and testing of the Project Geotechnical Consultant or his representative. An adequate number of field tests should be performed to verify compliance with recommendations presented in this report and local ordinances.

If it is determined during grading that site soils require over-excavation to greater depths for proper structural support, this additional work should be performed in accordance with the recommendations of the Project Geotechnical Consultant.

Fill materials should be compacted to the minimum 90 percent relative compaction based on the assigned laboratory maximum density determined in accordance with ASTM: D 1557. Road subbase and basecourse may require 95% relative compaction.

Foundations

Presented in the following are geotechnical criteria for design and construction of shallow conventional footings as well as concrete slab criteria for the proposed structures. Foundation design should consider anticipated post-construction settlements under both static loads and short-term seismic conditions, as appropriate.

Structure Foundations

Presented in the following are preliminary geotechnical criteria for design and construction of shallow continuous and spread footings for the support of structures with consideration for in-situ ground improvement support.

Allowable Bearing Pressure (1)	=	2,500 psf
Minimum Footing Depth (2)	=	24 inches
Minimum Footing Width	=	Per 2019 CBC
Passive Soil Pressure (3)	=	250 psf/ft., subject to 2,500 psf maximum
Friction Coefficient	=	0.4 (ultimate)
Minimum Footing reinforcement	=	For continuous footing, min. four No. 4 bars, two at top and two at bottom.

(1) The above value may be increased 250 lbs./sq.ft. for each additional foot exceeding the minimum embedment depth, subject to a maximum of 3,500 psf. Allowable bearing pressures may be increased one-third for short term loading due to wind of seismic forces.

(2) Footing depth is below lowest adjacent soil grade. Footings should be deepened, as necessary, to depths equivalent to existing adjacent foundations, where applicable.

(3) Passive soil pressure value is for level soil conditions adjacent to footings.

Ancillary Construction

For ancillary construction located outside the limits of proposed in-situ ground improvement, the following design criteria may be used:

Allowable Bearing Pressure (1)	=	1,500 psf

Minimum Footing Depth (2)	=	18 inches
Minimum Footing Width	=	Per 2019 CBC
Passive Soil Pressure (3)	=	200 psf/ft., subject to a maximum of 2,000 psf
Friction Coefficient	=	0.40 (ultimate)
Minimum Footing Reinforcement	=	For continuous footings, min. four No. 4 bars, two at top and two at bottom.

(1) Allowable bearing pressures may be increased by one-third for short term loading due to wind or seismic forces.

(2) Footing depth is below lowest adjacent soil grade and founded on engineered compacted fill.

(3) Passive soil pressure value is for level soil conditions adjacent to footings.

General Foundation Construction Comments / Guidelines

General remarks regarding the construction of conventional footings are presented below:

Footing embedment depths should be maintained throughout the life of the structure, and not compromised via erosion softening, digging, landscaping, etc.

Where foundations encroach closer than five (5) feet horizontally from the flow line of drainage swales, the footings edges should be deepened sufficiently to maintain the required embedment depth below the adjacent flow line.

Foundation details such as concrete strength, reinforcements, thickness, etc. should be established by the Project Structural Engineer, considering the loading conditions. The recommended foundation embedment, thickness and reinforcements are minimum requirements and should be established by the Project Structural Engineer. More restrictive criteria based on structural design considerations or Code requirements shall govern.

Foundation excavations should be observed and approved by the Project Geotechnical Engineer prior to the placement of reinforcement or concrete. Forming of footing excavations may be required. Excavations should be free of slough and debris and thoroughly moisture conditioned prior to placing concrete.

Excavated material from footing and utility trenches should not be placed in slab-on-grade areas unless properly compacted and tested.

Footings should be doweled to the floor slab with No. 4 bars at 18 inches on center.

Floor slabs should be underlain by a moisture vapor retarder, as recommended hereinafter, to mitigate moisture / water vapor intrusion into the structure.

Foundation details such as concrete strength, reinforcements, etc. should be established by the Project Structural Engineer. More restrictive criteria based on structural design considerations or

Code requirements shall govern.

Concrete Floor Slab-on-Grade

Presented below are preliminary geotechnical criteria which may be used for concrete floor slabs on grade.

Concrete Slab Thickness	=	7 inches or per structural design
Minimum Reinforcement	=	Per Structural Engineer

In order to minimize migration of moisture through the concrete slab from soil sub-grade and damage to floor coverings, a moisture / water vapor retarder system should be placed beneath floor slabs in areas to be tiled, carpeted, or otherwise considered moisture sensitive. Recommendations relating to the placement and location of this moisture vapor / retarder are provided in the “Moisture / Water Vapor Retarder for Concrete Slab-on-Grade” section. The use of a hydrophobic additive, such as Xypex or Hycrete, in the concrete should be considered, given the shallow groundwater conditions.

The prepared soil sub-grade should be moisture conditioned to and maintained at about 1 to 3 percentage points wet of optimum moisture contents to a depth of 12 inches and exhibit at least 95 percent relative compaction as determined by ASTM: D1557.

Interior floor slabs should be properly designed for the construction and service loading conditions, and potential differential movements. The structural details, such as slab thickness, concrete strength, reinforcing criteria, joint spacing, etc. should be established by the Project Civil / Structural Engineer.

To minimize slab curling, a low shrinkage / low slump concrete (concrete mix with a minimum 4,500 psi compressive strength and maximum water cement ratio of 0.45) should be used for the slab construction, as determined by the Project Structural Engineer. The mix design should be verified by the Project Civil / Structural Engineer, and placement of concrete should be observed and certified by the Concrete Deputy Inspector, as required.

Settlements

Some structure movement should be expected both during and following construction, even when supported on a zone of in-situ ground improvement, due to various factors including, but not limited to:

- Surcharge loading due to dock height fill construction;
- Sequence of foundation and slab loading during construction;
- Variation in structural loads along foundation elements;
- Variation in underlying soil types with different compressibility indices and subsurface soil profile and associated primary and long-term secondary consolidation settlements; and
- Potential dynamic settlement under a major seismic event

Total static settlements for foundations would be dependent upon the actual structural loading conditions and configuration, remedial grading performed, final grades, and final design / specifications and installation of the ground improvement program. For appropriately designed and constructed structure foundations and supporting loads typical for the concrete tilt-up construction (column and wall loads on the order of 125 kips and 5 kips/lineal foot, respectively), static settlement estimates following in-situ ground improvement are estimated to be on the order of 1-inch total. Differential settlements under static conditions are not expected to exceed ½-inch over a distance of approximately 50 feet and between similarly loaded adjacent foundations.

Under exposure to short term seismic loading during a major seismic event, the site is prone to additional settlements due to soil liquefaction. Liquefaction settlements under seismic conditions are anticipated to vary with the variance in the underlying site soil conditions. For preliminary design purposes and when considering in-situ ground improvement, average dynamic settlements on the order of 1-inch total may be considered and are expected to occur over a large area. Generally, the differential settlements at level sites are expected to be small even if the total settlements are large, and for preliminary design purposes are estimated to be on the order of ½ inch over a distance of approximately 50 feet. Potential dynamic settlements under a major seismic event should be further evaluated/ substantiated by our office and the ground improvement specialist based on review of the ground improvement program selected.

Total and differential settlement potentials for ancillary construction outside the limits of in-situ ground improvement would be dependent upon foundation loads, location relative to planned grade cuts and fill placements, etc. For preliminary design purposes, total and differential static settlements on the order of 1 inch and ¾ inch over a distance of approximately 30 feet may be considered for lightly loaded ancillary footings supported on engineered compacted fill as recommended in the Grading section. Under seismic load conditions, additional potential total and differential settlements could be on the order 2-1/2-inches and 1-1/2 inches over a distance of 50 feet respectively

The above estimated potential settlements should be substantiated by our office and the ground improvement specialist based on review of final foundation plans and proposed ground improvement measures and limits.

<u>Additional Considerations Regarding Settlement and Improvements:</u>

1. General fill equilibrium will develop with time but is most affected by changes in soil moisture;
2. Sequence of foundation and slab loading and variation in structural loads along foundation elements during construction can impact differential movements;
3. Variation in underlying soil types with different compressibility indices, subsurface soil profiles, and subsurface drainage systems and conditions will affect primary and long-term secondary consolidation settlements;
4. Moisture changes due to climatic and non-climatic influences following construction, and associated shrink / swell of expansive soils;

5. Soil shrinkage and expansive behavior will be separate and is considered independent of settlement as a result of fill placement and associated loading from water and structures;
6. Soil shrinkage and expansion effects that are not reconciled in the design and construction will have a direct impact to top of slope improvements and associated lateral deformation;
7. Adequate and properly designed and functioning area drainage systems combined with the proper landscape design and watering programs would significantly help reduce the potential for expansion and shrinkage and long-term slope deformation; and

It should be noted that moderate slab on grade cracking may be observed within the first week after construction that are not related to soil movement. These are related to water cement ratios exceeding specifications and inappropriate finishing techniques.

Seismic Design Considerations

The site is in a zone of high seismic activity / exposure. Strong ground motion from an earthquake generated along active faults should therefore be anticipated at this site. Based on the presence of liquefiable soils to depths down of 50 feet below the site, the site qualifies as Site Class F and the proposed development should be designed and constructed to the prevailing standards regarding seismic design. Seismic design parameters based on standard procedures for Default Site Class D (ASCE 7-16) are included in Appendix H and should be reviewed for acceptability by the Project Structural Engineer based on current and applicable CBC requirements, as appropriate.

Moisture / Water Vapor Retarder for Concrete Slab-on-Grade

It should be recognized that, even with site surface and sub-drainage measures, there is potential for saturation of ground beneath concrete floor slabs due to water infiltration from irrigation, rain, and run-off or flow through the soil subgrade. The upward migration of moisture in vapor phase from soil subgrade through the slab-on-grade is inevitable. It is imperative that the Contractor properly install the recommended site drainage measures, utility trench backfill, and the moisture / water vapor retarder system in accordance with the project design requirements and specifications to mitigate potential moisture / water vapor transmission into the structures.

On this project, the presence of relatively shallow groundwater is expected to exacerbate moisture-vapor intrusion issues.

In order to reduce the potential for moisture / water vapor migration up through the slab in moisture sensitive areas, and possibly affecting floor covering, wood cabinets and other objects, a moisture / vapor retarder is recommended under concrete slab-on-grade in these areas. The recommendations provided below are based on the guidelines of the American Concrete Institute:

The moisture / water vapor retarder should consist of high strength membrane and should meet or exceed the ASTM: E-1745-97 Class A material requirements for water vapor permeance, tensile strength, and puncture resistance. The vapor retarder should consist of “Stego Wrap” (Stego Industries, LLC) or “Vapor Block” VB 15 (Americover, Inc.), or approved equal.

The installation of the moisture / water vapor retarder system requires specialized knowledge and experience and should be accomplished with the technical assistance and supervision of retarder system manufacturer and/or supplier. The membrane should be properly lapped and sealed. Membranes intersecting utility pipes, sewer lines, ducts or drains must be properly wrapped around the penetrations and sealed. All punctures and rips in the membrane should be repaired prior to placement of concrete, following manufacturer's recommendations.

The vapor retarder should be installed in general accordance with the procedures outlined in ASTM: E-1643, and in conformance with the installation procedures recommended by the manufacturer.

In addition, floor coverings (e.g., wood, tile, etc.) and other built-in features should be carefully selected with vapor transmission in mind and include proper preparation and installation in accordance with the manufacturer's recommendations.

Moisture-vapor intrusion may be further reduced at the slab level by use of consistent and low water cement ratios (ie. do not allow addition of water to concrete during the pour operations), proper finishing and curing (moist or wet cure for the first several days will reduce permittivity) and consider use of a hydrophobic additive such as Xypex or Hycrete that heal microcracks and seams and improve overall water resistance.

It should be emphasized that, even with proper moisture / water vapor installation, proper control of irrigation and landscape water adjacent to the structure is very important to minimize problems caused by moisture and water vapor intrusion and is the responsibility of the Property Manager / Owner, including the maintaining of proper site drainage as recommended hereinafter.

Planters and similar open to the ground adjacent to building areas is an invitation to moisture and other problems. These should be avoided. Concrete / paved surfaces should have clear positive drainage away from the building to an approved disposal / drain. Roof drains should include hard conveyance away from the proximity of the building.

Soil Expansion

The near surface site soils consist predominantly of sandy soils, and these soils are expected to exhibit very low soil to low expansion. During site grading, the soil expansion potential of the exposed soil blend should be verified by additional laboratory testing.

Soil Corrosion and Concrete Design

Based on the laboratory test results presented in Appendix C, sulfate exposure for concrete ranges from S0 to S1. It has been our experience that post-construction factors such as near surface soil wetting and drying cycles, and other changes with time can increase the concentrations of soluble sulfate and other derogatory salts and these conditions predispose them to being highly corrosive to both concrete and buried metals. Higher strength concrete with lower water / cement ratio will improve overall slab performance, durability, and water and corrosivity resistance.

In an abundance of caution and to account for potential future conditions, we recommend concrete in contact with soils be designed for a minimum compressive strength of 4,500 psi and maximum w:c = 0.45.

Laboratory tests to evaluate the potential soil corrosivity to metallic installations were performed as part of the Feasibility Study by SCG (Reference No. 2). Based on these preliminary results, the soils along with any transient waters flowing through them should be considered to be highly corrosive to metals in contact with them. Attention to minimizing galvanic / chemical corrosivity (i.e., protective coatings, dielectric couplings, eliminating mixing metal types in contact or in near vicinity to each other) where in contact with soil and soil moisture can minimize these effects. An experienced corrosion consultant should be retained and their recommendations incorporated into the design if special / critical corrosive issues exist or further corrosion potential study is warranted.

Retaining Walls

Lateral Earth Pressures

The earth pressure acting on retaining walls depends primarily on the allowable wall movement, type of backfill materials, backfill slopes, wall inclination, surcharges, and hydrostatic pressure.

The following lateral earth pressures are recommended for the design of vertical cantilevered retaining walls (active case) and restrained walls (at-rest case) with no hydrostatic pressure, level backfill conditions, and no surcharge loading.

Wall Condition	Backfill Type	Equivalent Fluid Pressure
Active (Cantilever)	Sandy soils	40 pcf
At Rest (Restrained)	Sandy soils	60 pcf-

These values are applicable for compacted sand backfill placed between the wall stem and an imaginary plane at 45 degrees from the edge of wall footing.

For design purposes, walls supporting dock height fill construction should be based on at-rest earth pressures. The surcharge effect of anticipated loads on the wall backfill (e.g. traffic, construction equipment, footings, etc.) should be included in the wall design. For walls free to deflect or restrained, 33 or 50 percent, respectively, of the maximum surcharge load located within a distance equal to the height of the wall

Backfill

Retaining wall backfill should consist of select backfill comprised of free-draining granular soils exhibiting an expansion index (EI) of 30 or less. The backfill should extend within a 45-degree plane from the wall footing.

Retaining wall backfill should be mechanically compacted to minimum 90 percent of the applicable laboratory maximum density (ASTM: D1557) and performed under the observation and testing of the Project Geotechnical Consultant.

No jetting, ponding, or flooding should be permitted. No backfill should be placed against concrete until minimum design strengths as determined by compression tests of cylinders are attained.

Retaining Wall Backdrainage

As a minimum, subdrainage system for retaining walls (excluding walls supporting dock height fill construction) should be included as part of retaining wall construction. Sub-drains should consist of 4-inch diameter, perforated Schedule 40, PVC pipe or equivalent, embedded in approximately 3 cubic feet per lineal foot of clean, ¾-inch crushed aggregate, or approved alternate. This permeable material should be enveloped in geofabric consisting of Mirafi 140 or equivalent. The pipe and trench bottom should be sloped at a gradient of 2± percent to a suitable discharge outlet. Sub drains placed behind retaining walls should be approved by the Project Geotechnical Consultant prior to backfill placement.

Should seepage be experienced through retaining walls from nuisance water (e.g., irrigation, precipitation), staining and mineral development may result and necessitate periodic maintenance / cleaning. Note that efflorescence should not be confused with permeating water effects; some efflorescence is to be expected and is considered normal.

Concrete Flatwork

Exterior Flatwork

The concrete slab design and construction details should be established by the Project Design Engineer. From a geotechnical standpoint, the minimum criteria for exterior flatwork should consider low soil expansion potential and should be in accordance with the requirements of the project structural engineer and specialty contractor / consultant. Exterior hardscape / pavement construction in areas to receive substantial new fills to achieve planned grade elevations are expected to exhibit post construction total and differential movement due to surcharge fill loading on the underlying native soils and this may occur over several months or more. Depending on the magnitude / severity of post construction movement, it may be necessary to perform periodic repairs and/or relevelling / replacement of affected hardscape. Sidewalks and walkways should be 4 inches thick (minimum) and may be placed directly on the approved compacted subgrade. To control cracking, the slab should include joints at approximately 10 feet spacing (maximum). The slab design and construction details should be established by the Project Design Engineer.

Slab Sub-Grade Pre-Saturation

Prior to concrete placement, the prepared soil sub-grade should be moisture conditioned to and maintained at about 1 to 3 percentage points wet of optimum moisture contents to a depth of 12 inches and exhibit at least 90 percent relative compaction as determined by ASTM: D1557.

Asphalt Concrete Pavement Design

For preliminary design purposes, the following asphalt concrete pavement sections are recommended for the automobile parking lot and access drive areas. These sections were computed using Caltrans Highway Design Manual method, based on the assumed Traffic Indices shown below and an assumed R-Value of 20 for the resulting blend of site soils compacted as sub-grade.

Pavement Utilization	Traffic Index	Asphaltic Concrete (in.)	Aggregate Base (in.)
Parking Areas	5.0	4”	6”
Access Drives	8.0	6”	12”

The applicability of assumed traffic indices should be verified by the Project Civil Engineer. Aggregate base should consist of crushed base (CAB or CMB) as specified in the Standard Specifications for Public Works Construction (Green Book) and be compacted to 95 percent of the maximum laboratory density determined in accordance with ASTM: D1557.

The soil sub-grade to a depth of 5 feet should be compacted to minimum 90 percent relative compaction in accordance with the recommendations under “Site Grading”. The surface of the subgrade soil supporting basecourse should be compacted to at least 95% relative compaction and exhibit a firm and unyielding surface immediately prior to placement of base material, in addition to the recommended minimum compaction. Final compaction and testing of pavement sub-grade should be performed just prior to placement of aggregate base, so that the subgrade does not deteriorate for whatever reason in the interim..

The pavement sections shown above should be considered tentative and should be verified by R-value testing of sub-grade soils at the completion of grading. Further analysis and evaluation are necessary, if the design traffic index and the sub-grade R-value are different from those used in our analyses.

Should pavement construction be performed in stages, with the initial course section to be followed by asphalt cap layer after completion of on-site construction, it should be noted that some repairs / replacement of pavement should be anticipated, particularly in areas of concentrated construction traffic and along junctions prone to water seepage to the underlying pavement subgrade soils (e.g., pavement edges adjacent to curb / gutter construction).

Concrete Pavement Design

Concrete pavement design was based on review / comparison of the following methodologies with consideration for assumed truck frequencies at the subject property.

For the PCA Simplified Design Procedure, the following parameters were considered: Axle Load Category of 2 assigned to collector streets, rural and secondary roads (relatively high axle loads for this category) and arterial streets and primary roads (relatively low axle loads for this category), respective maximum single and tandem axle load distributions of 26 kips and 44 kips, low subgrade soil support, pavements with doweled joints for load transfer, supported edges (curbs, gutters or widened lane), and a concrete Modulus of Rupture (MR) of 650 psi.

For the ACI Guideline Document - “Guide for the Design and Construction of Concrete Site Paving for Industrial and Trucking Facilities” (ACI330.2R-17), considerations were given to a Modulus of Subgrade Reaction of 150 pci, a concrete Modulus of Rupture (MR) of 650 psi, supported pavement edges, dowels in construction joints, and axle load distributions representative for major arterial over-the-road truck category.

For both methods, two-axle four tire trucks are excluded, and concrete pavement section considerations assume appropriate construction/ contraction joint spacings and joint sealing, and minimum design service period of 20 years.

Concrete Pavement Section

Based on the above considerations, the following concrete pavement sections are recommended:

Trucks Per Day (*)	Concrete Pavement Thickness (**)
50	6 inches
100	7 inches

(*) For axle load distributions representative for over-the-road truck category major arterial per day design lane.

(**) Minimum concrete compressive strength of 4,500 psi with maximum water cement ratio of 0.45 and Concrete Modulus of rupture of 650 psi.

The Project Civil / Structural Engineer should establish structural details of the pavement, such as concrete mix design, reinforcing, longitudinal and contraction joints, load transfer devices, etc. As a minimum the longitudinal and contraction joints should be based on PCA and ACI guidelines.

The above Portland Cement Concrete pavement sections are a minimum. More restrictive criteria based on civil / structural design and jurisdictional requirements shall govern.

Pavement Subgrade

The subgrade soils beyond the limits of in-situ ground improvment should be over-excavated to a depth of at least 5 feet and recompacted to minimum 90 percent relative compaction at approximately 1-3 percentage points above optimum moisture content (ASTM: D1557). The uppermost one foot of the pavement subgrade should be compacted to at least 95 percent relative compaction and exhibit firm and unyielding condition prior to placement of base material.

Subbase Considerations

The pavement subgrade soils are expected to be comprised of a blend of the near surface soils at the completion of remedial grading operations. The use of a subbase directly beneath concrete pavement construction can improve load transfer across the joints and mitigate potential for soil erosion and pumping along the joints where the soil subgrade blend may include more than 15 percent fines passing the No. 200 sieve size. Upon request, recommendations for incorporating a subbase layer beneath concrete pavement construction can be provided.

Joint Spacings and Dowels

Longitudinal and contraction joints should be based on ACI / PCA guidelines. Concrete pavement crack control joints should be spaced at a minimum of 10 feet (5 feet preferred, and not exceeding 14 feet) on center with dowels incorporated along contraction joints or other load transfer mechanisms, or as specified by the Project Civil / Structural Engineer and should include additional joints to facilitate irregular pavement boundary conditions. From a performance standpoint, closer spacing and strategic location of control joints at returns, corners, and other areas that focus stress should be considered.

Where movement is expected in a construction or control joint, and both sides are restrained, a combination of waterstop (where transmission of water through the joint is to be avoided) and doweling may be used. Dowels installed across construction joints may consist of 1.5-inches diameter, epoxy-coated smooth dowels, 18 inches in length, placed mid-height of slab and so the dowel is centered across the joint, and spaced at 12 inches on center where joint is new to new.The dowel should be greased to limit bonding so slip may occur. In the case where movement is expected, but joining existing to new, the dowels should be placed similarly, but embedded and epoxied accordingly into the existing work, and the unbonded end that will extend into the new work greased with commercial waterproof grease.

Waterstops for control joints accommodating movement should preferably consist of the “hard” plastic type that have a crude dumbbell or similar shape and a center bulb that can accommodate the anticipated range of motion. The details of installation are highly dependent on the nature and expectations of the joint. We would be happy to provide additional input and recommendations to address particular conditions.

Where the control joint is to be restrained, such as in concrete pavement, doweling may consist of #5 or larger bar placed at slab mid height following the above criteria (18” overall dowel length, centered over joint, spaced 12” on center. Where joining new to new, the deformations of the rebar should provide adequate “bite;” where joining existing to new, the new rebar should be placed into an appropriately sized and cleaned out hole drilled into the existing work, and the dowel half embedded in the hole by epoxy.

Where control joints in concrete pavement occur where standing water or flowlines are associated (such as where pavement section joins a gutter, intake basin or similar), a waterstop incorporated into the joint should be considered to limit influx of waters into the subgrade. Consideration to thicken the edges of the slab on either side of the joint should be given where a higher degree of performance is expected.

Alternatively, the design may be per Civil / Structural Engineer design.

Factoring Site-Specific Considerations

Site specific factors such as expansive soils, variability, mediocre drainage, and related factors need to be considered. Should anticipated truck frequency and / or maximum truck axle loading conditions be different from the above assumed considerations, our office should be contacted for further evaluation and recommendations, as appropriate.

Curb / gutters should be monolithic to the extent feasible. Pavement edges in the proximity of open ground or similar may benefit from a thickened edge.

Special Note - Finishing and Curing of Concrete

Of critical importance to the long-term / lifelong behavior and performance of concrete is how it is place, finished, and preliminarily cured. Detailed studies by the Bureau of Reclamation have shown that low water-to-cement ratio, high strength concrete – such as is recommended herein – has inherently much lower shrinkage and much higher water tightness than the mediocre concrete originally specified when properly placed and finished. For this reason, water should not be added to the mix for any reason. If a stiff mix is an issue – fluidizer and similar admixtures should be considered – to be based on join recommendations of the Project Geotechnical and Structural engineering consultants.

The Bureau's studies also showed that both early and overall strength is greatly improved and issues with cracking, crazing, and surface abrasion resistance are also improved where properly placed and finished concrete is allowed to wet or moist cure for at least 5 to 7 days. Crack control joints should be performed at the proper time and using proper methods / materials. These recommendations are considered paramount to long-term performance. Structural Review

The above recommended concrete pavement recommendations are a minimum. The structural design (e.g., concrete mix design, reinforcing, longitudinal and contraction joints, load transfer devices, etc.) by the project Civil / Structural Engineer, where more restrictive, shall govern.

Utility Trench Backfill

- Bedding material should consist of sandy material exhibiting a Sand Equivalent (S.E.) value of 30 or greater and should comply with the requirements of the controlling governing jurisdiction.
- The site soils are considered suitable for trench backfill, provided they are free of organic material and rocks over 4 inches in maximum dimension.
- To reduce potential water migration into building sub-grade through the granular bedding / shading layer and trench backfill, utility trenches should be backfilled with the onsite finer grained materials or sand-cement slurry for minimum 3 feet length at their entry points.
- Backfill of all exterior and interior trenches should be placed in thin lifts not exceeding 4 inches and mechanically compacted to achieve a relative compaction of not less than 90% based on ASTM: D1557. Care should be taken not to damage utility lines.
- Utility trenches should not be located within the influence of footings. This is defined as a zone located below the footing and a line sloping at an inclination of 1:1 (horizontal to vertical) outward from the outside edge of footings. If utility lines are located within the zone of footings, the backfill should be compacted to a minimum 95 percent relative compaction or slurry backfilled (minimum 1-1/2 sack cement - sand mix).
- Trenches greater than 4 feet in depth should be shored or sloped back as required by the local regulatory agency, the State of California Division of Industrial Safety Construction Safety Orders, and Federal OSHA requirements.

As described in the Groundwater section of this report, the site includes shallow groundwater conditions. Where trench excavations come close to or intersect the water table, the groundwater may react adversely. These effects may include bottom quickening / heaving, sidewall raveling, sloughing and calving, and decrease in sidewall stability. Where trenching will be below 5-feet, special means and methods may be required to address and stabilize the situation. This office should be consulted for specific recommendations and support where this may occur.

Site Drainage

Of all the post-construction maintenance items – attention to site drainage is the most important. Nuisance water is the cause of most potential problems.

The Client, Landscape Architect, and Property Manager should be aware of the potential problems that may develop when drainage is altered through construction of retaining walls, paved walkways, and patios. Conditions which will lead to ground saturation must be avoided.

- All roof and surface drainage should be directed away from structures and their appurtenances and slopes to approved drainage facilities. Ponding of water should be avoided. Per the 2019 CBC, a minimum gradient of 5 percent away from structures should be maintained for graded soil areas to a distance of 10 feet or to approved drainage swales.
- The recommended drainage patterns should be established at the time of fine grading and maintained throughout the life of the structure or, if altered, should be replaced with properly designed area drain system.
- Irrigation activities at the site should be monitored and controlled to prevent over watering. Planter and lawn areas adjacent to structures should be avoided. If utilized, these should include measures to contain irrigation water and prevent moisture migration into the walls and under foundations and slabs-on-grade.
- Plants with aggressive roots should be avoided. Trees should be planted in designated tree wells that limit lateral and promote deeper root movement.
- Planters should be well drained. Root barriers should be considered to limit invasive roots from getting out and under the surrounding pavement. The incorporation of "Bio Barrier" fabric in root barriers is specifically recommended. Bio Barrier includes a hormone chemical that keeps roots away without harming the plants.
- The selection of plant palettes should be based on that which is suitable for the area and be drought tolerant. For any planned bio-swales or bio-basins, specific plant palettes may be required to address particular conditions. Our office should be consulted to provide such guidance as may be required.
- It is imperative that all new construction maintain positive drainage to suitable discharge facilities. Adequate area drainage systems should be installed in planter areas and within flatwork areas, as required.

Landscape, Irrigation, and Maintenance

General guidelines for landscape, irrigation and maintenance are shown below:

- Landscape planting should consist of appropriate drought resistant vegetation as recommended by the Landscape Architect. Landscaping of slopes should be completed as soon as possible and properly maintained;

- The property owner is responsible for proper irrigation and for maintenance and repair of installed irrigation systems. Leaks should be repaired immediately. Sprinklers should be adjusted to provide maximum coverage with a minimum of water usage and overlap. Over-watering with consequent excessive runoff and ground saturation must be avoided;
- If automatic sprinkler systems are installed, their use should be adjusted to account for natural rainfall conditions;
- All interceptor ditches, drainage terraces, down-drains, and any other drainage devices that have been installed must be maintained and cleaned;
- If rodent activity is present, the property owner should undertake a program for the elimination of burrowing animals. This should be an ongoing program in order to promote stability; and
- Water should be directed away from constructed slopes faces. This may require the construction of berms or ditches along the top of slopes, if such devices are not in place.

Plan Review, Observations and Testing

During the design and precise grading phases, the final Precise Grading and Foundation Plans, including the design details of planned structures (e.g., location, configuration, design loads, etc.) should be provided to the Project Geotechnical Engineer to verify the applicability of the recommendations provided above and to develop additional and/or revised recommendations, as appropriate.

Precise grading, including foundation and on-site construction should be performed under the observation, documentation, and testing by the Project Geotechnical Consultant. To document actual conditions encountered, work performed, and any in-field modifications / adjustments, an As-Graded report should be prepared upon the completion of work.

CLOSURE

Our evaluation and preparation of this report are based on our experience and our knowledge of the site and were obtained in accordance with currently accepted professional engineering principles and practice in the field of geologic and geotechnical engineering and reflect our best professional judgment. We make no other warranty, either express or implied. This report is subject to supplementation and revision as new information becomes available and the designs are refined. This report is also subject to the review of the controlling jurisdiction and any comments / responses become a part hereto and the project specifications.

The recommendations provided by this firm are made on the assumption that we will be retained to perform the geotechnical onsite observation, testing and support associated with the proposed work. If another geotechnical firm is used, these and any other applicable recommendations developed by this firm are considered void. G3SoilWorks is not responsible for any implementation of recommendations or grading / construction that it did not have an adequate opportunity to observe, test, comment on, and document. Similarly, should unanticipated conditions be encountered or alterations to the current design be made, this office should be given the opportunity and retainage to evaluate and provide revisions / updates as warranted.

We appreciate the opportunity of being of service to you on this project. Should you have any questions or need additional information, please contact the undersigned.

Sincerely,

G3SoilWorks, Inc.

By: ______________________
Daniel J. Morikawa, P.E., G.E.
Director of Engineering

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. MORIKAWA
GE 2726
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STATE OF CALIFORNIA

By: ______________________
Steve E. Strickler, P.E., G.E.
CEO / Principal Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
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By: ______________________
Erik C. Haaker, P.G., C.E.G.
Senior Engineering Geologist

CERTIFIED ENGINEERING GEOLOGIST
ERIK C. HAAKER
No. 2708
EXP. 2/28/23
STATE OF CALIFORNIA

Attachments: List of Selected References

Figure 1 – Site Location Map
Figure 2 – Boring / CPT Location & Groundwater Map
Figure 3 – Geologic Map
Figure 4 – Fault Activity Map

Appendix A – Geotechnical Boring Logs
Appendix B – CPT Results
Appendix C – Laboratory Test Procedures and Results
Appendix D – Reference No. 2 Excerpts
Appendix E – Reference No. 3 Excerpts
Appendix F – Well Permitting Documents
Appendix G – As-Built Well Diagrams
Appendix H – ASCE 7-16 Seismic Design Criteria
Appendix I – Liquefaction Analyses

LIST OF SELECTED REFERENCES

1. PBLA Engineering, Inc., Concept Grading Plan – Buildings 1 & 2, Goodman Commerce Center – Cypress, WO 128-7, Sheet 1 of 2, Dated August 3, 2021.

2. Southern California Geotechnical, Geotechnical Feasibility Study, Proposed Commercial / Industrial Development, 5665 and 5757 Plaza Drive, Cypress, California for Goodman, dated June 7, 2021, Project No. 21G150-1R.

3. Southern California Geotechnical, Geotechnical Investigation, Proposed Commercial / Industrial Development, 5757 Plaza Drive, Cypress, California for Goodman, dated September 29, 2021, Project No. 21G201-2.

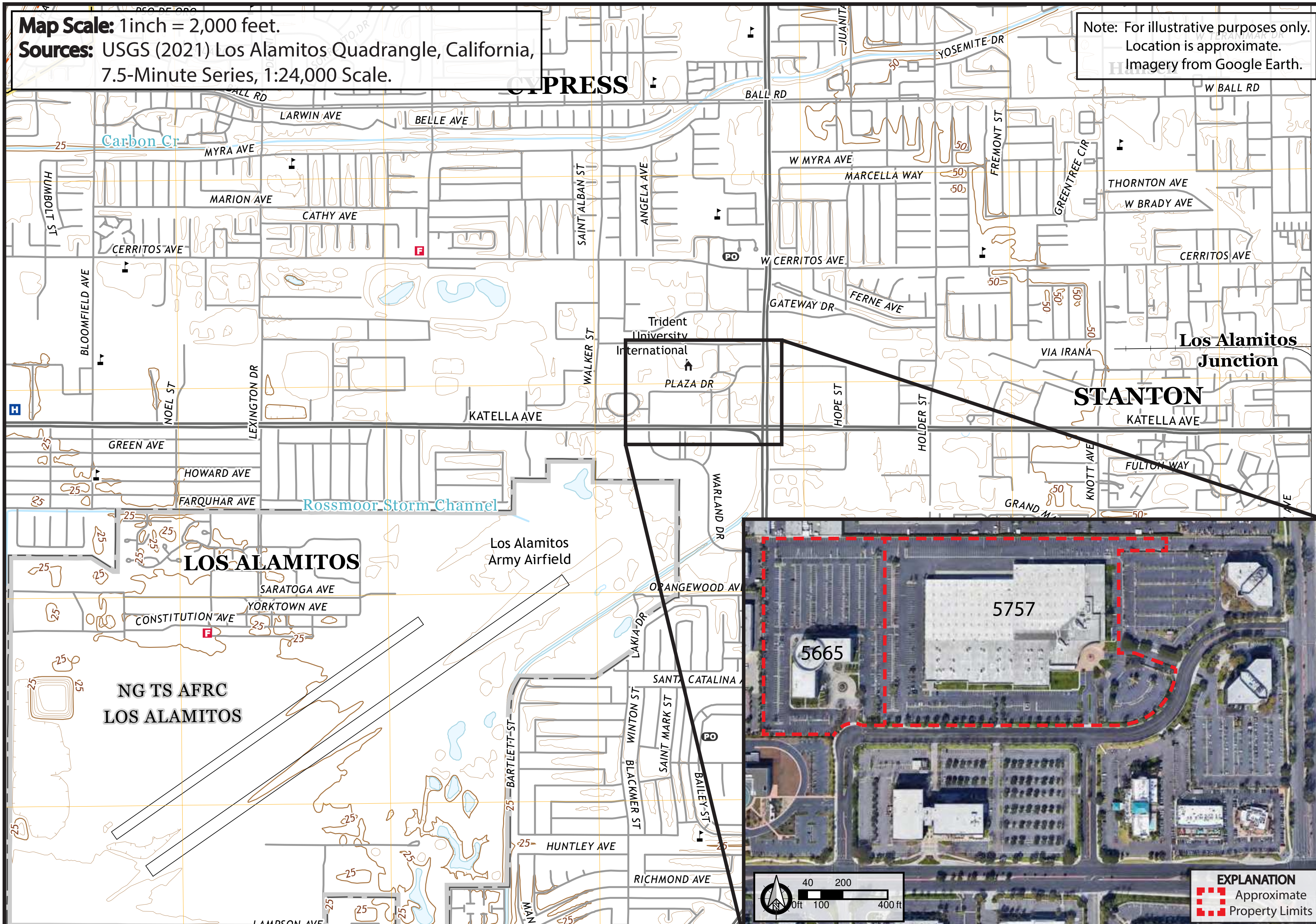
4. Barrows, A.G., 1970, A Review of the Geology and Earthquake History of the Newport-Inglewood Structural Zone, Southern California, California Division of Mines and Geology Special Report 114.

5. Trifunac, M.D., 2003, Nonlinear soil response as a natural passive isolation mechanism> Paper II. The 1933, Long Beach, California earthquake. Soil Dynamics and Earthquake Engineering 23, 549-562.

6. ARCADIS, "Second Quarter 2014 – Annual Status Report Submittal", 5100 Katella Avenue, Los Alamitos, Orange County, California, dated August 12, 2014.

7. California Division of Mines and Geology, Seismic Hazard Zone Report for the Los Alamitos 7.5-minute Quadrangle, Los Angeles County and Orange County, California", Seismic Hazard Zone Report 019, 1998.

8. California Emergency Management Agency, et al., Tsunami inundation Map for Emergency Planning, Los Alamitos Quadrangle, State of California, Orange County, dated March 15, 2009.



Site Location Map	Project No. 1-1209	May 2022
5665 and 5757 Plaza Drive	Cypress, CA	Figure 1

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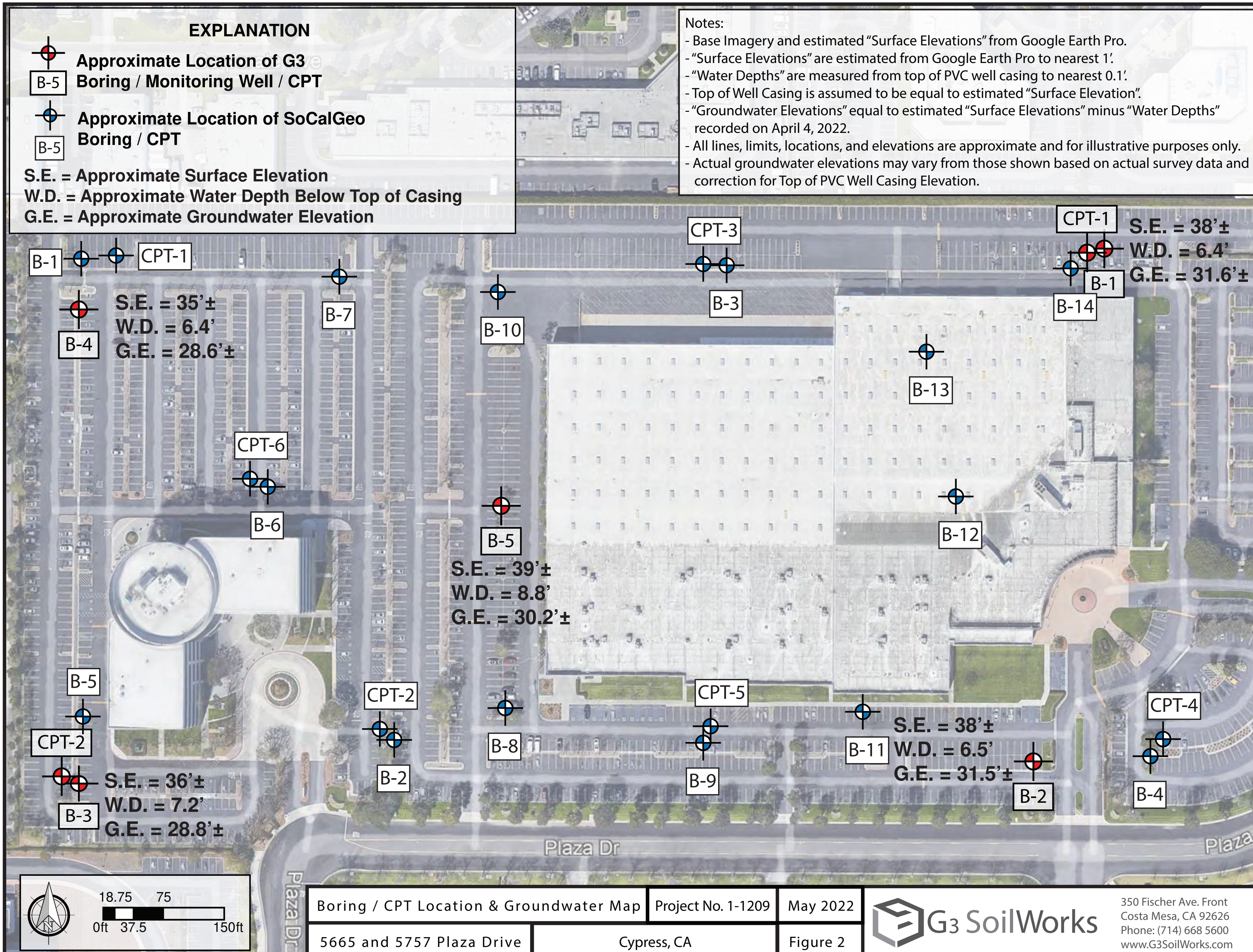

Boring / CPT Location & Groundwater Map	Project No. 1-1209	May 2022	G3 SoilWorks
5665 and 5757 Plaza Drive	Cypress, CA	Figure 2	

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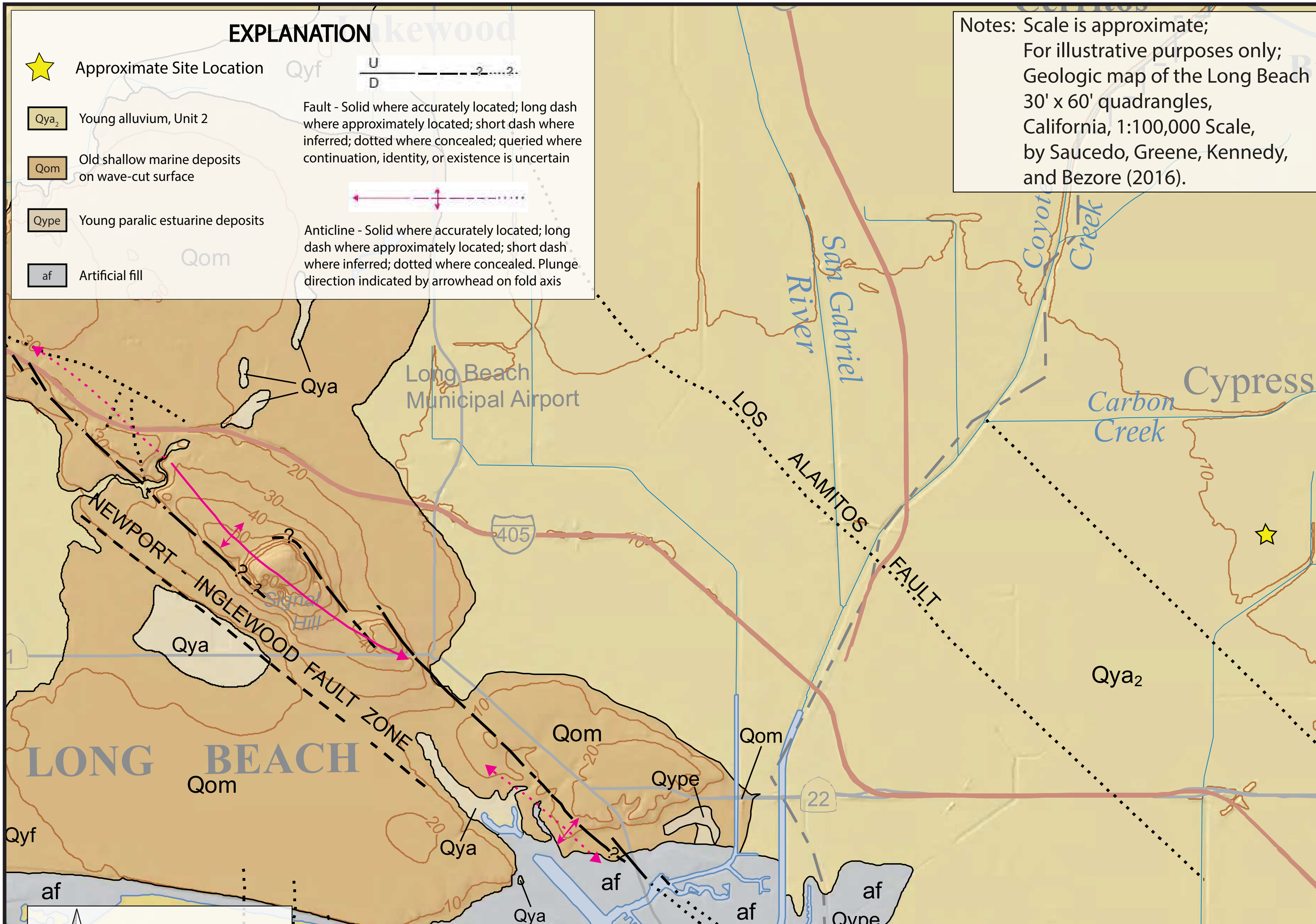

Geologic Map	Project No. 1-1209	May 2022
5665 and 5757 Plaza Drive	Cypress, CA	Figure 3

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Fault Activity Map	Project No. 1-1209	May 2022	G3 SoilWorks 350 Fischer Ave. Front Costa Mesa, CA 92626 Phone: (714) 668 5600 www.G3SoilWorks.com
5665 and 5757 Plaza Drive	Cypress, CA	Figure 4	

APPENDIX A

GEOTECHNICAL BORING LOGS

GEOTECHNICAL BORING LOG

PROJECT NO.	1-1209	PROJECT NAME	Goodman		
DATE STARTED	1/4/22	GROUND ELEV.(FT)	38'	BORING DESIG.	B-1
DATE FINISHED	1/4/22	GW DEPTH (FT)	7.0	LOGGED BY	G3
DRILLER	M&R Drilling	DRIVE WT.	140 lb.	NOTE	
TYPE OF DRILL RIG	8" hollow-stem CME-55	DROP	30"		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	OTHER TESTS
				SM/ML	@ 0-3": Asphalt Pavement @3"- 5": Crush Miscellaneous Base (CMB) **Artificial Fill (af)** @ 6": Silty SAND / Sandy SILT, dark gray, moist, medium dense to dense, fine-grained, some mica.			
5		R	27	SM	**Quaternary Alluvium (Qal)** @5': Silty SAND, grayish brown, very moist, medium dense, fine-grained, some mica.	24.7	91.1	
10		R	26	SM	@ 10': Silty SAND, dark gray to grayish brown, moist to very moist, medium dense, fine-grained, some mica.	23.5	103.3	
15		R	16	CL/ML	@ 15': Silty CLAY / Clayey SILT, dark gray, very moist, stiff, low apparent plasticity, calcereous.	30.9	89.0	
20		R	25	SM	@ 20': Silty SAND, light brown, very moist, medium dense, some mica.	23.9	101.3	
25		R	26	SM	@ 25': Silty SAND, grayish brown, wet, medium dense.	24.8		
30		R	16	ML	@ 30': Clayey SILT with sand, grayish brown, moist to very moist, stiff, low apparent plasticity, contains caliche, some mica.	27.6	97.1	

Notes:
Total Depth = 31.5';
Groundwater encountered at 7';
Installed 2" diameter PVC Monitoring Well;
Refer to Detail A for As-Built Well Diagram.

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE

Water Seepage
Groundwater
DS - Direct Shear
GS - Grain Size Analysis
EI - Expansion Index
CONS - Consolidation

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GEOTECHNICAL BORING LOG

PROJECT NO.	1-1209	PROJECT NAME	Goodman		
DATE STARTED	1/4/22	GROUND ELEV.(FT)	38'	BORING DESIG.	B-2
DATE FINISHED	1/4/22	GW DEPTH (FT)	8.0	LOGGED BY	G3
DRILLER	M&R Drilling	DRIVE WT.	140 lb.	NOTE	
TYPE OF DRILL RIG	8" hollow-stem CME-55	DROP	30"		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	OTHER TESTS
					@ 0 to 3": Asphalt Pavement @ 3 to 5": Crush Miscellaneous Base (CMB)			
		BULK		SM	**Artificial Fill (af)** @ 5"-5': Sandy SILT, dark grayish brown, moist, very low apparent plasticity, predominantly fine-grained, micaceous.			
5		R	23	SM	**Quaternary Alluvium (Qal)** @ 5': Silty SAND, grayish brown, moist, medium dense, some mica.	23.0	99.4	
10		R	10	ML	@ 10': Silty SAND, dark gray, wet, loose, very fine-grained, micaceous.	27.9	93.4	
15		R	15	CL	@ 15': Silty CLAY with Sand, dark grayish brown, wet, stiff, low apparent plastisity, sparse coarse sand.	36.8	87.1	
20		R	28	ML	@ 20': Sandy SILT with trace clay, olive brown, wet, very stiff, low to very low apparent plasticity, micaceous.	37.7	85.7	
25			20		@ 25': No sample recovered.			
		R	17	ML	@ 27': Clayey SILT with sand, gray, wet, stiff, some mica.	27.2		
30		R	33	ML	@ 30': Clayey SILT with Sand, dark grayish brown, wet, very stiff, low to medium apparent plasticity, calcareous.			
					Notes: Total Depth = 31.5'; Groundwater encountered at 7.5'; Installed 2" diameter PVC Monitoring Well; Refer to Detail B for As-Built Well Diagram.			

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE

▽ Water Seepage
▼ Groundwater
DS - Direct Shear
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PN: 1-1209
REPORT DATE:

GEOTECHNICAL BORING LOG

PROJECT NO.	1-1209	PROJECT NAME	Goodman		
DATE STARTED	1/3/22	GROUND ELEV.(FT)	36'	BORING DESIG.	B-3
DATE FINISHED	1/3/22	GW DEPTH (FT)	7.5	LOGGED BY	G3
DRILLER	M&R Drilling	DRIVE WT.	140 lb.	NOTE	
TYPE OF DRILL RIG	8" hollow-stem CME-55	DROP	30"		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	OTHER TESTS
					@ 0 to3": Asphalt Pavement @ 3 to 5": Crushed Miscellenious Base (CMB) **Artificial Fill (af)**			
		B		SM/ML	@2.5': Silty SAND / Sandy SILT, brown, slightly moist to moist, contains some gravel.	11.0		
5		B		SP	**Quaternary Alluvium (Qal)** @5': Poorly-Graded SAND, gray, slightly moist, fine- to medium-grained.	3.3		
		R	6	SM	@ 7.5': Silty SAND, olive gray, wet, very loose to loose, fine-grained.	26.4		
10		R	7	SM	@10': Silty SAND, dark grayish brown, wet, medium dense.	21.4	98.4	
		SPT	4	CL	@ 12.5': Silty CLAY, dark gray, very moist, soft to firm, sparse mica.	26.1		
15		R	7	ML	@15': Sandy SILT w/ Clay, dark grayish brown, moist, firm, low apparent plasticity, sparse mica.	23.3	99.1	
		SPT	2	ML/SM	@17,5': Sandy SILT / Silty SAND with Clay, light olive brown, very moist, very loose, predominantly fine-grained, sparse mica.	26.7		
20		R	15	SM/ML	@ 20': Silty SAND / Sandy SILT, light olive brown, moist, loose to medium dense, fine-grained, sparse mica.	21.2	102.5	
		SPT	6	ML	@ 22.5': Sandy SILT, olive brown, wet, firm, fine-grained, highly micaceous.	30.2		
25		R	9	ML	@ 25': Sandy SILT, dark gray, wet, firm, very low plasticity, highly micaceous.	31.4	91.2	
		SPT	1	ML	@ 27.5': Clayey SILT, dark gray, very moist, very soft, low apparent plasticity, some mica.	26.4		
30		R	9	ML	@30': Clayey SILT, dark gray, moist, firm, low apparent plasticity..	24.7	98.6	
		SPT	5	CL	@32.5': Silty CLAY with sand, grayish brown, wet, soft, low apparent plasticity, trace mica.	37.0		
35		R	24	SP	@35': Poorly-Graded SAND, gray to light gray, wet, medium dense, fine- to medium-grained, some mica.	17.1	105.2	
		SPT	8	SP	@ 37.5': Poorly-Graded SAND, light gray to gray, wet, loose, predominantly fine-grained with some coarse sand.	27.6		

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE

Water Seepage
Groundwater
DS - Direct Shear
GS - Grain Size Analysis
EI - Expansion Index
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GEOTECHNICAL BORING LOG

PROJECT NO.	1-1209	PROJECT NAME	Goodman		
DATE STARTED	1/3/22	GROUND ELEV.(FT)	36'	BORING DESIG.	B-3
DATE FINISHED	1/3/22	GW DEPTH (FT)	7.5	LOGGED BY	G3
DRILLER	M&R Drilling	DRIVE WT.	140 lb.	NOTE	
TYPE OF DRILL RIG	8" hollow-stem CME-55	DROP	30"		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY DENSITY (pcf)	OTHER TESTS
		R	7		@ 40': No sample recovery.			
		SPT	17	SM	@ 42.5': Silty SAND, dark grayish brown, medium dense, micaceous.	24.2		
45		R	25	SM/ML	@ 45': Silty SAND / Sandy SILT, dark gray, wet, medium dense, non-plastic, fine-grained, highly micaceous.	21.5	102.1	
		*SPT	15	ML	@47.5': Sandy SILT with Clay, dark gray, wet, medium dense, low apparent plasticity.	23.0		
50		R	23	ML	@50': Silty SAND, dark gray, wet, medium dense, predominantly fine-grained, micaceous.	23.8	99.4	

Notes:
Total Depth = 51.5';
Groundwater encountered at: 7.5';
Installed 2" diameter PVC Monitoring Well;
Refer to Detail C for As-Built Well Diagram.

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE

Water Seepage
Groundwater
DS - Direct Shear
GS - Grain Size Analysis
EI - Expansion Index
CONS - Consolidation

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GEOTECHNICAL BORING LOG

PROJECT NO.	1-1209	PROJECT NAME	Goodman		
DATE STARTED	1/3/22	GROUND ELEV.(FT)	35'	BORING DESIG.	B-4
DATE FINISHED	1/3/22	GW DEPTH (FT)	7.0	LOGGED BY	G3
DRILLER	M&R Drilling	DRIVE WT.	140 lb.	NOTE	
TYPE OF DRILL RIG	8" hollow-stem CME-55	DROP	30"		

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY DENSITY (pcf)	OTHER TESTS
					@ 0 to 3": Asphalt Pavement @ 3" to 5": Crush Miscellaneous Base (CMB)			
		B		SM	**Artificial Fill (af)** @ 2.5': Silty SAND with gravel, dark grayish brown.			
5		R	11	SM	**Quaternary Alluvium (Qal)** @ 5': Silty SAND; grayish brown, moist to very moist, loose, predominantly fine-grained, some mica.	23.5	95.1	
10		R	24	SM	@ 10': Silty SAND, dark gray, very moist to wet, medium dense, micaceous.	29.0	96.9	
15		R	10	ML	@ 15': Clayey SILT with Sand, dark gray, moist to very moist, firm, low apparent plasticity, sparse mica.	27.1	98.6	
20		R	21	SM	@20': Silty SAND, dark grayish brown, moist to very moist, medium dense, predominantly fine-grained.	20.0	108.3	
25		R	17	SM	@25': Silty SAND, dark grayish brown, wet, medium dense, predominantly fine-grained.	24.7	97.4	
30		SPT	30		@ 30': No sample recovered.			

Notes:
Total Depth = 31.5';
Groundwater encountered at 7';
Installed 2" diameter PVC Monitoring Well;
Refer to Detail B for As-Built Well Diagram.

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE

Water Seepage
Groundwater
DS - Direct Shear
GS - Grain Size Analysis
EI - Expansion Index
CONS - Consolidation

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GEOTECHNICAL BORING LOG

PROJECT NO. 1-1209
DATE STARTED 1/4/22
DATE FINISHED 1/4/22
DRILLER M&R Drilling
TYPE OF DRILL RIG 8" hollow-stem CME-55

PROJECT NAME Goodman
GROUND ELEV.(FT) 40'
GW DEPTH (FT) 8.0
DRIVE WT. 140 lb.
DROP 30"

BORING DESIG. B-5
LOGGED BY G3
NOTE

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	OTHER TESTS
					@ 0 to 3": Asphalt Pavement @ 3" to 5": Crushed Miscellaneous Base (CMB)			
		BULK		SM	**Artificial Fill (af)** @ 0.5-5': Sandy SILT, dark grayish brown, moist, predominantly fine-grained.			
5		R	36	ML	**Quaternary Alluvium (Qal)** @ 5': Silty SAND / Sandy SILT w/ Clay, light brown, moist, medium dense / very stiff, apprently very low plasticity / non-plastic, predominantly fine-grained, micaceous.	14.3	102.5	
10		R	44	SM	@ 10': Silty SAND, light grayish brown, moist, medium dense, micaceous.	20.6	104.6	
15		R	16	CL	@15': Silty CLAY with Sand, dark brown, moist to very moist, stiff, some mica, calcareous.	30.5	96.4	
20		R	23	SM	@20': Silty SAND, grayish brown, wet, medium dense, some mica.	20.2	104.1	
25		R	35	ML	@25': Sandy SILT w/ Clay, dark gray, wet, very stiff, low apparent plasticity, micaceous.	30.4	96.6	
30		R	30	CL	@30': Silty CLAY, dark gray, moist, very stiff, low apparent plasticity.	28.9	97.4	
					Notes: Total Depth = 31.5'; Groundwater encountered at 8'; Installed 2" diameter PVC Monitoring Well; Refer to Detail A for As-Built Well Diagram.			

SAMPLE TYPES:
R RING (DRIVE) SAMPLE
S SPT (SPLIT SPOON) SAMPLE
B BULK SAMPLE

Water Seepage
Groundwater
DS - Direct Shear
GS - Grain Size Analysis
EI - Expansion Index
CONS - Consolidation

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APPENDIX B

CPT RESULTS

SUMMARY

OF

CONE PENETRATION TEST DATA

Project:

5665 & 5757 Plaza Drive
Cypress, CA
December 13, 2021

Prepared for:

Ms. Dana Mariscal
G3SoilWorks, Inc.
350 Fischer Avenue, Front Unit
Costa Mesa, CA 92626
Office (714) 668-5600 / Fax (714) 754-0198

Prepared by:

KTE

KEHOE TESTING & ENGINEERING
5415 Industrial Drive
Huntington Beach, CA 92649-1518
Office (714) 901-7270 / Fax (714) 901-7289
www.kehoetesting.com

TABLE OF CONTENTS

SUMMARY
OF
CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the project located at 5665 & 5757 Plaza Drive in Cypress, California. The work was performed by Kehoe Testing & Engineering (KTE) on December 13, 2021. The scope of work was performed as directed by G3SoilWorks, Inc. personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at two locations to determine the soil lithology. A summary is provided in **TABLE 2.1**.

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
CPT-1	50	
CPT-2	50	

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

The CPT soundings were carried out by **KTE** using an integrated electronic cone system manufactured by Vertek. The CPT soundings were performed in accordance with ASTM standards (D5778). The cone penetrometers were pushed using a 30-ton CPT rig. The cone used during the program was a 15 cm^2 cone with a cone net area ratio of 0.83. The following parameters were recorded at approximately 2.5 cm depth intervals:

- Cone Resistance (qc)
- Sleeve Friction (fs)
- Dynamic Pore Pressure (u)
- Inclination
- Penetration Speed

The above parameters were recorded and viewed in real time using a laptop computer. Data is stored at the KTE office for up to 2 years for future analysis and reference. A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

4. CONE PENETRATION TEST DATA & INTERPRETATION

The Cone Penetration Test data is presented in graphical form in the attached Appendix. These plots were generated using the CPeT-IT program. Penetration depths are referenced to ground surface. The soil behavior type on the CPT plots is derived from the attached CPT SBT plot (Robertson, “Interpretation of Cone Penetration Test…”, 2009) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (qc), sleeve friction (fs), and penetration pore pressure (u). The friction ratio (Rf), which is sleeve friction divided by cone resistance, is a calculated parameter that is used along with cone resistance to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone resistance and generate excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little (or negative) excess pore water pressures.

The CPT data files have also been provided. These files can be imported in CPeT-IT (software by GeoLogismiki) and other programs to calculate various geotechnical parameters.

It should be noted that it is not always possible to clearly identify a soil type based on qc, fs and u. In these situations, experience, judgement and an assessment of the pore pressure data should be used to infer the soil behavior type.

If you have any questions regarding this information, please do not hesitate to call our office at (714) 901-7270.

Sincerely,

KEHOE TESTING & ENGINEERING

Steven P. Kehoe
President

12/15/21-kk-3657

APPENDIX

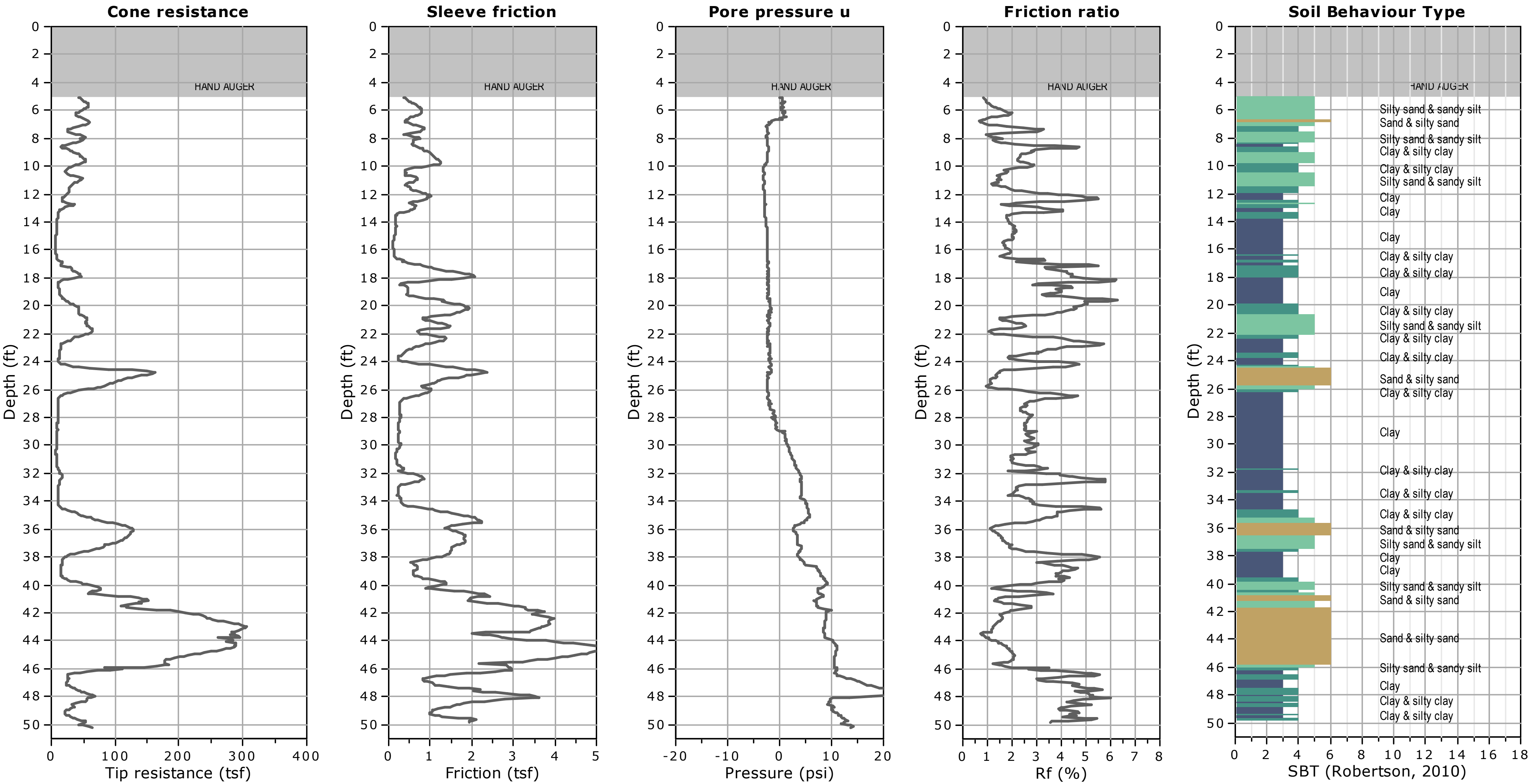
Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: G3SoilWorks

Location: 5665 & 5757 Plaza Dr, Cypress, CA

CPT-1

Total depth: 50.20 ft, Date: 12/13/2021



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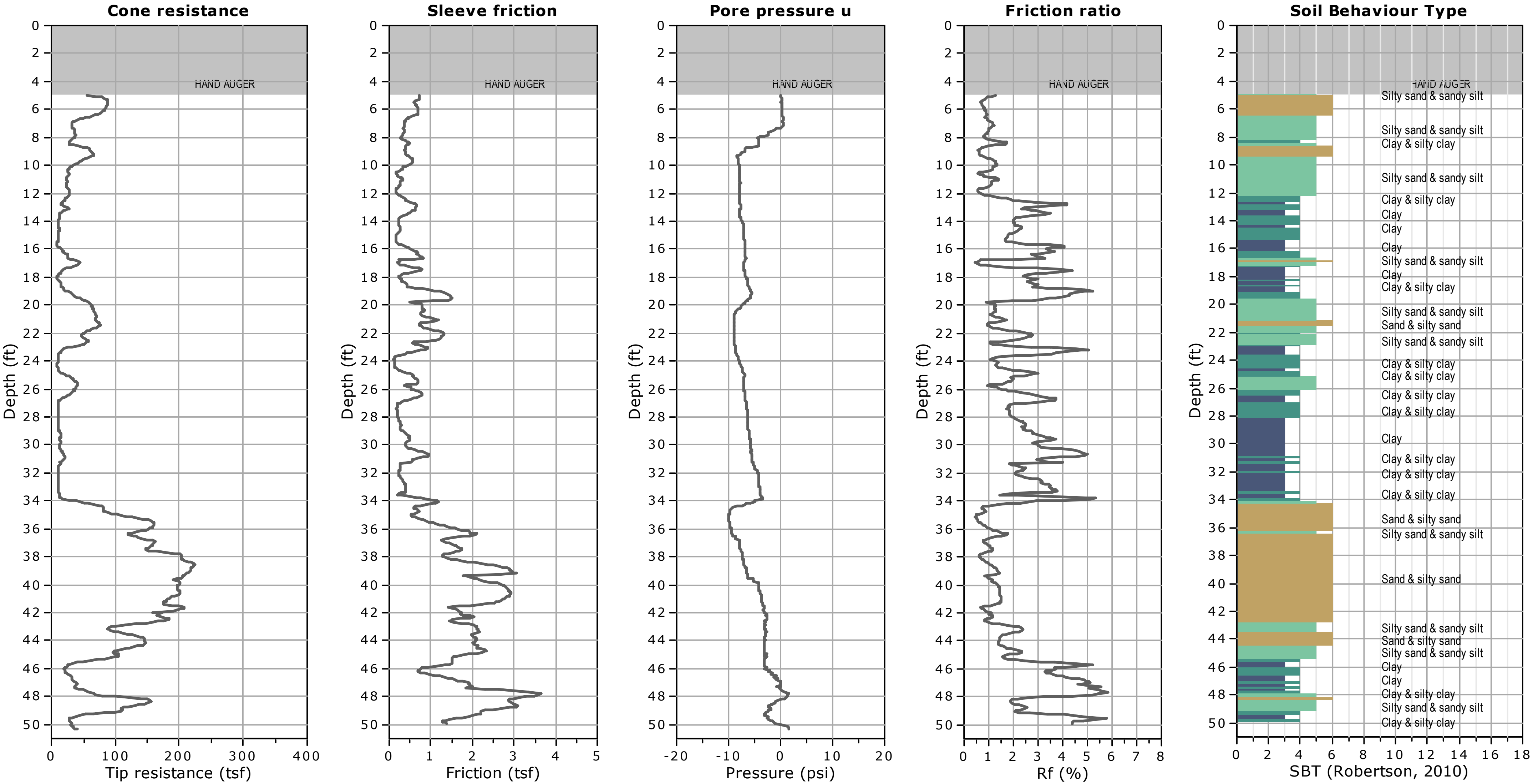
steve@kehoetesting.com
www.kehoetesting.com

Project: **G3SoilWorks** **CPT-2**

Location: **5665 & 5757 Plaza Dr, Cypress, CA** Total depth: 50.34 ft, Date: 12/13/2021



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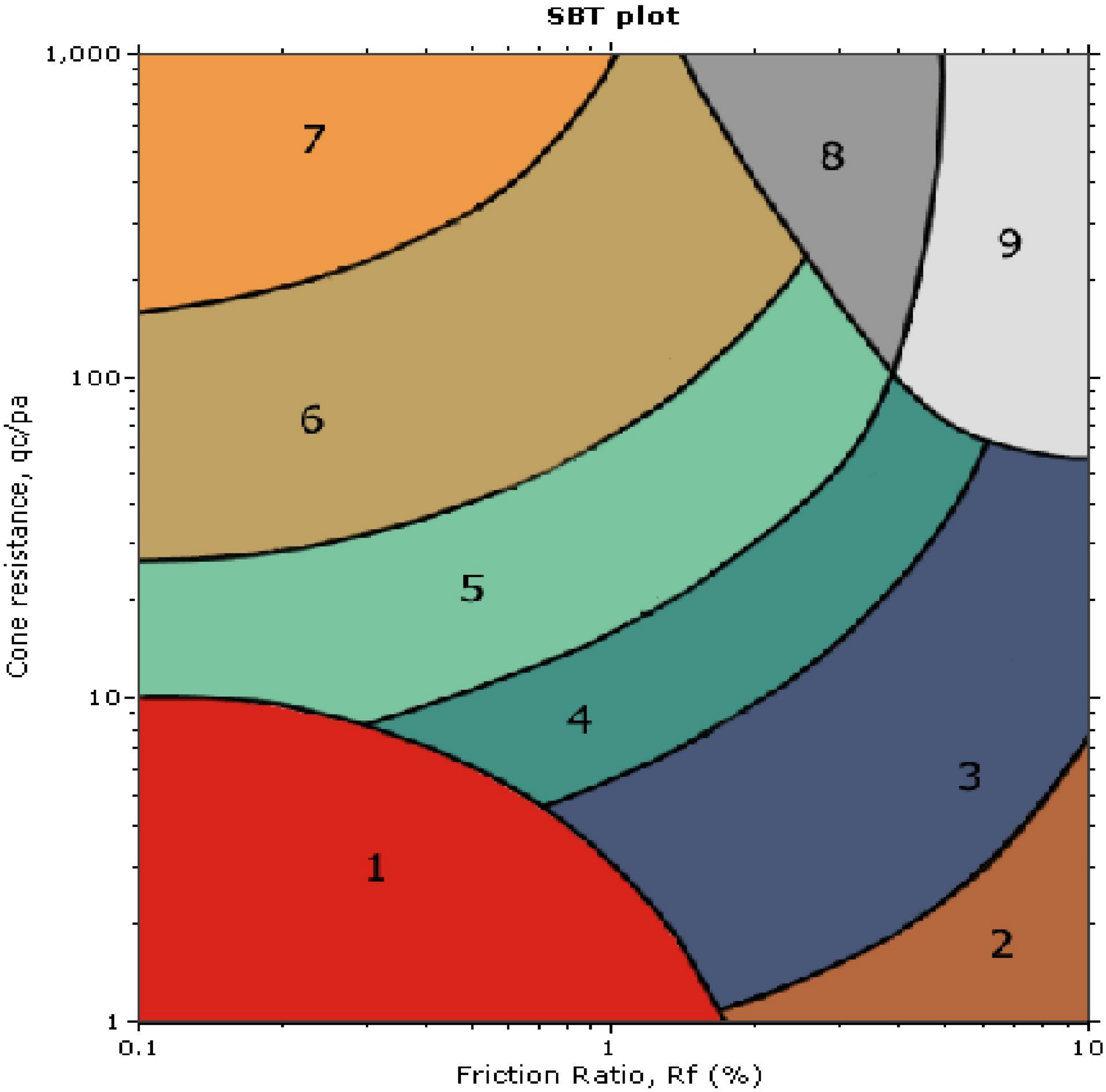
www.kehoetesting.com



SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

APPENDIX C

LABORATORY TEST PROCEDURES AND RESULTS

LABORATORY TEST PROCEDURES AND RESULTS

The samples obtained during the field investigation were transported to the laboratory for testing and analysis. The results of tests performed on selected samples and the test procedures are summarized below.

Dry Density and Moisture Content

Field dry density and moisture contents of undisturbed soils samples retained in 2 3/8–inch inside diameter by one-inch height rings were determined, and moisture test results were obtained for the small bulk samples. Dry density and moisture content testing were performed in accordance with ASTM D2937 and ASTM D2216, respectively. The test results are posted on the Geotechnical Boring Logs in Appendix A.

Maximum Dry Density and Optimum Moisture Content

Maximum dry density and optimum moisture content test was performed on the submitted bulk soil samples in accordance with ASTM: D 1557. The results are shown below:

Sample Identification	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B-2 @ 0-5’	107.0	11.5
B-5 @ 0-5’	118.0	13.0

Expansion Index

Representative soil samples were tested for expansion potential following the ASTM D4829 Test Procedure. Test results are presented below.

Sample Identification	Expansion Index	Expansion Potential (UBC 18-1-B)
B-2 @ 0-5’	0	Very Low
B-5 @ 0-5’	14	Very Low

Sulfate Content

Selected soil samples were tested for soluble sulfate content in accordance with the Hach method. The test results are shown below.

Sample Identification	Water Soluble Sulfate in Soil (ppm)	Sulfate Exposure (ACI 318-08, Table 4.2.1)
B-2 @ 0-5’	120	S0
B-5 @ 0-5’	300	S1

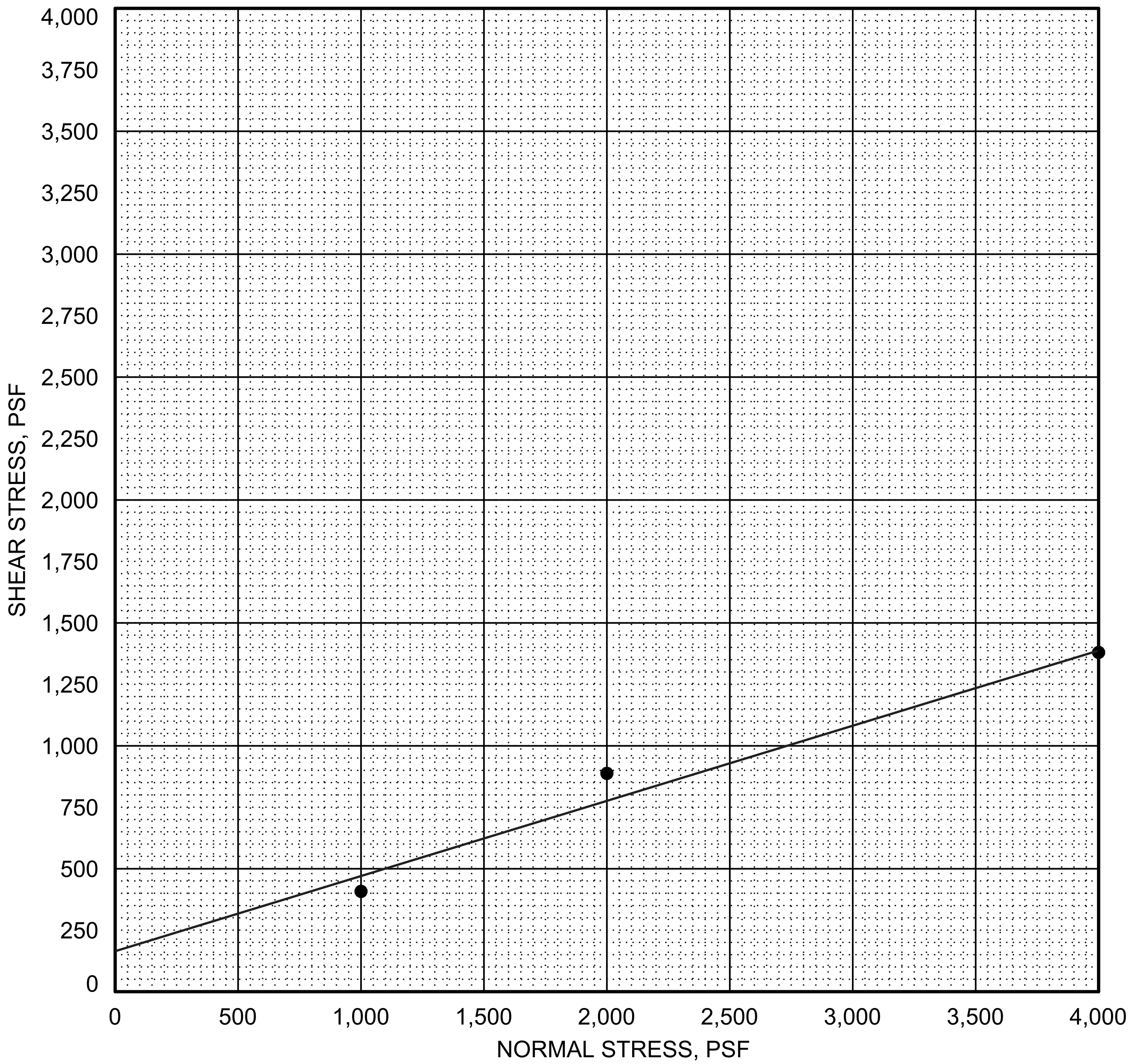
Direct Shear

Direct shear tests were performed on representative, relatively undisturbed soil samples with a direct shear machine of the strain-controlled type in which the rate of strain is 0.01 inches per minute. The soil specimens were soaked in a confined state prior to shearing and was sheared under varied normal loads ranging from 1.0 ksf to 4.0 ksf. The test results are plotted on Figures S-1 through S-7.

Consolidation

Consolidation tests was performed on sample identified as B-1 @ 15 feet, B-3 @ 15 feet, B-3 @ 30 feet, B-4 @ 10 feet, and B-4 @ 20 feet. The test specimen was initially loaded to 0.2 tons per square foot and soaked during the test. Progressive loading was then applied to a maximum of 3.2 tons per square foot. Loading was then reduced to determine rebound characteristics. The consolidation test is presented on Figure C-1 through C-5.

DIRECT SHEAR TEST
Undisturbed



5665 and 5757 Plaza Drive, Cypress	COHESION	162	psf.
	FRICTION ANGLE	17.0	degrees

symbol	boring	depth (ft.)	symbol	boring	depth (ft.)
●	B-1	15.0			

FIGURE S-1
DIRECT SHEAR TEST

PN: 1-1209 REPORT DATE: 05/04/22

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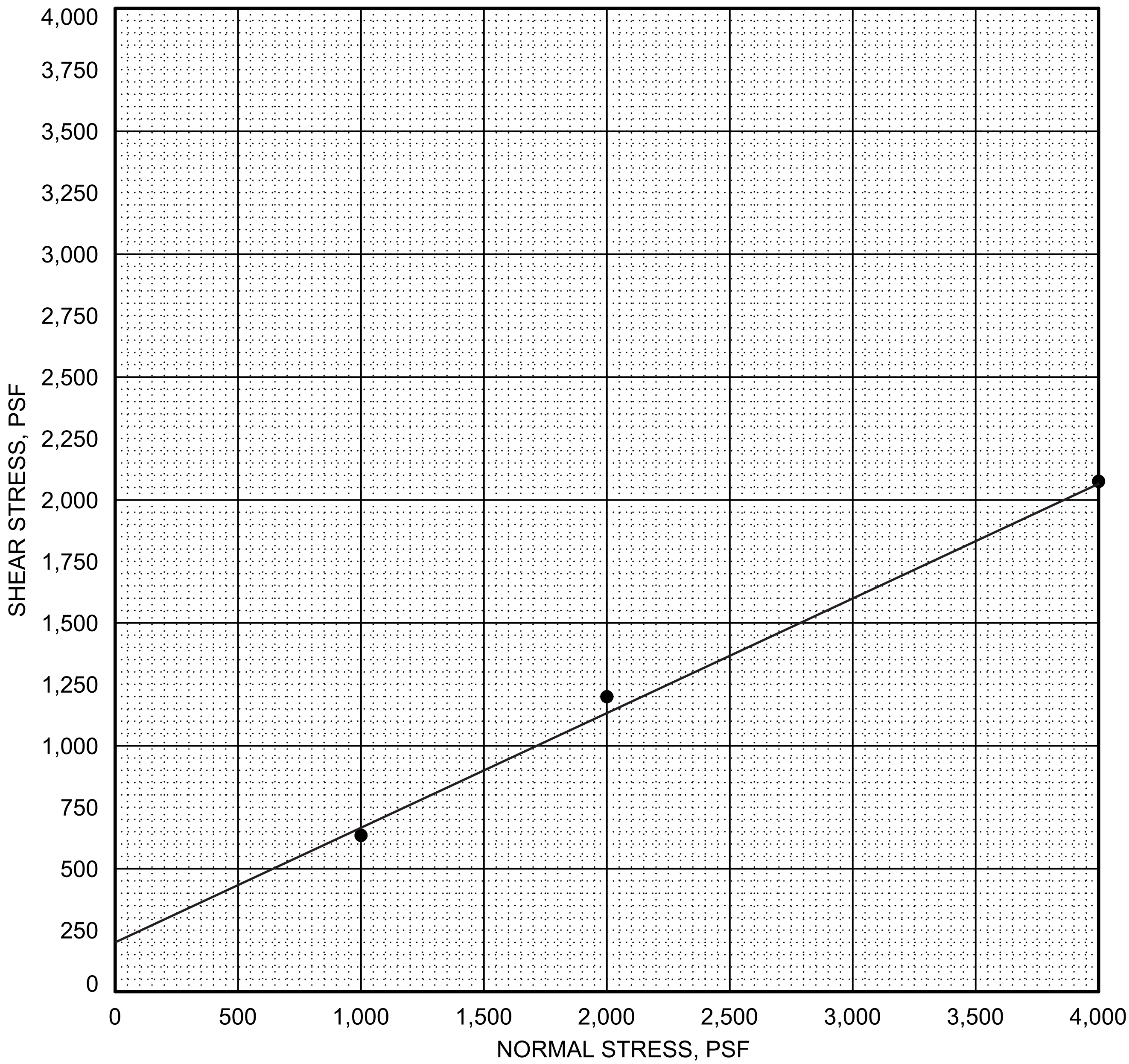
DIRECT SHEAR TEST
Undisturbed



5665 and 5757 Plaza Drive, Cypress	COHESION 198 psf.
	FRICTION ANGLE 25.0 degrees

symbol	boring	depth (ft.)	symbol	boring	depth (ft.)
●	B-2	20.0			

FIGURE S-2
DIRECT SHEAR TEST

PN: 1-1209 REPORT DATE: 05/04/22

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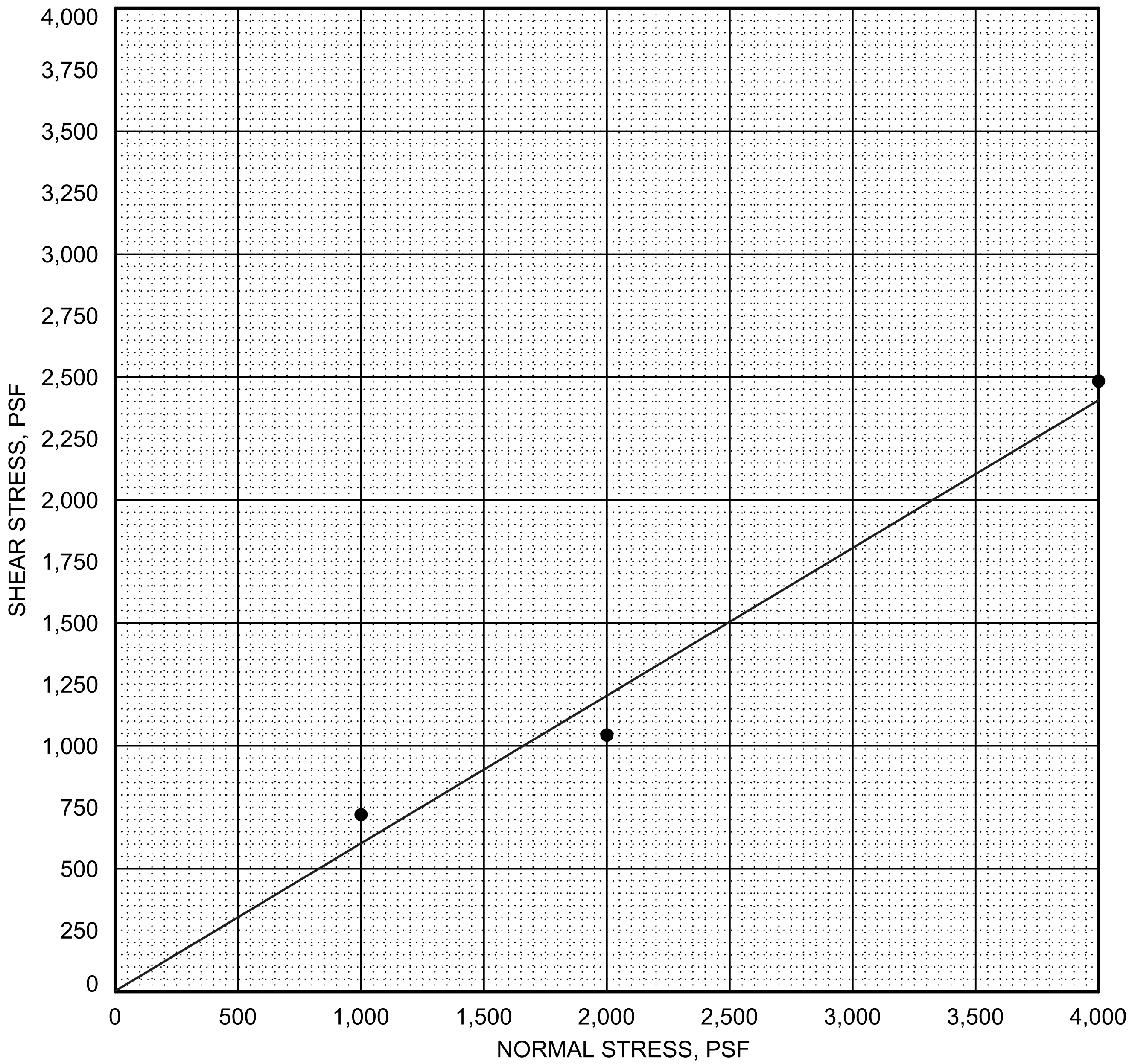
DIRECT SHEAR TEST
Undisturbed



5665 and 5757 Plaza Drive, Cypress	COHESION	0	psf.
	FRICTION ANGLE	31.0	degrees

symbol	boring	depth (ft.)	symbol	boring	depth (ft.)
●	B-3	15.0			

FIGURE S-3
DIRECT SHEAR TEST

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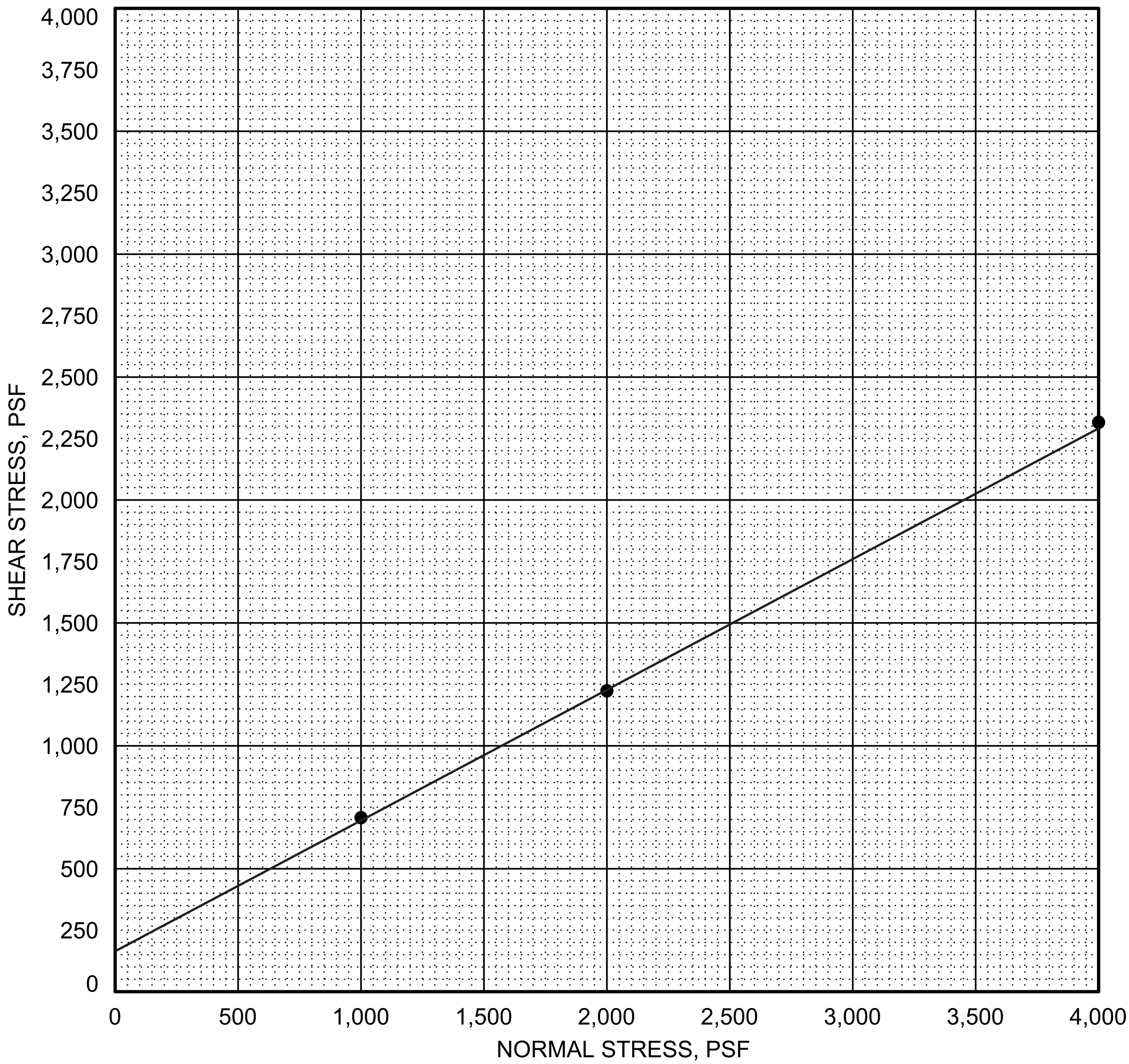
DIRECT SHEAR TEST
Undisturbed



5665 and 5757 Plaza Drive, Cypress	COHESION	162	psf.
	FRICTION ANGLE	28.0	degrees

symbol	boring	depth (ft.)	symbol	boring	depth (ft.)
●	B-3	30.0			

FIGURE S-4
DIRECT SHEAR TEST

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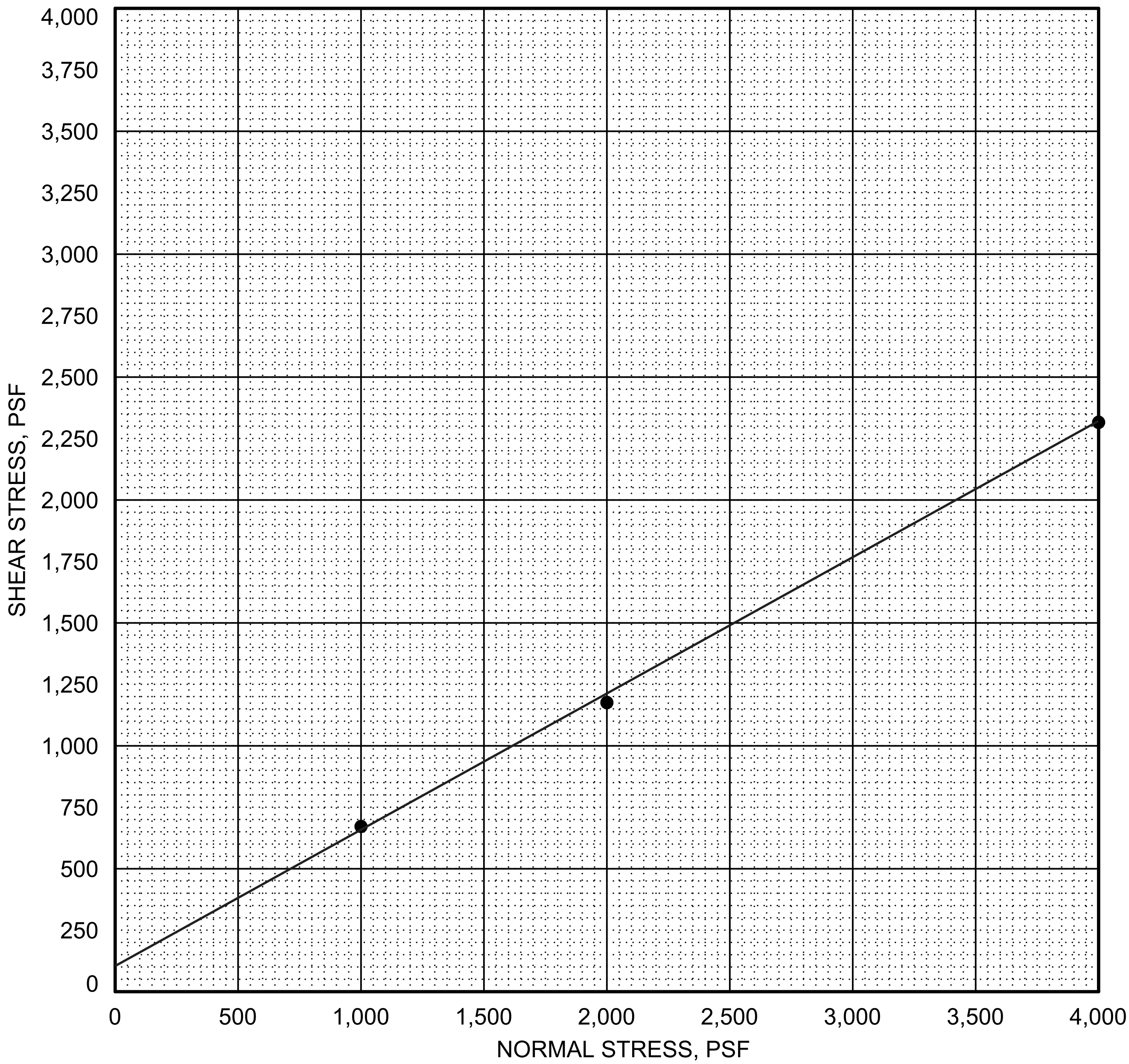
DIRECT SHEAR TEST
Undisturbed



5665 and 5757 Plaza Drive, Cypress	COHESION 102 psf.
	FRICTION ANGLE 29.0 degrees

symbol	boring	depth (ft.)	symbol	boring	depth (ft.)
●	B-4	10.0			

FIGURE S-5
DIRECT SHEAR TEST

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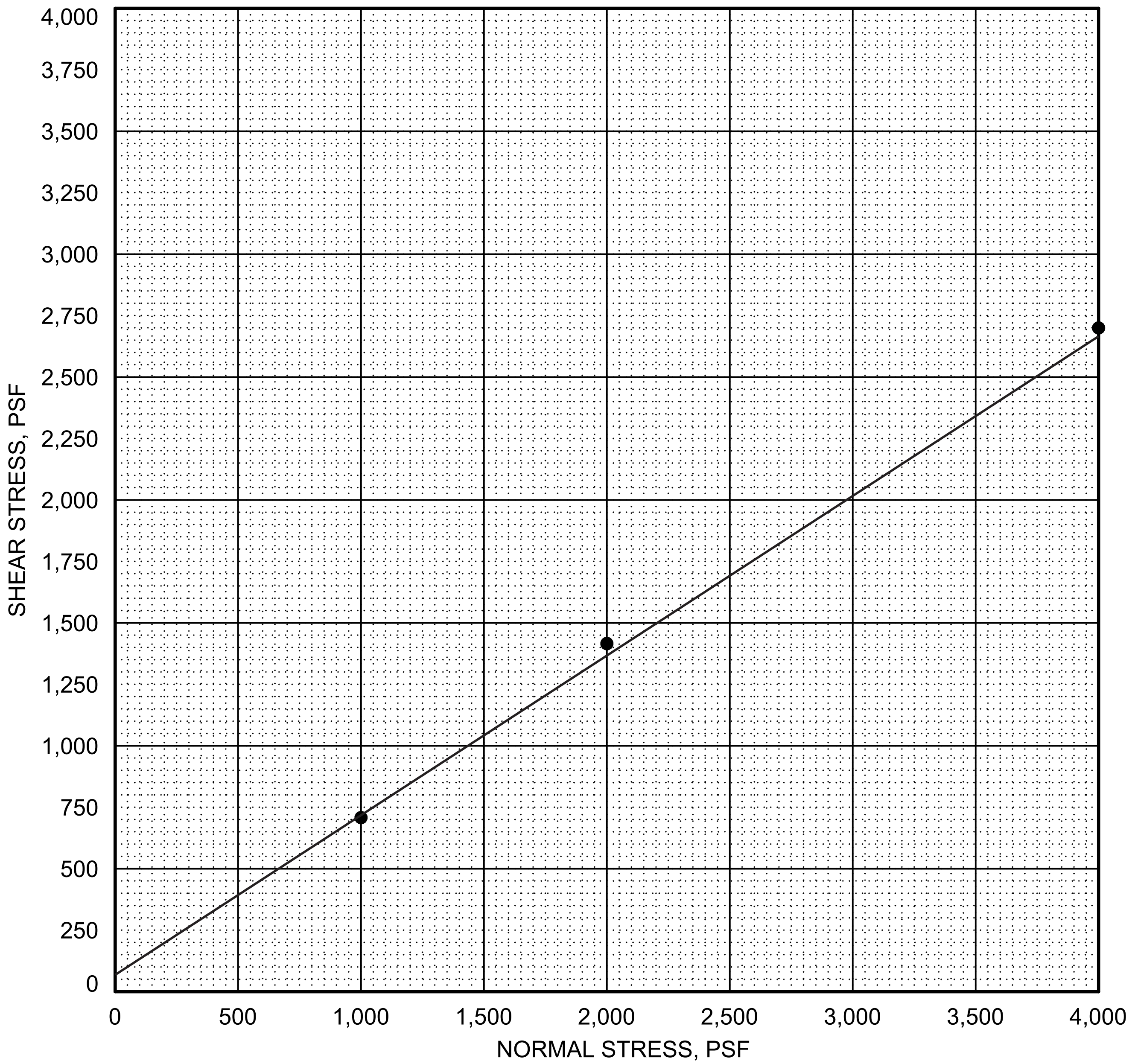
DIRECT SHEAR TEST
Undisturbed



5665 and 5757 Plaza Drive, Cypress	COHESION 66 psf.
	FRICTION ANGLE 33.0 degrees

symbol	boring	depth (ft.)	symbol	boring	depth (ft.)
●	B-4	20.0			

FIGURE S-6
DIRECT SHEAR TEST

PN: 1-1209 REPORT DATE: 05/04/22

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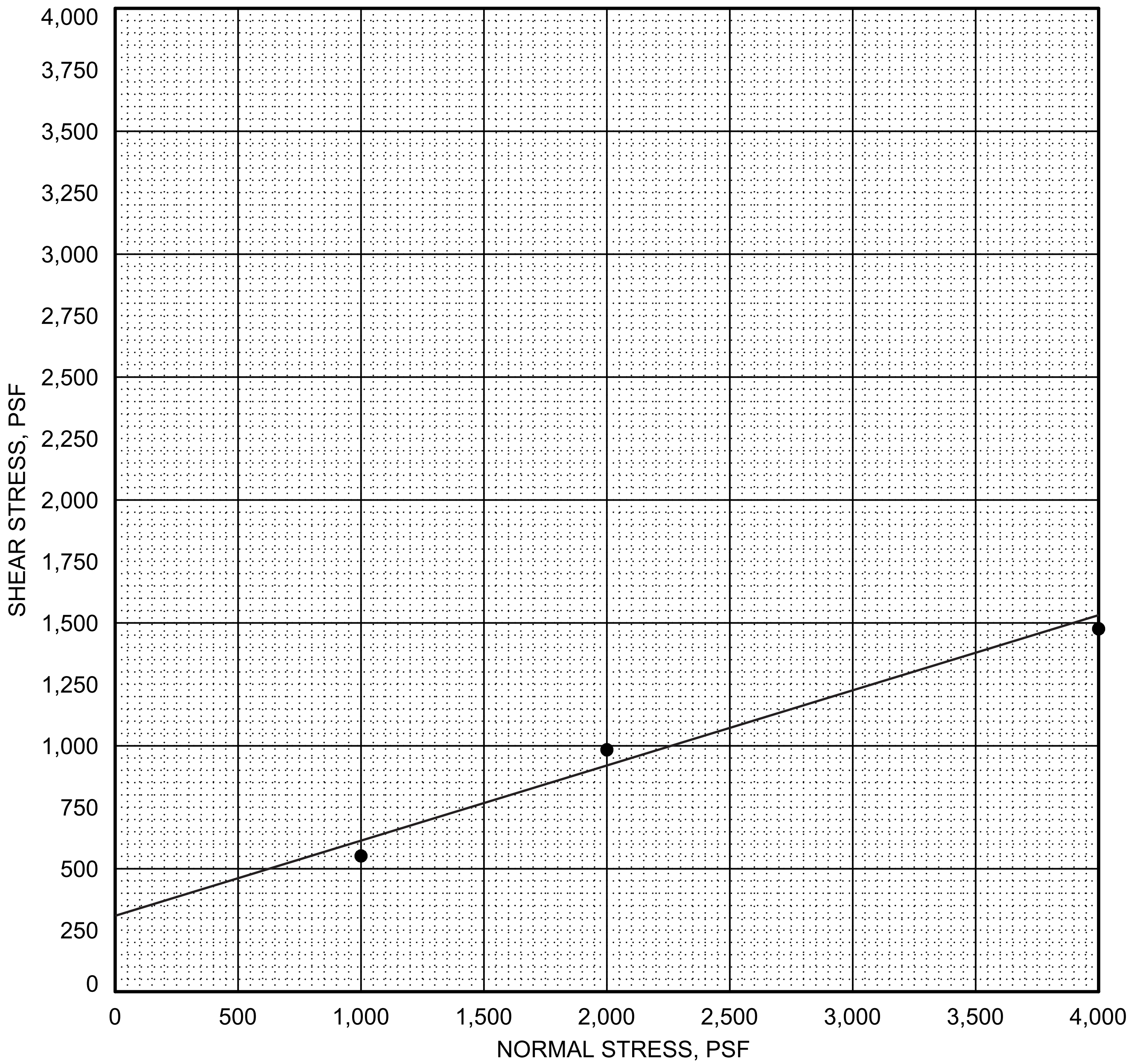
DIRECT SHEAR TEST
Undisturbed



5665 and 5757 Plaza Drive, Cypress	COHESION 306 psf.
	FRICTION ANGLE 17.0 degrees

symbol	boring	depth (ft.)	symbol	boring	depth (ft.)
●	B-5	15.0			

FIGURE S-7
DIRECT SHEAR TEST

PN: 1-1209 REPORT DATE: 05/04/22

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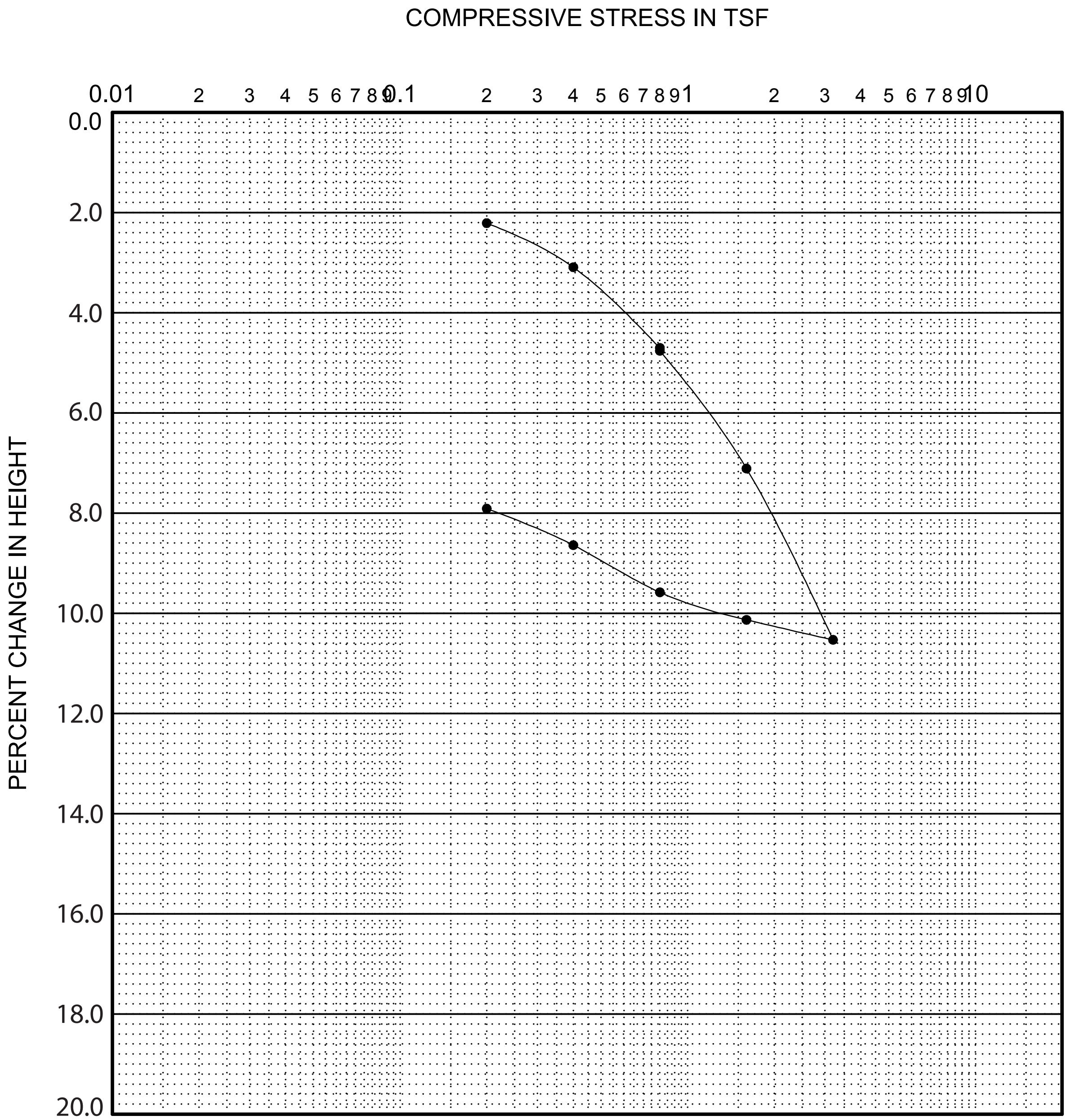

Boring	Depth(ft.)	Dry Density	in situ Moist.	-200 sieve	Group Symbol	Soil Description
B-1	15.0	89.0	30.9		CL/ML	

WATER ADDED AT .8 TSF.

FIGURE C-1
CONSOLIDATION CURVE

PN:1-1209 REPORT DATE: 05/04/22

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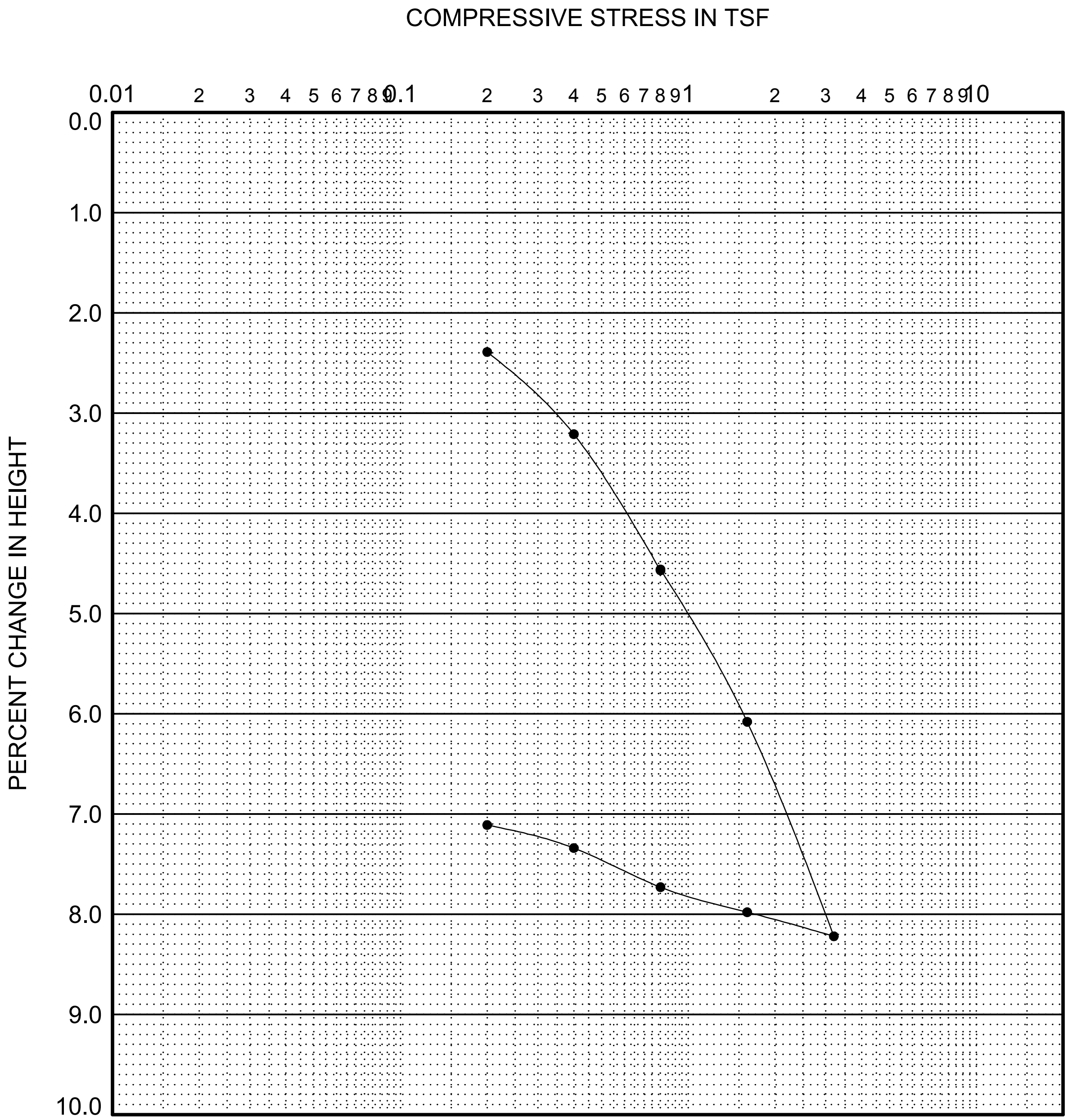

Boring	Depth(ft.)	Dry Density	in situ Moist.	-200 sieve	Group Symbol	Soil Description
B-3	15.0	99.1	23.3		ML	

WATER ADDED AT .8 TSF.

FIGURE C-2
CONSOLIDATION CURVE

PN:1-1209 REPORT DATE: 05/04/22

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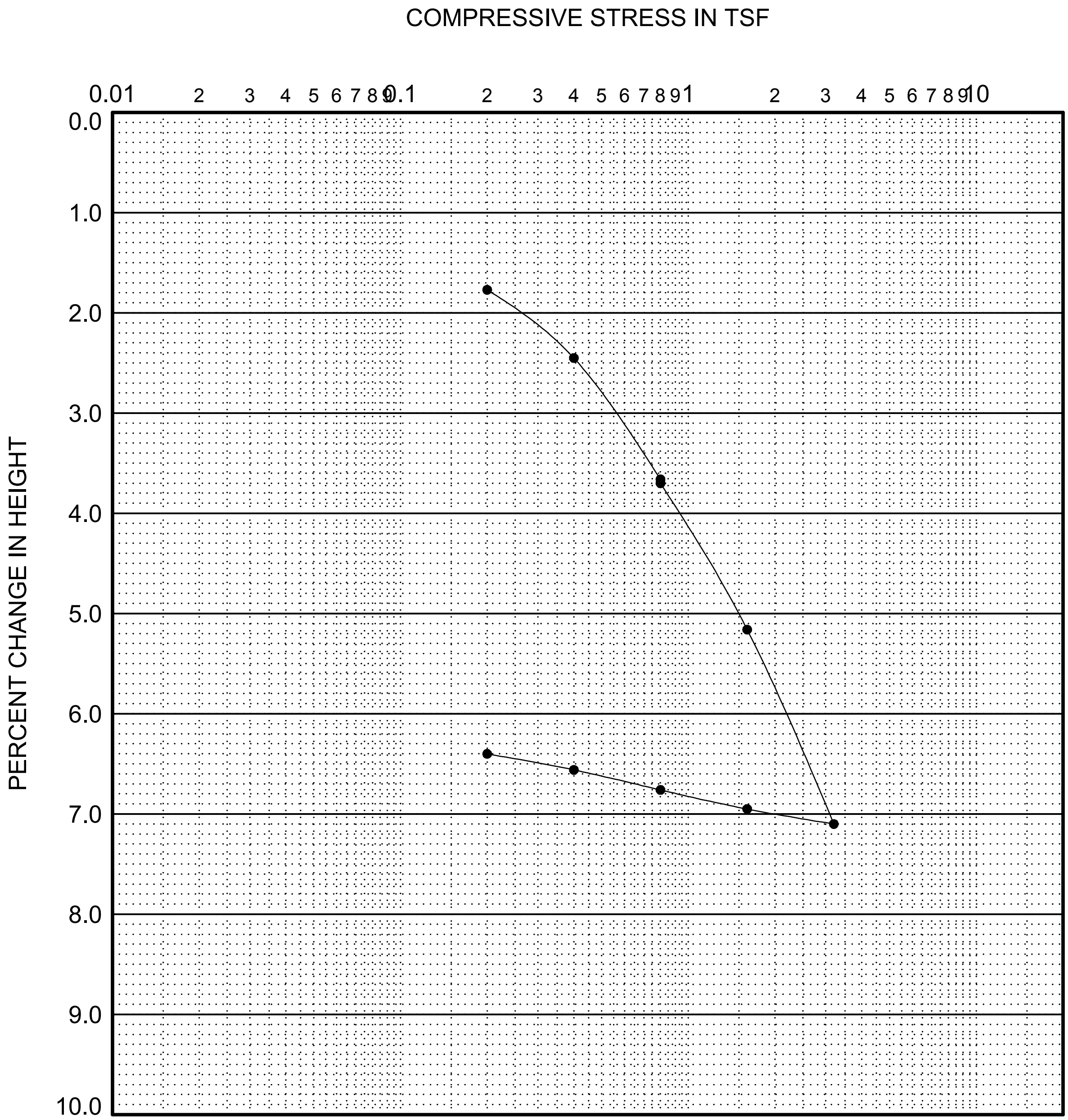

Boring	Depth(ft.)	Dry Density	in situ Moist.	-200 sieve	Group Symbol	Soil Description
B-3	30.0	98.6	24.7		ML	

WATER ADDED AT .8 TSF.

FIGURE C-3
CONSOLIDATION CURVE

PN:1-1209 REPORT DATE: 05/04/22

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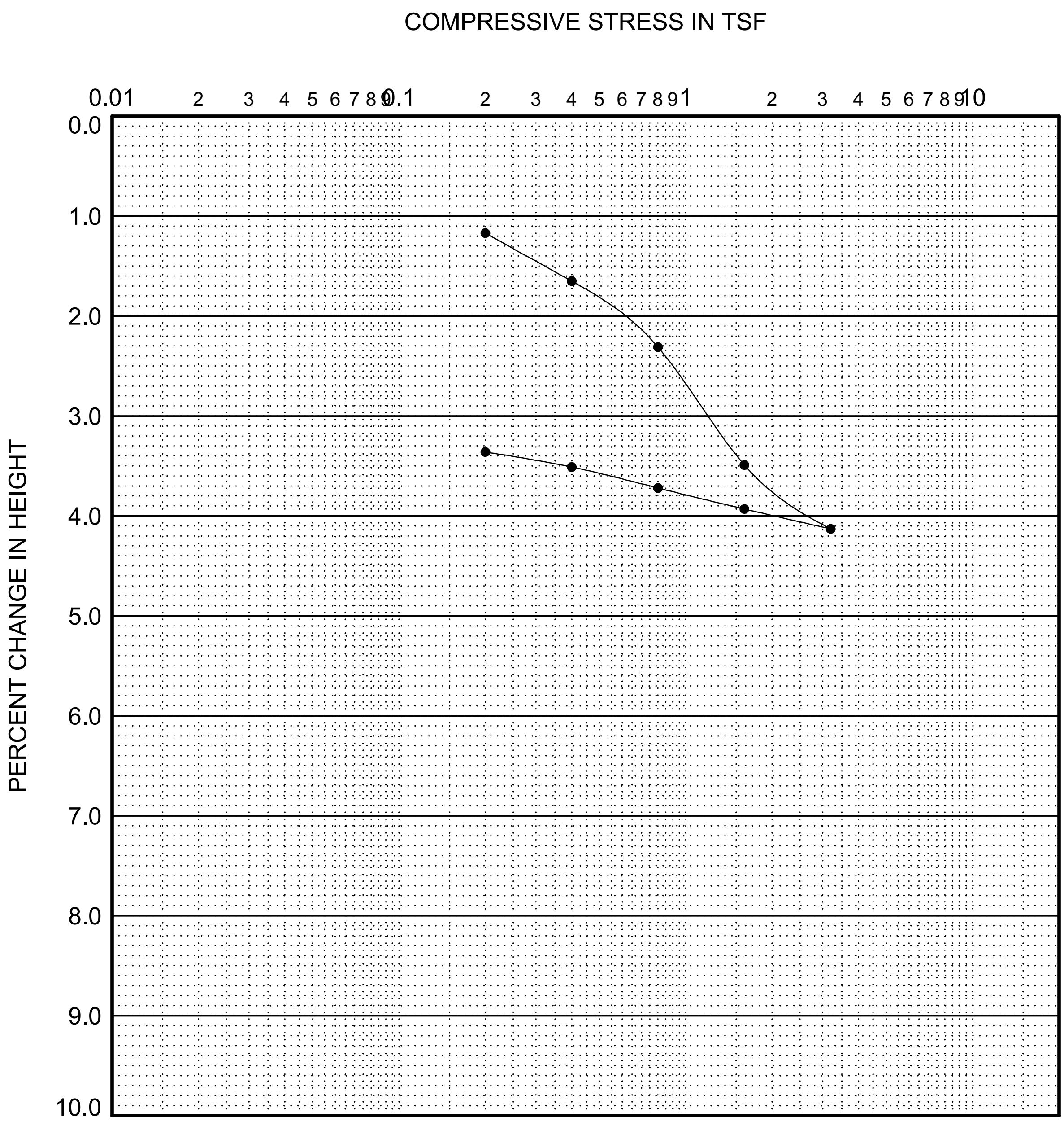

Boring	Depth(ft.)	Dry Density	in situ Moist.	-200 sieve	Group Symbol	Soil Description
B-4	10.0	96.9	29.0		SM	

WATER ADDED AT .8 TSF.

FIGURE C-4
CONSOLIDATION CURVE

PN:1-1209 REPORT DATE: 05/04/22

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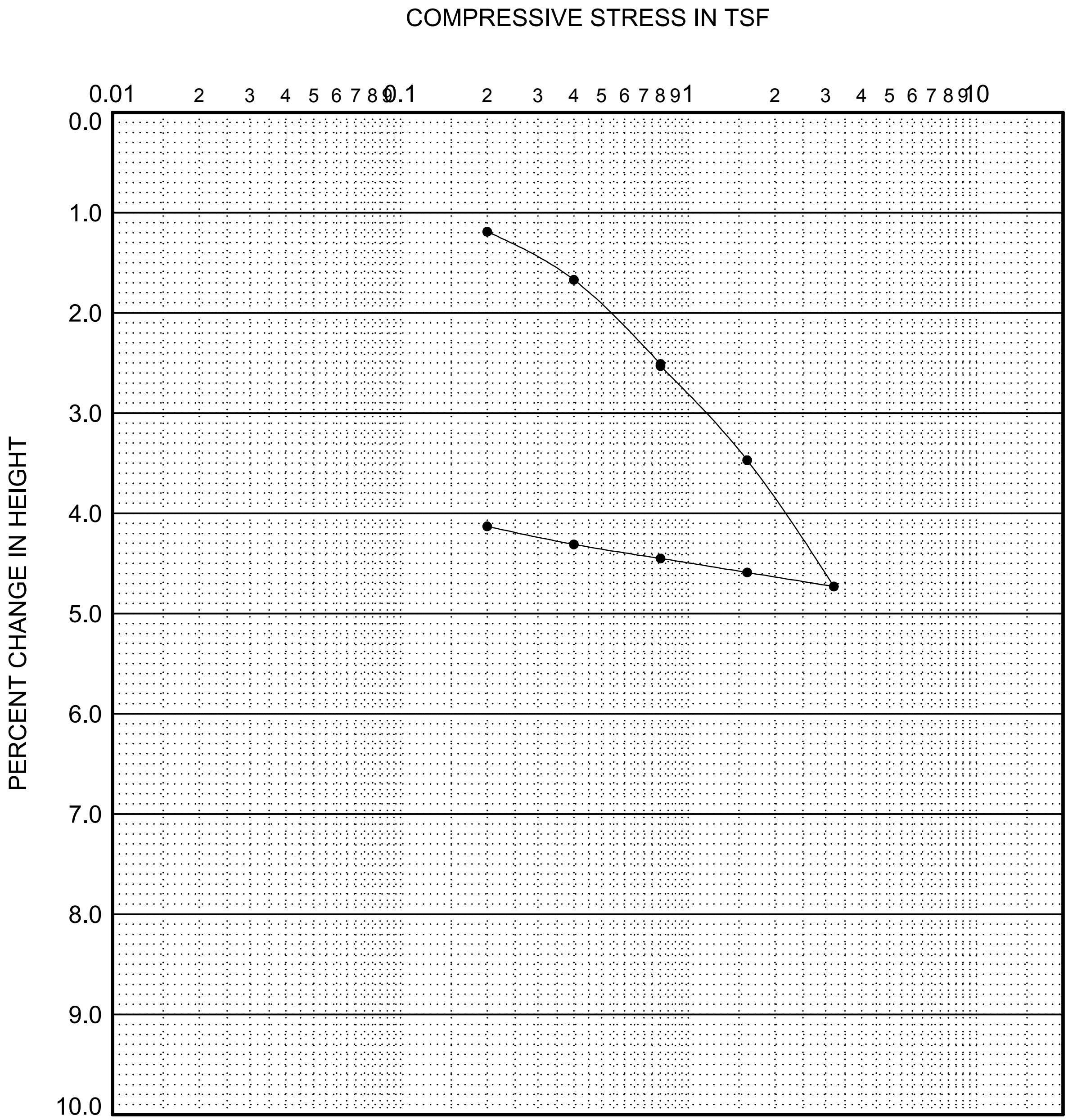

Boring	Depth(ft.)	Dry Density	in situ Moist.	-200 sieve	Group Symbol	Soil Description
B-4	20.0	108.3	20.0		SM	

WATER ADDED AT .8 TSF.

FIGURE C-5
CONSOLIDATION CURVE

PN:1-1209 REPORT DATE: 05/04/22

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APPENDIX D

REFERENCE NO. 2 EXCERPTS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-1

JOB NO.: 21G150-1
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 4/2/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 9.5 feet
CAVE DEPTH: 11 feet
READING TAKEN: At Completion

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					3± inches Asphaltic Concrete; 8± inches Aggregate Base							
		10			FILL: Gray Brown Silty fine Sand, mottled, loose to medium dense-moist to very moist		15					
		6					18					
5			2.0		ALLUVIUM: Gray Brown Silty Clay, trace Calcareous nodules, little Iron oxide staining, medium stiff-very moist		36	46	23			
		10			Dark Gray fine Sandy Silt, loose to medium dense-very moist to wet		24			56		
		7					29			62		
10												
		13			@ 14 feet, trace Iron oxide staining		23			50		
15												
					Gray Brown Silty fine Sand, loose to medium dense-wet							
		7					25			23		
20												
		25			@ 24 feet, little Iron oxide staining		20			37		
25												
					Gray Brown fine Sand, trace Silt, very loose-wet							
		2					25			4		
30			1.0		Gray Brown Silty Clay, little Iron oxide staining, very soft-wet		37	50	28	93		
					Gray Brown fine Sand, medium dense-wet							
		19					22			5		
					Gray Brown Silty fine Sand, trace Iron oxide staining, medium							

TBL 21G150-1.GPJ SOCALGEO.GDT 5/18/21

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-1

JOB NO.: 21G150-1
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 4/2/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 9.5 feet
CAVE DEPTH: 11 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					dense-wet							
	X	16					23					
40												
	X	14			@ 43½ feet, trace Calcareous nodules		21			42		
45												
					Gray fine Sandy Silt, medium dense-wet							
	X	15					31			80		
50												
					Boring Terminated at 50'							

TBL 21G150-1.GPJ SOCALGEO.GDT 5/18/21

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-2

JOB NO.: 21G150-1	DRILLING DATE: 4/2/21	WATER DEPTH: 7.5 feet
PROJECT: Proposed C/I Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 8 feet
LOCATION: Cypress, California	LOGGED BY: Jamie Hayward	READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					3± inches Asphaltic Concrete; 5± inches Aggregate Base							
		12			FILL: Gray Brown Silty fine Sand, trace medium to coarse Sand, little fine Gravel, trace tree roots, loose-damp	91	7					
		18			ALLUVIUM: Light Gray Brown fine Sand, trace medium Sand, medium dense-damp	99	3					
5		24				92	5					
		14			Gray Silty fine Sand, loose-wet	102	21			21		
10		11			Gray Brown fine Sandy Silt, loose-wet	93	29			70		
					Gray Brown Silty Clay, little to some fine Sand, little Calcareous nodules, stiff-wet							
15		9	1.5				27			82		
					Gray Brown fine Sandy Silt, little Iron oxide staining, loose to medium dense-wet							
20		15				103	23			59		
		7					22			61		
25			1.0		Dark Gray to Gray fine Sandy Clay, medium stiff-wet		23	29	17	58		
					Gray Brown fine Sandy Silt, little Clay, trace Iron oxide staining, medium dense-wet							
30		18				99	28					
					Gray Brown Silty Clay, trace Calcareous nodules, little Iron oxide staining, stiff-wet							
		11					30			88		

TBL 21G150-1.GPJ SOCALGEO.GDT 5/18/21

TEST BORING LOG

PLATE B-2a

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-2

JOB NO.: 21G150-1 | DRILLING DATE: 4/2/21 | WATER DEPTH: 7.5 feet
PROJECT: Proposed C/I Development | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 8 feet
LOCATION: Cypress, California | LOGGED BY: Jamie Hayward | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					Gray Brown fine Sandy Silt, medium dense-wet							
	X	19					26					
40												
					Gray Silty fine Sand, medium dense-wet							
	X	16					26			33		
45												
					Gray Silty Clay, little fine Sand, very stiff-wet							
	X	23	3.0				20			77		
50												
					Boring Terminated at 50'							

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-3

JOB NO.: 21G150-1
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 4/2/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 9 feet
CAVE DEPTH: 12 feet
READING TAKEN: At Completion

FIELD RESULTS			DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	BLOW COUNT	POCKET PEN. (TSF)	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
			3± inches Asphaltic Concrete; 8± inches Aggregate Base							
	12		FILL: Gray Silty fine Sand, little Clay, loose-moist to very moist	107	16					
	8		@ 3 feet, slightly mottled	100	21					
5	10			107	19					
	15	1.5	ALLUVIUM: Gray Silty Clay, trace Iron oxide staining, stiff-very moist	93	30			83		
			Gray Brown Silty fine Sand to fine Sandy Silt, little Iron oxide staining, medium dense-wet							
10	16			103	25			45		
			Gray Brown Silty Clay, little fine Sand, medium stiff-wet							
15	5	2.0			31	38	21	69		
			Gray Brown fine Sandy Silt, little Iron oxide staining, micaceous, loose to medium dense-wet							
20	12			96	25			66		
	12				24					
25			Gray Silty fine Sand, trace to little Clay, medium dense-wet		21	25	21	41		
			Gray Silty fine Sand to fine Sandy Silt, loose-wet							
30	10			98	25			55		
			Light Gray Brown fine Sandy Clay, little Iron oxide staining, trace Calcareous nodules/veining, stiff-wet							
	11	2.0			29	40	20	76		

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-3

JOB NO.: 21G150-1
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 4/2/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 9 feet
CAVE DEPTH: 12 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					Gray Brown Silty fine Sand, loose-wet							
	X	7					27			40		
40												
					Gray Brown fine Sand, little Silt, medium dense-wet							
	X	16					24			11		
45												
	X	18					22					
50												
					Boring Terminated at 50'							

TBL 21G150-1.GPJ SOCALGEO.GDT 5/18/21

TEST BORING LOG

BORING NO. B-4

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

JOB NO.: 21G150-1
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 4/2/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 6 feet
CAVE DEPTH: 12 feet
READING TAKEN: 4 hrs After Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					3± inches Asphaltic Concrete; 8± inches Aggregate Base							
		11			FILL: Gray Silty fine Sand, 2-inch fine Sandy Silt lense, medium dense-very moist to wet		15					EI = 8 @ 0 to 5 feet
		6			@ 3½ feet, mottled, loose		28					
5												
		4			FILL: Brown Silty fine Sand, very loose to loose-wet		22			17		
					ALLUVIUM: Gray Brown Silty fine Sand, very loose to loose-wet		26			41		
		2					27			37		
10												
					Gray Brown Silty Clay, little fine Sand, little Iron oxide staining, medium stiff-wet							
		11	2.5				27	40	18	82		
15												
					Gray fine Sand, trace to little Silt, loose-wet							
		8					28					
20												
		25			@ 24 feet, medium dense		16			11		
25												
		5					24			12		
30					Gray Brown fine Sandy Silt, loose-wet		24			59		
					Gray Brown Silty fine Sand, medium dense-wet							
		35					19			36		

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-4

JOB NO.: 21G150-1
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 4/2/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 6 feet
CAVE DEPTH: 12 feet
READING TAKEN: 4 hrs After Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					Gray Brown to Gray fine Sandy Silt, little Iron oxide staining, medium dense-wet							
	X	27					31					
40												
					Gray Brown to Gray Silty fine Sand, medium dense-wet							
	X	12					27			42		
45					Gray fine Sandy Silt, trace Clay, medium dense-wet		18			54		
	X	26					20					
50					Boring Terminated at 50'							

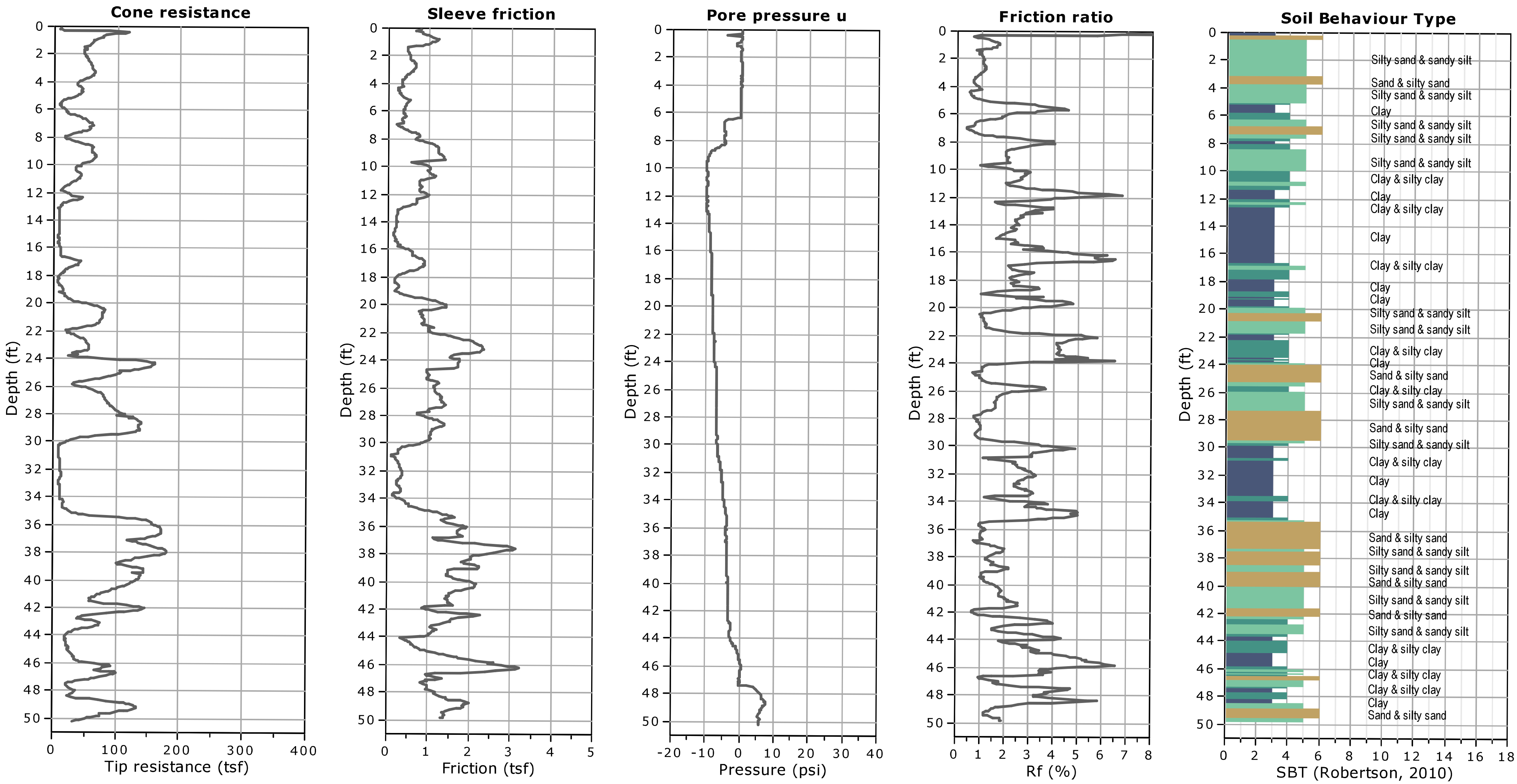
TBL 21G150-1.GPJ SOCALGEO.GDT 5/18/21

TEST BORING LOG **PLATE B-4b**

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

Project: Southern California Geotechnical
Location: 5665 Plaza Dr, Cypress, CA

CPT-1
Total depth: 50.22 ft, Date: 4/2/2021



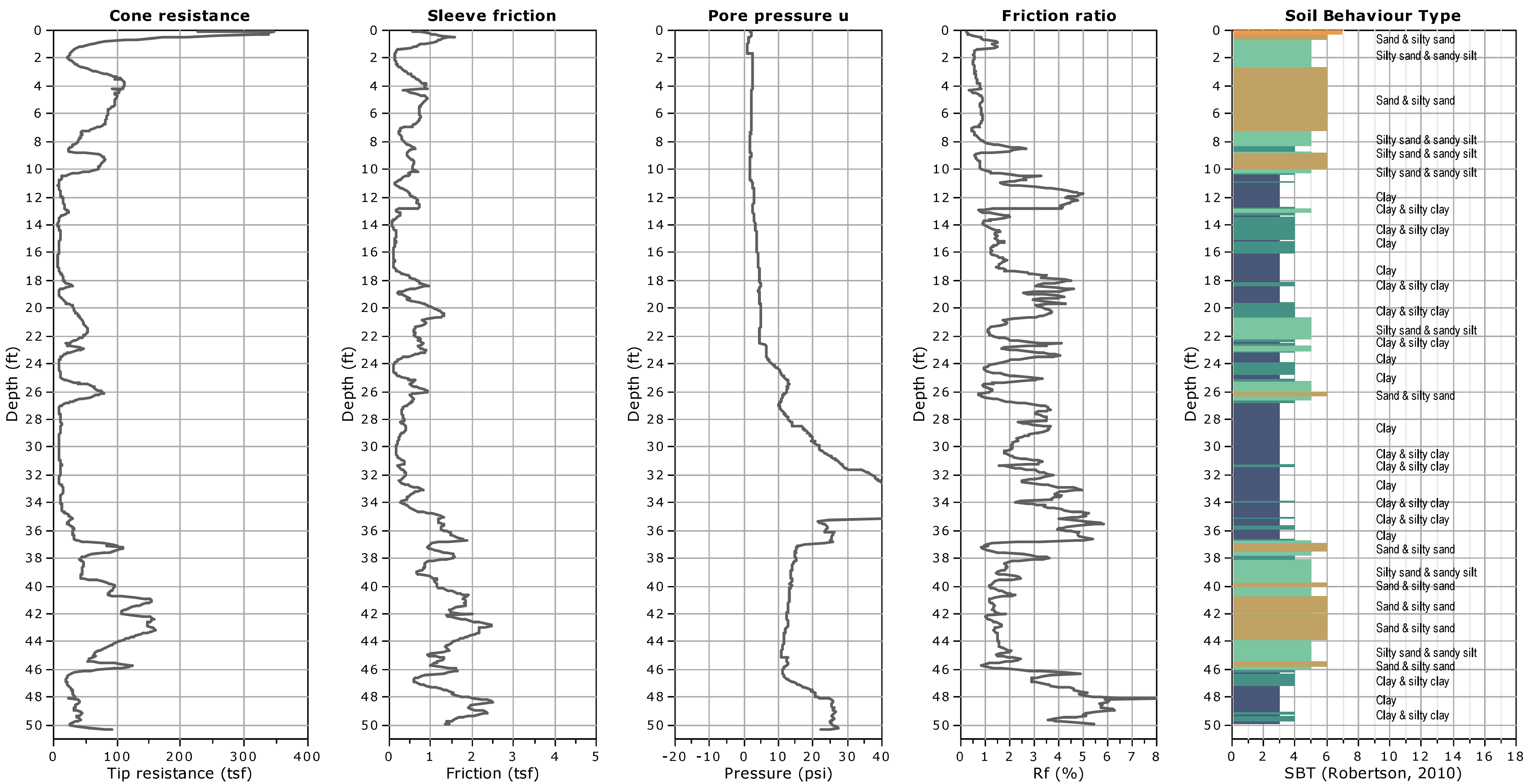
Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: Southern California Geotechnical

Location: 5665 Plaza Dr, Cypress, CA

CPT-2

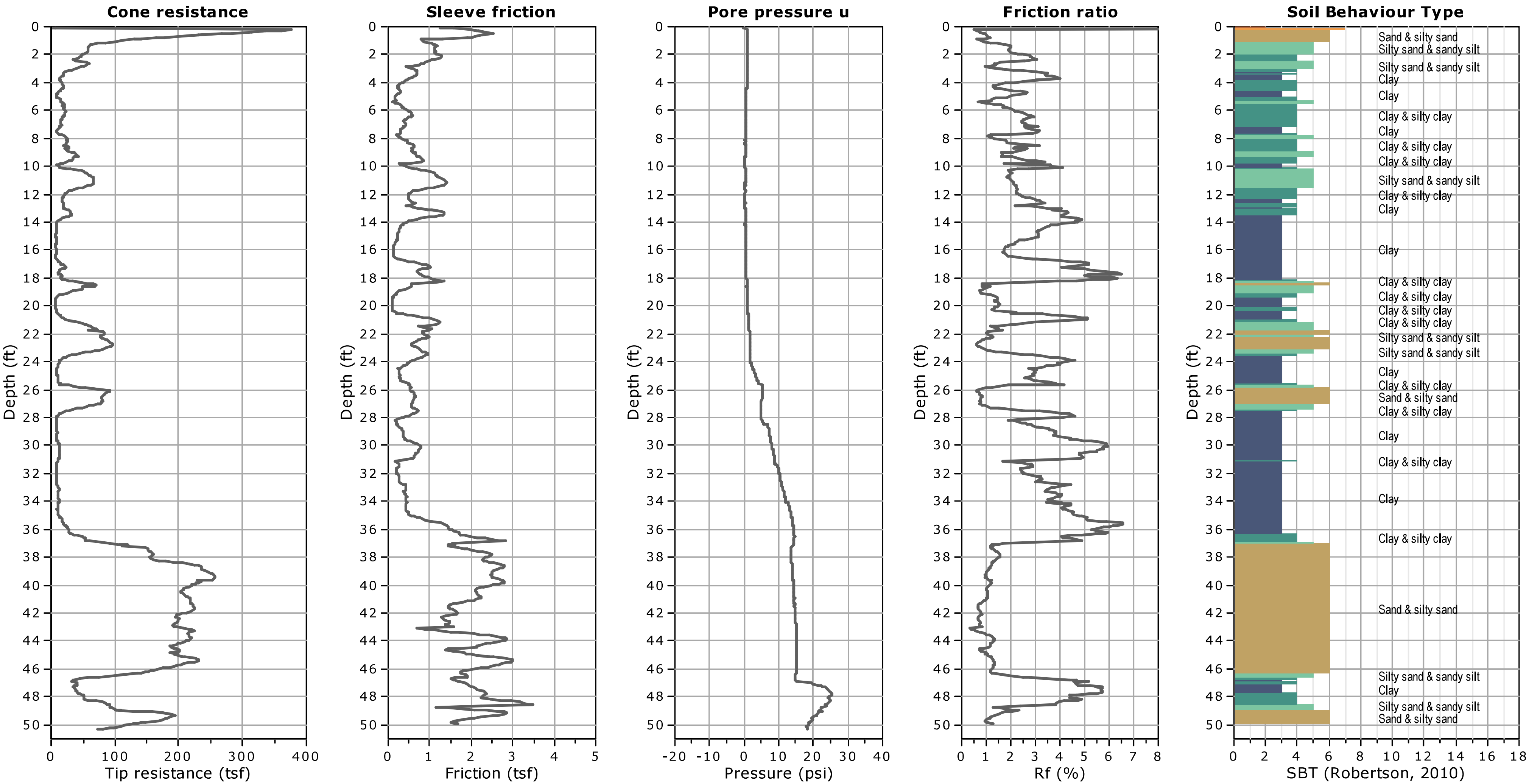
Total depth: 50.33 ft, Date: 4/2/2021



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

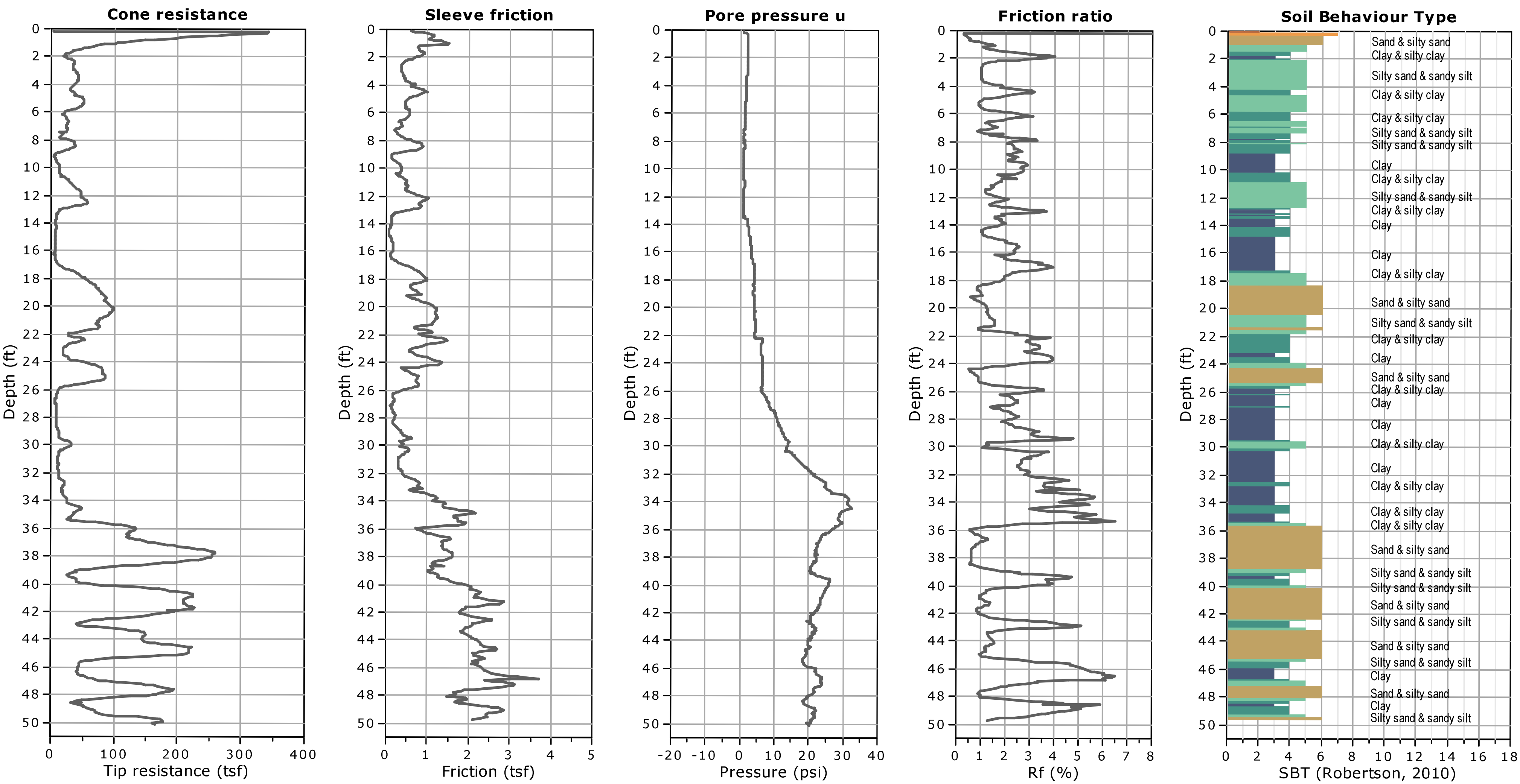
Project: **Southern California Geotechnical**
Location: **5665 Plaza Dr, Cypress, CA**

CPT-3
Total depth: 50.35 ft, Date: 4/2/2021



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

Project: Southern California Geotechnical | **CPT-4**
Location: 5665 Plaza Dr, Cypress, CA | Total depth: 50.10 ft, Date: 4/2/2021



:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
5.06	105.65	0.39	3.04	1.00	0.02	5.15	98.60	0.35	3.26	1.00	0.03
5.19	94.96	0.34	3.39	1.00	0.02	5.28	26.94	2.00	0.00	1.00	0.00
5.32	25.00	2.00	0.00	1.00	0.00	5.40	22.09	2.00	0.00	1.00	0.00
5.45	18.48	2.00	0.00	1.00	0.00	5.54	15.55	2.00	0.00	1.00	0.00
5.58	15.13	2.00	0.00	1.00	0.00	5.66	14.44	2.00	0.00	1.00	0.00
5.72	15.97	2.00	0.00	1.00	0.00	5.80	18.60	2.00	0.00	1.00	0.00
5.85	20.00	2.00	0.00	1.00	0.00	5.92	24.45	2.00	0.00	1.00	0.00
5.99	86.64	0.29	3.71	1.00	0.03	6.04	87.43	0.29	3.68	1.00	0.02
6.12	89.04	0.30	3.61	1.00	0.04	6.20	91.91	0.30	3.50	1.00	0.04
6.24	93.96	0.31	3.42	1.00	0.02	6.32	99.49	0.32	3.23	1.00	0.03
6.39	104.70	0.34	3.06	1.00	0.02	6.46	106.41	0.35	3.01	1.00	0.03
6.51	105.90	0.34	3.03	1.00	0.02	6.59	103.31	0.33	3.11	1.00	0.03
6.64	101.41	0.32	3.17	1.00	0.02	6.70	99.84	0.32	3.22	1.00	0.03
6.79	100.57	0.32	3.19	1.00	0.03	6.83	96.59	0.30	3.33	1.00	0.01
6.90	89.51	0.28	3.59	1.00	0.03	6.99	92.52	0.29	3.48	1.00	0.04
7.04	93.83	0.29	3.43	1.00	0.02	7.12	95.27	0.29	3.37	1.00	0.03
7.17	95.76	0.29	3.36	1.00	0.02	7.23	93.20	0.28	3.45	1.00	0.03
7.33	100.03	0.30	3.21	1.00	0.04	7.36	102.37	0.31	3.14	1.00	0.01
7.42	108.82	0.33	2.94	1.00	0.02	7.50	114.73	0.36	2.79	1.00	0.03
7.59	116.57	0.37	2.74	1.00	0.03	7.63	114.97	0.36	2.78	1.00	0.02
7.68	112.14	0.34	2.85	1.00	0.02	7.76	103.61	0.31	3.10	1.00	0.03
7.81	98.37	0.29	3.27	1.00	0.02	7.89	29.14	2.00	0.00	1.00	0.00
7.94	26.27	2.00	0.00	1.00	0.00	8.03	24.70	2.00	0.00	1.00	0.00
8.12	27.54	2.00	0.00	1.00	0.00	8.16	32.41	2.00	0.00	1.00	0.00
8.20	101.14	0.29	3.18	1.00	0.02	8.29	110.07	0.33	2.91	1.00	0.03
8.34	111.74	0.33	2.86	1.00	0.02	8.43	118.93	0.36	2.68	1.00	0.03
8.49	124.88	0.40	2.54	1.00	0.02	8.54	129.17	0.43	2.45	1.00	0.01
8.61	133.85	0.46	2.36	1.00	0.02	8.69	134.94	0.47	2.34	1.00	0.02
8.73	135.30	0.47	2.33	1.00	0.01	8.82	134.71	0.47	2.34	1.00	0.03
8.86	134.45	0.46	2.35	1.00	0.01	8.96	134.25	0.46	2.35	1.00	0.03
9.01	134.07	0.46	2.35	1.00	0.01	9.08	134.29	0.46	2.35	1.00	0.02
9.13	135.04	0.46	2.33	1.00	0.01	9.23	137.50	0.49	2.29	1.00	0.03
9.30	138.71	0.50	2.27	1.00	0.02	9.35	139.26	0.50	2.26	1.00	0.01
9.39	139.18	0.50	2.26	1.00	0.01	9.51	137.83	0.48	2.28	1.00	0.03
9.54	136.94	0.48	2.30	1.00	0.01	9.60	126.47	0.39	2.51	1.00	0.02
9.65	110.14	0.31	2.91	1.00	0.02	9.77	118.19	0.34	2.70	1.00	0.04
9.83	118.50	0.34	2.69	1.00	0.02	9.93	115.20	0.33	2.77	1.00	0.03
9.98	113.29	0.32	2.82	1.00	0.02	10.04	114.58	0.32	2.79	1.00	0.02
10.13	107.25	0.29	2.99	1.00	0.03	10.20	104.68	0.28	3.07	1.00	0.03
10.27	104.42	0.28	3.07	1.00	0.03	10.32	104.17	0.28	3.08	1.00	0.02
10.40	104.31	0.28	3.08	1.00	0.03	10.45	107.24	0.29	2.99	1.00	0.02
10.53	111.49	0.31	2.87	1.00	0.03	10.57	112.49	0.31	2.84	1.00	0.01
10.66	113.58	0.31	2.81	1.00	0.03	10.71	114.22	0.32	2.80	1.00	0.02
10.79	113.99	0.31	2.80	1.00	0.03	10.88	111.08	0.30	2.88	1.00	0.03
10.93	109.19	0.29	2.93	1.00	0.02	10.98	107.23	0.29	2.99	1.00	0.02
11.07	103.80	0.27	3.09	1.00	0.04	11.12	101.95	0.27	3.15	1.00	0.02
11.17	100.06	0.26	3.21	1.00	0.02	11.27	95.22	0.25	3.38	1.00	0.04
11.32	93.20	0.24	3.45	1.00	0.02	11.37	91.05	0.23	3.53	1.00	0.02

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
11.43	29.14	2.00	0.00	1.00	0.00	11.49	26.45	2.00	0.00	1.00	0.00
11.58	21.60	2.00	0.00	1.00	0.00	11.64	19.64	2.00	0.00	1.00	0.00
11.76	15.59	2.00	0.00	1.00	0.00	11.84	15.14	2.00	0.00	1.00	0.00
11.89	17.48	2.00	0.00	1.00	0.00	11.95	22.37	2.00	0.00	1.00	0.00
12.02	27.90	2.00	0.00	1.00	0.00	12.07	30.58	2.00	0.00	1.00	0.00
12.11	31.58	2.00	0.00	1.00	0.00	12.20	95.23	0.24	3.38	1.00	0.04
12.33	107.16	0.27	2.99	1.00	0.05	12.37	109.09	0.28	2.94	1.00	0.02
12.44	106.98	0.27	3.00	1.00	0.02	12.51	102.44	0.26	3.13	1.00	0.03
12.58	94.94	0.24	3.39	1.00	0.03	12.63	87.53	0.22	3.67	1.00	0.02
12.69	22.75	2.00	0.00	1.00	0.00	12.75	19.15	2.00	0.00	1.00	0.00
12.81	16.49	2.00	0.00	1.00	0.00	12.88	15.11	2.00	0.00	1.00	0.00
12.94	14.13	2.00	0.00	1.00	0.00	13.00	13.16	2.00	0.00	1.00	0.00
13.12	11.43	2.00	0.00	1.00	0.00	13.16	8.96	2.00	0.00	1.00	0.00
13.20	10.77	2.00	0.00	1.00	0.00	13.27	10.87	2.00	0.00	1.00	0.00
13.34	10.85	2.00	0.00	1.00	0.00	13.42	10.84	2.00	0.00	1.00	0.00
13.45	10.40	2.00	0.00	1.00	0.00	13.56	11.02	2.00	0.00	1.00	0.00
13.60	11.11	2.00	0.00	1.00	0.00	13.68	10.89	2.00	0.00	1.00	0.00
13.74	10.88	2.00	0.00	1.00	0.00	13.82	10.86	2.00	0.00	1.00	0.00
13.85	10.85	2.00	0.00	1.00	0.00	13.95	10.83	2.00	0.00	1.00	0.00
14.00	10.82	2.00	0.00	1.00	0.00	14.05	10.72	2.00	0.00	1.00	0.00
14.13	10.70	2.00	0.00	1.00	0.00	14.17	10.69	2.00	0.00	1.00	0.00
14.26	9.82	2.00	0.00	1.00	0.00	14.31	9.72	2.00	0.00	1.00	0.00
14.39	10.12	2.00	0.00	1.00	0.00	14.44	10.11	2.00	0.00	1.00	0.00
14.53	10.10	2.00	0.00	1.00	0.00	14.59	10.09	2.00	0.00	1.00	0.00
14.66	9.98	2.00	0.00	1.00	0.00	14.70	9.97	2.00	0.00	1.00	0.00
14.79	9.96	2.00	0.00	1.00	0.00	14.84	9.95	2.00	0.00	1.00	0.00
14.96	9.78	2.00	0.00	1.00	0.00	15.01	9.61	2.00	0.00	1.00	0.00
15.10	8.23	2.00	0.00	1.00	0.00	15.15	9.06	2.00	0.00	1.00	0.00
15.22	9.04	2.00	0.00	1.00	0.00	15.27	9.35	2.00	0.00	1.00	0.00
15.32	9.96	2.00	0.00	1.00	0.00	15.45	9.53	2.00	0.00	1.00	0.00
15.50	9.42	2.00	0.00	1.00	0.00	15.58	8.27	2.00	0.00	1.00	0.00
15.63	8.58	2.00	0.00	1.00	0.00	15.68	9.90	2.00	0.00	1.00	0.00
15.75	9.79	2.00	0.00	1.00	0.00	15.80	10.49	2.00	0.00	1.00	0.00
15.87	11.50	2.00	0.00	1.00	0.00	15.93	11.89	2.00	0.00	1.00	0.00
15.99	12.79	2.00	0.00	1.00	0.00	16.03	13.09	2.00	0.00	1.00	0.00
16.11	12.46	2.00	0.00	1.00	0.00	16.15	11.84	2.00	0.00	1.00	0.00
16.23	12.23	2.00	0.00	1.00	0.00	16.28	12.31	2.00	0.00	1.00	0.00
16.37	12.29	2.00	0.00	1.00	0.00	16.41	11.88	2.00	0.00	1.00	0.00
16.49	11.87	2.00	0.00	1.00	0.00	16.55	12.76	2.00	0.00	1.00	0.00
16.63	16.21	2.00	0.00	1.00	0.00	16.67	19.97	2.00	0.00	1.00	0.00
16.76	30.38	2.00	0.00	1.00	0.00	16.81	96.52	0.22	3.33	1.00	0.02
16.90	104.95	0.24	3.06	1.00	0.03	16.93	106.25	0.25	3.02	1.00	0.01
17.02	104.80	0.24	3.06	1.00	0.03	17.07	104.25	0.24	3.08	1.00	0.02
17.16	103.77	0.24	3.09	1.00	0.03	17.21	102.11	0.23	3.15	1.00	0.02
17.27	98.71	0.22	3.26	1.00	0.02	17.34	93.68	0.21	3.43	1.00	0.03
17.44	25.77	2.00	0.00	1.00	0.00	17.51	23.43	2.00	0.00	1.00	0.00
17.55	21.38	2.00	0.00	1.00	0.00	17.63	20.29	2.00	0.00	1.00	0.00
17.69	19.21	2.00	0.00	1.00	0.00	17.74	18.12	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
17.82	16.35	2.00	0.00	1.00	0.00	17.86	14.10	2.00	0.00	1.00	0.00
17.92	12.02	2.00	0.00	1.00	0.00	18.00	10.04	2.00	0.00	1.00	0.00
18.06	9.25	2.00	0.00	1.00	0.00	18.12	8.16	2.00	0.00	1.00	0.00
18.25	8.63	2.00	0.00	1.00	0.00	18.30	8.43	2.00	0.00	1.00	0.00
18.37	8.43	2.00	0.00	1.00	0.00	18.43	8.42	2.00	0.00	1.00	0.00
18.54	8.21	2.00	0.00	1.00	0.00	18.61	9.07	2.00	0.00	1.00	0.00
18.66	10.13	2.00	0.00	1.00	0.00	18.73	12.35	2.00	0.00	1.00	0.00
18.78	14.87	2.00	0.00	1.00	0.00	18.97	73.05	0.17	4.37	1.00	0.10
19.09	16.33	2.00	0.00	1.00	0.00	19.15	14.20	2.00	0.00	1.00	0.00
19.16	12.47	2.00	0.00	1.00	0.00	19.17	10.25	2.00	0.00	1.00	0.00
19.26	17.42	2.00	0.00	1.00	0.00	19.30	18.17	2.00	0.00	1.00	0.00
19.39	19.08	2.00	0.00	1.00	0.00	19.43	19.63	2.00	0.00	1.00	0.00
19.53	21.66	2.00	0.00	1.00	0.00	19.59	22.95	2.00	0.00	1.00	0.00
19.66	25.16	2.00	0.00	1.00	0.00	19.71	27.84	2.00	0.00	1.00	0.00
19.83	35.81	2.00	0.00	1.00	0.00	19.89	103.55	0.23	3.10	1.00	0.02
19.96	110.97	0.25	2.88	1.00	0.03	20.01	117.44	0.27	2.72	1.00	0.02
20.07	123.87	0.30	2.57	1.00	0.02	20.14	128.46	0.33	2.47	1.00	0.02
20.21	131.22	0.34	2.41	1.00	0.02	20.27	132.30	0.35	2.39	1.00	0.02
20.32	129.67	0.33	2.44	1.00	0.01	20.38	122.94	0.30	2.59	1.00	0.02
20.45	115.74	0.27	2.76	1.00	0.02	20.50	121.25	0.29	2.63	1.00	0.02
20.62	119.60	0.28	2.66	1.00	0.04	20.68	121.45	0.29	2.62	1.00	0.02
20.75	122.13	0.29	2.61	1.00	0.02	20.81	121.49	0.29	2.62	1.00	0.02
20.84	121.54	0.29	2.62	1.00	0.01	20.98	122.78	0.29	2.59	1.00	0.04
21.05	123.63	0.30	2.57	1.00	0.02	21.11	123.67	0.30	2.57	1.00	0.02
21.17	123.19	0.30	2.58	1.00	0.02	21.23	122.53	0.29	2.60	1.00	0.02
21.37	120.77	0.28	2.64	1.00	0.04	21.41	121.11	0.29	2.63	1.00	0.01
21.48	122.57	0.29	2.60	1.00	0.02	21.54	123.21	0.30	2.58	1.00	0.02
21.60	121.22	0.29	2.63	1.00	0.02	21.67	114.05	0.26	2.80	1.00	0.02
21.72	106.84	0.23	3.00	1.00	0.02	21.80	99.11	0.21	3.24	1.00	0.03
21.85	31.01	2.00	0.00	1.00	0.00	21.90	25.77	2.00	0.00	1.00	0.00
21.94	20.97	2.00	0.00	1.00	0.00	21.99	21.67	2.00	0.00	1.00	0.00
22.10	23.25	2.00	0.00	1.00	0.00	22.16	26.54	2.00	0.00	1.00	0.00
22.22	30.08	2.00	0.00	1.00	0.00	22.26	32.65	2.00	0.00	1.00	0.00
22.36	36.67	2.00	0.00	1.00	0.00	22.43	39.89	2.00	0.00	1.00	0.00
22.49	108.13	0.24	2.96	1.00	0.02	22.55	113.52	0.25	2.82	1.00	0.02
22.62	116.41	0.26	2.74	1.00	0.02	22.68	117.42	0.27	2.72	1.00	0.02
22.80	118.59	0.27	2.69	1.00	0.04	22.86	119.93	0.28	2.66	1.00	0.02
22.93	120.84	0.28	2.64	1.00	0.02	22.98	121.61	0.29	2.62	1.00	0.02
23.05	121.47	0.29	2.62	1.00	0.02	23.11	121.60	0.29	2.62	1.00	0.02
23.18	122.28	0.29	2.60	1.00	0.02	23.24	122.36	0.29	2.60	1.00	0.02
23.31	121.81	0.29	2.61	1.00	0.02	23.37	119.53	0.28	2.67	1.00	0.02
23.42	115.34	0.26	2.77	1.00	0.02	23.49	44.55	2.00	0.00	1.00	0.00
23.54	37.74	2.00	0.00	1.00	0.00	23.63	30.64	2.00	0.00	1.00	0.00
23.69	38.35	2.00	0.00	1.00	0.00	23.75	23.77	2.00	0.00	1.00	0.00
23.86	38.95	2.00	0.00	1.00	0.00	23.93	118.56	0.27	2.69	1.00	0.02
23.98	138.73	0.39	2.27	1.00	0.01	24.04	155.52	0.59	1.99	1.00	0.01
24.11	157.11	0.62	1.90	1.00	0.02	24.16	153.82	0.56	2.02	1.00	0.01
24.24	156.98	0.61	1.91	1.00	0.02	24.29	160.28	0.68	1.71	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
24.36	160.33	0.68	1.71	1.00	0.01	24.42	158.67	0.64	1.81	1.00	0.01
24.49	156.47	0.60	1.95	1.00	0.02	24.55	153.21	0.55	2.03	1.00	0.02
24.67	141.16	0.41	2.22	1.00	0.03	24.73	134.13	0.35	2.35	1.00	0.02
24.78	126.94	0.31	2.50	1.00	0.01	24.86	121.09	0.28	2.63	1.00	0.03
24.88	122.04	0.29	2.61	1.00	0.00	25.00	122.79	0.29	2.59	1.00	0.04
25.04	123.87	0.29	2.57	1.00	0.01	25.08	125.31	0.30	2.53	1.00	0.01
25.16	126.87	0.31	2.50	1.00	0.02	25.23	126.71	0.31	2.50	1.00	0.02
25.27	126.07	0.30	2.52	1.00	0.01	25.35	125.48	0.30	2.53	1.00	0.02
25.44	124.44	0.30	2.55	1.00	0.03	25.48	122.69	0.29	2.59	1.00	0.01
25.56	115.35	0.26	2.77	1.00	0.03	25.63	105.55	0.23	3.04	1.00	0.02
25.68	100.82	0.22	3.19	1.00	0.02	25.76	32.38	2.00	0.00	1.00	0.00
25.80	30.93	2.00	0.00	1.00	0.00	25.88	30.47	2.00	0.00	1.00	0.00
25.93	33.74	2.00	0.00	1.00	0.00	26.01	105.74	0.23	3.03	1.00	0.03
26.06	110.60	0.24	2.89	1.00	0.02	26.12	114.47	0.25	2.79	1.00	0.02
26.19	119.52	0.27	2.67	1.00	0.02	26.29	123.10	0.29	2.58	1.00	0.03
26.39	126.01	0.30	2.52	1.00	0.03	26.43	127.74	0.31	2.48	1.00	0.01
26.47	129.03	0.32	2.45	1.00	0.01	26.57	131.02	0.33	2.41	1.00	0.03
26.62	132.04	0.34	2.39	1.00	0.01	26.67	132.73	0.34	2.38	1.00	0.01
26.72	133.20	0.34	2.37	1.00	0.01	26.81	133.52	0.35	2.36	1.00	0.03
26.87	133.75	0.35	2.36	1.00	0.02	26.93	134.23	0.35	2.35	1.00	0.02
26.99	134.97	0.36	2.34	1.00	0.02	27.06	135.94	0.36	2.32	1.00	0.02
27.11	136.68	0.37	2.30	1.00	0.01	27.17	137.52	0.37	2.29	1.00	0.02
27.24	138.32	0.38	2.27	1.00	0.02	27.37	137.54	0.37	2.29	1.00	0.03
27.42	134.39	0.35	2.35	1.00	0.02	27.50	128.51	0.31	2.47	1.00	0.02
27.60	126.94	0.31	2.50	1.00	0.03	27.68	126.93	0.31	2.50	1.00	0.02
27.80	105.48	0.23	3.04	1.00	0.04	27.85	105.18	0.23	3.05	1.00	0.02
27.98	111.16	0.24	2.88	1.00	0.05	28.03	113.63	0.25	2.81	1.00	0.02
28.06	120.44	0.28	2.64	1.00	0.01	28.16	120.10	0.27	2.65	1.00	0.03
28.21	122.92	0.29	2.59	1.00	0.02	28.25	126.59	0.30	2.51	1.00	0.01
28.33	130.46	0.33	2.43	1.00	0.02	28.36	131.40	0.33	2.41	1.00	0.01
28.45	134.43	0.35	2.35	1.00	0.03	28.56	137.49	0.37	2.29	1.00	0.03
28.60	137.93	0.38	2.28	1.00	0.01	28.65	137.62	0.37	2.29	1.00	0.01
28.68	136.99	0.37	2.30	1.00	0.01	28.78	134.06	0.35	2.35	1.00	0.03
28.82	132.23	0.34	2.39	1.00	0.01	28.92	128.67	0.31	2.46	1.00	0.03
28.97	127.57	0.31	2.49	1.00	0.02	29.02	127.51	0.31	2.49	1.00	0.01
29.07	128.51	0.31	2.47	1.00	0.02	29.17	128.09	0.31	2.47	1.00	0.03
29.22	125.57	0.30	2.53	1.00	0.02	29.27	122.81	0.29	2.59	1.00	0.01
29.35	121.90	0.28	2.61	1.00	0.03	29.45	127.06	0.31	2.50	1.00	0.03
29.50	127.75	0.31	2.48	1.00	0.01	29.59	119.13	0.27	2.68	1.00	0.03
29.66	110.71	0.24	2.89	1.00	0.02	29.70	100.79	0.21	3.19	1.00	0.02
29.75	33.26	2.00	0.00	1.00	0.00	29.84	25.01	2.00	0.00	1.00	0.00
29.91	22.67	2.00	0.00	1.00	0.00	29.96	20.00	2.00	0.00	1.00	0.00
30.01	16.95	2.00	0.00	1.00	0.00	30.12	12.04	2.00	0.00	1.00	0.00
30.17	10.44	2.00	0.00	1.00	0.00	30.23	9.31	2.00	0.00	1.00	0.00
30.28	8.67	2.00	0.00	1.00	0.00	30.34	8.27	2.00	0.00	1.00	0.00
30.45	7.94	2.00	0.00	1.00	0.00	30.49	7.94	2.00	0.00	1.00	0.00
30.53	7.93	2.00	0.00	1.00	0.00	30.60	7.93	2.00	0.00	1.00	0.00
30.66	7.60	2.00	0.00	1.00	0.00	30.71	7.51	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
30.80	7.67	2.00	0.00	1.00	0.00	30.87	7.82	2.00	0.00	1.00	0.00
30.93	8.06	2.00	0.00	1.00	0.00	30.97	8.13	2.00	0.00	1.00	0.00
31.07	8.59	2.00	0.00	1.00	0.00	31.11	7.48	2.00	0.00	1.00	0.00
31.21	9.21	2.00	0.00	1.00	0.00	31.25	9.29	2.00	0.00	1.00	0.00
31.31	9.36	2.00	0.00	1.00	0.00	31.37	9.51	2.00	0.00	1.00	0.00
31.43	9.82	2.00	0.00	1.00	0.00	31.51	10.13	2.00	0.00	1.00	0.00
31.58	9.73	2.00	0.00	1.00	0.00	31.64	10.35	2.00	0.00	1.00	0.00
31.70	9.87	2.00	0.00	1.00	0.00	31.77	9.70	2.00	0.00	1.00	0.00
31.82	9.78	2.00	0.00	1.00	0.00	31.91	9.92	2.00	0.00	1.00	0.00
31.98	9.92	2.00	0.00	1.00	0.00	32.05	9.91	2.00	0.00	1.00	0.00
32.13	10.37	2.00	0.00	1.00	0.00	32.17	10.67	2.00	0.00	1.00	0.00
32.24	10.90	2.00	0.00	1.00	0.00	32.32	11.20	2.00	0.00	1.00	0.00
32.36	11.20	2.00	0.00	1.00	0.00	32.43	11.19	2.00	0.00	1.00	0.00
32.50	11.18	2.00	0.00	1.00	0.00	32.58	9.77	2.00	0.00	1.00	0.00
32.65	8.99	2.00	0.00	1.00	0.00	32.70	8.75	2.00	0.00	1.00	0.00
32.81	8.04	2.00	0.00	1.00	0.00	32.87	8.03	2.00	0.00	1.00	0.00
32.92	7.95	2.00	0.00	1.00	0.00	32.99	8.25	2.00	0.00	1.00	0.00
33.05	8.56	2.00	0.00	1.00	0.00	33.11	8.71	2.00	0.00	1.00	0.00
33.17	9.09	2.00	0.00	1.00	0.00	33.23	9.16	2.00	0.00	1.00	0.00
33.29	9.15	2.00	0.00	1.00	0.00	33.36	9.15	2.00	0.00	1.00	0.00
33.42	9.21	2.00	0.00	1.00	0.00	33.49	9.29	2.00	0.00	1.00	0.00
33.55	9.36	2.00	0.00	1.00	0.00	33.61	9.51	2.00	0.00	1.00	0.00
33.66	9.42	2.00	0.00	1.00	0.00	33.73	9.26	2.00	0.00	1.00	0.00
33.79	9.03	2.00	0.00	1.00	0.00	33.92	8.86	2.00	0.00	1.00	0.00
33.93	8.63	2.00	0.00	1.00	0.00	33.99	8.89	2.00	0.00	1.00	0.00
34.06	8.92	2.00	0.00	1.00	0.00	34.14	10.14	2.00	0.00	1.00	0.00
34.21	12.51	2.00	0.00	1.00	0.00	34.33	14.64	2.00	0.00	1.00	0.00
34.38	14.25	2.00	0.00	1.00	0.00	34.44	13.78	2.00	0.00	1.00	0.00
34.50	13.16	2.00	0.00	1.00	0.00	34.54	12.84	2.00	0.00	1.00	0.00
34.58	12.60	2.00	0.00	1.00	0.00	34.68	12.67	2.00	0.00	1.00	0.00
34.73	13.80	2.00	0.00	1.00	0.00	34.83	17.07	2.00	0.00	1.00	0.00
34.89	18.90	2.00	0.00	1.00	0.00	34.93	20.19	2.00	0.00	1.00	0.00
34.98	21.25	2.00	0.00	1.00	0.00	35.11	26.87	2.00	0.00	1.00	0.00
35.17	31.46	2.00	0.00	1.00	0.00	35.22	35.98	2.00	0.00	1.00	0.00
35.27	104.32	0.22	3.08	1.00	0.02	35.31	114.18	0.25	2.80	1.00	0.01
35.47	142.41	0.41	2.20	1.00	0.04	35.51	140.65	0.39	2.23	1.00	0.01
35.55	134.89	0.35	2.34	1.00	0.01	35.61	137.09	0.36	2.30	1.00	0.01
35.66	134.92	0.35	2.34	1.00	0.02	35.72	138.26	0.37	2.27	1.00	0.02
35.83	145.48	0.44	2.15	1.00	0.03	35.90	152.36	0.52	2.04	1.00	0.02
35.95	156.58	0.58	1.94	1.00	0.01	36.01	160.01	0.65	1.73	1.00	0.01
36.05	160.97	0.66	1.67	1.00	0.01	36.11	157.76	0.60	1.86	1.00	0.01
36.17	154.63	0.55	2.00	1.00	0.01	36.27	152.00	0.51	2.04	1.00	0.03
36.33	151.94	0.51	2.05	1.00	0.01	36.39	151.95	0.51	2.04	1.00	0.01
36.43	152.22	0.52	2.04	1.00	0.01	36.49	152.56	0.52	2.04	1.00	0.01
36.60	153.16	0.53	2.03	1.00	0.03	36.65	152.71	0.52	2.03	1.00	0.01
36.71	155.33	0.56	1.99	1.00	0.01	36.78	143.68	0.42	2.18	1.00	0.02
36.82	137.48	0.37	2.29	1.00	0.01	36.89	131.42	0.33	2.41	1.00	0.02
36.96	129.66	0.32	2.44	1.00	0.02	37.02	135.91	0.36	2.32	1.00	0.02

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
37.10	149.96	0.49	2.08	1.00	0.02	37.16	158.90	0.62	1.79	1.00	0.01
37.23	167.77	0.83	1.12	1.00	0.01	37.28	173.70	1.04	0.71	1.00	0.00
37.38	185.64	1.74	0.12	1.00	0.00	37.42	189.32	2.00	0.00	1.00	0.00
37.47	193.23	2.00	0.00	1.00	0.00	37.56	198.63	2.00	0.00	1.00	0.00
37.65	199.65	2.00	0.00	1.00	0.00	37.69	198.56	2.00	0.00	1.00	0.00
37.73	196.93	2.00	0.00	1.00	0.00	37.81	192.86	2.00	0.00	1.00	0.00
37.91	186.19	1.78	0.09	1.00	0.00	37.99	179.80	1.33	0.38	1.00	0.00
38.04	171.50	0.95	0.85	1.00	0.01	38.11	165.91	0.78	1.27	1.00	0.01
38.17	163.72	0.73	1.48	1.00	0.01	38.22	165.96	0.78	1.27	1.00	0.01
38.29	167.26	0.82	1.16	1.00	0.01	38.35	166.04	0.79	1.26	1.00	0.01
38.40	163.76	0.73	1.47	1.00	0.01	38.52	156.27	0.58	1.96	1.00	0.03
38.59	155.78	0.57	1.99	1.00	0.02	38.65	151.05	0.50	2.06	1.00	0.02
38.79	149.44	0.48	2.08	1.00	0.03	38.83	151.92	0.51	2.05	1.00	0.01
38.90	156.60	0.59	1.94	1.00	0.02	38.96	161.54	0.68	1.64	1.00	0.01
39.02	165.97	0.78	1.26	1.00	0.01	39.09	152.03	0.52	2.04	1.00	0.02
39.14	143.58	0.42	2.18	1.00	0.01	39.20	142.04	0.41	2.21	1.00	0.02
39.27	141.95	0.41	2.21	1.00	0.02	39.34	142.27	0.41	2.20	1.00	0.02
39.40	141.03	0.40	2.22	1.00	0.02	39.45	144.04	0.43	2.17	1.00	0.01
39.52	140.89	0.40	2.23	1.00	0.02	39.58	141.34	0.40	2.22	1.00	0.02
39.69	148.50	0.47	2.10	1.00	0.03	39.71	149.59	0.49	2.08	1.00	0.00
39.80	155.80	0.57	1.99	1.00	0.02	39.84	157.76	0.61	1.86	1.00	0.01
39.92	162.22	0.69	1.60	1.00	0.02	39.98	163.71	0.73	1.47	1.00	0.01
40.03	164.45	0.75	1.40	1.00	0.01	40.13	164.10	0.74	1.43	1.00	0.02
40.18	163.63	0.73	1.48	1.00	0.01	40.27	161.75	0.68	1.63	1.00	0.02
40.35	158.93	0.63	1.79	1.00	0.02	40.40	157.13	0.60	1.90	1.00	0.01
40.44	154.57	0.55	2.01	1.00	0.01	40.54	148.12	0.47	2.11	1.00	0.02
40.59	144.47	0.43	2.17	1.00	0.01	40.67	139.14	0.38	2.26	1.00	0.02
40.72	136.96	0.37	2.30	1.00	0.01	40.78	133.63	0.34	2.36	1.00	0.02
40.82	131.28	0.33	2.41	1.00	0.01	40.93	125.88	0.30	2.52	1.00	0.03
40.97	123.24	0.29	2.58	1.00	0.01	41.06	120.63	0.28	2.64	1.00	0.03
41.10	119.41	0.27	2.67	1.00	0.02	41.16	116.88	0.26	2.73	1.00	0.02
41.23	113.53	0.25	2.82	1.00	0.02	41.28	111.11	0.24	2.88	1.00	0.02
41.35	109.79	0.24	2.92	1.00	0.02	41.41	111.10	0.24	2.88	1.00	0.02
41.47	110.28	0.24	2.90	1.00	0.02	41.54	111.37	0.24	2.87	1.00	0.02
41.66	129.81	0.32	2.44	1.00	0.03	41.72	138.47	0.38	2.27	1.00	0.02
41.78	117.51	0.27	2.72	1.00	0.02	41.85	107.93	0.23	2.97	1.00	0.02
41.90	112.30	0.25	2.85	1.00	0.02	41.97	117.81	0.27	2.71	1.00	0.02
42.03	120.41	0.28	2.65	1.00	0.02	42.08	121.71	0.28	2.61	1.00	0.02
42.14	130.95	0.33	2.42	1.00	0.02	42.20	144.89	0.44	2.16	1.00	0.02
42.28	150.93	0.51	2.06	1.00	0.02	42.33	148.22	0.47	2.10	1.00	0.01
42.41	136.20	0.36	2.31	1.00	0.02	42.51	118.04	0.27	2.70	1.00	0.03
42.59	37.73	2.00	0.00	1.00	0.00	42.66	33.77	2.00	0.00	1.00	0.00
42.70	32.47	2.00	0.00	1.00	0.00	42.77	30.88	2.00	0.00	1.00	0.00
42.82	34.42	2.00	0.00	1.00	0.00	42.87	104.89	0.23	3.06	1.00	0.02
42.92	112.59	0.25	2.84	1.00	0.02	42.98	117.79	0.27	2.71	1.00	0.02
43.09	120.90	0.28	2.63	1.00	0.03	43.17	117.96	0.27	2.70	1.00	0.02
43.23	116.58	0.26	2.74	1.00	0.02	43.30	114.61	0.26	2.79	1.00	0.02
43.35	111.66	0.25	2.87	1.00	0.02	43.43	105.89	0.23	3.03	1.00	0.03

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
43.48	99.45	0.21	3.23	1.00	0.02	43.53	32.44	2.00	0.00	1.00	0.00
43.61	28.12	2.00	0.00	1.00	0.00	43.65	25.59	2.00	0.00	1.00	0.00
43.72	22.99	2.00	0.00	1.00	0.00	43.78	19.93	2.00	0.00	1.00	0.00
43.85	18.25	2.00	0.00	1.00	0.00	43.91	17.34	2.00	0.00	1.00	0.00
43.97	16.16	2.00	0.00	1.00	0.00	44.09	15.31	2.00	0.00	1.00	0.00
44.15	15.78	2.00	0.00	1.00	0.00	44.22	15.84	2.00	0.00	1.00	0.00
44.26	15.43	2.00	0.00	1.00	0.00	44.32	15.36	2.00	0.00	1.00	0.00
44.39	14.73	2.00	0.00	1.00	0.00	44.44	17.18	2.00	0.00	1.00	0.00
44.53	16.82	2.00	0.00	1.00	0.00	44.58	16.00	2.00	0.00	1.00	0.00
44.62	15.96	2.00	0.00	1.00	0.00	44.71	15.91	2.00	0.00	1.00	0.00
44.75	17.75	2.00	0.00	1.00	0.00	44.84	19.30	2.00	0.00	1.00	0.00
44.88	19.09	2.00	0.00	1.00	0.00	44.97	18.26	2.00	0.00	1.00	0.00
45.02	18.87	2.00	0.00	1.00	0.00	45.12	20.01	2.00	0.00	1.00	0.00
45.19	20.89	2.00	0.00	1.00	0.00	45.24	21.70	2.00	0.00	1.00	0.00
45.28	22.45	2.00	0.00	1.00	0.00	45.40	24.22	2.00	0.00	1.00	0.00
45.45	24.75	2.00	0.00	1.00	0.00	45.50	25.36	2.00	0.00	1.00	0.00
45.54	26.11	2.00	0.00	1.00	0.00	45.64	26.22	2.00	0.00	1.00	0.00
45.69	27.39	2.00	0.00	1.00	0.00	45.81	29.71	2.00	0.00	1.00	0.00
45.85	31.72	2.00	0.00	1.00	0.00	45.89	34.21	2.00	0.00	1.00	0.00
45.94	37.54	2.00	0.00	1.00	0.00	46.04	52.90	2.00	0.00	1.00	0.00
46.10	130.69	0.33	2.42	1.00	0.02	46.15	140.42	0.40	2.24	1.00	0.01
46.20	144.01	0.43	2.17	1.00	0.01	46.29	131.42	0.34	2.41	1.00	0.03
46.44	129.03	0.32	2.45	1.00	0.04	46.49	118.43	0.27	2.69	1.00	0.01
46.55	124.61	0.30	2.55	1.00	0.02	46.60	128.99	0.32	2.46	1.00	0.01
46.64	130.09	0.33	2.43	1.00	0.01	46.70	123.63	0.30	2.57	1.00	0.02
46.75	123.92	0.30	2.56	1.00	0.02	46.80	125.03	0.30	2.54	1.00	0.01
46.86	125.22	0.30	2.54	1.00	0.02	46.95	120.00	0.28	2.66	1.00	0.03
47.05	111.97	0.25	2.86	1.00	0.03	47.11	107.04	0.24	3.00	1.00	0.02
47.17	103.98	0.23	3.09	1.00	0.02	47.21	99.27	0.22	3.24	1.00	0.02
47.30	28.41	2.00	0.00	1.00	0.00	47.36	24.21	2.00	0.00	1.00	0.00
47.39	19.51	2.00	0.00	1.00	0.00	47.47	16.83	2.00	0.00	1.00	0.00
47.51	15.89	2.00	0.00	1.00	0.00	47.61	16.27	2.00	0.00	1.00	0.00
47.66	17.80	2.00	0.00	1.00	0.00	47.76	19.58	2.00	0.00	1.00	0.00
47.81	19.64	2.00	0.00	1.00	0.00	47.85	21.97	2.00	0.00	1.00	0.00
47.95	26.12	2.00	0.00	1.00	0.00	48.01	26.84	2.00	0.00	1.00	0.00
48.06	26.68	2.00	0.00	1.00	0.00	48.11	25.53	2.00	0.00	1.00	0.00
48.16	24.04	2.00	0.00	1.00	0.00	48.25	20.55	2.00	0.00	1.00	0.00
48.31	18.87	2.00	0.00	1.00	0.00	48.39	18.32	2.00	0.00	1.00	0.00
48.46	22.38	2.00	0.00	1.00	0.00	48.52	29.36	2.00	0.00	1.00	0.00
48.60	110.57	0.25	2.90	1.00	0.03	48.65	120.89	0.29	2.63	1.00	0.02
48.70	132.13	0.34	2.39	1.00	0.02	48.81	145.24	0.45	2.15	1.00	0.03
48.87	148.94	0.49	2.09	1.00	0.01	48.91	151.86	0.53	2.05	1.00	0.01
48.96	153.32	0.55	2.02	1.00	0.01	49.06	156.49	0.60	1.94	1.00	0.02
49.12	155.77	0.58	1.99	1.00	0.01	49.17	152.78	0.54	2.03	1.00	0.01
49.22	148.24	0.48	2.10	1.00	0.01	49.32	144.43	0.44	2.17	1.00	0.02
49.39	141.03	0.41	2.22	1.00	0.02	49.43	138.42	0.39	2.27	1.00	0.01
49.48	137.14	0.38	2.30	1.00	0.01	49.58	130.21	0.33	2.43	1.00	0.03
49.64	126.81	0.31	2.50	1.00	0.02	49.68	118.85	0.28	2.68	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
49.78	119.72	0.28	2.66	1.00	0.03	49.83	114.94	0.26	2.78	1.00	0.02
49.93	45.58	2.00	0.00	1.00	0.00	49.97	42.86	2.00	0.00	1.00	0.00
50.01	39.54	2.00	0.00	1.00	0.00	50.09	31.88	2.00	0.00	1.00	0.00
50.13	28.63	2.00	0.00	1.00	0.00	50.22	22.95	2.00	0.00	1.00	0.00

Total estimated settlement: 7.62

Abbreviations

$Q_{tn,cs}$: Equivalent clean sand normalized cone resistance
FS: Factor of safety against liquefaction
e_v (%): Post-liquefaction volumentric strain
DF: e_v depth weighting factor
Settlement: Calculated settlement

:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
5.04	153.24	0.92	1.07	1.00	0.02	5.09	152.25	0.89	1.16	1.00	0.01
5.16	152.18	0.88	1.18	1.00	0.01	5.27	151.76	0.86	1.24	1.00	0.02
5.35	149.99	0.82	1.42	1.00	0.01	5.39	148.23	0.78	1.61	1.00	0.01
5.48	145.62	0.73	1.98	1.00	0.02	5.52	142.36	0.67	2.20	1.00	0.01
5.59	139.79	0.63	2.25	1.00	0.02	5.65	137.53	0.60	2.29	1.00	0.02
5.71	135.23	0.57	2.33	1.00	0.02	5.83	132.16	0.53	2.39	1.00	0.03
5.92	130.90	0.52	2.42	1.00	0.02	5.96	130.53	0.51	2.42	1.00	0.01
6.03	129.99	0.50	2.43	1.00	0.02	6.09	129.61	0.50	2.44	1.00	0.02
6.15	128.80	0.49	2.46	1.00	0.02	6.23	127.57	0.48	2.49	1.00	0.02
6.29	126.52	0.46	2.51	1.00	0.02	6.36	125.77	0.46	2.52	1.00	0.02
6.41	125.02	0.45	2.54	1.00	0.02	6.49	123.41	0.44	2.58	1.00	0.02
6.54	122.29	0.43	2.60	1.00	0.02	6.62	120.73	0.41	2.64	1.00	0.03
6.67	120.14	0.41	2.65	1.00	0.01	6.73	119.66	0.41	2.66	1.00	0.02
6.80	117.61	0.39	2.71	1.00	0.02	6.86	114.34	0.37	2.80	1.00	0.02
6.93	109.92	0.35	2.91	1.00	0.03	6.99	103.38	0.32	3.11	1.00	0.02
7.06	96.92	0.30	3.32	1.00	0.03	7.11	90.34	0.28	3.56	1.00	0.02
7.20	85.02	0.27	3.78	1.00	0.04	7.25	82.15	0.26	3.91	1.00	0.02
7.29	83.52	0.26	3.85	1.00	0.02	7.36	84.66	0.26	3.79	1.00	0.04
7.46	84.29	0.26	3.81	1.00	0.05	7.52	86.25	0.26	3.73	1.00	0.03
7.58	89.49	0.27	3.59	1.00	0.03	7.64	92.16	0.28	3.49	1.00	0.02
7.70	94.06	0.28	3.42	1.00	0.03	7.77	95.63	0.28	3.36	1.00	0.03
7.81	96.70	0.29	3.32	1.00	0.02	7.90	98.30	0.29	3.27	1.00	0.03
7.95	99.29	0.29	3.24	1.00	0.02	8.01	100.37	0.30	3.20	1.00	0.02
8.08	101.29	0.30	3.17	1.00	0.03	8.19	100.77	0.29	3.19	1.00	0.04
8.25	100.04	0.29	3.21	1.00	0.03	8.32	98.83	0.29	3.25	1.00	0.03
8.38	97.10	0.28	3.31	1.00	0.02	8.44	95.06	0.27	3.38	1.00	0.02
8.52	92.46	0.27	3.48	1.00	0.03	8.56	92.19	0.26	3.49	1.00	0.02
8.65	91.22	0.26	3.53	1.00	0.04	8.70	90.84	0.26	3.54	1.00	0.02
8.77	99.65	0.28	3.22	1.00	0.03	8.82	101.96	0.29	3.15	1.00	0.02
8.95	99.02	0.28	3.25	1.00	0.05	9.00	103.94	0.29	3.09	1.00	0.02
9.09	107.13	0.30	2.99	1.00	0.03	9.13	108.96	0.31	2.94	1.00	0.02
9.20	110.12	0.31	2.91	1.00	0.02	9.26	111.18	0.32	2.88	1.00	0.02
9.32	111.04	0.32	2.88	1.00	0.02	9.39	110.25	0.31	2.90	1.00	0.02
9.44	109.19	0.31	2.93	1.00	0.02	9.52	108.48	0.30	2.95	1.00	0.03
9.57	107.94	0.30	2.97	1.00	0.02	9.75	105.00	0.29	3.06	1.00	0.06
9.82	104.88	0.29	3.06	1.00	0.02	9.88	104.91	0.29	3.06	1.00	0.02
9.97	106.06	0.29	3.02	1.00	0.03	10.07	113.29	0.32	2.82	1.00	0.04
10.15	117.58	0.34	2.71	1.00	0.02	10.20	109.27	0.30	2.93	1.00	0.02
10.28	102.64	0.28	3.13	1.00	0.03	10.32	97.25	0.26	3.31	1.00	0.02
10.40	90.32	0.24	3.56	1.00	0.03	10.46	84.42	0.23	3.81	1.00	0.02
10.50	20.37	2.00	0.00	1.00	0.00	10.51	17.89	2.00	0.00	1.00	0.00
10.59	18.22	2.00	0.00	1.00	0.00	10.64	16.80	2.00	0.00	1.00	0.00
10.73	13.91	2.00	0.00	1.00	0.00	10.79	13.05	2.00	0.00	1.00	0.00
10.84	13.17	2.00	0.00	1.00	0.00	10.90	12.80	2.00	0.00	1.00	0.00
10.99	12.06	2.00	0.00	1.00	0.00	11.06	11.45	2.00	0.00	1.00	0.00
11.12	10.83	2.00	0.00	1.00	0.00	11.16	10.33	2.00	0.00	1.00	0.00
11.27	10.71	2.00	0.00	1.00	0.00	11.31	10.65	2.00	0.00	1.00	0.00
11.38	11.22	2.00	0.00	1.00	0.00	11.43	11.92	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
11.58	13.51	2.00	0.00	1.00	0.00	11.65	13.84	2.00	0.00	1.00	0.00
11.70	13.82	2.00	0.00	1.00	0.00	11.74	13.80	2.00	0.00	1.00	0.00
11.79	13.79	2.00	0.00	1.00	0.00	11.84	14.47	2.00	0.00	1.00	0.00
11.91	15.60	2.00	0.00	1.00	0.00	11.95	17.30	2.00	0.00	1.00	0.00
12.01	18.54	2.00	0.00	1.00	0.00	12.09	19.29	2.00	0.00	1.00	0.00
12.21	19.12	2.00	0.00	1.00	0.00	12.27	19.31	2.00	0.00	1.00	0.00
12.35	19.84	2.00	0.00	1.00	0.00	12.40	20.27	2.00	0.00	1.00	0.00
12.45	21.35	2.00	0.00	1.00	0.00	12.53	22.98	2.00	0.00	1.00	0.00
12.60	23.83	2.00	0.00	1.00	0.00	12.72	22.67	2.00	0.00	1.00	0.00
12.79	22.18	2.00	0.00	1.00	0.00	12.84	78.45	0.20	4.08	1.00	0.02
12.89	78.58	0.20	4.08	1.00	0.03	12.97	79.48	0.20	4.03	1.00	0.04
13.03	81.63	0.20	3.93	1.00	0.03	13.10	83.30	0.21	3.86	1.00	0.03
13.15	82.30	0.20	3.90	1.00	0.02	13.20	79.73	0.20	4.02	1.00	0.02
13.27	76.46	0.19	4.19	1.00	0.04	13.32	17.60	2.00	0.00	1.00	0.00
13.45	12.95	2.00	0.00	1.00	0.00	13.50	12.50	2.00	0.00	1.00	0.00
13.57	11.92	2.00	0.00	1.00	0.00	13.63	10.89	2.00	0.00	1.00	0.00
13.68	10.20	2.00	0.00	1.00	0.00	13.75	10.08	2.00	0.00	1.00	0.00
13.87	9.84	2.00	0.00	1.00	0.00	13.94	9.83	2.00	0.00	1.00	0.00
13.99	9.82	2.00	0.00	1.00	0.00	14.06	9.81	2.00	0.00	1.00	0.00
14.11	10.02	2.00	0.00	1.00	0.00	14.19	10.23	2.00	0.00	1.00	0.00
14.24	10.78	2.00	0.00	1.00	0.00	14.31	12.01	2.00	0.00	1.00	0.00
14.37	12.09	2.00	0.00	1.00	0.00	14.43	12.74	2.00	0.00	1.00	0.00
14.51	13.29	2.00	0.00	1.00	0.00	14.55	14.94	2.00	0.00	1.00	0.00
14.62	14.70	2.00	0.00	1.00	0.00	14.68	15.02	2.00	0.00	1.00	0.00
14.76	14.55	2.00	0.00	1.00	0.00	14.82	14.20	2.00	0.00	1.00	0.00
14.89	13.85	2.00	0.00	1.00	0.00	14.95	13.29	2.00	0.00	1.00	0.00
15.07	12.59	2.00	0.00	1.00	0.00	15.13	12.25	2.00	0.00	1.00	0.00
15.21	11.68	2.00	0.00	1.00	0.00	15.26	10.89	2.00	0.00	1.00	0.00
15.32	11.71	2.00	0.00	1.00	0.00	15.39	11.43	2.00	0.00	1.00	0.00
15.44	11.75	2.00	0.00	1.00	0.00	15.49	12.07	2.00	0.00	1.00	0.00
15.56	11.73	2.00	0.00	1.00	0.00	15.61	11.72	2.00	0.00	1.00	0.00
15.69	11.38	2.00	0.00	1.00	0.00	15.74	11.14	2.00	0.00	1.00	0.00
15.82	10.69	2.00	0.00	1.00	0.00	15.87	10.24	2.00	0.00	1.00	0.00
15.94	10.12	2.00	0.00	1.00	0.00	16.05	9.67	2.00	0.00	1.00	0.00
16.13	9.21	2.00	0.00	1.00	0.00	16.18	8.77	2.00	0.00	1.00	0.00
16.24	8.43	2.00	0.00	1.00	0.00	16.31	8.52	2.00	0.00	1.00	0.00
16.38	7.97	2.00	0.00	1.00	0.00	16.42	8.08	2.00	0.00	1.00	0.00
16.52	8.06	2.00	0.00	1.00	0.00	16.56	8.06	2.00	0.00	1.00	0.00
16.62	8.59	2.00	0.00	1.00	0.00	16.69	8.47	2.00	0.00	1.00	0.00
16.74	8.46	2.00	0.00	1.00	0.00	16.86	8.67	2.00	0.00	1.00	0.00
16.93	8.76	2.00	0.00	1.00	0.00	17.00	8.97	2.00	0.00	1.00	0.00
17.05	9.29	2.00	0.00	1.00	0.00	17.13	9.60	2.00	0.00	1.00	0.00
17.18	9.69	2.00	0.00	1.00	0.00	17.24	10.32	2.00	0.00	1.00	0.00
17.30	11.07	2.00	0.00	1.00	0.00	17.36	11.69	2.00	0.00	1.00	0.00
17.43	12.40	2.00	0.00	1.00	0.00	17.48	13.66	2.00	0.00	1.00	0.00
17.54	14.79	2.00	0.00	1.00	0.00	17.61	15.60	2.00	0.00	1.00	0.00
17.66	15.90	2.00	0.00	1.00	0.00	17.73	17.13	2.00	0.00	1.00	0.00
17.79	18.55	2.00	0.00	1.00	0.00	17.92	17.78	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
17.98	18.06	2.00	0.00	1.00	0.00	18.05	19.67	2.00	0.00	1.00	0.00
18.11	20.99	2.00	0.00	1.00	0.00	18.18	22.58	2.00	0.00	1.00	0.00
18.23	26.51	2.00	0.00	1.00	0.00	18.28	92.45	0.20	3.48	1.00	0.02
18.36	96.90	0.21	3.32	1.00	0.03	18.45	92.52	0.20	3.48	1.00	0.03
18.51	22.63	2.00	0.00	1.00	0.00	18.58	17.11	2.00	0.00	1.00	0.00
18.63	13.93	2.00	0.00	1.00	0.00	18.71	11.13	2.00	0.00	1.00	0.00
18.76	9.68	2.00	0.00	1.00	0.00	18.83	9.46	2.00	0.00	1.00	0.00
18.89	9.76	2.00	0.00	1.00	0.00	18.95	9.85	2.00	0.00	1.00	0.00
19.02	10.25	2.00	0.00	1.00	0.00	19.08	10.86	2.00	0.00	1.00	0.00
19.15	11.76	2.00	0.00	1.00	0.00	19.20	12.87	2.00	0.00	1.00	0.00
19.27	14.48	2.00	0.00	1.00	0.00	19.33	15.98	2.00	0.00	1.00	0.00
19.41	16.78	2.00	0.00	1.00	0.00	19.46	19.07	2.00	0.00	1.00	0.00
19.54	22.52	2.00	0.00	1.00	0.00	19.63	22.26	2.00	0.00	1.00	0.00
19.67	27.97	2.00	0.00	1.00	0.00	19.73	92.14	0.20	3.49	1.00	0.02
19.78	94.17	0.20	3.41	1.00	0.02	19.84	95.38	0.21	3.37	1.00	0.03
19.89	96.08	0.21	3.35	1.00	0.02	20.02	97.41	0.21	3.30	1.00	0.05
20.07	98.19	0.21	3.27	1.00	0.02	20.15	98.40	0.21	3.27	1.00	0.03
20.20	98.94	0.21	3.25	1.00	0.02	20.28	99.78	0.22	3.22	1.00	0.03
20.33	101.14	0.22	3.18	1.00	0.02	20.41	102.84	0.22	3.12	1.00	0.03
20.46	104.76	0.23	3.06	1.00	0.02	20.53	106.10	0.23	3.02	1.00	0.02
20.58	106.57	0.23	3.01	1.00	0.02	20.64	107.15	0.24	2.99	1.00	0.02
20.69	107.72	0.24	2.98	1.00	0.02	20.77	107.56	0.24	2.98	1.00	0.03
20.83	107.57	0.24	2.98	1.00	0.02	20.90	108.20	0.24	2.96	1.00	0.02
21.03	110.47	0.24	2.90	1.00	0.05	21.08	110.80	0.25	2.89	1.00	0.02
21.15	110.16	0.24	2.91	1.00	0.03	21.21	110.10	0.24	2.91	1.00	0.02
21.34	108.54	0.24	2.95	1.00	0.05	21.39	109.13	0.24	2.94	1.00	0.02
21.46	109.14	0.24	2.94	1.00	0.03	21.52	108.56	0.24	2.95	1.00	0.02
21.59	108.41	0.24	2.96	1.00	0.03	21.65	108.32	0.24	2.96	1.00	0.02
21.72	108.16	0.24	2.96	1.00	0.02	21.78	108.90	0.24	2.94	1.00	0.02
21.83	108.29	0.24	2.96	1.00	0.02	21.91	106.44	0.23	3.01	1.00	0.03
21.97	104.86	0.23	3.06	1.00	0.02	22.05	105.21	0.23	3.05	1.00	0.03
22.10	104.73	0.23	3.06	1.00	0.02	22.17	103.25	0.22	3.11	1.00	0.02
22.22	100.30	0.21	3.20	1.00	0.02	22.31	96.63	0.21	3.33	1.00	0.03
22.35	93.41	0.20	3.44	1.00	0.02	22.42	90.37	0.19	3.56	1.00	0.03
22.49	27.53	2.00	0.00	1.00	0.00	22.53	22.34	2.00	0.00	1.00	0.00
22.60	27.95	2.00	0.00	1.00	0.00	22.66	23.05	2.00	0.00	1.00	0.00
22.72	28.37	2.00	0.00	1.00	0.00	22.84	102.39	0.22	3.14	1.00	0.04
22.88	106.47	0.23	3.01	1.00	0.02	22.94	107.08	0.23	2.99	1.00	0.02
23.00	105.17	0.23	3.05	1.00	0.02	23.05	102.05	0.22	3.15	1.00	0.02
23.19	28.86	2.00	0.00	1.00	0.00	23.23	24.30	2.00	0.00	1.00	0.00
23.27	20.84	2.00	0.00	1.00	0.00	23.32	18.12	2.00	0.00	1.00	0.00
23.37	15.39	2.00	0.00	1.00	0.00	23.45	13.39	2.00	0.00	1.00	0.00
23.54	11.97	2.00	0.00	1.00	0.00	23.58	11.59	2.00	0.00	1.00	0.00
23.65	11.02	2.00	0.00	1.00	0.00	23.71	10.54	2.00	0.00	1.00	0.00
23.76	10.05	2.00	0.00	1.00	0.00	23.86	8.91	2.00	0.00	1.00	0.00
23.94	8.82	2.00	0.00	1.00	0.00	24.06	9.17	2.00	0.00	1.00	0.00
24.12	9.27	2.00	0.00	1.00	0.00	24.17	9.44	2.00	0.00	1.00	0.00
24.24	9.72	2.00	0.00	1.00	0.00	24.32	10.19	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
24.37	10.36	2.00	0.00	1.00	0.00	24.42	10.45	2.00	0.00	1.00	0.00
24.51	10.44	2.00	0.00	1.00	0.00	24.55	10.62	2.00	0.00	1.00	0.00
24.62	10.60	2.00	0.00	1.00	0.00	24.69	10.69	2.00	0.00	1.00	0.00
24.74	10.68	2.00	0.00	1.00	0.00	24.82	10.85	2.00	0.00	1.00	0.00
24.86	11.12	2.00	0.00	1.00	0.00	24.94	11.84	2.00	0.00	1.00	0.00
25.06	14.11	2.00	0.00	1.00	0.00	25.12	17.51	2.00	0.00	1.00	0.00
25.20	21.58	2.00	0.00	1.00	0.00	25.26	86.03	0.18	3.74	1.00	0.03
25.32	92.21	0.19	3.49	1.00	0.02	25.39	97.99	0.20	3.28	1.00	0.03
25.41	96.43	0.20	3.33	1.00	0.01	25.49	103.03	0.22	3.12	1.00	0.03
25.55	104.56	0.22	3.07	1.00	0.02	25.63	108.94	0.23	2.94	1.00	0.03
25.68	111.28	0.24	2.88	1.00	0.02	25.75	114.10	0.25	2.80	1.00	0.02
25.85	119.65	0.27	2.66	1.00	0.03	25.90	122.05	0.28	2.61	1.00	0.01
25.94	123.88	0.29	2.57	1.00	0.01	25.99	124.14	0.29	2.56	1.00	0.02
26.11	108.73	0.23	2.95	1.00	0.04	26.16	102.92	0.22	3.12	1.00	0.02
26.21	102.04	0.21	3.15	1.00	0.02	26.26	102.60	0.21	3.13	1.00	0.02
26.32	104.40	0.22	3.07	1.00	0.03	26.38	105.98	0.22	3.03	1.00	0.02
26.48	102.26	0.21	3.14	1.00	0.04	26.53	98.67	0.21	3.26	1.00	0.02
26.65	92.02	0.19	3.49	1.00	0.05	26.69	89.14	0.19	3.61	1.00	0.02
26.76	85.70	0.18	3.75	1.00	0.03	26.81	23.42	2.00	0.00	1.00	0.00
26.86	19.48	2.00	0.00	1.00	0.00	26.93	16.08	2.00	0.00	1.00	0.00
26.99	13.57	2.00	0.00	1.00	0.00	27.04	12.05	2.00	0.00	1.00	0.00
27.16	9.71	2.00	0.00	1.00	0.00	27.22	9.07	2.00	0.00	1.00	0.00
27.28	8.53	2.00	0.00	1.00	0.00	27.35	8.61	2.00	0.00	1.00	0.00
27.39	8.61	2.00	0.00	1.00	0.00	27.44	9.31	2.00	0.00	1.00	0.00
27.52	9.74	2.00	0.00	1.00	0.00	27.57	9.83	2.00	0.00	1.00	0.00
27.63	9.99	2.00	0.00	1.00	0.00	27.70	9.98	2.00	0.00	1.00	0.00
27.77	9.97	2.00	0.00	1.00	0.00	27.84	9.96	2.00	0.00	1.00	0.00
27.90	10.04	2.00	0.00	1.00	0.00	27.96	10.21	2.00	0.00	1.00	0.00
28.10	10.72	2.00	0.00	1.00	0.00	28.14	11.41	2.00	0.00	1.00	0.00
28.22	11.76	2.00	0.00	1.00	0.00	28.27	12.10	2.00	0.00	1.00	0.00
28.34	12.36	2.00	0.00	1.00	0.00	28.40	12.34	2.00	0.00	1.00	0.00
28.45	11.28	2.00	0.00	1.00	0.00	28.51	10.66	2.00	0.00	1.00	0.00
28.57	10.91	2.00	0.00	1.00	0.00	28.65	10.90	2.00	0.00	1.00	0.00
28.70	10.89	2.00	0.00	1.00	0.00	28.74	10.88	2.00	0.00	1.00	0.00
28.82	10.87	2.00	0.00	1.00	0.00	28.88	10.51	2.00	0.00	1.00	0.00
28.97	10.06	2.00	0.00	1.00	0.00	29.00	9.80	2.00	0.00	1.00	0.00
29.09	9.62	2.00	0.00	1.00	0.00	29.17	9.17	2.00	0.00	1.00	0.00
29.22	9.34	2.00	0.00	1.00	0.00	29.27	9.33	2.00	0.00	1.00	0.00
29.34	9.41	2.00	0.00	1.00	0.00	29.44	9.22	2.00	0.00	1.00	0.00
29.52	8.87	2.00	0.00	1.00	0.00	29.57	8.68	2.00	0.00	1.00	0.00
29.70	8.50	2.00	0.00	1.00	0.00	29.76	8.40	2.00	0.00	1.00	0.00
29.83	8.23	2.00	0.00	1.00	0.00	29.88	8.13	2.00	0.00	1.00	0.00
29.97	8.12	2.00	0.00	1.00	0.00	30.01	8.04	2.00	0.00	1.00	0.00
30.10	8.03	2.00	0.00	1.00	0.00	30.14	8.03	2.00	0.00	1.00	0.00
30.21	8.19	2.00	0.00	1.00	0.00	30.27	8.53	2.00	0.00	1.00	0.00
30.41	8.85	2.00	0.00	1.00	0.00	30.45	8.77	2.00	0.00	1.00	0.00
30.54	8.58	2.00	0.00	1.00	0.00	30.59	8.58	2.00	0.00	1.00	0.00
30.66	8.91	2.00	0.00	1.00	0.00	30.72	9.33	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
30.80	9.41	2.00	0.00	1.00	0.00	30.85	9.41	2.00	0.00	1.00	0.00
30.92	9.40	2.00	0.00	1.00	0.00	30.98	9.73	2.00	0.00	1.00	0.00
31.06	10.40	2.00	0.00	1.00	0.00	31.11	11.16	2.00	0.00	1.00	0.00
31.20	11.31	2.00	0.00	1.00	0.00	31.24	11.65	2.00	0.00	1.00	0.00
31.31	11.72	2.00	0.00	1.00	0.00	31.37	11.12	2.00	0.00	1.00	0.00
31.50	10.67	2.00	0.00	1.00	0.00	31.56	10.75	2.00	0.00	1.00	0.00
31.60	10.66	2.00	0.00	1.00	0.00	31.64	9.98	2.00	0.00	1.00	0.00
31.72	10.56	2.00	0.00	1.00	0.00	31.78	10.47	2.00	0.00	1.00	0.00
31.86	10.46	2.00	0.00	1.00	0.00	31.89	10.37	2.00	0.00	1.00	0.00
32.00	9.68	2.00	0.00	1.00	0.00	32.03	9.42	2.00	0.00	1.00	0.00
32.12	9.34	2.00	0.00	1.00	0.00	32.17	9.33	2.00	0.00	1.00	0.00
32.26	9.07	2.00	0.00	1.00	0.00	32.31	9.06	2.00	0.00	1.00	0.00
32.39	9.05	2.00	0.00	1.00	0.00	32.44	9.05	2.00	0.00	1.00	0.00
32.51	9.29	2.00	0.00	1.00	0.00	32.56	9.20	2.00	0.00	1.00	0.00
32.70	10.68	2.00	0.00	1.00	0.00	32.74	11.68	2.00	0.00	1.00	0.00
32.80	12.58	2.00	0.00	1.00	0.00	32.85	13.57	2.00	0.00	1.00	0.00
32.91	14.13	2.00	0.00	1.00	0.00	32.98	14.78	2.00	0.00	1.00	0.00
33.05	15.26	2.00	0.00	1.00	0.00	33.09	15.18	2.00	0.00	1.00	0.00
33.17	15.08	2.00	0.00	1.00	0.00	33.22	14.57	2.00	0.00	1.00	0.00
33.27	13.81	2.00	0.00	1.00	0.00	33.40	12.80	2.00	0.00	1.00	0.00
33.49	10.89	2.00	0.00	1.00	0.00	33.53	10.56	2.00	0.00	1.00	0.00
33.62	10.37	2.00	0.00	1.00	0.00	33.66	10.37	2.00	0.00	1.00	0.00
33.75	10.35	2.00	0.00	1.00	0.00	33.81	10.35	2.00	0.00	1.00	0.00
33.90	10.34	2.00	0.00	1.00	0.00	33.94	10.33	2.00	0.00	1.00	0.00
34.03	10.81	2.00	0.00	1.00	0.00	34.09	11.29	2.00	0.00	1.00	0.00
34.15	11.70	2.00	0.00	1.00	0.00	34.20	11.20	2.00	0.00	1.00	0.00
34.28	12.00	2.00	0.00	1.00	0.00	34.35	12.08	2.00	0.00	1.00	0.00
34.39	11.66	2.00	0.00	1.00	0.00	34.48	11.81	2.00	0.00	1.00	0.00
34.57	13.02	2.00	0.00	1.00	0.00	34.62	13.66	2.00	0.00	1.00	0.00
34.69	15.18	2.00	0.00	1.00	0.00	34.74	16.15	2.00	0.00	1.00	0.00
34.78	17.52	2.00	0.00	1.00	0.00	34.86	21.16	2.00	0.00	1.00	0.00
34.91	22.59	2.00	0.00	1.00	0.00	35.00	25.24	2.00	0.00	1.00	0.00
35.05	26.11	2.00	0.00	1.00	0.00	35.13	27.54	2.00	0.00	1.00	0.00
35.18	27.44	2.00	0.00	1.00	0.00	35.26	23.77	2.00	0.00	1.00	0.00
35.31	21.58	2.00	0.00	1.00	0.00	35.40	19.06	2.00	0.00	1.00	0.00
35.44	21.74	2.00	0.00	1.00	0.00	35.53	20.30	2.00	0.00	1.00	0.00
35.58	21.89	2.00	0.00	1.00	0.00	35.67	24.52	2.00	0.00	1.00	0.00
35.75	26.74	2.00	0.00	1.00	0.00	35.78	27.53	2.00	0.00	1.00	0.00
35.83	28.72	2.00	0.00	1.00	0.00	35.92	29.41	2.00	0.00	1.00	0.00
36.01	28.00	2.00	0.00	1.00	0.00	36.05	28.07	2.00	0.00	1.00	0.00
36.09	28.05	2.00	0.00	1.00	0.00	36.17	28.11	2.00	0.00	1.00	0.00
36.24	28.32	2.00	0.00	1.00	0.00	36.31	28.21	2.00	0.00	1.00	0.00
36.36	28.75	2.00	0.00	1.00	0.00	36.44	29.51	2.00	0.00	1.00	0.00
36.50	29.57	2.00	0.00	1.00	0.00	36.57	30.02	2.00	0.00	1.00	0.00
36.66	33.01	2.00	0.00	1.00	0.00	36.71	35.69	2.00	0.00	1.00	0.00
36.77	102.63	0.21	3.13	1.00	0.02	36.84	109.30	0.23	2.93	1.00	0.02
36.93	124.30	0.28	2.56	1.00	0.03	37.02	125.57	0.29	2.53	1.00	0.03
37.07	123.60	0.28	2.57	1.00	0.02	37.10	123.73	0.28	2.57	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
37.19	119.47	0.26	2.67	1.00	0.03	37.22	118.10	0.26	2.70	1.00	0.01
37.29	119.48	0.26	2.67	1.00	0.02	37.34	122.02	0.27	2.61	1.00	0.02
37.44	130.41	0.31	2.43	1.00	0.03	37.51	135.02	0.34	2.34	1.00	0.02
37.56	134.31	0.34	2.35	1.00	0.01	37.61	130.35	0.31	2.43	1.00	0.01
37.73	116.91	0.25	2.73	1.00	0.04	37.78	110.91	0.23	2.89	1.00	0.02
37.84	106.84	0.22	3.00	1.00	0.02	37.91	40.87	2.00	0.00	1.00	0.00
37.97	38.32	2.00	0.00	1.00	0.00	38.05	37.41	2.00	0.00	1.00	0.00
38.09	99.53	0.21	3.23	1.00	0.02	38.17	99.42	0.21	3.23	1.00	0.03
38.22	100.37	0.21	3.20	1.00	0.02	38.27	100.89	0.21	3.18	1.00	0.02
38.34	101.20	0.21	3.17	1.00	0.03	38.40	100.88	0.21	3.18	1.00	0.02
38.46	101.02	0.21	3.18	1.00	0.02	38.53	100.61	0.21	3.19	1.00	0.03
38.65	99.36	0.21	3.23	1.00	0.05	38.71	99.18	0.21	3.24	1.00	0.02
38.76	98.51	0.20	3.26	1.00	0.02	38.84	98.01	0.20	3.28	1.00	0.03
38.89	97.59	0.20	3.29	1.00	0.02	38.97	96.89	0.20	3.32	1.00	0.03
39.01	96.62	0.20	3.33	1.00	0.02	39.08	96.57	0.20	3.33	1.00	0.03
39.14	97.08	0.20	3.31	1.00	0.03	39.20	97.55	0.20	3.30	1.00	0.02
39.28	97.99	0.20	3.28	1.00	0.03	39.34	97.75	0.20	3.29	1.00	0.03
39.41	98.85	0.20	3.25	1.00	0.03	39.48	102.79	0.21	3.12	1.00	0.03
39.54	109.52	0.23	2.92	1.00	0.02	39.59	118.13	0.26	2.70	1.00	0.02
39.67	124.05	0.28	2.56	1.00	0.02	39.72	127.55	0.30	2.49	1.00	0.01
39.80	129.75	0.31	2.44	1.00	0.02	39.85	130.65	0.32	2.42	1.00	0.01
39.92	131.73	0.32	2.40	1.00	0.02	39.98	132.05	0.33	2.39	1.00	0.02
40.04	131.92	0.32	2.40	1.00	0.02	40.10	132.99	0.33	2.37	1.00	0.02
40.18	135.06	0.34	2.33	1.00	0.02	40.29	136.38	0.35	2.31	1.00	0.03
40.35	137.30	0.36	2.29	1.00	0.02	40.41	137.26	0.36	2.29	1.00	0.02
40.48	137.26	0.36	2.29	1.00	0.02	40.53	136.95	0.36	2.30	1.00	0.01
40.59	137.04	0.36	2.30	1.00	0.02	40.66	138.83	0.37	2.26	1.00	0.02
40.71	142.53	0.40	2.20	1.00	0.01	40.76	152.00	0.51	2.04	1.00	0.01
40.84	157.87	0.60	1.85	1.00	0.02	40.88	157.15	0.58	1.90	1.00	0.01
40.95	156.79	0.58	1.92	1.00	0.02	41.01	156.98	0.58	1.91	1.00	0.01
41.13	157.16	0.58	1.90	1.00	0.03	41.19	158.57	0.61	1.81	1.00	0.01
41.25	158.20	0.60	1.83	1.00	0.01	41.31	159.98	0.64	1.73	1.00	0.01
41.37	160.41	0.64	1.70	1.00	0.01	41.43	159.06	0.62	1.78	1.00	0.01
41.54	151.45	0.50	2.05	1.00	0.03	41.61	148.37	0.46	2.10	1.00	0.02
41.67	145.43	0.43	2.15	1.00	0.02	41.72	144.18	0.42	2.17	1.00	0.01
41.79	143.93	0.42	2.17	1.00	0.02	41.85	144.15	0.42	2.17	1.00	0.02
41.90	144.63	0.42	2.16	1.00	0.01	41.98	149.04	0.47	2.09	1.00	0.02
42.04	154.77	0.55	2.00	1.00	0.01	42.11	141.50	0.40	2.22	1.00	0.02
42.16	138.48	0.37	2.27	1.00	0.01	42.23	139.73	0.38	2.25	1.00	0.02
42.29	146.16	0.44	2.14	1.00	0.02	42.35	152.29	0.51	2.04	1.00	0.01
42.40	157.82	0.60	1.86	1.00	0.01	42.46	163.10	0.70	1.55	1.00	0.01
42.55	167.10	0.80	1.20	1.00	0.01	42.62	171.50	0.94	0.87	1.00	0.01
42.67	175.48	1.10	0.63	1.00	0.00	42.80	179.82	1.32	0.40	1.00	0.01
42.85	179.88	1.32	0.39	1.00	0.00	42.93	176.31	1.14	0.58	1.00	0.01
42.97	173.88	1.03	0.72	1.00	0.00	43.02	172.06	0.96	0.83	1.00	0.00
43.07	171.29	0.94	0.88	1.00	0.01	43.13	171.11	0.93	0.90	1.00	0.01
43.19	170.99	0.93	0.90	1.00	0.01	43.29	172.21	0.97	0.82	1.00	0.01
43.35	171.49	0.94	0.87	1.00	0.01	43.41	169.62	0.88	1.00	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
43.46	167.15	0.81	1.19	1.00	0.01	43.55	161.81	0.68	1.62	1.00	0.02
43.62	158.93	0.62	1.79	1.00	0.01	43.67	156.81	0.58	1.92	1.00	0.01
43.74	154.00	0.54	2.01	1.00	0.02	43.79	151.14	0.50	2.06	1.00	0.01
43.85	148.68	0.47	2.10	1.00	0.01	43.94	144.70	0.43	2.16	1.00	0.02
44.00	142.47	0.41	2.20	1.00	0.01	44.06	140.45	0.39	2.24	1.00	0.02
44.16	136.85	0.36	2.30	1.00	0.03	44.23	135.14	0.35	2.33	1.00	0.02
44.29	132.98	0.34	2.37	1.00	0.02	44.36	130.96	0.32	2.42	1.00	0.02
44.48	127.48	0.31	2.49	1.00	0.04	44.56	125.37	0.30	2.53	1.00	0.02
44.61	123.02	0.28	2.59	1.00	0.02	44.68	120.06	0.27	2.65	1.00	0.02
44.74	116.79	0.26	2.73	1.00	0.02	44.82	112.05	0.24	2.86	1.00	0.03
44.86	111.82	0.24	2.86	1.00	0.02	44.95	110.44	0.24	2.90	1.00	0.03
45.00	110.87	0.24	2.89	1.00	0.02	45.06	114.22	0.25	2.80	1.00	0.02
45.10	113.17	0.25	2.83	1.00	0.01	45.17	113.59	0.25	2.81	1.00	0.03
45.26	107.10	0.23	2.99	1.00	0.03	45.29	106.76	0.23	3.00	1.00	0.01
45.39	105.93	0.23	3.03	1.00	0.03	45.43	111.25	0.24	2.88	1.00	0.01
45.48	118.89	0.27	2.68	1.00	0.02	45.57	128.50	0.31	2.47	1.00	0.03
45.61	127.37	0.31	2.49	1.00	0.01	45.70	119.41	0.27	2.67	1.00	0.03
45.74	119.90	0.27	2.66	1.00	0.01	45.84	137.35	0.37	2.29	1.00	0.03
45.89	141.76	0.40	2.21	1.00	0.01	45.94	139.22	0.38	2.26	1.00	0.01
46.03	120.34	0.27	2.65	1.00	0.03	46.09	110.30	0.24	2.90	1.00	0.02
46.14	38.70	2.00	0.00	1.00	0.00	46.23	26.55	2.00	0.00	1.00	0.00
46.27	21.83	2.00	0.00	1.00	0.00	46.44	18.59	2.00	0.00	1.00	0.00
46.50	17.88	2.00	0.00	1.00	0.00	46.55	17.44	2.00	0.00	1.00	0.00
46.62	16.93	2.00	0.00	1.00	0.00	46.67	16.08	2.00	0.00	1.00	0.00
46.72	15.86	2.00	0.00	1.00	0.00	46.80	16.00	2.00	0.00	1.00	0.00
46.86	16.12	2.00	0.00	1.00	0.00	46.93	16.25	2.00	0.00	1.00	0.00
46.98	16.66	2.00	0.00	1.00	0.00	47.06	17.00	2.00	0.00	1.00	0.00
47.11	17.70	2.00	0.00	1.00	0.00	47.18	19.30	2.00	0.00	1.00	0.00
47.24	19.99	2.00	0.00	1.00	0.00	47.30	20.19	2.00	0.00	1.00	0.00
47.37	21.44	2.00	0.00	1.00	0.00	47.43	22.83	2.00	0.00	1.00	0.00
47.50	23.66	2.00	0.00	1.00	0.00	47.55	23.51	2.00	0.00	1.00	0.00
47.68	23.48	2.00	0.00	1.00	0.00	47.74	23.89	2.00	0.00	1.00	0.00
47.81	24.64	2.00	0.00	1.00	0.00	47.88	25.19	2.00	0.00	1.00	0.00
47.94	25.46	2.00	0.00	1.00	0.00	48.00	26.43	2.00	0.00	1.00	0.00
48.05	24.58	2.00	0.00	1.00	0.00	48.05	18.48	2.00	0.00	1.00	0.00
48.14	29.93	2.00	0.00	1.00	0.00	48.18	30.91	2.00	0.00	1.00	0.00
48.28	32.30	2.00	0.00	1.00	0.00	48.32	33.06	2.00	0.00	1.00	0.00
48.36	33.12	2.00	0.00	1.00	0.00	48.47	31.37	2.00	0.00	1.00	0.00
48.59	27.10	2.00	0.00	1.00	0.00	48.66	26.44	2.00	0.00	1.00	0.00
48.71	26.50	2.00	0.00	1.00	0.00	48.77	25.99	2.00	0.00	1.00	0.00
48.85	24.91	2.00	0.00	1.00	0.00	48.90	25.60	2.00	0.00	1.00	0.00
48.98	28.67	2.00	0.00	1.00	0.00	49.02	33.16	2.00	0.00	1.00	0.00
49.10	35.82	2.00	0.00	1.00	0.00	49.15	35.30	2.00	0.00	1.00	0.00
49.20	33.87	2.00	0.00	1.00	0.00	49.29	31.51	2.00	0.00	1.00	0.00
49.33	29.11	2.00	0.00	1.00	0.00	49.39	29.22	2.00	0.00	1.00	0.00
49.46	30.87	2.00	0.00	1.00	0.00	49.51	32.82	2.00	0.00	1.00	0.00
49.59	34.13	2.00	0.00	1.00	0.00	49.64	32.42	2.00	0.00	1.00	0.00
49.69	30.30	2.00	0.00	1.00	0.00	49.77	26.45	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
49.84	22.50	2.00	0.00	1.00	0.00	49.90	20.01	2.00	0.00	1.00	0.00
49.96	19.65	2.00	0.00	1.00	0.00	50.03	20.40	2.00	0.00	1.00	0.00
50.16	31.36	2.00	0.00	1.00	0.00	50.21	46.42	2.00	0.00	1.00	0.00
50.29	65.25	2.00	0.00	1.00	0.00	50.33	75.45	2.00	0.00	1.00	0.00

Total estimated settlement: 6.53

Abbreviations

$Q_{tn,cs}$: Equivalent clean sand normalized cone resistance
FS: Factor of safety against liquefaction
e_v (%): Post-liquefaction volumentric strain
DF: e_v depth weighting factor
Settlement: Calculated settlement

:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
5.08	14.32	2.00	0.00	1.00	0.00	5.13	18.64	2.00	0.00	1.00	0.00
5.21	78.23	0.29	4.10	1.00	0.04	5.26	79.99	0.29	4.01	1.00	0.02
5.34	77.33	0.28	4.14	1.00	0.04	5.39	78.83	0.29	4.07	1.00	0.02
5.47	82.91	0.30	3.87	1.00	0.04	5.52	86.73	0.30	3.71	1.00	0.02
5.60	90.42	0.31	3.56	1.00	0.03	5.63	86.99	0.30	3.70	1.00	0.01
5.66	86.26	0.30	3.73	1.00	0.02	5.74	89.96	0.31	3.57	1.00	0.03
5.78	89.37	0.30	3.60	1.00	0.02	5.85	90.24	0.31	3.56	1.00	0.03
5.94	92.72	0.31	3.47	1.00	0.04	6.00	94.94	0.32	3.39	1.00	0.02
6.06	96.33	0.32	3.34	1.00	0.02	6.10	96.73	0.32	3.32	1.00	0.02
6.20	95.72	0.31	3.36	1.00	0.04	6.26	94.21	0.31	3.41	1.00	0.02
6.32	93.48	0.30	3.44	1.00	0.02	6.37	92.62	0.30	3.47	1.00	0.02
6.46	30.03	2.00	0.00	1.00	0.00	6.51	28.92	2.00	0.00	1.00	0.00
6.63	27.10	2.00	0.00	1.00	0.00	6.69	25.03	2.00	0.00	1.00	0.00
6.76	25.03	2.00	0.00	1.00	0.00	6.81	25.03	2.00	0.00	1.00	0.00
6.86	25.02	2.00	0.00	1.00	0.00	6.94	25.12	2.00	0.00	1.00	0.00
7.00	25.65	2.00	0.00	1.00	0.00	7.08	25.53	2.00	0.00	1.00	0.00
7.11	20.81	2.00	0.00	1.00	0.00	7.18	22.94	2.00	0.00	1.00	0.00
7.22	21.07	2.00	0.00	1.00	0.00	7.34	16.86	2.00	0.00	1.00	0.00
7.40	14.70	2.00	0.00	1.00	0.00	7.46	14.24	2.00	0.00	1.00	0.00
7.52	14.44	2.00	0.00	1.00	0.00	7.58	14.26	2.00	0.00	1.00	0.00
7.65	16.27	2.00	0.00	1.00	0.00	7.71	20.70	2.00	0.00	1.00	0.00
7.78	82.19	0.25	3.91	1.00	0.03	7.82	85.67	0.26	3.75	1.00	0.02
7.90	87.69	0.26	3.67	1.00	0.03	7.96	89.17	0.26	3.61	1.00	0.03
8.02	90.93	0.27	3.54	1.00	0.03	8.10	90.57	0.27	3.55	1.00	0.03
8.16	93.38	0.27	3.44	1.00	0.02	8.24	93.09	0.27	3.45	1.00	0.04
8.30	92.01	0.27	3.50	1.00	0.03	8.38	91.63	0.26	3.51	1.00	0.03
8.42	93.07	0.27	3.46	1.00	0.02	8.49	28.41	2.00	0.00	1.00	0.00
8.55	92.70	0.27	3.47	1.00	0.02	8.61	97.42	0.28	3.30	1.00	0.02
8.68	95.52	0.27	3.37	1.00	0.03	8.73	89.95	0.26	3.57	1.00	0.02
8.81	90.81	0.26	3.54	1.00	0.03	8.86	92.94	0.26	3.46	1.00	0.02
8.99	101.32	0.28	3.17	1.00	0.05	9.04	104.31	0.29	3.08	1.00	0.02
9.12	107.93	0.31	2.97	1.00	0.03	9.26	110.49	0.31	2.90	1.00	0.05
9.30	110.83	0.31	2.89	1.00	0.02	9.34	106.11	0.30	3.02	1.00	0.02
9.39	105.16	0.29	3.05	1.00	0.02	9.48	103.56	0.29	3.10	1.00	0.03
9.55	102.12	0.28	3.14	1.00	0.03	9.60	98.25	0.27	3.27	1.00	0.02
9.68	91.59	0.25	3.51	1.00	0.03	9.74	25.76	2.00	0.00	1.00	0.00
9.79	77.04	0.22	4.16	1.00	0.03	9.87	16.20	2.00	0.00	1.00	0.00
9.92	13.25	2.00	0.00	1.00	0.00	10.00	16.48	2.00	0.00	1.00	0.00
10.06	16.79	2.00	0.00	1.00	0.00	10.14	89.39	0.24	3.60	1.00	0.04
10.18	97.85	0.26	3.28	1.00	0.02	10.26	111.15	0.31	2.88	1.00	0.03
10.31	117.03	0.33	2.73	1.00	0.02	10.37	122.45	0.36	2.60	1.00	0.02
10.47	125.88	0.38	2.52	1.00	0.03	10.51	127.16	0.38	2.49	1.00	0.01
10.62	129.94	0.40	2.44	1.00	0.03	10.67	132.38	0.42	2.39	1.00	0.01
10.75	134.57	0.44	2.34	1.00	0.02	10.80	135.98	0.45	2.32	1.00	0.01
10.87	137.42	0.46	2.29	1.00	0.02	10.93	138.30	0.47	2.27	1.00	0.02
11.02	138.91	0.47	2.26	1.00	0.02	11.07	139.13	0.47	2.26	1.00	0.01
11.14	139.18	0.47	2.26	1.00	0.02	11.20	139.11	0.47	2.26	1.00	0.02
11.25	137.96	0.46	2.28	1.00	0.01	11.32	135.28	0.44	2.33	1.00	0.02

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
11.38	131.13	0.40	2.41	1.00	0.02	11.45	125.66	0.37	2.53	1.00	0.02
11.51	119.90	0.33	2.66	1.00	0.02	11.57	112.76	0.30	2.84	1.00	0.02
11.64	104.75	0.27	3.06	1.00	0.02	11.71	97.93	0.25	3.28	1.00	0.03
11.77	92.80	0.24	3.47	1.00	0.03	11.90	87.07	0.22	3.69	1.00	0.06
11.95	86.15	0.22	3.73	1.00	0.02	12.03	85.71	0.22	3.75	1.00	0.03
12.09	85.07	0.22	3.78	1.00	0.03	12.16	83.90	0.21	3.83	1.00	0.03
12.21	24.43	2.00	0.00	1.00	0.00	12.28	23.21	2.00	0.00	1.00	0.00
12.34	22.10	2.00	0.00	1.00	0.00	12.42	21.74	2.00	0.00	1.00	0.00
12.47	21.71	2.00	0.00	1.00	0.00	12.54	22.53	2.00	0.00	1.00	0.00
12.60	23.45	2.00	0.00	1.00	0.00	12.67	24.37	2.00	0.00	1.00	0.00
12.74	25.09	2.00	0.00	1.00	0.00	12.80	82.25	0.21	3.90	1.00	0.03
12.87	24.18	2.00	0.00	1.00	0.00	12.92	24.24	2.00	0.00	1.00	0.00
12.99	26.20	2.00	0.00	1.00	0.00	13.02	24.48	2.00	0.00	1.00	0.00
13.09	30.99	2.00	0.00	1.00	0.00	13.13	95.94	0.24	3.35	1.00	0.02
13.23	36.90	2.00	0.00	1.00	0.00	13.26	36.87	2.00	0.00	1.00	0.00
13.36	37.89	2.00	0.00	1.00	0.00	13.40	100.99	0.25	3.18	1.00	0.02
13.49	100.85	0.25	3.19	1.00	0.03	13.54	98.88	0.24	3.25	1.00	0.02
13.60	34.10	2.00	0.00	1.00	0.00	13.65	29.88	2.00	0.00	1.00	0.00
13.75	21.25	2.00	0.00	1.00	0.00	13.79	18.00	2.00	0.00	1.00	0.00
13.89	14.07	2.00	0.00	1.00	0.00	13.93	13.32	2.00	0.00	1.00	0.00
13.98	11.93	2.00	0.00	1.00	0.00	14.11	11.38	2.00	0.00	1.00	0.00
14.15	11.15	2.00	0.00	1.00	0.00	14.20	11.04	2.00	0.00	1.00	0.00
14.27	10.48	2.00	0.00	1.00	0.00	14.33	10.47	2.00	0.00	1.00	0.00
14.38	10.46	2.00	0.00	1.00	0.00	14.46	10.40	2.00	0.00	1.00	0.00
14.54	10.33	2.00	0.00	1.00	0.00	14.59	10.21	2.00	0.00	1.00	0.00
14.66	10.09	2.00	0.00	1.00	0.00	14.78	9.34	2.00	0.00	1.00	0.00
14.85	9.22	2.00	0.00	1.00	0.00	14.91	9.11	2.00	0.00	1.00	0.00
14.99	9.10	2.00	0.00	1.00	0.00	15.04	9.09	2.00	0.00	1.00	0.00
15.12	9.39	2.00	0.00	1.00	0.00	15.17	9.90	2.00	0.00	1.00	0.00
15.23	10.52	2.00	0.00	1.00	0.00	15.30	10.92	2.00	0.00	1.00	0.00
15.34	10.91	2.00	0.00	1.00	0.00	15.48	10.06	2.00	0.00	1.00	0.00
15.54	9.53	2.00	0.00	1.00	0.00	15.61	9.09	2.00	0.00	1.00	0.00
15.66	8.77	2.00	0.00	1.00	0.00	15.73	8.67	2.00	0.00	1.00	0.00
15.78	8.97	2.00	0.00	1.00	0.00	15.97	10.09	2.00	0.00	1.00	0.00
16.02	10.08	2.00	0.00	1.00	0.00	16.03	10.08	2.00	0.00	1.00	0.00
16.11	10.07	2.00	0.00	1.00	0.00	16.14	10.26	2.00	0.00	1.00	0.00
16.29	9.10	2.00	0.00	1.00	0.00	16.33	8.79	2.00	0.00	1.00	0.00
16.45	8.77	2.00	0.00	1.00	0.00	16.49	8.76	2.00	0.00	1.00	0.00
16.56	8.75	2.00	0.00	1.00	0.00	16.63	9.36	2.00	0.00	1.00	0.00
16.67	10.37	2.00	0.00	1.00	0.00	16.75	11.58	2.00	0.00	1.00	0.00
16.80	13.19	2.00	0.00	1.00	0.00	16.87	14.97	2.00	0.00	1.00	0.00
16.93	16.56	2.00	0.00	1.00	0.00	16.99	18.44	2.00	0.00	1.00	0.00
17.06	21.39	2.00	0.00	1.00	0.00	17.11	24.82	2.00	0.00	1.00	0.00
17.18	27.81	2.00	0.00	1.00	0.00	17.24	27.68	2.00	0.00	1.00	0.00
17.30	23.65	2.00	0.00	1.00	0.00	17.37	19.09	2.00	0.00	1.00	0.00
17.43	16.20	2.00	0.00	1.00	0.00	17.51	14.19	2.00	0.00	1.00	0.00
17.64	13.35	2.00	0.00	1.00	0.00	17.68	13.34	2.00	0.00	1.00	0.00
17.75	17.48	2.00	0.00	1.00	0.00	17.82	19.22	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
17.88	19.10	2.00	0.00	1.00	0.00	17.94	18.48	2.00	0.00	1.00	0.00
17.99	18.46	2.00	0.00	1.00	0.00	18.08	20.57	2.00	0.00	1.00	0.00
18.12	24.62	2.00	0.00	1.00	0.00	18.21	31.00	2.00	0.00	1.00	0.00
18.26	101.50	0.23	3.16	1.00	0.02	18.32	111.11	0.26	2.88	1.00	0.02
18.39	109.37	0.25	2.93	1.00	0.02	18.44	107.67	0.24	2.98	1.00	0.02
18.52	106.43	0.24	3.01	1.00	0.03	18.57	107.18	0.24	2.99	1.00	0.02
18.62	108.53	0.25	2.95	1.00	0.02	18.64	105.72	0.24	3.03	1.00	0.01
18.74	103.46	0.23	3.10	1.00	0.04	18.78	99.55	0.22	3.23	1.00	0.02
18.88	91.80	0.20	3.50	1.00	0.04	18.92	87.95	0.20	3.66	1.00	0.02
19.05	81.45	0.18	3.94	1.00	0.06	19.15	74.45	0.17	4.29	1.00	0.05
19.22	15.21	2.00	0.00	1.00	0.00	19.27	12.38	2.00	0.00	1.00	0.00
19.34	10.42	2.00	0.00	1.00	0.00	19.40	8.95	2.00	0.00	1.00	0.00
19.46	8.07	2.00	0.00	1.00	0.00	19.53	7.19	2.00	0.00	1.00	0.00
19.59	7.56	2.00	0.00	1.00	0.00	19.66	7.66	2.00	0.00	1.00	0.00
19.71	7.07	2.00	0.00	1.00	0.00	19.79	6.87	2.00	0.00	1.00	0.00
19.84	6.87	2.00	0.00	1.00	0.00	19.91	6.66	2.00	0.00	1.00	0.00
19.98	7.23	2.00	0.00	1.00	0.00	20.03	7.62	2.00	0.00	1.00	0.00
20.11	8.00	2.00	0.00	1.00	0.00	20.21	8.28	2.00	0.00	1.00	0.00
20.28	8.66	2.00	0.00	1.00	0.00	20.34	9.04	2.00	0.00	1.00	0.00
20.40	9.51	2.00	0.00	1.00	0.00	20.46	10.07	2.00	0.00	1.00	0.00
20.52	11.03	2.00	0.00	1.00	0.00	20.58	11.96	2.00	0.00	1.00	0.00
20.64	13.66	2.00	0.00	1.00	0.00	20.69	15.73	2.00	0.00	1.00	0.00
20.76	17.59	2.00	0.00	1.00	0.00	20.81	19.26	2.00	0.00	1.00	0.00
20.88	21.01	2.00	0.00	1.00	0.00	20.94	23.05	2.00	0.00	1.00	0.00
21.05	31.05	2.00	0.00	1.00	0.00	21.17	105.87	0.23	3.03	1.00	0.04
21.23	112.53	0.25	2.84	1.00	0.02	21.30	116.08	0.26	2.75	1.00	0.02
21.35	119.20	0.28	2.67	1.00	0.02	21.43	117.81	0.27	2.71	1.00	0.02
21.48	115.02	0.26	2.78	1.00	0.02	21.53	119.31	0.28	2.67	1.00	0.02
21.61	125.14	0.30	2.54	1.00	0.02	21.65	127.16	0.31	2.49	1.00	0.01
21.71	126.14	0.31	2.52	1.00	0.02	21.72	118.46	0.27	2.69	1.00	0.00
21.83	121.10	0.28	2.63	1.00	0.04	21.91	120.01	0.28	2.65	1.00	0.02
21.96	120.83	0.28	2.64	1.00	0.02	22.01	122.26	0.29	2.60	1.00	0.02
22.09	124.79	0.30	2.55	1.00	0.02	22.14	126.09	0.31	2.52	1.00	0.01
22.21	127.24	0.31	2.49	1.00	0.02	22.27	125.56	0.30	2.53	1.00	0.02
22.34	120.55	0.28	2.64	1.00	0.02	22.40	115.34	0.26	2.77	1.00	0.02
22.46	110.97	0.25	2.88	1.00	0.02	22.53	106.26	0.23	3.02	1.00	0.02
22.58	101.24	0.22	3.17	1.00	0.02	22.71	100.35	0.22	3.20	1.00	0.05
22.76	101.55	0.22	3.16	1.00	0.02	22.89	100.77	0.22	3.19	1.00	0.05
22.95	103.87	0.22	3.09	1.00	0.02	23.02	111.65	0.25	2.87	1.00	0.03
23.07	115.93	0.26	2.75	1.00	0.02	23.16	118.24	0.27	2.70	1.00	0.03
23.21	117.89	0.27	2.71	1.00	0.02	23.28	116.28	0.26	2.75	1.00	0.02
23.34	112.76	0.25	2.84	1.00	0.02	23.42	106.74	0.23	3.00	1.00	0.03
23.46	99.49	0.21	3.23	1.00	0.02	23.53	92.59	0.20	3.47	1.00	0.03
23.59	27.15	2.00	0.00	1.00	0.00	23.68	23.91	2.00	0.00	1.00	0.00
23.73	20.76	2.00	0.00	1.00	0.00	23.79	17.36	2.00	0.00	1.00	0.00
23.86	14.74	2.00	0.00	1.00	0.00	23.91	13.47	2.00	0.00	1.00	0.00
23.99	13.37	2.00	0.00	1.00	0.00	24.05	12.99	2.00	0.00	1.00	0.00
24.10	12.54	2.00	0.00	1.00	0.00	24.17	11.54	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
24.24	10.99	2.00	0.00	1.00	0.00	24.30	10.53	2.00	0.00	1.00	0.00
24.36	10.26	2.00	0.00	1.00	0.00	24.44	9.89	2.00	0.00	1.00	0.00
24.51	9.34	2.00	0.00	1.00	0.00	24.56	8.97	2.00	0.00	1.00	0.00
24.62	8.79	2.00	0.00	1.00	0.00	24.69	8.88	2.00	0.00	1.00	0.00
24.74	9.05	2.00	0.00	1.00	0.00	24.82	9.48	2.00	0.00	1.00	0.00
24.87	9.74	2.00	0.00	1.00	0.00	24.95	9.91	2.00	0.00	1.00	0.00
25.01	9.99	2.00	0.00	1.00	0.00	25.08	10.24	2.00	0.00	1.00	0.00
25.14	10.76	2.00	0.00	1.00	0.00	25.20	10.85	2.00	0.00	1.00	0.00
25.27	10.48	2.00	0.00	1.00	0.00	25.32	10.03	2.00	0.00	1.00	0.00
25.40	10.29	2.00	0.00	1.00	0.00	25.45	10.98	2.00	0.00	1.00	0.00
25.53	12.82	2.00	0.00	1.00	0.00	25.58	14.91	2.00	0.00	1.00	0.00
25.60	12.28	2.00	0.00	1.00	0.00	25.67	85.24	0.18	3.77	1.00	0.03
25.74	90.68	0.19	3.55	1.00	0.03	25.82	99.34	0.21	3.23	1.00	0.03
25.87	104.02	0.22	3.09	1.00	0.02	25.94	104.57	0.22	3.07	1.00	0.03
26.01	94.24	0.20	3.41	1.00	0.03	26.05	94.80	0.20	3.39	1.00	0.02
26.12	96.32	0.20	3.34	1.00	0.03	26.18	97.95	0.21	3.28	1.00	0.02
26.28	103.31	0.22	3.11	1.00	0.03	26.31	105.45	0.22	3.04	1.00	0.01
26.40	109.29	0.23	2.93	1.00	0.03	26.48	109.74	0.24	2.92	1.00	0.03
26.53	108.64	0.23	2.95	1.00	0.02	26.59	107.68	0.23	2.98	1.00	0.02
26.66	106.63	0.23	3.01	1.00	0.03	26.78	104.54	0.22	3.07	1.00	0.04
26.83	105.30	0.22	3.05	1.00	0.02	26.90	106.02	0.23	3.03	1.00	0.03
26.98	104.20	0.22	3.08	1.00	0.03	27.03	105.63	0.22	3.04	1.00	0.02
27.10	106.68	0.23	3.01	1.00	0.02	27.15	106.19	0.23	3.02	1.00	0.02
27.22	104.47	0.22	3.07	1.00	0.03	27.28	102.22	0.22	3.14	1.00	0.02
27.33	97.79	0.20	3.29	1.00	0.02	27.42	92.98	0.19	3.46	1.00	0.03
27.46	27.82	2.00	0.00	1.00	0.00	27.55	22.19	2.00	0.00	1.00	0.00
27.60	18.27	2.00	0.00	1.00	0.00	27.67	15.36	2.00	0.00	1.00	0.00
27.73	13.05	2.00	0.00	1.00	0.00	27.85	10.22	2.00	0.00	1.00	0.00
27.91	9.37	2.00	0.00	1.00	0.00	27.99	8.94	2.00	0.00	1.00	0.00
28.04	8.75	2.00	0.00	1.00	0.00	28.10	8.75	2.00	0.00	1.00	0.00
28.17	8.58	2.00	0.00	1.00	0.00	28.24	8.06	2.00	0.00	1.00	0.00
28.30	7.80	2.00	0.00	1.00	0.00	28.37	7.63	2.00	0.00	1.00	0.00
28.43	7.62	2.00	0.00	1.00	0.00	28.45	7.66	2.00	0.00	1.00	0.00
28.50	7.69	2.00	0.00	1.00	0.00	28.55	7.94	2.00	0.00	1.00	0.00
28.63	8.02	2.00	0.00	1.00	0.00	28.68	8.27	2.00	0.00	1.00	0.00
28.78	8.76	2.00	0.00	1.00	0.00	28.84	8.84	2.00	0.00	1.00	0.00
28.89	9.00	2.00	0.00	1.00	0.00	28.94	9.25	2.00	0.00	1.00	0.00
29.03	9.49	2.00	0.00	1.00	0.00	29.10	9.39	2.00	0.00	1.00	0.00
29.14	9.31	2.00	0.00	1.00	0.00	29.20	9.13	2.00	0.00	1.00	0.00
29.30	8.95	2.00	0.00	1.00	0.00	29.40	8.69	2.00	0.00	1.00	0.00
29.46	8.52	2.00	0.00	1.00	0.00	29.52	8.76	2.00	0.00	1.00	0.00
29.56	8.76	2.00	0.00	1.00	0.00	29.61	8.92	2.00	0.00	1.00	0.00
29.67	9.32	2.00	0.00	1.00	0.00	29.73	9.98	2.00	0.00	1.00	0.00
29.83	10.80	2.00	0.00	1.00	0.00	29.88	11.54	2.00	0.00	1.00	0.00
30.01	12.51	2.00	0.00	1.00	0.00	30.05	12.75	2.00	0.00	1.00	0.00
30.09	12.99	2.00	0.00	1.00	0.00	30.14	13.06	2.00	0.00	1.00	0.00
30.21	12.64	2.00	0.00	1.00	0.00	30.27	12.62	2.00	0.00	1.00	0.00
30.36	12.61	2.00	0.00	1.00	0.00	30.42	12.60	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
30.47	12.83	2.00	0.00	1.00	0.00	30.53	13.16	2.00	0.00	1.00	0.00
30.58	13.15	2.00	0.00	1.00	0.00	30.67	12.64	2.00	0.00	1.00	0.00
30.74	12.13	2.00	0.00	1.00	0.00	30.79	11.95	2.00	0.00	1.00	0.00
30.85	11.70	2.00	0.00	1.00	0.00	30.91	11.28	2.00	0.00	1.00	0.00
30.98	10.62	2.00	0.00	1.00	0.00	31.10	9.71	2.00	0.00	1.00	0.00
31.23	8.96	2.00	0.00	1.00	0.00	31.28	8.63	2.00	0.00	1.00	0.00
31.34	8.38	2.00	0.00	1.00	0.00	31.37	8.37	2.00	0.00	1.00	0.00
31.37	8.37	2.00	0.00	1.00	0.00	31.46	8.36	2.00	0.00	1.00	0.00
31.51	8.12	2.00	0.00	1.00	0.00	31.60	7.86	2.00	0.00	1.00	0.00
31.65	8.03	2.00	0.00	1.00	0.00	31.74	8.02	2.00	0.00	1.00	0.00
31.82	8.01	2.00	0.00	1.00	0.00	31.86	8.01	2.00	0.00	1.00	0.00
31.91	7.84	2.00	0.00	1.00	0.00	31.99	7.83	2.00	0.00	1.00	0.00
32.04	8.07	2.00	0.00	1.00	0.00	32.16	7.81	2.00	0.00	1.00	0.00
32.18	7.57	2.00	0.00	1.00	0.00	32.23	7.81	2.00	0.00	1.00	0.00
32.31	7.80	2.00	0.00	1.00	0.00	32.35	7.72	2.00	0.00	1.00	0.00
32.44	7.55	2.00	0.00	1.00	0.00	32.53	7.54	2.00	0.00	1.00	0.00
32.57	7.62	2.00	0.00	1.00	0.00	32.62	7.46	2.00	0.00	1.00	0.00
32.69	7.69	2.00	0.00	1.00	0.00	32.75	8.00	2.00	0.00	1.00	0.00
32.83	8.71	2.00	0.00	1.00	0.00	32.92	9.82	2.00	0.00	1.00	0.00
32.97	10.29	2.00	0.00	1.00	0.00	33.01	10.53	2.00	0.00	1.00	0.00
33.10	10.84	2.00	0.00	1.00	0.00	33.14	11.07	2.00	0.00	1.00	0.00
33.23	10.26	2.00	0.00	1.00	0.00	33.28	9.78	2.00	0.00	1.00	0.00
33.34	9.29	2.00	0.00	1.00	0.00	33.43	9.21	2.00	0.00	1.00	0.00
33.50	9.20	2.00	0.00	1.00	0.00	33.54	9.51	2.00	0.00	1.00	0.00
33.64	10.29	2.00	0.00	1.00	0.00	33.70	10.28	2.00	0.00	1.00	0.00
33.76	10.43	2.00	0.00	1.00	0.00	33.80	10.59	2.00	0.00	1.00	0.00
33.86	10.90	2.00	0.00	1.00	0.00	33.98	10.88	2.00	0.00	1.00	0.00
34.04	9.85	2.00	0.00	1.00	0.00	34.08	11.66	2.00	0.00	1.00	0.00
34.17	10.14	2.00	0.00	1.00	0.00	34.21	8.88	2.00	0.00	1.00	0.00
34.26	8.88	2.00	0.00	1.00	0.00	34.39	8.86	2.00	0.00	1.00	0.00
34.43	8.86	2.00	0.00	1.00	0.00	34.48	9.01	2.00	0.00	1.00	0.00
34.53	8.85	2.00	0.00	1.00	0.00	34.58	8.69	2.00	0.00	1.00	0.00
34.65	8.83	2.00	0.00	1.00	0.00	34.74	9.13	2.00	0.00	1.00	0.00
34.78	9.36	2.00	0.00	1.00	0.00	34.87	9.90	2.00	0.00	1.00	0.00
34.92	9.90	2.00	0.00	1.00	0.00	35.00	10.59	2.00	0.00	1.00	0.00
35.05	11.13	2.00	0.00	1.00	0.00	35.12	12.14	2.00	0.00	1.00	0.00
35.18	12.98	2.00	0.00	1.00	0.00	35.27	14.61	2.00	0.00	1.00	0.00
35.31	15.46	2.00	0.00	1.00	0.00	35.40	15.99	2.00	0.00	1.00	0.00
35.44	16.05	2.00	0.00	1.00	0.00	35.58	17.19	2.00	0.00	1.00	0.00
35.62	18.04	2.00	0.00	1.00	0.00	35.72	19.73	2.00	0.00	1.00	0.00
35.76	20.58	2.00	0.00	1.00	0.00	35.81	21.27	2.00	0.00	1.00	0.00
35.84	22.34	2.00	0.00	1.00	0.00	35.90	23.26	2.00	0.00	1.00	0.00
35.98	24.95	2.00	0.00	1.00	0.00	36.04	25.39	2.00	0.00	1.00	0.00
36.09	25.61	2.00	0.00	1.00	0.00	36.24	25.64	2.00	0.00	1.00	0.00
36.28	26.01	2.00	0.00	1.00	0.00	36.33	27.78	2.00	0.00	1.00	0.00
36.39	31.41	2.00	0.00	1.00	0.00	36.46	37.05	2.00	0.00	1.00	0.00
36.51	43.11	2.00	0.00	1.00	0.00	36.57	46.36	2.00	0.00	1.00	0.00
36.64	47.34	2.00	0.00	1.00	0.00	36.68	47.31	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
36.76	48.29	2.00	0.00	1.00	0.00	36.81	52.80	2.00	0.00	1.00	0.00
36.99	138.91	0.37	2.26	1.00	0.05	37.07	148.14	0.46	2.10	1.00	0.02
37.13	145.32	0.43	2.15	1.00	0.01	37.18	144.61	0.42	2.16	1.00	0.01
37.21	144.50	0.42	2.16	1.00	0.01	37.32	151.33	0.50	2.05	1.00	0.03
37.39	157.60	0.59	1.87	1.00	0.02	37.44	161.86	0.68	1.62	1.00	0.01
37.48	165.79	0.77	1.31	1.00	0.01	37.57	172.11	0.96	0.83	1.00	0.01
37.61	175.56	1.10	0.62	1.00	0.00	37.67	179.85	1.32	0.39	1.00	0.00
37.75	182.99	1.52	0.24	1.00	0.00	37.81	183.31	1.54	0.23	1.00	0.00
37.88	182.57	1.49	0.26	1.00	0.00	37.94	180.48	1.36	0.36	1.00	0.00
38.02	178.11	1.23	0.48	1.00	0.00	38.07	176.50	1.15	0.57	1.00	0.00
38.14	175.30	1.09	0.63	1.00	0.01	38.23	175.29	1.09	0.64	1.00	0.01
38.28	175.90	1.12	0.60	1.00	0.00	38.34	178.49	1.25	0.46	1.00	0.00
38.39	185.18	1.68	0.15	1.00	0.00	38.45	193.16	2.00	0.00	1.00	0.00
38.52	200.34	2.00	0.00	1.00	0.00	38.59	206.16	2.00	0.00	1.00	0.00
38.67	209.39	2.00	0.00	1.00	0.00	38.72	209.46	2.00	0.00	1.00	0.00
38.81	210.19	2.00	0.00	1.00	0.00	38.85	210.59	2.00	0.00	1.00	0.00
38.97	215.89	2.00	0.00	1.00	0.00	39.03	219.04	2.00	0.00	1.00	0.00
39.11	222.46	2.00	0.00	1.00	0.00	39.16	224.84	2.00	0.00	1.00	0.00
39.23	226.74	2.00	0.00	1.00	0.00	39.29	227.94	2.00	0.00	1.00	0.00
39.36	228.87	2.00	0.00	1.00	0.00	39.42	229.16	2.00	0.00	1.00	0.00
39.47	228.82	2.00	0.00	1.00	0.00	39.55	226.80	2.00	0.00	1.00	0.00
39.60	223.70	2.00	0.00	1.00	0.00	39.64	202.56	2.00	0.00	1.00	0.00
39.71	207.78	2.00	0.00	1.00	0.00	39.81	203.83	2.00	0.00	1.00	0.00
39.86	200.69	2.00	0.00	1.00	0.00	39.90	199.22	2.00	0.00	1.00	0.00
39.99	193.97	2.00	0.00	1.00	0.00	40.03	192.65	2.00	0.00	1.00	0.00
40.12	189.03	2.00	0.00	1.00	0.00	40.16	186.93	1.83	0.07	1.00	0.00
40.25	182.20	1.47	0.28	1.00	0.00	40.29	180.93	1.39	0.34	1.00	0.00
40.39	177.01	1.17	0.53	1.00	0.01	40.45	176.99	1.17	0.54	1.00	0.00
40.52	177.36	1.19	0.52	1.00	0.00	40.56	178.24	1.24	0.47	1.00	0.00
40.66	180.94	1.39	0.34	1.00	0.00	40.70	182.00	1.46	0.29	1.00	0.00
40.78	184.50	1.63	0.17	1.00	0.00	40.83	186.26	1.77	0.10	1.00	0.00
40.89	188.16	1.93	0.03	1.00	0.00	40.96	189.17	2.00	0.00	1.00	0.00
41.05	189.02	2.00	0.00	1.00	0.00	41.09	189.02	2.00	0.00	1.00	0.00
41.16	189.38	2.00	0.00	1.00	0.00	41.22	189.28	2.00	0.00	1.00	0.00
41.29	190.28	2.00	0.00	1.00	0.00	41.34	191.49	2.00	0.00	1.00	0.00
41.44	193.26	2.00	0.00	1.00	0.00	41.49	193.82	2.00	0.00	1.00	0.00
41.58	193.94	2.00	0.00	1.00	0.00	41.63	194.02	2.00	0.00	1.00	0.00
41.69	193.84	2.00	0.00	1.00	0.00	41.74	193.91	2.00	0.00	1.00	0.00
41.91	187.75	1.90	0.04	1.00	0.00	41.96	183.09	1.53	0.23	1.00	0.00
42.02	177.26	1.19	0.52	1.00	0.00	42.07	172.86	1.00	0.77	1.00	0.01
42.13	169.20	0.87	1.02	1.00	0.01	42.19	167.28	0.82	1.17	1.00	0.01
42.25	166.95	0.81	1.19	1.00	0.01	42.33	167.78	0.83	1.13	1.00	0.01
42.43	171.52	0.95	0.86	1.00	0.01	42.47	170.62	0.92	0.92	1.00	0.00
42.56	169.79	0.89	0.97	1.00	0.01	42.60	169.58	0.89	0.99	1.00	0.00
42.66	167.75	0.83	1.13	1.00	0.01	42.73	164.39	0.74	1.42	1.00	0.01
42.81	162.85	0.71	1.57	1.00	0.01	42.86	161.50	0.68	1.64	1.00	0.01
42.95	162.47	0.70	1.59	1.00	0.02	42.99	166.20	0.79	1.25	1.00	0.01
43.08	176.38	1.15	0.56	1.00	0.01	43.17	185.31	1.70	0.14	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
43.22	188.75	1.99	0.00	1.00	0.00	43.26	191.41	2.00	0.00	1.00	0.00
43.34	183.52	1.56	0.21	1.00	0.00	43.39	183.72	1.58	0.20	1.00	0.00
43.48	182.59	1.50	0.26	1.00	0.00	43.51	183.80	1.58	0.20	1.00	0.00
43.59	184.53	1.64	0.17	1.00	0.00	43.65	186.58	1.80	0.08	1.00	0.00
43.72	190.64	2.00	0.00	1.00	0.00	43.79	192.86	2.00	0.00	1.00	0.00
43.88	193.56	2.00	0.00	1.00	0.00	43.91	192.64	2.00	0.00	1.00	0.00
44.00	189.42	2.00	0.00	1.00	0.00	44.04	186.30	1.78	0.09	1.00	0.00
44.14	178.42	1.25	0.45	1.00	0.01	44.18	174.96	1.09	0.64	1.00	0.00
44.23	171.17	0.94	0.87	1.00	0.01	44.32	167.06	0.81	1.17	1.00	0.01
44.36	165.94	0.78	1.27	1.00	0.01	44.45	165.80	0.78	1.28	1.00	0.01
44.52	161.61	0.68	1.63	1.00	0.01	44.58	165.46	0.77	1.31	1.00	0.01
44.63	167.51	0.83	1.14	1.00	0.01	44.70	167.40	0.82	1.15	1.00	0.01
44.76	166.84	0.81	1.19	1.00	0.01	44.85	155.75	0.57	1.99	1.00	0.02
44.89	165.88	0.78	1.27	1.00	0.00	44.98	161.82	0.69	1.62	1.00	0.02
45.03	167.44	0.83	1.14	1.00	0.01	45.11	177.73	1.22	0.49	1.00	0.00
45.15	181.93	1.46	0.28	1.00	0.00	45.26	194.65	2.00	0.00	1.00	0.00
45.31	198.06	2.00	0.00	1.00	0.00	45.35	199.75	2.00	0.00	1.00	0.00
45.41	199.81	2.00	0.00	1.00	0.00	45.47	197.14	2.00	0.00	1.00	0.00
45.55	193.21	2.00	0.00	1.00	0.00	45.64	188.68	1.99	0.00	1.00	0.00
45.68	187.02	1.85	0.06	1.00	0.00	45.74	184.25	1.62	0.18	1.00	0.00
45.83	180.04	1.35	0.37	1.00	0.00	45.87	177.14	1.19	0.52	1.00	0.00
45.95	172.31	0.99	0.79	1.00	0.01	46.08	158.96	0.63	1.79	1.00	0.03
46.13	156.38	0.59	1.95	1.00	0.01	46.18	153.87	0.55	2.02	1.00	0.01
46.22	154.76	0.56	2.00	1.00	0.01	46.27	155.23	0.57	2.00	1.00	0.01
46.34	154.98	0.56	2.00	1.00	0.02	46.43	150.76	0.50	2.06	1.00	0.02
46.52	140.05	0.39	2.24	1.00	0.02	46.57	124.94	0.30	2.54	1.00	0.01
46.64	108.85	0.24	2.94	1.00	0.03	46.70	34.41	2.00	0.00	1.00	0.00
46.77	27.98	2.00	0.00	1.00	0.00	46.83	26.86	2.00	0.00	1.00	0.00
46.90	28.09	2.00	0.00	1.00	0.00	46.94	25.66	2.00	0.00	1.00	0.00
47.01	30.90	2.00	0.00	1.00	0.00	47.05	31.66	2.00	0.00	1.00	0.00
47.14	31.70	2.00	0.00	1.00	0.00	47.19	28.91	2.00	0.00	1.00	0.00
47.27	26.81	2.00	0.00	1.00	0.00	47.33	28.97	2.00	0.00	1.00	0.00
47.41	28.29	2.00	0.00	1.00	0.00	47.44	29.04	2.00	0.00	1.00	0.00
47.54	30.53	2.00	0.00	1.00	0.00	47.58	30.80	2.00	0.00	1.00	0.00
47.68	31.61	2.00	0.00	1.00	0.00	47.74	33.18	2.00	0.00	1.00	0.00
47.77	34.84	2.00	0.00	1.00	0.00	47.84	38.23	2.00	0.00	1.00	0.00
47.91	40.66	2.00	0.00	1.00	0.00	47.98	39.63	2.00	0.00	1.00	0.00
48.05	39.43	2.00	0.00	1.00	0.00	48.11	39.41	2.00	0.00	1.00	0.00
48.19	39.21	2.00	0.00	1.00	0.00	48.24	44.41	2.00	0.00	1.00	0.00
48.30	55.76	2.00	0.00	1.00	0.00	48.38	132.59	0.34	2.38	1.00	0.02
48.46	136.00	0.37	2.32	1.00	0.02	48.52	139.45	0.39	2.25	1.00	0.02
48.60	142.96	0.42	2.19	1.00	0.02	48.64	139.33	0.39	2.26	1.00	0.01
48.71	126.44	0.31	2.51	1.00	0.02	48.77	132.19	0.34	2.39	1.00	0.02
48.90	145.04	0.44	2.16	1.00	0.03	48.95	151.22	0.52	2.06	1.00	0.01
48.96	146.02	0.45	2.14	1.00	0.00	49.02	168.60	0.87	1.03	1.00	0.01
49.08	186.58	1.82	0.08	1.00	0.00	49.16	193.66	2.00	0.00	1.00	0.00
49.22	193.20	2.00	0.00	1.00	0.00	49.33	187.00	1.86	0.06	1.00	0.00
49.36	182.82	1.53	0.23	1.00	0.00	49.46	170.44	0.93	0.90	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
49.51	164.49	0.76	1.36	1.00	0.01	49.55	160.49	0.67	1.70	1.00	0.01
49.62	149.94	0.50	2.08	1.00	0.02	49.69	143.36	0.43	2.18	1.00	0.02
49.81	143.82	0.43	2.18	1.00	0.03	49.86	146.27	0.46	2.14	1.00	0.01
49.90	149.89	0.50	2.08	1.00	0.01	49.94	151.07	0.52	2.06	1.00	0.01
50.01	93.37	2.00	0.00	1.00	0.00	50.08	87.77	2.00	0.00	1.00	0.00
50.17	78.12	2.00	0.00	1.00	0.00	50.21	72.28	2.00	0.00	1.00	0.00
50.30	63.35	2.00	0.00	1.00	0.00	50.35	56.57	2.00	0.00	1.00	0.00

Total estimated settlement: 5.13

Abbreviations

$Q_{tn,cs}$: Equivalent clean sand normalized cone resistance
FS: Factor of safety against liquefaction
e_v (%): Post-liquefaction volumentric strain
DF: e_v depth weighting factor
Settlement: Calculated settlement

:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
5.07	102.84	0.53	2.28	1.00	0.02	5.15	102.74	0.53	2.29	1.00	0.02
5.18	102.57	0.52	2.29	1.00	0.01	5.29	102.02	0.51	2.30	1.00	0.03
5.34	101.39	0.50	2.31	1.00	0.01	5.42	100.52	0.49	2.33	1.00	0.02
5.46	100.68	0.49	2.32	1.00	0.01	5.54	98.94	0.48	2.36	1.00	0.02
5.58	97.70	0.46	2.38	1.00	0.01	5.66	96.10	0.45	2.41	1.00	0.02
5.73	97.08	0.45	2.39	1.00	0.02	5.78	98.78	0.46	2.36	1.00	0.01
5.87	98.15	0.46	2.37	1.00	0.02	5.91	98.05	0.45	2.37	1.00	0.01
6.00	100.65	0.47	2.32	1.00	0.02	6.04	101.34	0.47	2.31	1.00	0.01
6.13	103.64	2.00	0.00	1.00	0.00	6.21	102.89	2.00	0.00	1.00	0.00
6.28	99.93	0.45	2.34	1.00	0.02	6.31	97.87	0.44	2.38	1.00	0.01
6.39	93.32	0.41	2.47	1.00	0.03	6.44	91.40	0.39	2.52	1.00	0.01
6.57	79.42	0.33	2.82	1.00	0.04	6.62	76.22	0.31	2.92	1.00	0.02
6.65	77.46	0.32	2.88	1.00	0.01	6.70	78.93	0.32	2.84	1.00	0.02
6.79	79.76	0.32	2.81	1.00	0.03	6.83	81.39	0.33	2.77	1.00	0.01
6.92	84.43	0.34	2.68	1.00	0.03	6.96	83.76	0.34	2.70	1.00	0.01
7.05	79.57	0.32	2.82	1.00	0.03	7.12	75.50	0.30	2.94	1.00	0.02
7.19	68.61	0.27	3.18	1.00	0.02	7.29	65.03	0.26	3.33	1.00	0.04
7.41	71.49	0.28	3.08	1.00	0.04	7.47	70.85	0.28	3.10	1.00	0.02
7.49	73.72	2.00	0.00	1.00	0.00	7.58	71.27	0.27	3.08	1.00	0.03
7.66	78.95	0.30	2.84	1.00	0.03	7.71	83.58	2.00	0.00	1.00	0.00
7.75	87.69	2.00	0.00	1.00	0.00	7.83	94.87	2.00	0.00	1.00	0.00
7.88	98.68	2.00	0.00	1.00	0.00	7.97	103.27	0.43	2.28	1.00	0.02
8.02	104.68	0.44	2.25	1.00	0.01	8.11	111.56	0.49	2.14	1.00	0.02
8.16	115.93	0.53	2.07	1.00	0.01	8.26	119.80	0.56	2.02	1.00	0.02
8.30	120.85	0.57	2.00	1.00	0.01	8.36	120.94	0.57	2.00	1.00	0.02
8.41	121.04	0.57	2.00	1.00	0.01	8.50	120.98	0.56	2.00	1.00	0.02
8.55	121.02	0.56	2.00	1.00	0.01	8.65	115.49	0.51	2.08	1.00	0.03
8.69	112.83	0.49	2.12	1.00	0.01	8.75	103.86	0.42	2.27	1.00	0.02
8.81	91.42	0.34	2.52	1.00	0.02	8.90	76.29	2.00	0.00	1.00	0.00
8.94	69.27	2.00	0.00	1.00	0.00	9.03	59.63	2.00	0.00	1.00	0.00
9.09	58.19	2.00	0.00	1.00	0.00	9.15	57.81	2.00	0.00	1.00	0.00
9.19	57.40	2.00	0.00	1.00	0.00	9.25	57.62	2.00	0.00	1.00	0.00
9.34	58.38	2.00	0.00	1.00	0.00	9.41	61.36	2.00	0.00	1.00	0.00
9.51	71.41	2.00	0.00	1.00	0.00	9.57	75.84	2.00	0.00	1.00	0.00
9.70	83.25	2.00	0.00	1.00	0.00	9.74	84.02	2.00	0.00	1.00	0.00
9.81	84.66	2.00	0.00	1.00	0.00	9.87	84.85	2.00	0.00	1.00	0.00
9.93	85.50	2.00	0.00	1.00	0.00	9.99	86.42	2.00	0.00	1.00	0.00
10.05	86.74	2.00	0.00	1.00	0.00	10.13	86.80	2.00	0.00	1.00	0.00
10.18	85.74	2.00	0.00	1.00	0.00	10.31	83.16	2.00	0.00	1.00	0.00
10.36	80.93	2.00	0.00	1.00	0.00	10.42	69.30	0.24	3.16	1.00	0.02
10.49	73.88	2.00	0.00	1.00	0.00	10.55	78.18	2.00	0.00	1.00	0.00
10.62	82.54	0.28	2.73	1.00	0.02	10.69	87.66	2.00	0.00	1.00	0.00
10.70	85.35	0.29	2.66	1.00	0.00	10.76	88.89	0.31	2.57	1.00	0.02
10.86	92.40	0.32	2.49	1.00	0.03	10.91	92.70	0.32	2.49	1.00	0.02
10.96	91.83	0.32	2.51	1.00	0.02	11.03	90.34	0.31	2.54	1.00	0.02
11.12	91.81	0.32	2.51	1.00	0.03	11.17	89.83	0.31	2.55	1.00	0.02
11.25	92.52	0.32	2.49	1.00	0.02	11.30	94.70	0.33	2.44	1.00	0.01
11.42	95.28	0.33	2.43	1.00	0.04	11.47	93.36	0.32	2.47	1.00	0.02

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
11.53	94.42	0.33	2.45	1.00	0.02	11.58	96.59	0.34	2.40	1.00	0.02
11.64	97.83	0.34	2.38	1.00	0.02	11.69	100.62	0.36	2.32	1.00	0.01
11.75	103.60	0.38	2.27	1.00	0.02	11.86	110.73	0.42	2.15	1.00	0.03
11.91	114.12	0.44	2.10	1.00	0.01	11.95	117.09	0.47	2.05	1.00	0.01
12.01	121.86	0.50	1.99	1.00	0.01	12.13	130.10	0.58	1.88	1.00	0.03
12.17	132.04	0.60	1.86	1.00	0.01	12.24	130.13	0.58	1.88	1.00	0.02
12.30	125.52	0.53	1.94	1.00	0.01	12.35	123.47	0.51	1.97	1.00	0.01
12.50	119.46	0.48	2.02	1.00	0.04	12.57	119.18	0.48	2.02	1.00	0.02
12.61	118.26	0.47	2.04	1.00	0.01	12.66	118.48	0.47	2.03	1.00	0.01
12.70	120.02	0.48	2.01	1.00	0.01	12.76	120.62	0.49	2.00	1.00	0.01
12.81	119.48	0.48	2.02	1.00	0.01	12.88	117.31	0.46	2.05	1.00	0.02
12.97	112.26	2.00	0.00	1.00	0.00	13.03	105.93	2.00	0.00	1.00	0.00
13.07	100.93	2.00	0.00	1.00	0.00	13.14	91.14	2.00	0.00	1.00	0.00
13.23	68.02	2.00	0.00	1.00	0.00	13.29	66.97	2.00	0.00	1.00	0.00
13.34	64.33	2.00	0.00	1.00	0.00	13.41	60.82	2.00	0.00	1.00	0.00
13.46	59.36	2.00	0.00	1.00	0.00	13.52	58.61	2.00	0.00	1.00	0.00
13.59	59.32	2.00	0.00	1.00	0.00	13.65	59.55	2.00	0.00	1.00	0.00
13.73	59.66	2.00	0.00	1.00	0.00	13.81	59.78	2.00	0.00	1.00	0.00
13.88	59.87	2.00	0.00	1.00	0.00	13.92	59.31	2.00	0.00	1.00	0.00
14.00	56.97	2.00	0.00	1.00	0.00	14.08	55.97	2.00	0.00	1.00	0.00
14.12	55.17	2.00	0.00	1.00	0.00	14.21	52.00	2.00	0.00	1.00	0.00
14.26	50.21	2.00	0.00	1.00	0.00	14.35	48.38	2.00	0.00	1.00	0.00
14.39	47.08	2.00	0.00	1.00	0.00	14.47	46.47	2.00	0.00	1.00	0.00
14.52	46.19	2.00	0.00	1.00	0.00	14.61	46.57	2.00	0.00	1.00	0.00
14.66	46.45	2.00	0.00	1.00	0.00	14.74	47.41	2.00	0.00	1.00	0.00
14.79	48.01	2.00	0.00	1.00	0.00	14.87	48.78	2.00	0.00	1.00	0.00
14.91	50.33	2.00	0.00	1.00	0.00	14.97	53.03	2.00	0.00	1.00	0.00
15.06	55.85	2.00	0.00	1.00	0.00	15.10	56.92	2.00	0.00	1.00	0.00
15.20	58.42	2.00	0.00	1.00	0.00	15.23	58.72	2.00	0.00	1.00	0.00
15.32	61.69	2.00	0.00	1.00	0.00	15.41	62.42	2.00	0.00	1.00	0.00
15.46	62.69	2.00	0.00	1.00	0.00	15.54	63.42	2.00	0.00	1.00	0.00
15.58	63.45	2.00	0.00	1.00	0.00	15.64	63.05	2.00	0.00	1.00	0.00
15.70	62.43	2.00	0.00	1.00	0.00	15.75	62.07	2.00	0.00	1.00	0.00
15.84	61.73	2.00	0.00	1.00	0.00	15.90	61.72	2.00	0.00	1.00	0.00
15.96	61.72	2.00	0.00	1.00	0.00	16.06	59.84	2.00	0.00	1.00	0.00
16.11	54.89	2.00	0.00	1.00	0.00	16.15	50.95	2.00	0.00	1.00	0.00
16.22	52.29	2.00	0.00	1.00	0.00	16.27	53.51	2.00	0.00	1.00	0.00
16.37	54.80	2.00	0.00	1.00	0.00	16.42	55.51	2.00	0.00	1.00	0.00
16.50	59.28	2.00	0.00	1.00	0.00	16.54	62.59	2.00	0.00	1.00	0.00
16.62	68.01	2.00	0.00	1.00	0.00	16.68	71.56	2.00	0.00	1.00	0.00
16.77	78.40	2.00	0.00	1.00	0.00	16.83	82.38	2.00	0.00	1.00	0.00
16.87	85.10	2.00	0.00	1.00	0.00	16.95	93.34	2.00	0.00	1.00	0.00
17.03	101.69	2.00	0.00	1.00	0.00	17.07	104.77	2.00	0.00	1.00	0.00
17.16	109.33	2.00	0.00	1.00	0.00	17.21	110.18	2.00	0.00	1.00	0.00
17.30	109.17	0.37	2.17	1.00	0.02	17.33	108.79	0.36	2.18	1.00	0.01
17.43	109.47	0.37	2.17	1.00	0.02	17.47	110.33	0.37	2.16	1.00	0.01
17.55	112.69	0.39	2.12	1.00	0.02	17.62	113.56	0.39	2.11	1.00	0.02
17.66	113.67	0.39	2.10	1.00	0.01	17.75	114.39	0.40	2.09	1.00	0.02

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
17.79	115.59	0.40	2.07	1.00	0.01	17.87	118.69	0.43	2.03	1.00	0.02
17.95	120.55	0.44	2.00	1.00	0.02	18.00	120.57	0.44	2.00	1.00	0.01
18.09	119.75	0.43	2.02	1.00	0.02	18.13	117.09	0.41	2.05	1.00	0.01
18.18	114.65	0.40	2.09	1.00	0.01	18.26	108.66	0.36	2.18	1.00	0.02
18.31	106.47	0.35	2.22	1.00	0.01	18.40	105.29	0.34	2.24	1.00	0.02
18.44	104.97	0.34	2.25	1.00	0.01	18.53	106.10	0.34	2.23	1.00	0.02
18.57	106.90	0.35	2.21	1.00	0.01	18.66	108.75	0.36	2.18	1.00	0.02
18.70	110.13	0.37	2.16	1.00	0.01	18.80	113.29	0.39	2.11	1.00	0.02
18.84	114.97	0.40	2.08	1.00	0.01	18.90	116.25	0.40	2.07	1.00	0.02
19.01	118.58	0.42	2.03	1.00	0.03	19.06	120.09	0.43	2.01	1.00	0.01
19.11	122.40	0.45	1.98	1.00	0.01	19.20	109.44	0.36	2.17	1.00	0.02
19.31	114.90	0.39	2.09	1.00	0.03	19.37	117.92	0.41	2.04	1.00	0.01
19.41	120.31	0.43	2.01	1.00	0.01	19.46	120.42	0.43	2.01	1.00	0.01
19.51	122.37	0.45	1.98	1.00	0.01	19.55	122.70	0.45	1.98	1.00	0.01
19.65	127.51	0.49	1.91	1.00	0.02	19.69	129.13	0.50	1.89	1.00	0.01
19.78	132.92	0.53	1.85	1.00	0.02	19.82	134.69	0.55	1.83	1.00	0.01
19.91	137.03	0.57	1.80	1.00	0.02	19.96	139.45	0.59	1.78	1.00	0.01
20.04	142.19	0.62	1.75	1.00	0.02	20.09	143.88	0.63	1.73	1.00	0.01
20.17	144.11	0.64	1.73	1.00	0.02	20.22	143.72	0.63	1.74	1.00	0.01
20.30	142.33	0.62	1.75	1.00	0.02	20.37	141.00	0.60	1.76	1.00	0.02
20.44	139.88	0.59	1.77	1.00	0.02	20.49	139.01	0.58	1.78	1.00	0.01
20.57	138.56	0.58	1.79	1.00	0.02	20.61	137.96	0.57	1.79	1.00	0.01
20.70	136.28	0.56	1.81	1.00	0.02	20.74	135.19	0.55	1.82	1.00	0.01
20.83	132.22	0.52	1.86	1.00	0.02	20.90	130.03	0.50	1.88	1.00	0.01
20.95	128.84	0.49	1.90	1.00	0.01	21.03	126.69	0.47	1.92	1.00	0.02
21.08	125.95	0.47	1.93	1.00	0.01	21.16	125.77	0.47	1.94	1.00	0.02
21.20	123.54	0.45	1.96	1.00	0.01	21.29	118.29	0.41	2.04	1.00	0.02
21.35	114.09	0.38	2.10	1.00	0.01	21.40	108.65	0.35	2.18	1.00	0.01
21.49	107.44	0.34	2.20	1.00	0.02	21.54	108.10	0.35	2.19	1.00	0.01
21.59	110.01	0.36	2.16	1.00	0.01	21.66	112.76	0.38	2.12	1.00	0.02
21.76	118.49	0.41	2.03	1.00	0.02	21.82	121.72	0.44	1.99	1.00	0.01
21.89	108.92	0.35	2.18	1.00	0.02	21.95	108.53	0.35	2.19	1.00	0.02
22.03	112.66	0.37	2.12	1.00	0.02	22.08	120.36	2.00	0.00	1.00	0.00
22.15	128.28	2.00	0.00	1.00	0.00	22.20	131.02	0.51	1.87	1.00	0.01
22.26	134.85	0.54	1.83	1.00	0.01	22.32	137.62	0.57	1.80	1.00	0.01
22.39	138.94	0.58	1.78	1.00	0.01	22.45	138.04	0.57	1.79	1.00	0.01
22.52	134.47	0.54	1.83	1.00	0.01	22.61	127.32	0.48	1.92	1.00	0.02
22.65	124.12	0.45	1.96	1.00	0.01	22.74	118.10	2.00	0.00	1.00	0.00
22.79	114.37	2.00	0.00	1.00	0.00	22.88	108.60	2.00	0.00	1.00	0.00
22.92	106.14	2.00	0.00	1.00	0.00	23.02	98.20	2.00	0.00	1.00	0.00
23.08	95.23	2.00	0.00	1.00	0.00	23.13	93.02	2.00	0.00	1.00	0.00
23.19	94.15	2.00	0.00	1.00	0.00	23.24	95.76	2.00	0.00	1.00	0.00
23.31	102.27	2.00	0.00	1.00	0.00	23.36	105.79	2.00	0.00	1.00	0.00
23.46	108.88	2.00	0.00	1.00	0.00	23.58	117.84	2.00	0.00	1.00	0.00
23.63	120.53	2.00	0.00	1.00	0.00	23.71	124.73	2.00	0.00	1.00	0.00
23.77	127.37	2.00	0.00	1.00	0.00	23.85	130.32	2.00	0.00	1.00	0.00
23.90	129.86	0.49	1.89	1.00	0.01	24.02	129.89	0.49	1.89	1.00	0.03
24.10	127.00	0.47	1.92	1.00	0.02	24.15	123.19	0.44	1.97	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
24.21	115.68	0.39	2.07	1.00	0.02	24.28	108.11	0.34	2.19	1.00	0.02
24.35	107.89	0.34	2.20	1.00	0.02	24.42	85.10	0.24	2.67	1.00	0.02
24.54	97.67	0.29	2.38	1.00	0.04	24.59	99.49	0.30	2.35	1.00	0.02
24.66	101.53	0.31	2.31	1.00	0.02	24.70	102.37	0.31	2.29	1.00	0.01
24.75	103.51	0.32	2.27	1.00	0.01	24.84	105.69	0.33	2.23	1.00	0.02
24.88	107.12	0.34	2.21	1.00	0.01	24.97	109.89	0.35	2.16	1.00	0.02
25.01	111.32	0.36	2.14	1.00	0.01	25.10	111.52	0.36	2.14	1.00	0.02
25.15	111.01	0.36	2.14	1.00	0.01	25.21	109.59	0.35	2.17	1.00	0.01
25.27	107.68	0.34	2.20	1.00	0.02	25.36	103.82	0.32	2.27	1.00	0.03
25.40	101.67	0.31	2.31	1.00	0.01	25.49	98.62	0.29	2.36	1.00	0.03
25.54	97.84	0.29	2.38	1.00	0.01	25.64	99.92	0.30	2.34	1.00	0.03
25.70	100.49	2.00	0.00	1.00	0.00	25.76	100.60	2.00	0.00	1.00	0.00
25.81	96.70	2.00	0.00	1.00	0.00	25.87	92.64	2.00	0.00	1.00	0.00
25.94	88.56	2.00	0.00	1.00	0.00	25.99	84.05	2.00	0.00	1.00	0.00
26.11	69.55	2.00	0.00	1.00	0.00	26.14	66.36	2.00	0.00	1.00	0.00
26.21	60.86	2.00	0.00	1.00	0.00	26.26	57.45	2.00	0.00	1.00	0.00
26.37	57.07	2.00	0.00	1.00	0.00	26.42	57.19	2.00	0.00	1.00	0.00
26.47	57.34	2.00	0.00	1.00	0.00	26.55	57.84	2.00	0.00	1.00	0.00
26.60	58.14	2.00	0.00	1.00	0.00	26.67	58.66	2.00	0.00	1.00	0.00
26.73	58.44	2.00	0.00	1.00	0.00	26.80	57.75	2.00	0.00	1.00	0.00
26.86	57.12	2.00	0.00	1.00	0.00	26.91	56.59	2.00	0.00	1.00	0.00
26.99	55.16	2.00	0.00	1.00	0.00	27.04	51.84	2.00	0.00	1.00	0.00
27.12	47.89	2.00	0.00	1.00	0.00	27.17	49.26	2.00	0.00	1.00	0.00
27.25	52.63	2.00	0.00	1.00	0.00	27.30	53.21	2.00	0.00	1.00	0.00
27.36	53.95	2.00	0.00	1.00	0.00	27.44	55.25	2.00	0.00	1.00	0.00
27.55	56.83	2.00	0.00	1.00	0.00	27.58	57.20	2.00	0.00	1.00	0.00
27.64	57.55	2.00	0.00	1.00	0.00	27.73	60.35	2.00	0.00	1.00	0.00
27.78	62.44	2.00	0.00	1.00	0.00	27.82	62.73	2.00	0.00	1.00	0.00
27.97	61.25	2.00	0.00	1.00	0.00	28.01	59.93	2.00	0.00	1.00	0.00
28.06	58.00	2.00	0.00	1.00	0.00	28.15	54.86	2.00	0.00	1.00	0.00
28.20	54.61	2.00	0.00	1.00	0.00	28.29	55.26	2.00	0.00	1.00	0.00
28.35	55.38	2.00	0.00	1.00	0.00	28.41	56.43	2.00	0.00	1.00	0.00
28.45	57.51	2.00	0.00	1.00	0.00	28.50	58.80	2.00	0.00	1.00	0.00
28.59	61.91	2.00	0.00	1.00	0.00	28.63	63.33	2.00	0.00	1.00	0.00
28.72	67.40	2.00	0.00	1.00	0.00	28.77	70.02	2.00	0.00	1.00	0.00
28.83	72.78	2.00	0.00	1.00	0.00	28.89	75.26	2.00	0.00	1.00	0.00
29.00	76.32	2.00	0.00	1.00	0.00	29.06	76.60	2.00	0.00	1.00	0.00
29.11	77.01	2.00	0.00	1.00	0.00	29.16	78.57	2.00	0.00	1.00	0.00
29.24	81.02	2.00	0.00	1.00	0.00	29.29	84.38	2.00	0.00	1.00	0.00
29.34	88.69	2.00	0.00	1.00	0.00	29.40	93.57	2.00	0.00	1.00	0.00
29.47	94.01	2.00	0.00	1.00	0.00	29.59	83.54	2.00	0.00	1.00	0.00
29.64	74.95	2.00	0.00	1.00	0.00	29.70	67.10	0.18	3.24	1.00	0.02
29.74	68.15	0.19	3.20	1.00	0.01	29.82	71.23	0.19	3.09	1.00	0.03
29.87	73.13	0.20	3.02	1.00	0.02	29.95	69.82	0.19	3.14	1.00	0.03
30.05	65.43	0.18	3.31	1.00	0.04	30.18	81.40	0.22	2.77	1.00	0.04
30.26	85.23	2.00	0.00	1.00	0.00	30.30	87.06	2.00	0.00	1.00	0.00
30.32	88.23	2.00	0.00	1.00	0.00	30.34	87.80	2.00	0.00	1.00	0.00
30.40	85.98	2.00	0.00	1.00	0.00	30.47	83.22	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
30.52	81.72	2.00	0.00	1.00	0.00	30.60	78.83	2.00	0.00	1.00	0.00
30.66	75.96	2.00	0.00	1.00	0.00	30.73	72.94	2.00	0.00	1.00	0.00
30.82	72.28	2.00	0.00	1.00	0.00	30.87	69.28	2.00	0.00	1.00	0.00
30.92	68.45	2.00	0.00	1.00	0.00	31.04	68.42	2.00	0.00	1.00	0.00
31.09	69.09	2.00	0.00	1.00	0.00	31.17	68.94	2.00	0.00	1.00	0.00
31.22	68.90	2.00	0.00	1.00	0.00	31.29	68.59	2.00	0.00	1.00	0.00
31.35	68.24	2.00	0.00	1.00	0.00	31.40	68.30	2.00	0.00	1.00	0.00
31.48	68.60	2.00	0.00	1.00	0.00	31.53	68.58	2.00	0.00	1.00	0.00
31.58	68.82	2.00	0.00	1.00	0.00	31.74	72.41	2.00	0.00	1.00	0.00
31.80	74.24	2.00	0.00	1.00	0.00	31.86	74.99	2.00	0.00	1.00	0.00
31.92	75.07	2.00	0.00	1.00	0.00	31.98	74.91	2.00	0.00	1.00	0.00
32.04	75.64	2.00	0.00	1.00	0.00	32.10	77.67	2.00	0.00	1.00	0.00
32.16	80.17	2.00	0.00	1.00	0.00	32.23	82.86	2.00	0.00	1.00	0.00
32.29	87.56	2.00	0.00	1.00	0.00	32.36	93.11	2.00	0.00	1.00	0.00
32.42	95.65	2.00	0.00	1.00	0.00	32.49	97.87	2.00	0.00	1.00	0.00
32.62	100.23	2.00	0.00	1.00	0.00	32.68	101.92	2.00	0.00	1.00	0.00
32.74	101.45	2.00	0.00	1.00	0.00	32.81	99.64	2.00	0.00	1.00	0.00
32.87	98.90	2.00	0.00	1.00	0.00	32.93	99.41	2.00	0.00	1.00	0.00
32.98	102.43	2.00	0.00	1.00	0.00	33.05	107.87	2.00	0.00	1.00	0.00
33.12	92.80	2.00	0.00	1.00	0.00	33.19	87.25	2.00	0.00	1.00	0.00
33.25	93.52	2.00	0.00	1.00	0.00	33.30	98.86	2.00	0.00	1.00	0.00
33.38	104.33	2.00	0.00	1.00	0.00	33.43	107.83	2.00	0.00	1.00	0.00
33.50	113.35	2.00	0.00	1.00	0.00	33.55	116.68	2.00	0.00	1.00	0.00
33.61	120.58	2.00	0.00	1.00	0.00	33.68	122.87	2.00	0.00	1.00	0.00
33.75	122.66	2.00	0.00	1.00	0.00	33.81	123.03	2.00	0.00	1.00	0.00
33.89	119.61	2.00	0.00	1.00	0.00	33.94	116.06	2.00	0.00	1.00	0.00
34.07	130.81	2.00	0.00	1.00	0.00	34.12	131.94	2.00	0.00	1.00	0.00
34.18	131.52	2.00	0.00	1.00	0.00	34.29	127.24	2.00	0.00	1.00	0.00
34.38	123.06	2.00	0.00	1.00	0.00	34.43	122.15	0.43	1.98	1.00	0.01
34.55	132.39	0.51	1.86	1.00	0.03	34.61	138.39	0.56	1.79	1.00	0.01
34.69	147.55	2.00	0.00	1.00	0.00	34.75	153.81	2.00	0.00	1.00	0.00
34.82	157.42	2.00	0.00	1.00	0.00	34.88	156.37	2.00	0.00	1.00	0.00
34.95	148.25	2.00	0.00	1.00	0.00	35.07	136.84	2.00	0.00	1.00	0.00
35.14	138.40	2.00	0.00	1.00	0.00	35.20	142.52	2.00	0.00	1.00	0.00
35.26	142.51	2.00	0.00	1.00	0.00	35.33	143.86	2.00	0.00	1.00	0.00
35.39	142.29	2.00	0.00	1.00	0.00	35.46	140.24	2.00	0.00	1.00	0.00
35.53	138.90	0.57	1.78	1.00	0.01	35.57	137.07	0.55	1.80	1.00	0.01
35.64	136.13	0.54	1.81	1.00	0.02	35.70	133.71	0.52	1.84	1.00	0.01
35.77	130.90	0.50	1.87	1.00	0.02	35.83	130.07	0.49	1.88	1.00	0.01
35.89	124.26	0.45	1.96	1.00	0.01	35.97	125.14	0.45	1.94	1.00	0.02
36.01	126.86	0.47	1.92	1.00	0.01	36.14	129.27	0.49	1.89	1.00	0.03
36.19	125.48	0.46	1.94	1.00	0.01	36.23	125.30	0.45	1.94	1.00	0.01
36.30	125.80	0.46	1.94	1.00	0.02	36.36	126.62	0.46	1.93	1.00	0.01
36.45	127.54	0.47	1.91	1.00	0.02	36.50	131.76	0.51	1.86	1.00	0.01
36.62	135.38	0.54	1.82	1.00	0.03	36.67	137.81	0.56	1.80	1.00	0.01
36.72	139.74	0.58	1.78	1.00	0.01	36.80	141.29	0.59	1.76	1.00	0.02
36.84	143.84	0.62	1.73	1.00	0.01	36.91	146.47	0.64	1.71	1.00	0.01
36.97	151.14	0.69	1.37	1.00	0.01	37.02	156.93	0.76	1.05	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
37.10	163.26	0.84	0.99	1.00	0.01	37.15	168.09	0.90	0.73	1.00	0.00
37.24	175.16	1.00	0.52	1.00	0.01	37.29	180.48	1.08	0.38	1.00	0.00
37.39	197.94	1.39	0.00	1.00	0.00	37.46	208.06	2.00	0.00	1.00	0.00
37.51	217.35	2.00	0.00	1.00	0.00	37.55	223.81	2.00	0.00	1.00	0.00
37.65	230.55	2.00	0.00	1.00	0.00	37.68	232.09	2.00	0.00	1.00	0.00
37.76	231.90	2.00	0.00	1.00	0.00	37.81	231.18	2.00	0.00	1.00	0.00
37.90	228.15	2.00	0.00	1.00	0.00	37.95	227.38	2.00	0.00	1.00	0.00
38.03	226.41	2.00	0.00	1.00	0.00	38.10	222.75	2.00	0.00	1.00	0.00
38.17	215.61	2.00	0.00	1.00	0.00	38.24	207.17	2.00	0.00	1.00	0.00
38.30	195.94	1.35	0.00	1.00	0.00	38.38	183.31	1.13	0.37	1.00	0.00
38.43	170.43	0.94	0.71	1.00	0.00	38.52	157.15	0.76	1.05	1.00	0.01
38.57	148.25	0.66	1.41	1.00	0.01	38.66	139.23	0.57	1.78	1.00	0.02
38.71	119.35	0.41	2.02	1.00	0.01	38.78	109.55	0.35	2.17	1.00	0.02
38.85	104.71	0.32	2.25	1.00	0.02	38.92	100.73	0.30	2.32	1.00	0.02
39.01	98.41	0.29	2.37	1.00	0.03	39.02	100.28	0.30	2.33	1.00	0.01
39.04	99.19	0.30	2.35	1.00	0.01	39.13	103.22	0.32	2.28	1.00	0.02
39.18	108.43	2.00	0.00	1.00	0.00	39.28	115.06	2.00	0.00	1.00	0.00
39.34	116.38	2.00	0.00	1.00	0.00	39.39	116.31	2.00	0.00	1.00	0.00
39.45	115.54	2.00	0.00	1.00	0.00	39.54	116.33	2.00	0.00	1.00	0.00
39.59	117.58	2.00	0.00	1.00	0.00	39.66	122.59	2.00	0.00	1.00	0.00
39.71	123.99	2.00	0.00	1.00	0.00	39.81	127.25	2.00	0.00	1.00	0.00
39.92	130.39	2.00	0.00	1.00	0.00	39.97	130.76	0.50	1.88	1.00	0.01
40.02	132.74	0.52	1.85	1.00	0.01	40.10	134.92	0.54	1.83	1.00	0.02
40.15	136.72	0.55	1.81	1.00	0.01	40.25	152.31	0.71	1.35	1.00	0.02
40.32	159.47	0.80	1.03	1.00	0.01	40.37	167.88	0.91	0.73	1.00	0.00
40.44	175.13	1.01	0.52	1.00	0.00	40.50	180.18	1.09	0.38	1.00	0.00
40.54	185.50	1.18	0.26	1.00	0.00	40.67	195.94	1.36	0.00	1.00	0.00
40.72	198.33	1.41	0.00	1.00	0.00	40.77	199.85	1.44	0.00	1.00	0.00
40.90	198.33	1.41	0.00	1.00	0.00	40.94	198.18	1.40	0.00	1.00	0.00
41.01	196.46	1.37	0.00	1.00	0.00	41.07	194.54	1.34	0.18	1.00	0.00
41.25	199.18	1.43	0.00	1.00	0.00	41.38	197.41	1.39	0.00	1.00	0.00
41.45	195.32	1.35	0.00	1.00	0.00	41.52	195.27	1.35	0.00	1.00	0.00
41.57	194.55	1.34	0.18	1.00	0.00	41.64	192.42	1.30	0.18	1.00	0.00
41.70	193.64	1.32	0.18	1.00	0.00	41.77	191.63	1.29	0.18	1.00	0.00
41.83	187.91	1.22	0.26	1.00	0.00	41.88	177.84	1.06	0.38	1.00	0.00
41.89	167.91	0.91	0.73	1.00	0.00	41.95	173.38	0.99	0.53	1.00	0.00
42.00	170.68	0.95	0.54	1.00	0.00	42.09	166.07	0.89	0.74	1.00	0.01
42.13	163.52	0.86	0.76	1.00	0.00	42.21	155.61	0.76	1.07	1.00	0.01
42.26	152.40	0.72	1.35	1.00	0.01	42.35	147.38	0.66	1.42	1.00	0.02
42.46	145.87	0.65	1.71	1.00	0.02	42.52	147.34	0.66	1.42	1.00	0.01
42.57	147.55	0.67	1.42	1.00	0.01	42.61	146.53	0.66	1.43	1.00	0.01
42.66	144.13	0.63	1.73	1.00	0.01	42.75	140.84	2.00	0.00	1.00	0.00
42.80	139.72	2.00	0.00	1.00	0.00	42.90	140.85	2.00	0.00	1.00	0.00
43.01	139.22	2.00	0.00	1.00	0.00	43.06	133.01	0.53	1.85	1.00	0.01
43.10	127.16	0.48	1.92	1.00	0.01	43.15	126.62	0.47	1.93	1.00	0.01
43.25	131.88	0.52	1.86	1.00	0.02	43.32	134.01	0.54	1.84	1.00	0.01
43.36	136.61	0.56	1.81	1.00	0.01	43.41	139.13	0.58	1.78	1.00	0.01
43.47	142.44	0.62	1.75	1.00	0.01	43.51	144.68	0.64	1.73	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)
43.68	147.78	0.67	1.41	1.00	0.03	43.72	147.47	0.67	1.42	1.00	0.01
43.78	147.16	0.67	1.42	1.00	0.01	43.81	146.71	0.66	1.43	1.00	0.01
43.89	147.07	0.67	1.42	1.00	0.01	43.94	147.69	0.67	1.41	1.00	0.01
43.98	148.20	0.68	1.41	1.00	0.01	44.04	149.27	0.69	1.39	1.00	0.01
44.11	151.06	0.71	1.37	1.00	0.01	44.20	155.87	0.77	1.06	1.00	0.01
44.25	160.06	0.82	1.02	1.00	0.01	44.31	165.37	0.89	0.74	1.00	0.00
44.38	173.27	1.00	0.53	1.00	0.00	44.43	182.60	1.15	0.37	1.00	0.00
44.51	192.18	1.32	0.18	1.00	0.00	44.56	196.62	1.40	0.00	1.00	0.00
44.64	194.42	1.36	0.00	1.00	0.00	44.69	194.39	1.36	0.00	1.00	0.00
44.77	192.48	1.33	0.18	1.00	0.00	44.86	188.80	1.26	0.18	1.00	0.00
44.90	187.32	1.23	0.26	1.00	0.00	44.95	186.08	1.21	0.26	1.00	0.00
45.03	183.01	1.16	0.27	1.00	0.00	45.12	174.32	1.02	0.53	1.00	0.01
45.17	163.01	0.86	0.76	1.00	0.00	45.23	152.05	0.73	1.36	1.00	0.01
45.35	138.86	0.59	1.79	1.00	0.02	45.43	134.08	0.54	1.84	1.00	0.02
45.49	131.61	0.52	1.87	1.00	0.01	45.56	137.82	2.00	0.00	1.00	0.00
45.61	140.07	2.00	0.00	1.00	0.00	45.69	135.55	2.00	0.00	1.00	0.00
45.74	137.30	2.00	0.00	1.00	0.00	45.87	142.57	2.00	0.00	1.00	0.00
45.93	142.53	2.00	0.00	1.00	0.00	46.05	143.35	2.00	0.00	1.00	0.00
46.18	145.67	2.00	0.00	1.00	0.00	46.23	146.34	2.00	0.00	1.00	0.00
46.31	148.60	2.00	0.00	1.00	0.00	46.37	150.09	2.00	0.00	1.00	0.00
46.49	156.18	2.00	0.00	1.00	0.00	46.58	162.62	2.00	0.00	1.00	0.00
46.62	166.29	2.00	0.00	1.00	0.00	46.68	170.78	2.00	0.00	1.00	0.00
46.76	179.42	2.00	0.00	1.00	0.00	46.81	159.00	2.00	0.00	1.00	0.00
46.89	138.18	0.59	1.79	1.00	0.02	46.94	143.37	0.64	1.74	1.00	0.01
47.02	148.52	0.70	1.40	1.00	0.01	47.08	151.79	0.73	1.36	1.00	0.01
47.12	153.96	0.76	1.08	1.00	0.00	47.21	161.21	0.85	0.77	1.00	0.01
47.25	162.90	0.87	0.76	1.00	0.00	47.32	164.79	0.90	0.75	1.00	0.01
47.39	164.72	0.90	0.75	1.00	0.01	47.46	164.02	0.89	0.75	1.00	0.01
47.53	165.05	0.91	0.75	1.00	0.01	47.61	164.34	0.90	0.75	1.00	0.01
47.66	162.95	0.88	0.76	1.00	0.00	47.75	156.22	0.79	1.06	1.00	0.01
47.78	153.15	0.75	1.09	1.00	0.00	47.88	148.06	0.70	1.41	1.00	0.02
47.92	145.36	0.67	1.45	1.00	0.01	47.97	140.65	0.62	1.77	1.00	0.01
48.05	133.32	0.55	1.85	1.00	0.02	48.11	122.41	0.46	1.98	1.00	0.01
48.19	122.84	0.46	1.97	1.00	0.02	48.24	122.75	0.46	1.98	1.00	0.01
48.32	120.87	0.45	2.00	1.00	0.02	48.36	119.70	2.00	0.00	1.00	0.00
48.45	119.83	2.00	0.00	1.00	0.00	48.53	120.06	2.00	0.00	1.00	0.00
48.58	126.64	2.00	0.00	1.00	0.00	48.71	139.13	2.00	0.00	1.00	0.00
48.76	142.56	2.00	0.00	1.00	0.00	48.80	145.53	2.00	0.00	1.00	0.00
48.85	147.84	2.00	0.00	1.00	0.00	48.89	149.67	2.00	0.00	1.00	0.00
48.96	150.80	2.00	0.00	1.00	0.00	49.05	151.12	2.00	0.00	1.00	0.00
49.08	150.69	2.00	0.00	1.00	0.00	49.16	147.72	0.70	1.41	1.00	0.01
49.24	141.61	0.63	1.76	1.00	0.02	49.28	138.75	0.61	1.79	1.00	0.01
49.38	135.50	0.57	1.82	1.00	0.02	49.42	135.08	0.57	1.83	1.00	0.01
49.49	135.78	0.58	1.82	1.00	0.02	49.57	141.25	0.63	1.76	1.00	0.02
49.62	144.41	0.67	1.46	1.00	0.01	49.69	150.21	0.73	1.38	1.00	0.01
49.77	-1.00	2.00	0.00	1.00	0.00	49.82	-1.00	2.00	0.00	1.00	0.00
49.90	-1.00	2.00	0.00	1.00	0.00	49.95	-1.00	2.00	0.00	1.00	0.00
50.00	-1.00	2.00	0.00	1.00	0.00	50.10	-1.00	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$Q_{tn,cs}$	FS	e_v (%)	DF	Settlement (in)

Total estimated settlement: 5.08

Abbreviations

$Q_{tn,cs}$:	Equivalent clean sand normalized cone resistance
FS:	Factor of safety against liquefaction
e_v (%):	Post-liquefaction volumentric strain
DF:	e_v depth weighting factor
Settlement:	Calculated settlement

APPENDIX E

REFERENCE NO. 3 EXCERPTS

BORING NO. B-8

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

JOB NO.: 21G201-2	DRILLING DATE: 8/3/21	WATER DEPTH: 7 feet
PROJECT: Proposed C/I Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 9 feet
LOCATION: Cypress, California	LOGGED BY: Jamie Hayward	READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					3± inches Asphaltic concrete; 4± inches Aggregate base							
	X	11			FILL: Gray Brown Silty fine Sand, mottled, loose-damp to moist	109	10					
	X	23				112	7					
5	X	13			ALLUVIUM: Light Gray fine Sand, trace medium to coarse Sand, loose to medium dense-damp	99	2					
	X	26				92	9					
	X	16				96	25					
10					Gray Silty Clay, stiff-wet							
					Gray Brown Silty fine Sand, loose-wet							
	X	8				97	24					
15					Dark Gray Brown Silty Clay, trace Iron oxide staining, medium stiff-wet							
					Gray Brown fine Sandy Silt, trace Clay, little Iron oxide staining, medium dense-wet							
	X	17	1.5			98	29					
20												
	X	12	2.5			100	24					
25												
					Gray fine Sandy Silt, little to some Clay, loose-wet							
	X	6	1.5			103	22					
30												
					Boring Terminated @ 30'							

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-9

JOB NO.: 21G201-2
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 8/3/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 7 feet
CAVE DEPTH: 9 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					4± inches Asphaltic concrete; 5± inches Aggregate base							
	X	7			FILL: Gray Brown Silty fine Sand, loose-moist		9					
	X	12			FILL: Gray Brown to Light Gray Brown fine Sand, mottled, medium dense-damp		4					
5												
	X	7			ALLUVIUM: Light Gray fine Sand, trace medium Sand, loose-wet		30					
	X	9	1.0		Gray Brown fine Sandy Silt, little to some Clay, trace Calcareous nodules, loose-wet		32					
10												
					Gray Brown Silty Clay, little Calcareous nodules, trace Iron oxide staining, soft to medium stiff-wet							
	X	4	1.5				36					
15												
					Gray Brown Silty fine Sand, trace medium to coarse Sand, medium dense-wet							
	X	15					27					
20												

Boring Terminated @ 20'

TBL 21G201-2.GPJ SOCALGEO.GDT 10/5/21

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-10

JOB NO.: 21G201-2
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 8/3/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 8.5 feet
CAVE DEPTH: 26 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					3± inches Asphaltic concrete; 5± inches Aggregate base							
	X	7			FILL: Gray Brown Silty fine Sand, mottled, loose-moist		18					
			4.0		FILL: Dark Gray Clayey fine Sand, mottled, loose-moist		14					
5	X	6			FILL: Gray Brown Silty fine Sand, slightly mottled, loose-damp		9					
	X	18			ALLUVIUM: Gray Brown fine Sand, trace Silt, 2-inch fine Sand lense, medium dense-damp		7					
10	X	11			Gray Brown Silty fine Sand, trace Iron oxide staining, medium dense-wet		25					
15	X	4			Gray fine Sand, little Silt, very loose to loose-wet		26					
20	X	8	2.0		Gray Brown fine Sandy Silt, little Clay, loose-wet		27					
25	X	8			Gray to Gray Brown Interbedded fine Sand and Silty fine Sand, loose-wet		27					
30	X	10	2.0		Dark Gray Silty Clay, trace Calcareous nodules, stiff-wet		26					
					Boring Terminated @ 30'							

TBL 21G201-2.GPJ SOCALGEO.GDT 10/5/21

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-11

JOB NO.: 21G201-2
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 8/3/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 7 feet
CAVE DEPTH: 14 feet
READING TAKEN: At Completion

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (SURFACE ELEVATION: --- MSL)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					4± inches Asphaltic concrete; 5± inches Aggregate base							
	X	22			FILL: Gray Brown Silty fine Sand, mottled, medium dense-moist	116	12					
	X	22				108	13					
5	X	28			ALLUVIUM: Light Gray fine Sand, medium dense-damp	95	4					
	X	7			Gray Brown fine Sandy Silt, little Iron oxide staining, loose-very moist to wet	92	32					
	X	13			Gray Brown fine Sand, trace Silt, loose-wet	103	23					
10												
					Gray Brown Silty Clay, trace Calcareous nodules, loose-wet							
	X	8	2.5			98	27					
15												
					Gray Brown Silty fine Sand, little Iron oxide staining, medium dense-wet							
	X	18				109	20					
20												
					Boring Terminated @ 20'							

TBL 21G201-2.GPJ SOCALGEO.GDT 10/5/21

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-12

JOB NO.: 21G201-2
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 8/4/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 9 feet
CAVE DEPTH: 16 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					5½± inches Portland cement concrete							
	X	29	4.5		FILL: Gray Brown to Gray Silty fine Sand, trace Clay nodules, slightly mottled, medium dense-moist	112	14					
	X	19	4.5			113	12					
5	X	23	1.5			101	10					
	X	25			ALLUVIUM: Light Gray fine Sand, medium dense-moist	98	5					
	X	9			Gray Brown Silty fine Sand, loose-wet	100	23					
10												
					Gray Brown Silty Clay, little fine Sand, little Iron oxide staining, medium stiff-wet							
	X	11				96	25					
15												
	X	9	1.0			96	29					
20					Boring Terminated @ 20'							

TBL 21G201-2.GPJ SOCALGEO.GDT 10/5/21

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-13

JOB NO.: 21G201-2
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 8/4/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 8.5 feet
CAVE DEPTH: 17 feet
READING TAKEN: At Completion

SURFACE ELEVATION: --- MSL

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
				6± inches Portland cement concrete							
	X	15	3.0	FILL: Gray Brown Silty fine Sand, trace medium Sand, trace fine Gravel, 2-inch fine Sand lense, medium dense-moist		14					
	X	13	2.0			11					
5											
	X	17	3.0	FILL: Gray Brown Silty Clay, trace fine Sand, mottled, very stiff-very moist		29					
	X	16		ALLUVIUM: Gray Silty fine Sand, medium dense-wet		22					
10											
				Gray fine Sandy Silt, loose-wet							
	X	5				30					
15											
				Gray Silty Clay, little Calcareous nodules, trace Iron oxide staining, medium stiff-wet							
	X	7	1.5			36					
20											

Boring Terminated @ 20'

TBL 21G201-2.GPJ SOCALGEO.GDT 10/5/21

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-14

JOB NO.: 21G201-2
PROJECT: Proposed C/I Development
LOCATION: Cypress, California

DRILLING DATE: 8/3/21
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jamie Hayward

WATER DEPTH: 5 feet
CAVE DEPTH: 14 feet
READING TAKEN: At Completion

SURFACE ELEVATION: --- MSL

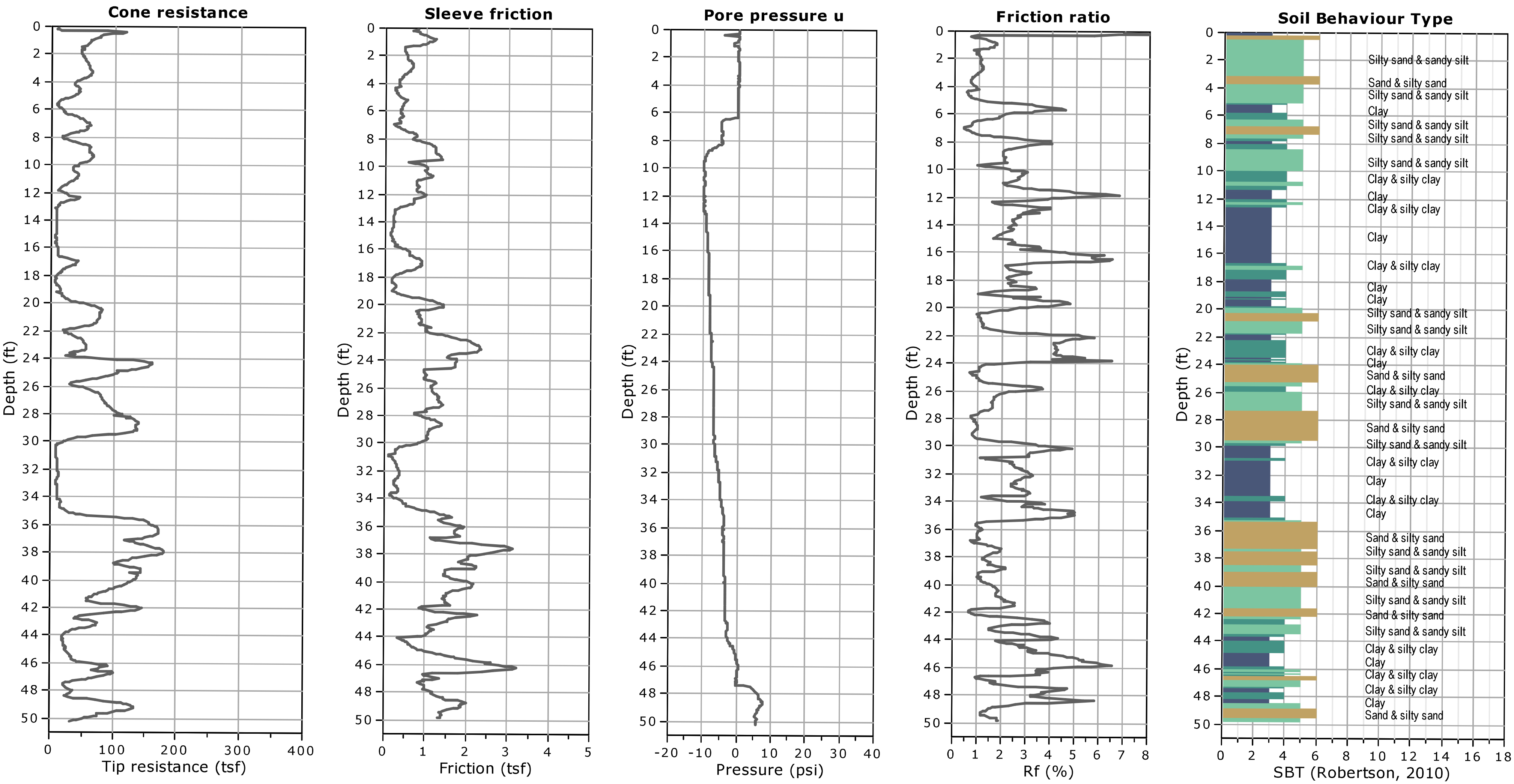
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					3± inches Asphaltic concrete; 5± inches Aggregate base							
	X	24	4.5		FILL: Gray Brown fine Sandy Clay, little Silt, medium dense-moist	104	19					
	X	12			ALLUVIUM: Gray Brown Silty fine Sand, loose-moist	102	21					
5	X	11				95	28					
	X	8				100	23					
	X	13			@ 9 feet, wet	97	23					
10												
	X	11				95	23					
15												
	X	18	3.0		@ 19 feet, little Clay	97	27					
20												
					Gray Brown fine Sand, little Silt, little Iron oxide staining, medium dense-wet							
	X	26				108	19					
25												
					Gray Silty Clay, trace Iron oxide staining, medium stiff to stiff-wet							
	X	12	1.5			99	25					
30												
					Boring Terminated @ 30'							

TEST BORING LOG

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

Project: **Southern California Geotechnical**
Location: **5665 Plaza Dr, Cypress, CA**

CPT-1
Total depth: 50.22 ft, Date: 4/2/2021



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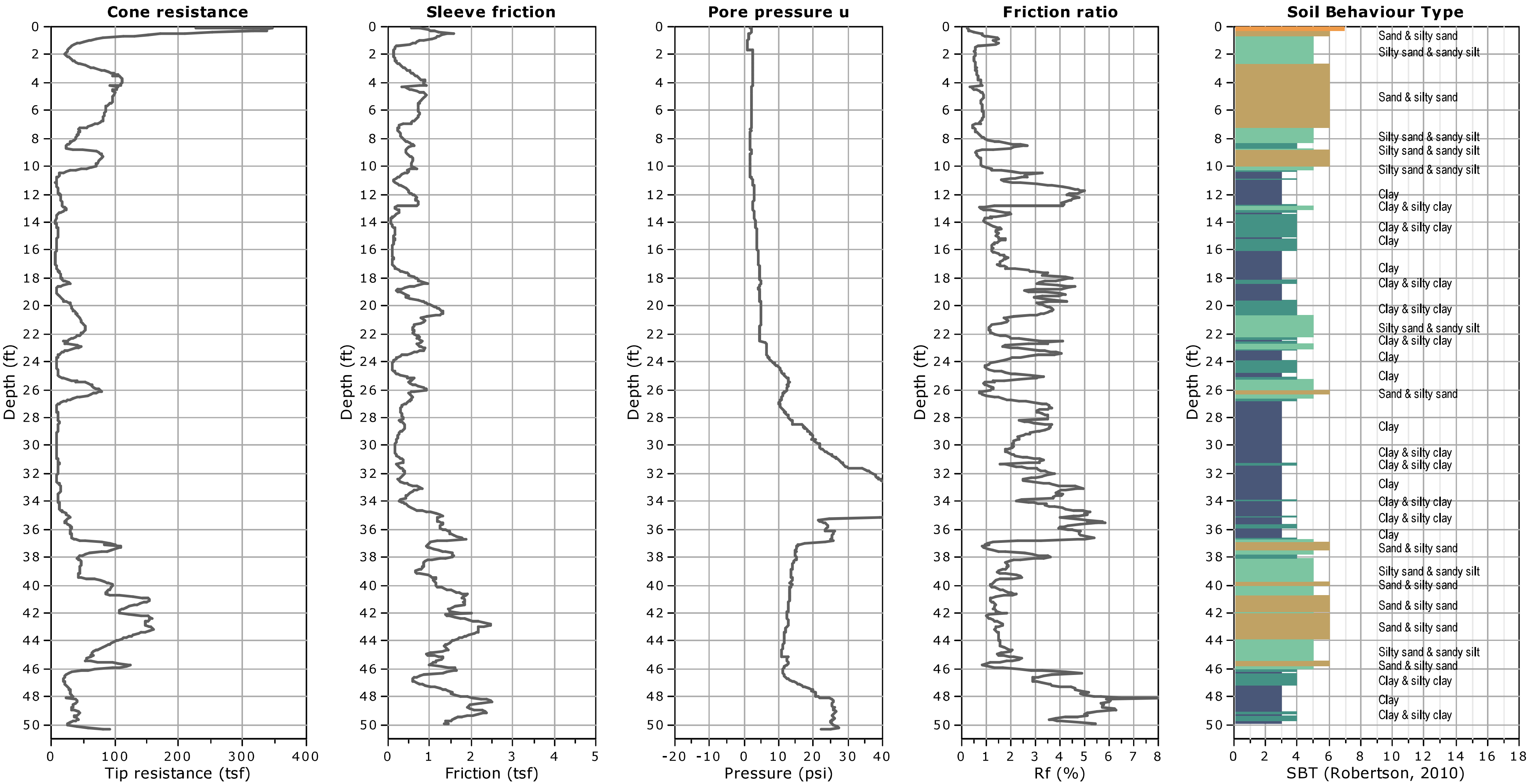
www.kehoetesting.com

Project: Southern California Geotechnical

Location: 5665 Plaza Dr, Cypress, CA

CPT-2

Total depth: 50.33 ft, Date: 4/2/2021



Kehoe Testing and Engineering
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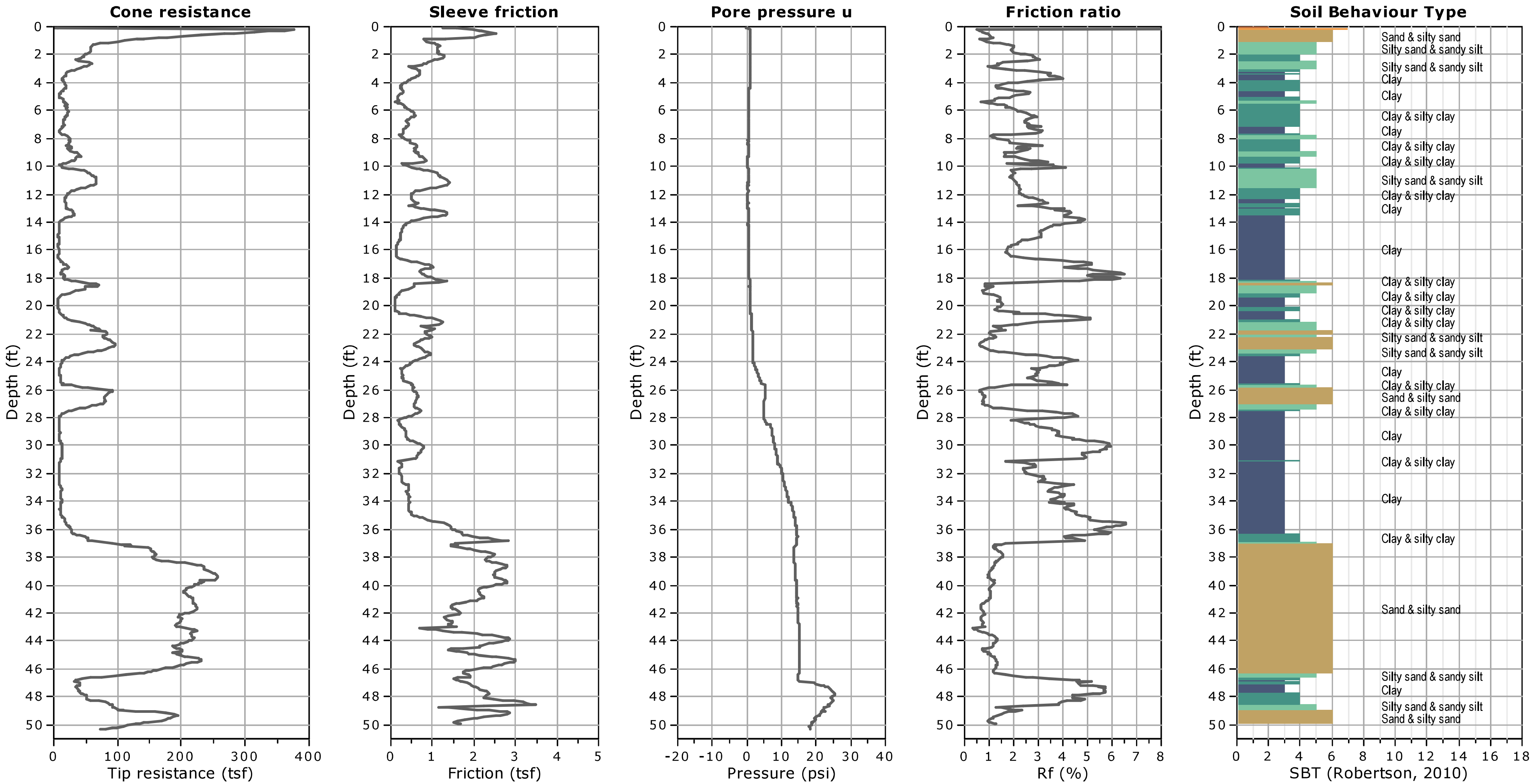
Project: Southern California Geotechnical
Location: 5665 Plaza Dr, Cypress, CA

CPT-3
Total depth: 50.35 ft, Date: 4/2/2021



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
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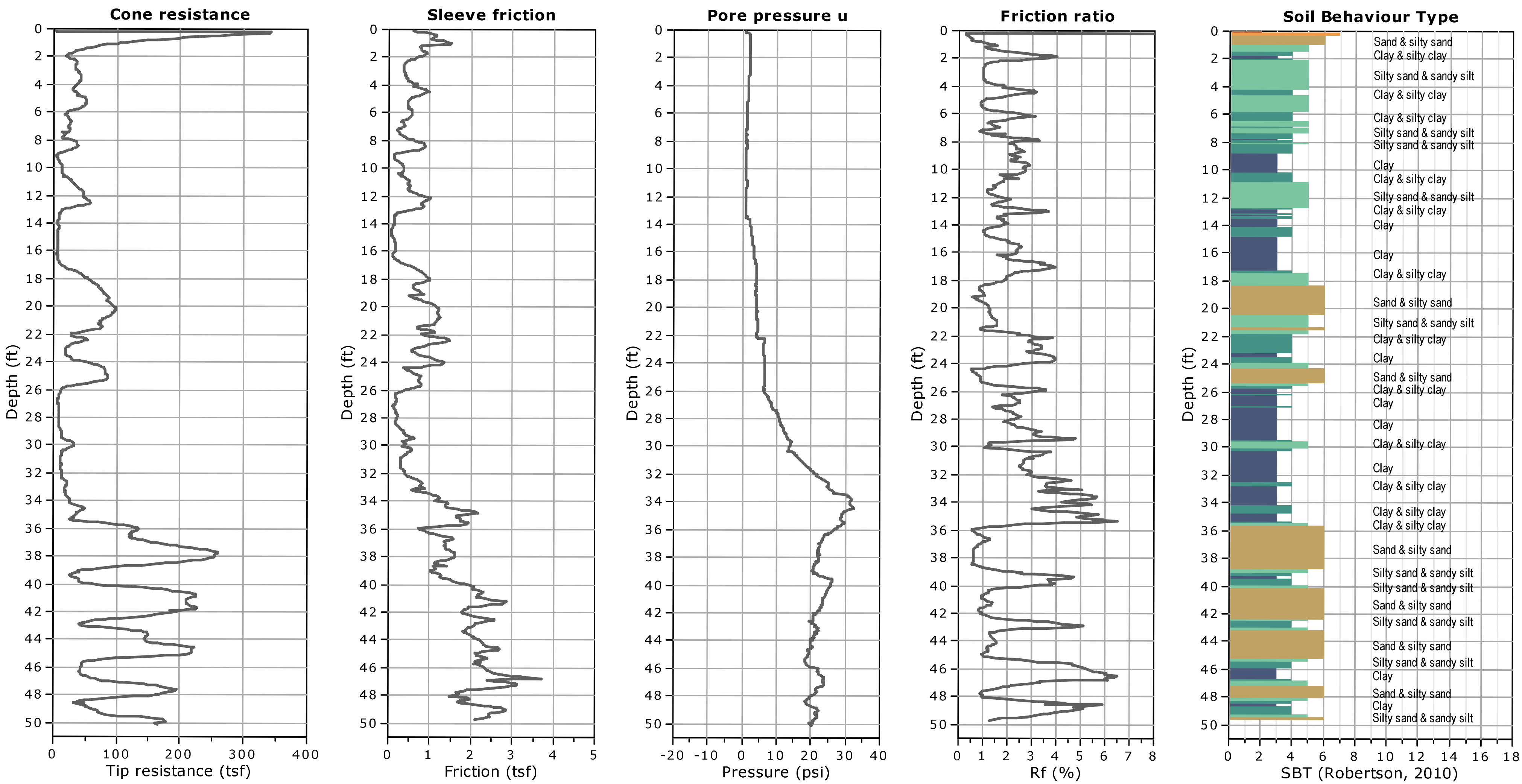
Project: Southern California Geotechnical

Location: 5665 Plaza Dr, Cypress, CA

CPT-4

Total depth: 50.10 ft, Date: 4/2/2021



:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
5.08	14.32	2.00	0.00	1.00	0.00	5.13	18.64	2.00	0.00	1.00	0.00
5.21	78.23	2.00	0.00	1.00	0.00	5.26	79.99	2.00	0.00	1.00	0.00
5.34	77.33	2.00	0.00	1.00	0.00	5.39	78.83	0.29	4.07	1.00	0.02
5.47	82.91	0.30	3.87	1.00	0.04	5.52	86.73	0.30	3.71	1.00	0.02
5.60	90.42	0.31	3.56	1.00	0.03	5.63	86.99	0.30	3.70	1.00	0.01
5.66	86.26	0.30	3.73	1.00	0.02	5.74	89.96	0.31	3.57	1.00	0.03
5.78	89.37	0.30	3.60	1.00	0.02	5.85	90.24	0.31	3.56	1.00	0.03
5.94	92.72	0.31	3.47	1.00	0.04	6.00	94.94	0.32	3.39	1.00	0.02
6.06	96.33	0.32	3.34	1.00	0.02	6.10	96.73	2.00	0.00	1.00	0.00
6.20	95.72	2.00	0.00	1.00	0.00	6.26	94.21	2.00	0.00	1.00	0.00
6.32	93.48	2.00	0.00	1.00	0.00	6.37	92.62	2.00	0.00	1.00	0.00
6.46	30.03	2.00	0.00	1.00	0.00	6.51	28.92	2.00	0.00	1.00	0.00
6.63	27.10	2.00	0.00	1.00	0.00	6.69	25.03	2.00	0.00	1.00	0.00
6.76	25.03	2.00	0.00	1.00	0.00	6.81	25.03	2.00	0.00	1.00	0.00
6.86	25.02	2.00	0.00	1.00	0.00	6.94	25.12	2.00	0.00	1.00	0.00
7.00	25.65	2.00	0.00	1.00	0.00	7.08	25.53	2.00	0.00	1.00	0.00
7.11	20.81	2.00	0.00	1.00	0.00	7.18	22.94	2.00	0.00	1.00	0.00
7.22	21.07	2.00	0.00	1.00	0.00	7.34	16.86	2.00	0.00	1.00	0.00
7.40	14.70	2.00	0.00	1.00	0.00	7.46	14.24	2.00	0.00	1.00	0.00
7.52	14.44	2.00	0.00	1.00	0.00	7.58	14.26	2.00	0.00	1.00	0.00
7.65	16.27	2.00	0.00	1.00	0.00	7.71	20.70	2.00	0.00	1.00	0.00
7.78	82.19	2.00	0.00	1.00	0.00	7.82	85.67	2.00	0.00	1.00	0.00
7.90	87.69	0.26	3.67	1.00	0.03	7.96	89.17	0.26	3.61	1.00	0.03
8.02	90.93	0.27	3.54	1.00	0.03	8.10	90.57	0.27	3.55	1.00	0.03
8.16	93.38	0.27	3.44	1.00	0.02	8.24	93.09	0.27	3.45	1.00	0.04
8.30	92.01	0.27	3.50	1.00	0.03	8.38	91.63	0.26	3.51	1.00	0.03
8.42	93.07	0.27	3.46	1.00	0.02	8.49	28.41	2.00	0.00	1.00	0.00
8.55	92.70	0.27	3.47	1.00	0.02	8.61	97.42	0.28	3.30	1.00	0.02
8.68	95.52	0.27	3.37	1.00	0.03	8.73	89.95	2.00	0.00	1.00	0.00
8.81	90.81	2.00	0.00	1.00	0.00	8.86	92.94	2.00	0.00	1.00	0.00
8.99	101.32	2.00	0.00	1.00	0.00	9.04	104.31	2.00	0.00	1.00	0.00
9.12	107.93	0.31	2.97	1.00	0.03	9.26	110.49	2.00	0.00	1.00	0.00
9.30	110.83	2.00	0.00	1.00	0.00	9.34	106.11	2.00	0.00	1.00	0.00
9.39	105.16	2.00	0.00	1.00	0.00	9.48	103.56	2.00	0.00	1.00	0.00
9.55	102.12	2.00	0.00	1.00	0.00	9.60	98.25	2.00	0.00	1.00	0.00
9.68	91.59	2.00	0.00	1.00	0.00	9.74	25.76	2.00	0.00	1.00	0.00
9.79	77.04	0.22	4.16	1.00	0.03	9.87	16.20	2.00	0.00	1.00	0.00
9.92	13.25	2.00	0.00	1.00	0.00	10.00	16.48	2.00	0.00	1.00	0.00
10.06	16.79	2.00	0.00	1.00	0.00	10.14	89.39	2.00	0.00	1.00	0.00
10.18	97.85	2.00	0.00	1.00	0.00	10.26	111.15	2.00	0.00	1.00	0.00
10.31	117.03	2.00	0.00	1.00	0.00	10.37	122.45	2.00	0.00	1.00	0.00
10.47	125.88	0.38	2.52	1.00	0.03	10.51	127.16	0.38	2.49	1.00	0.01
10.62	129.94	0.40	2.44	1.00	0.03	10.67	132.38	0.42	2.39	1.00	0.01
10.75	134.57	0.44	2.34	1.00	0.02	10.80	135.98	0.45	2.32	1.00	0.01
10.87	137.42	0.46	2.29	1.00	0.02	10.93	138.30	0.47	2.27	1.00	0.02
11.02	138.91	0.47	2.26	1.00	0.02	11.07	139.13	0.47	2.26	1.00	0.01
11.14	139.18	0.47	2.26	1.00	0.02	11.20	139.11	0.47	2.26	1.00	0.02
11.25	137.96	0.46	2.28	1.00	0.01	11.32	135.28	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
11.38	131.13	2.00	0.00	1.00	0.00	11.45	125.66	2.00	0.00	1.00	0.00
11.51	119.90	2.00	0.00	1.00	0.00	11.57	112.76	2.00	0.00	1.00	0.00
11.64	104.75	2.00	0.00	1.00	0.00	11.71	97.93	2.00	0.00	1.00	0.00
11.77	92.80	2.00	0.00	1.00	0.00	11.90	87.07	2.00	0.00	1.00	0.00
11.95	86.15	2.00	0.00	1.00	0.00	12.03	85.71	0.22	3.75	1.00	0.03
12.09	85.07	0.22	3.78	1.00	0.03	12.16	83.90	0.21	3.83	1.00	0.03
12.21	24.43	2.00	0.00	1.00	0.00	12.28	23.21	2.00	0.00	1.00	0.00
12.34	22.10	2.00	0.00	1.00	0.00	12.42	21.74	2.00	0.00	1.00	0.00
12.47	21.71	2.00	0.00	1.00	0.00	12.54	22.53	2.00	0.00	1.00	0.00
12.60	23.45	2.00	0.00	1.00	0.00	12.67	24.37	2.00	0.00	1.00	0.00
12.74	25.09	2.00	0.00	1.00	0.00	12.80	82.25	0.21	3.90	1.00	0.03
12.87	24.18	2.00	0.00	1.00	0.00	12.92	24.24	2.00	0.00	1.00	0.00
12.99	26.20	2.00	0.00	1.00	0.00	13.02	24.48	2.00	0.00	1.00	0.00
13.09	30.99	2.00	0.00	1.00	0.00	13.13	95.94	0.24	3.35	1.00	0.02
13.23	36.90	2.00	0.00	1.00	0.00	13.26	36.87	2.00	0.00	1.00	0.00
13.36	37.89	2.00	0.00	1.00	0.00	13.40	100.99	0.25	3.18	1.00	0.02
13.49	100.85	0.25	3.19	1.00	0.03	13.54	98.88	0.24	3.25	1.00	0.02
13.60	34.10	2.00	0.00	1.00	0.00	13.65	29.88	2.00	0.00	1.00	0.00
13.75	21.25	2.00	0.00	1.00	0.00	13.79	18.00	2.00	0.00	1.00	0.00
13.89	14.07	2.00	0.00	1.00	0.00	13.93	13.32	2.00	0.00	1.00	0.00
13.98	11.93	2.00	0.00	1.00	0.00	14.11	11.38	2.00	0.00	1.00	0.00
14.15	11.15	2.00	0.00	1.00	0.00	14.20	11.04	2.00	0.00	1.00	0.00
14.27	10.48	2.00	0.00	1.00	0.00	14.33	10.47	2.00	0.00	1.00	0.00
14.38	10.46	2.00	0.00	1.00	0.00	14.46	10.40	2.00	0.00	1.00	0.00
14.54	10.33	2.00	0.00	1.00	0.00	14.59	10.21	2.00	0.00	1.00	0.00
14.66	10.09	2.00	0.00	1.00	0.00	14.78	9.34	2.00	0.00	1.00	0.00
14.85	9.22	2.00	0.00	1.00	0.00	14.91	9.11	2.00	0.00	1.00	0.00
14.99	9.10	2.00	0.00	1.00	0.00	15.04	9.09	2.00	0.00	1.00	0.00
15.12	9.39	2.00	0.00	1.00	0.00	15.17	9.90	2.00	0.00	1.00	0.00
15.23	10.52	2.00	0.00	1.00	0.00	15.30	10.92	2.00	0.00	1.00	0.00
15.34	10.91	2.00	0.00	1.00	0.00	15.48	10.06	2.00	0.00	1.00	0.00
15.54	9.53	2.00	0.00	1.00	0.00	15.61	9.09	2.00	0.00	1.00	0.00
15.66	8.77	2.00	0.00	1.00	0.00	15.73	8.67	2.00	0.00	1.00	0.00
15.78	8.97	2.00	0.00	1.00	0.00	15.97	10.09	2.00	0.00	1.00	0.00
16.02	10.08	2.00	0.00	1.00	0.00	16.03	10.08	2.00	0.00	1.00	0.00
16.11	10.07	2.00	0.00	1.00	0.00	16.14	10.26	2.00	0.00	1.00	0.00
16.29	9.10	2.00	0.00	1.00	0.00	16.33	8.79	2.00	0.00	1.00	0.00
16.45	8.77	2.00	0.00	1.00	0.00	16.49	8.76	2.00	0.00	1.00	0.00
16.56	8.75	2.00	0.00	1.00	0.00	16.63	9.36	2.00	0.00	1.00	0.00
16.67	10.37	2.00	0.00	1.00	0.00	16.75	11.58	2.00	0.00	1.00	0.00
16.80	13.19	2.00	0.00	1.00	0.00	16.87	14.97	2.00	0.00	1.00	0.00
16.93	16.56	2.00	0.00	1.00	0.00	16.99	18.44	2.00	0.00	1.00	0.00
17.06	21.39	2.00	0.00	1.00	0.00	17.11	24.82	2.00	0.00	1.00	0.00
17.18	27.81	2.00	0.00	1.00	0.00	17.24	27.68	2.00	0.00	1.00	0.00
17.30	23.65	2.00	0.00	1.00	0.00	17.37	19.09	2.00	0.00	1.00	0.00
17.43	16.20	2.00	0.00	1.00	0.00	17.51	14.19	2.00	0.00	1.00	0.00
17.64	13.35	2.00	0.00	1.00	0.00	17.68	13.34	2.00	0.00	1.00	0.00
17.75	17.48	2.00	0.00	1.00	0.00	17.82	19.22	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
17.88	19.10	2.00	0.00	1.00	0.00	17.94	18.48	2.00	0.00	1.00	0.00
17.99	18.46	2.00	0.00	1.00	0.00	18.08	20.57	2.00	0.00	1.00	0.00
18.12	24.62	2.00	0.00	1.00	0.00	18.21	31.00	2.00	0.00	1.00	0.00
18.26	101.50	2.00	0.00	1.00	0.00	18.32	111.11	2.00	0.00	1.00	0.00
18.39	109.37	2.00	0.00	1.00	0.00	18.44	107.67	2.00	0.00	1.00	0.00
18.52	106.43	2.00	0.00	1.00	0.00	18.57	107.18	0.24	2.99	1.00	0.02
18.62	108.53	0.25	2.95	1.00	0.02	18.64	105.72	0.24	3.03	1.00	0.01
18.74	103.46	0.23	3.10	1.00	0.04	18.78	99.55	2.00	0.00	1.00	0.00
18.88	91.80	2.00	0.00	1.00	0.00	18.92	87.95	2.00	0.00	1.00	0.00
19.05	81.45	2.00	0.00	1.00	0.00	19.15	74.45	2.00	0.00	1.00	0.00
19.22	15.21	2.00	0.00	1.00	0.00	19.27	12.38	2.00	0.00	1.00	0.00
19.34	10.42	2.00	0.00	1.00	0.00	19.40	8.95	2.00	0.00	1.00	0.00
19.46	8.07	2.00	0.00	1.00	0.00	19.53	7.19	2.00	0.00	1.00	0.00
19.59	7.56	2.00	0.00	1.00	0.00	19.66	7.66	2.00	0.00	1.00	0.00
19.71	7.07	2.00	0.00	1.00	0.00	19.79	6.87	2.00	0.00	1.00	0.00
19.84	6.87	2.00	0.00	1.00	0.00	19.91	6.66	2.00	0.00	1.00	0.00
19.98	7.23	2.00	0.00	1.00	0.00	20.03	7.62	2.00	0.00	1.00	0.00
20.11	8.00	2.00	0.00	1.00	0.00	20.21	8.28	2.00	0.00	1.00	0.00
20.28	8.66	2.00	0.00	1.00	0.00	20.34	9.04	2.00	0.00	1.00	0.00
20.40	9.51	2.00	0.00	1.00	0.00	20.46	10.07	2.00	0.00	1.00	0.00
20.52	11.03	2.00	0.00	1.00	0.00	20.58	11.96	2.00	0.00	1.00	0.00
20.64	13.66	2.00	0.00	1.00	0.00	20.69	15.73	2.00	0.00	1.00	0.00
20.76	17.59	2.00	0.00	1.00	0.00	20.81	19.26	2.00	0.00	1.00	0.00
20.88	21.01	2.00	0.00	1.00	0.00	20.94	23.05	2.00	0.00	1.00	0.00
21.05	31.05	2.00	0.00	1.00	0.00	21.17	105.87	2.00	0.00	1.00	0.00
21.23	112.53	2.00	0.00	1.00	0.00	21.30	116.08	2.00	0.00	1.00	0.00
21.35	119.20	2.00	0.00	1.00	0.00	21.43	117.81	2.00	0.00	1.00	0.00
21.48	115.02	2.00	0.00	1.00	0.00	21.53	119.31	0.28	2.67	1.00	0.02
21.61	125.14	0.30	2.54	1.00	0.02	21.65	127.16	0.31	2.49	1.00	0.01
21.71	126.14	0.31	2.52	1.00	0.02	21.72	118.46	0.27	2.69	1.00	0.00
21.83	121.10	0.28	2.63	1.00	0.04	21.91	120.01	0.28	2.65	1.00	0.02
21.96	120.83	0.28	2.64	1.00	0.02	22.01	122.26	0.29	2.60	1.00	0.02
22.09	124.79	0.30	2.55	1.00	0.02	22.14	126.09	0.31	2.52	1.00	0.01
22.21	127.24	0.31	2.49	1.00	0.02	22.27	125.56	0.30	2.53	1.00	0.02
22.34	120.55	0.28	2.64	1.00	0.02	22.40	115.34	0.26	2.77	1.00	0.02
22.46	110.97	0.25	2.88	1.00	0.02	22.53	106.26	0.23	3.02	1.00	0.02
22.58	101.24	0.22	3.17	1.00	0.02	22.71	100.35	0.22	3.20	1.00	0.05
22.76	101.55	0.22	3.16	1.00	0.02	22.89	100.77	2.00	0.00	1.00	0.00
22.95	103.87	2.00	0.00	1.00	0.00	23.02	111.65	2.00	0.00	1.00	0.00
23.07	115.93	2.00	0.00	1.00	0.00	23.16	118.24	2.00	0.00	1.00	0.00
23.21	117.89	2.00	0.00	1.00	0.00	23.28	116.28	2.00	0.00	1.00	0.00
23.34	112.76	2.00	0.00	1.00	0.00	23.42	106.74	2.00	0.00	1.00	0.00
23.46	99.49	2.00	0.00	1.00	0.00	23.53	92.59	2.00	0.00	1.00	0.00
23.59	27.15	2.00	0.00	1.00	0.00	23.68	23.91	2.00	0.00	1.00	0.00
23.73	20.76	2.00	0.00	1.00	0.00	23.79	17.36	2.00	0.00	1.00	0.00
23.86	14.74	2.00	0.00	1.00	0.00	23.91	13.47	2.00	0.00	1.00	0.00
23.99	13.37	2.00	0.00	1.00	0.00	24.05	12.99	2.00	0.00	1.00	0.00
24.10	12.54	2.00	0.00	1.00	0.00	24.17	11.54	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
24.24	10.99	2.00	0.00	1.00	0.00	24.30	10.53	2.00	0.00	1.00	0.00
24.36	10.26	2.00	0.00	1.00	0.00	24.44	9.89	2.00	0.00	1.00	0.00
24.51	9.34	2.00	0.00	1.00	0.00	24.56	8.97	2.00	0.00	1.00	0.00
24.62	8.79	2.00	0.00	1.00	0.00	24.69	8.88	2.00	0.00	1.00	0.00
24.74	9.05	2.00	0.00	1.00	0.00	24.82	9.48	2.00	0.00	1.00	0.00
24.87	9.74	2.00	0.00	1.00	0.00	24.95	9.91	2.00	0.00	1.00	0.00
25.01	9.99	2.00	0.00	1.00	0.00	25.08	10.24	2.00	0.00	1.00	0.00
25.14	10.76	2.00	0.00	1.00	0.00	25.20	10.85	2.00	0.00	1.00	0.00
25.27	10.48	2.00	0.00	1.00	0.00	25.32	10.03	2.00	0.00	1.00	0.00
25.40	10.29	2.00	0.00	1.00	0.00	25.45	10.98	2.00	0.00	1.00	0.00
25.53	12.82	2.00	0.00	1.00	0.00	25.58	14.91	2.00	0.00	1.00	0.00
25.60	12.28	2.00	0.00	1.00	0.00	25.67	85.24	2.00	0.00	1.00	0.00
25.74	90.68	2.00	0.00	1.00	0.00	25.82	99.34	2.00	0.00	1.00	0.00
25.87	104.02	2.00	0.00	1.00	0.00	25.94	104.57	2.00	0.00	1.00	0.00
26.01	94.24	2.00	0.00	1.00	0.00	26.05	94.80	2.00	0.00	1.00	0.00
26.12	96.32	0.20	3.34	1.00	0.03	26.18	97.95	0.21	3.28	1.00	0.02
26.28	103.31	0.22	3.11	1.00	0.03	26.31	105.45	0.22	3.04	1.00	0.01
26.40	109.29	0.23	2.93	1.00	0.03	26.48	109.74	0.24	2.92	1.00	0.03
26.53	108.64	0.23	2.95	1.00	0.02	26.59	107.68	0.23	2.98	1.00	0.02
26.66	106.63	0.23	3.01	1.00	0.03	26.78	104.54	0.22	3.07	1.00	0.04
26.83	105.30	0.22	3.05	1.00	0.02	26.90	106.02	0.23	3.03	1.00	0.03
26.98	104.20	2.00	0.00	1.00	0.00	27.03	105.63	2.00	0.00	1.00	0.00
27.10	106.68	2.00	0.00	1.00	0.00	27.15	106.19	2.00	0.00	1.00	0.00
27.22	104.47	2.00	0.00	1.00	0.00	27.28	102.22	2.00	0.00	1.00	0.00
27.33	97.79	2.00	0.00	1.00	0.00	27.42	92.98	2.00	0.00	1.00	0.00
27.46	27.82	2.00	0.00	1.00	0.00	27.55	22.19	2.00	0.00	1.00	0.00
27.60	18.27	2.00	0.00	1.00	0.00	27.67	15.36	2.00	0.00	1.00	0.00
27.73	13.05	2.00	0.00	1.00	0.00	27.85	10.22	2.00	0.00	1.00	0.00
27.91	9.37	2.00	0.00	1.00	0.00	27.99	8.94	2.00	0.00	1.00	0.00
28.04	8.75	2.00	0.00	1.00	0.00	28.10	8.75	2.00	0.00	1.00	0.00
28.17	8.58	2.00	0.00	1.00	0.00	28.24	8.06	2.00	0.00	1.00	0.00
28.30	7.80	2.00	0.00	1.00	0.00	28.37	7.63	2.00	0.00	1.00	0.00
28.43	7.62	2.00	0.00	1.00	0.00	28.45	7.66	2.00	0.00	1.00	0.00
28.50	7.69	2.00	0.00	1.00	0.00	28.55	7.94	2.00	0.00	1.00	0.00
28.63	8.02	2.00	0.00	1.00	0.00	28.68	8.27	2.00	0.00	1.00	0.00
28.78	8.76	2.00	0.00	1.00	0.00	28.84	8.84	2.00	0.00	1.00	0.00
28.89	9.00	2.00	0.00	1.00	0.00	28.94	9.25	2.00	0.00	1.00	0.00
29.03	9.49	2.00	0.00	1.00	0.00	29.10	9.39	2.00	0.00	1.00	0.00
29.14	9.31	2.00	0.00	1.00	0.00	29.20	9.13	2.00	0.00	1.00	0.00
29.30	8.95	2.00	0.00	1.00	0.00	29.40	8.69	2.00	0.00	1.00	0.00
29.46	8.52	2.00	0.00	1.00	0.00	29.52	8.76	2.00	0.00	1.00	0.00
29.56	8.76	2.00	0.00	1.00	0.00	29.61	8.92	2.00	0.00	1.00	0.00
29.67	9.32	2.00	0.00	1.00	0.00	29.73	9.98	2.00	0.00	1.00	0.00
29.83	10.80	2.00	0.00	1.00	0.00	29.88	11.54	2.00	0.00	1.00	0.00
30.01	12.51	2.00	0.00	1.00	0.00	30.05	12.75	2.00	0.00	1.00	0.00
30.09	12.99	2.00	0.00	1.00	0.00	30.14	13.06	2.00	0.00	1.00	0.00
30.21	12.64	2.00	0.00	1.00	0.00	30.27	12.62	2.00	0.00	1.00	0.00
30.36	12.61	2.00	0.00	1.00	0.00	30.42	12.60	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
30.47	12.83	2.00	0.00	1.00	0.00	30.53	13.16	2.00	0.00	1.00	0.00
30.58	13.15	2.00	0.00	1.00	0.00	30.67	12.64	2.00	0.00	1.00	0.00
30.74	12.13	2.00	0.00	1.00	0.00	30.79	11.95	2.00	0.00	1.00	0.00
30.85	11.70	2.00	0.00	1.00	0.00	30.91	11.28	2.00	0.00	1.00	0.00
30.98	10.62	2.00	0.00	1.00	0.00	31.10	9.71	2.00	0.00	1.00	0.00
31.23	8.96	2.00	0.00	1.00	0.00	31.28	8.63	2.00	0.00	1.00	0.00
31.34	8.38	2.00	0.00	1.00	0.00	31.37	8.37	2.00	0.00	1.00	0.00
31.37	8.37	2.00	0.00	1.00	0.00	31.46	8.36	2.00	0.00	1.00	0.00
31.51	8.12	2.00	0.00	1.00	0.00	31.60	7.86	2.00	0.00	1.00	0.00
31.65	8.03	2.00	0.00	1.00	0.00	31.74	8.02	2.00	0.00	1.00	0.00
31.82	8.01	2.00	0.00	1.00	0.00	31.86	8.01	2.00	0.00	1.00	0.00
31.91	7.84	2.00	0.00	1.00	0.00	31.99	7.83	2.00	0.00	1.00	0.00
32.04	8.07	2.00	0.00	1.00	0.00	32.16	7.81	2.00	0.00	1.00	0.00
32.18	7.57	2.00	0.00	1.00	0.00	32.23	7.81	2.00	0.00	1.00	0.00
32.31	7.80	2.00	0.00	1.00	0.00	32.35	7.72	2.00	0.00	1.00	0.00
32.44	7.55	2.00	0.00	1.00	0.00	32.53	7.54	2.00	0.00	1.00	0.00
32.57	7.62	2.00	0.00	1.00	0.00	32.62	7.46	2.00	0.00	1.00	0.00
32.69	7.69	2.00	0.00	1.00	0.00	32.75	8.00	2.00	0.00	1.00	0.00
32.83	8.71	2.00	0.00	1.00	0.00	32.92	9.82	2.00	0.00	1.00	0.00
32.97	10.29	2.00	0.00	1.00	0.00	33.01	10.53	2.00	0.00	1.00	0.00
33.10	10.84	2.00	0.00	1.00	0.00	33.14	11.07	2.00	0.00	1.00	0.00
33.23	10.26	2.00	0.00	1.00	0.00	33.28	9.78	2.00	0.00	1.00	0.00
33.34	9.29	2.00	0.00	1.00	0.00	33.43	9.21	2.00	0.00	1.00	0.00
33.50	9.20	2.00	0.00	1.00	0.00	33.54	9.51	2.00	0.00	1.00	0.00
33.64	10.29	2.00	0.00	1.00	0.00	33.70	10.28	2.00	0.00	1.00	0.00
33.76	10.43	2.00	0.00	1.00	0.00	33.80	10.59	2.00	0.00	1.00	0.00
33.86	10.90	2.00	0.00	1.00	0.00	33.98	10.88	2.00	0.00	1.00	0.00
34.04	9.85	2.00	0.00	1.00	0.00	34.08	11.66	2.00	0.00	1.00	0.00
34.17	10.14	2.00	0.00	1.00	0.00	34.21	8.88	2.00	0.00	1.00	0.00
34.26	8.88	2.00	0.00	1.00	0.00	34.39	8.86	2.00	0.00	1.00	0.00
34.43	8.86	2.00	0.00	1.00	0.00	34.48	9.01	2.00	0.00	1.00	0.00
34.53	8.85	2.00	0.00	1.00	0.00	34.58	8.69	2.00	0.00	1.00	0.00
34.65	8.83	2.00	0.00	1.00	0.00	34.74	9.13	2.00	0.00	1.00	0.00
34.78	9.36	2.00	0.00	1.00	0.00	34.87	9.90	2.00	0.00	1.00	0.00
34.92	9.90	2.00	0.00	1.00	0.00	35.00	10.59	2.00	0.00	1.00	0.00
35.05	11.13	2.00	0.00	1.00	0.00	35.12	12.14	2.00	0.00	1.00	0.00
35.18	12.98	2.00	0.00	1.00	0.00	35.27	14.61	2.00	0.00	1.00	0.00
35.31	15.46	2.00	0.00	1.00	0.00	35.40	15.99	2.00	0.00	1.00	0.00
35.44	16.05	2.00	0.00	1.00	0.00	35.58	17.19	2.00	0.00	1.00	0.00
35.62	18.04	2.00	0.00	1.00	0.00	35.72	19.73	2.00	0.00	1.00	0.00
35.76	20.58	2.00	0.00	1.00	0.00	35.81	21.27	2.00	0.00	1.00	0.00
35.84	22.34	2.00	0.00	1.00	0.00	35.90	23.26	2.00	0.00	1.00	0.00
35.98	24.95	2.00	0.00	1.00	0.00	36.04	25.39	2.00	0.00	1.00	0.00
36.09	25.61	2.00	0.00	1.00	0.00	36.24	25.64	2.00	0.00	1.00	0.00
36.28	26.01	2.00	0.00	1.00	0.00	36.33	27.78	2.00	0.00	1.00	0.00
36.39	31.41	2.00	0.00	1.00	0.00	36.46	37.05	2.00	0.00	1.00	0.00
36.51	43.11	2.00	0.00	1.00	0.00	36.57	46.36	2.00	0.00	1.00	0.00
36.64	47.34	2.00	0.00	1.00	0.00	36.68	47.31	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
36.76	48.29	2.00	0.00	1.00	0.00	36.81	52.80	2.00	0.00	1.00	0.00
36.99	138.91	2.00	0.00	1.00	0.00	37.07	148.14	2.00	0.00	1.00	0.00
37.13	145.32	2.00	0.00	1.00	0.00	37.18	144.61	2.00	0.00	1.00	0.00
37.21	144.50	0.42	2.16	1.00	0.01	37.32	151.33	0.50	2.05	1.00	0.03
37.39	157.60	0.59	1.87	1.00	0.02	37.44	161.86	0.68	1.62	1.00	0.01
37.48	165.79	0.77	1.31	1.00	0.01	37.57	172.11	0.96	0.83	1.00	0.01
37.61	175.56	1.10	0.62	1.00	0.00	37.67	179.85	1.32	0.39	1.00	0.00
37.75	182.99	1.52	0.24	1.00	0.00	37.81	183.31	1.54	0.23	1.00	0.00
37.88	182.57	1.49	0.26	1.00	0.00	37.94	180.48	1.36	0.36	1.00	0.00
38.02	178.11	1.23	0.48	1.00	0.00	38.07	176.50	1.15	0.57	1.00	0.00
38.14	175.30	1.09	0.63	1.00	0.01	38.23	175.29	1.09	0.64	1.00	0.01
38.28	175.90	1.12	0.60	1.00	0.00	38.34	178.49	1.25	0.46	1.00	0.00
38.39	185.18	1.68	0.15	1.00	0.00	38.45	193.16	2.00	0.00	1.00	0.00
38.52	200.34	2.00	0.00	1.00	0.00	38.59	206.16	2.00	0.00	1.00	0.00
38.67	209.39	2.00	0.00	1.00	0.00	38.72	209.46	2.00	0.00	1.00	0.00
38.81	210.19	2.00	0.00	1.00	0.00	38.85	210.59	2.00	0.00	1.00	0.00
38.97	215.89	2.00	0.00	1.00	0.00	39.03	219.04	2.00	0.00	1.00	0.00
39.11	222.46	2.00	0.00	1.00	0.00	39.16	224.84	2.00	0.00	1.00	0.00
39.23	226.74	2.00	0.00	1.00	0.00	39.29	227.94	2.00	0.00	1.00	0.00
39.36	228.87	2.00	0.00	1.00	0.00	39.42	229.16	2.00	0.00	1.00	0.00
39.47	228.82	2.00	0.00	1.00	0.00	39.55	226.80	2.00	0.00	1.00	0.00
39.60	223.70	2.00	0.00	1.00	0.00	39.64	202.56	2.00	0.00	1.00	0.00
39.71	207.78	2.00	0.00	1.00	0.00	39.81	203.83	2.00	0.00	1.00	0.00
39.86	200.69	2.00	0.00	1.00	0.00	39.90	199.22	2.00	0.00	1.00	0.00
39.99	193.97	2.00	0.00	1.00	0.00	40.03	192.65	2.00	0.00	1.00	0.00
40.12	189.03	2.00	0.00	1.00	0.00	40.16	186.93	1.83	0.07	1.00	0.00
40.25	182.20	1.47	0.28	1.00	0.00	40.29	180.93	1.39	0.34	1.00	0.00
40.39	177.01	1.17	0.53	1.00	0.01	40.45	176.99	1.17	0.54	1.00	0.00
40.52	177.36	1.19	0.52	1.00	0.00	40.56	178.24	1.24	0.47	1.00	0.00
40.66	180.94	1.39	0.34	1.00	0.00	40.70	182.00	1.46	0.29	1.00	0.00
40.78	184.50	1.63	0.17	1.00	0.00	40.83	186.26	1.77	0.10	1.00	0.00
40.89	188.16	1.93	0.03	1.00	0.00	40.96	189.17	2.00	0.00	1.00	0.00
41.05	189.02	2.00	0.00	1.00	0.00	41.09	189.02	2.00	0.00	1.00	0.00
41.16	189.38	2.00	0.00	1.00	0.00	41.22	189.28	2.00	0.00	1.00	0.00
41.29	190.28	2.00	0.00	1.00	0.00	41.34	191.49	2.00	0.00	1.00	0.00
41.44	193.26	2.00	0.00	1.00	0.00	41.49	193.82	2.00	0.00	1.00	0.00
41.58	193.94	2.00	0.00	1.00	0.00	41.63	194.02	2.00	0.00	1.00	0.00
41.69	193.84	2.00	0.00	1.00	0.00	41.74	193.91	2.00	0.00	1.00	0.00
41.91	187.75	1.90	0.04	1.00	0.00	41.96	183.09	1.53	0.23	1.00	0.00
42.02	177.26	1.19	0.52	1.00	0.00	42.07	172.86	1.00	0.77	1.00	0.01
42.13	169.20	0.87	1.02	1.00	0.01	42.19	167.28	0.82	1.17	1.00	0.01
42.25	166.95	0.81	1.19	1.00	0.01	42.33	167.78	0.83	1.13	1.00	0.01
42.43	171.52	0.95	0.86	1.00	0.01	42.47	170.62	0.92	0.92	1.00	0.00
42.56	169.79	0.89	0.97	1.00	0.01	42.60	169.58	0.89	0.99	1.00	0.00
42.66	167.75	0.83	1.13	1.00	0.01	42.73	164.39	0.74	1.42	1.00	0.01
42.81	162.85	0.71	1.57	1.00	0.01	42.86	161.50	0.68	1.64	1.00	0.01
42.95	162.47	0.70	1.59	1.00	0.02	42.99	166.20	0.79	1.25	1.00	0.01
43.08	176.38	1.15	0.56	1.00	0.01	43.17	185.31	1.70	0.14	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
43.22	188.75	1.99	0.00	1.00	0.00	43.26	191.41	2.00	0.00	1.00	0.00
43.34	183.52	1.56	0.21	1.00	0.00	43.39	183.72	1.58	0.20	1.00	0.00
43.48	182.59	1.50	0.26	1.00	0.00	43.51	183.80	1.58	0.20	1.00	0.00
43.59	184.53	1.64	0.17	1.00	0.00	43.65	186.58	1.80	0.08	1.00	0.00
43.72	190.64	2.00	0.00	1.00	0.00	43.79	192.86	2.00	0.00	1.00	0.00
43.88	193.56	2.00	0.00	1.00	0.00	43.91	192.64	2.00	0.00	1.00	0.00
44.00	189.42	2.00	0.00	1.00	0.00	44.04	186.30	1.78	0.09	1.00	0.00
44.14	178.42	1.25	0.45	1.00	0.01	44.18	174.96	1.09	0.64	1.00	0.00
44.23	171.17	0.94	0.87	1.00	0.01	44.32	167.06	0.81	1.17	1.00	0.01
44.36	165.94	0.78	1.27	1.00	0.01	44.45	165.80	0.78	1.28	1.00	0.01
44.52	161.61	0.68	1.63	1.00	0.01	44.58	165.46	0.77	1.31	1.00	0.01
44.63	167.51	0.83	1.14	1.00	0.01	44.70	167.40	0.82	1.15	1.00	0.01
44.76	166.84	0.81	1.19	1.00	0.01	44.85	155.75	0.57	1.99	1.00	0.02
44.89	165.88	0.78	1.27	1.00	0.00	44.98	161.82	0.69	1.62	1.00	0.02
45.03	167.44	0.83	1.14	1.00	0.01	45.11	177.73	1.22	0.49	1.00	0.00
45.15	181.93	1.46	0.28	1.00	0.00	45.26	194.65	2.00	0.00	1.00	0.00
45.31	198.06	2.00	0.00	1.00	0.00	45.35	199.75	2.00	0.00	1.00	0.00
45.41	199.81	2.00	0.00	1.00	0.00	45.47	197.14	2.00	0.00	1.00	0.00
45.55	193.21	2.00	0.00	1.00	0.00	45.64	188.68	1.99	0.00	1.00	0.00
45.68	187.02	1.85	0.06	1.00	0.00	45.74	184.25	1.62	0.18	1.00	0.00
45.83	180.04	1.35	0.37	1.00	0.00	45.87	177.14	1.19	0.52	1.00	0.00
45.95	172.31	0.99	0.79	1.00	0.01	46.08	158.96	0.63	1.79	1.00	0.03
46.13	156.38	0.59	1.95	1.00	0.01	46.18	153.87	2.00	0.00	1.00	0.00
46.22	154.76	2.00	0.00	1.00	0.00	46.27	155.23	2.00	0.00	1.00	0.00
46.34	154.98	2.00	0.00	1.00	0.00	46.43	150.76	2.00	0.00	1.00	0.00
46.52	140.05	2.00	0.00	1.00	0.00	46.57	124.94	2.00	0.00	1.00	0.00
46.64	108.85	2.00	0.00	1.00	0.00	46.70	34.41	2.00	0.00	1.00	0.00
46.77	27.98	2.00	0.00	1.00	0.00	46.83	26.86	2.00	0.00	1.00	0.00
46.90	28.09	2.00	0.00	1.00	0.00	46.94	25.66	2.00	0.00	1.00	0.00
47.01	30.90	2.00	0.00	1.00	0.00	47.05	31.66	2.00	0.00	1.00	0.00
47.14	31.70	2.00	0.00	1.00	0.00	47.19	28.91	2.00	0.00	1.00	0.00
47.27	26.81	2.00	0.00	1.00	0.00	47.33	28.97	2.00	0.00	1.00	0.00
47.41	28.29	2.00	0.00	1.00	0.00	47.44	29.04	2.00	0.00	1.00	0.00
47.54	30.53	2.00	0.00	1.00	0.00	47.58	30.80	2.00	0.00	1.00	0.00
47.68	31.61	2.00	0.00	1.00	0.00	47.74	33.18	2.00	0.00	1.00	0.00
47.77	34.84	2.00	0.00	1.00	0.00	47.84	38.23	2.00	0.00	1.00	0.00
47.91	40.66	2.00	0.00	1.00	0.00	47.98	39.63	2.00	0.00	1.00	0.00
48.05	39.43	2.00	0.00	1.00	0.00	48.11	39.41	2.00	0.00	1.00	0.00
48.19	39.21	2.00	0.00	1.00	0.00	48.24	44.41	2.00	0.00	1.00	0.00
48.30	55.76	2.00	0.00	1.00	0.00	48.38	132.59	0.34	2.38	1.00	0.02
48.46	136.00	0.37	2.32	1.00	0.02	48.52	139.45	0.39	2.25	1.00	0.02
48.60	142.96	0.42	2.19	1.00	0.02	48.64	139.33	0.39	2.26	1.00	0.01
48.71	126.44	0.31	2.51	1.00	0.02	48.77	132.19	0.34	2.39	1.00	0.02
48.90	145.04	0.44	2.16	1.00	0.03	48.95	151.22	0.52	2.06	1.00	0.01
48.96	146.02	0.45	2.14	1.00	0.00	49.02	168.60	0.87	1.03	1.00	0.01
49.08	186.58	1.82	0.08	1.00	0.00	49.16	193.66	2.00	0.00	1.00	0.00
49.22	193.20	2.00	0.00	1.00	0.00	49.33	187.00	1.86	0.06	1.00	0.00
49.36	182.82	1.53	0.23	1.00	0.00	49.46	170.44	0.93	0.90	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
49.51	164.49	0.76	1.36	1.00	0.01	49.55	160.49	0.67	1.70	1.00	0.01
49.62	149.94	0.50	2.08	1.00	0.02	49.69	143.36	0.43	2.18	1.00	0.02
49.81	143.82	0.43	2.18	1.00	0.03	49.86	146.27	0.46	2.14	1.00	0.01
49.90	149.89	0.50	2.08	1.00	0.01	49.94	151.07	0.52	2.06	1.00	0.01
50.01	93.37	2.00	0.00	1.00	0.00	50.08	87.77	2.00	0.00	1.00	0.00
50.17	78.12	2.00	0.00	1.00	0.00	50.21	72.28	2.00	0.00	1.00	0.00
50.30	63.35	2.00	0.00	1.00	0.00	50.35	56.57	2.00	0.00	1.00	0.00

Total estimated settlement: 2.80

Abbreviations

$Q_{tn,cs}$: Equivalent clean sand normalized cone resistance
FS: Factor of safety against liquefaction
e_v (%): Post-liquefaction volumentric strain
DF: e_v depth weighting factor
Settlement: Calculated settlement

:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
5.07	117.97	0.45	2.70	1.00	0.03	5.15	115.74	0.44	2.76	1.00	0.02
5.18	114.95	0.43	2.78	1.00	0.01	5.29	114.43	0.42	2.79	1.00	0.04
5.34	114.80	0.42	2.78	1.00	0.02	5.42	116.08	0.43	2.75	1.00	0.03
5.46	116.83	0.43	2.73	1.00	0.01	5.54	117.51	0.43	2.72	1.00	0.03
5.58	116.89	2.00	0.00	1.00	0.00	5.66	116.39	2.00	0.00	1.00	0.00
5.73	115.80	2.00	0.00	1.00	0.00	5.78	113.79	2.00	0.00	1.00	0.00
5.87	104.57	2.00	0.00	1.00	0.00	5.91	100.24	2.00	0.00	1.00	0.00
6.00	95.30	2.00	0.00	1.00	0.00	6.04	92.83	2.00	0.00	1.00	0.00
6.13	28.92	2.00	0.00	1.00	0.00	6.21	30.86	2.00	0.00	1.00	0.00
6.28	93.56	2.00	0.00	1.00	0.00	6.31	94.61	2.00	0.00	1.00	0.00
6.39	96.75	2.00	0.00	1.00	0.00	6.44	97.74	2.00	0.00	1.00	0.00
6.57	97.94	2.00	0.00	1.00	0.00	6.62	97.43	2.00	0.00	1.00	0.00
6.65	97.99	0.31	3.28	1.00	0.01	6.70	98.25	0.31	3.27	1.00	0.02
6.79	96.98	0.31	3.31	1.00	0.04	6.83	96.55	0.30	3.33	1.00	0.01
6.92	95.24	0.30	3.38	1.00	0.04	6.96	94.65	0.29	3.40	1.00	0.02
7.05	94.78	0.29	3.39	1.00	0.04	7.12	94.40	0.29	3.41	1.00	0.03
7.19	92.57	0.28	3.47	1.00	0.03	7.29	90.56	2.00	0.00	1.00	0.00
7.41	91.53	2.00	0.00	1.00	0.00	7.47	89.63	2.00	0.00	1.00	0.00
7.49	21.96	2.00	0.00	1.00	0.00	7.58	87.20	2.00	0.00	1.00	0.00
7.66	84.89	2.00	0.00	1.00	0.00	7.71	25.45	2.00	0.00	1.00	0.00
7.75	23.91	2.00	0.00	1.00	0.00	7.83	22.11	2.00	0.00	1.00	0.00
7.88	23.49	2.00	0.00	1.00	0.00	7.97	95.70	2.00	0.00	1.00	0.00
8.02	103.58	2.00	0.00	1.00	0.00	8.11	112.15	2.00	0.00	1.00	0.00
8.16	114.44	0.35	2.79	1.00	0.02	8.26	115.26	0.35	2.77	1.00	0.03
8.30	115.25	0.35	2.77	1.00	0.01	8.36	115.44	0.35	2.77	1.00	0.02
8.41	115.76	0.35	2.76	1.00	0.02	8.50	114.79	2.00	0.00	1.00	0.00
8.55	113.18	2.00	0.00	1.00	0.00	8.65	106.02	2.00	0.00	1.00	0.00
8.69	100.80	2.00	0.00	1.00	0.00	8.75	94.04	2.00	0.00	1.00	0.00
8.81	87.73	2.00	0.00	1.00	0.00	8.90	19.49	2.00	0.00	1.00	0.00
8.94	16.07	2.00	0.00	1.00	0.00	9.03	10.28	2.00	0.00	1.00	0.00
9.09	8.48	2.00	0.00	1.00	0.00	9.15	9.05	2.00	0.00	1.00	0.00
9.19	8.48	2.00	0.00	1.00	0.00	9.25	8.90	2.00	0.00	1.00	0.00
9.34	9.96	2.00	0.00	1.00	0.00	9.41	11.41	2.00	0.00	1.00	0.00
9.51	12.56	2.00	0.00	1.00	0.00	9.57	14.11	2.00	0.00	1.00	0.00
9.70	17.17	2.00	0.00	1.00	0.00	9.74	18.80	2.00	0.00	1.00	0.00
9.81	19.78	2.00	0.00	1.00	0.00	9.87	20.26	2.00	0.00	1.00	0.00
9.93	20.22	2.00	0.00	1.00	0.00	9.99	20.19	2.00	0.00	1.00	0.00
10.05	20.16	2.00	0.00	1.00	0.00	10.13	20.11	2.00	0.00	1.00	0.00
10.18	20.09	2.00	0.00	1.00	0.00	10.31	20.27	2.00	0.00	1.00	0.00
10.36	20.38	2.00	0.00	1.00	0.00	10.42	77.28	0.21	4.14	1.00	0.03
10.49	21.09	2.00	0.00	1.00	0.00	10.55	22.27	2.00	0.00	1.00	0.00
10.62	82.04	0.22	3.91	1.00	0.03	10.69	23.39	2.00	0.00	1.00	0.00
10.70	88.44	2.00	0.00	1.00	0.00	10.76	91.99	2.00	0.00	1.00	0.00
10.86	95.20	2.00	0.00	1.00	0.00	10.91	96.31	2.00	0.00	1.00	0.00
10.96	97.25	2.00	0.00	1.00	0.00	11.03	98.01	2.00	0.00	1.00	0.00
11.12	99.98	2.00	0.00	1.00	0.00	11.17	100.08	2.00	0.00	1.00	0.00
11.25	101.48	0.26	3.17	1.00	0.03	11.30	102.88	0.27	3.12	1.00	0.02
11.42	104.71	0.27	3.06	1.00	0.05	11.47	104.27	0.27	3.08	1.00	0.02

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
11.53	104.92	0.27	3.06	1.00	0.02	11.58	106.48	0.28	3.01	1.00	0.02
11.64	107.43	0.28	2.98	1.00	0.02	11.69	109.32	0.29	2.93	1.00	0.02
11.75	111.25	0.29	2.88	1.00	0.02	11.86	114.97	0.31	2.78	1.00	0.04
11.91	116.46	0.31	2.74	1.00	0.02	11.95	117.72	0.32	2.71	1.00	0.01
12.01	119.40	0.33	2.67	1.00	0.02	12.13	121.46	0.33	2.62	1.00	0.04
12.17	122.54	0.34	2.60	1.00	0.01	12.24	123.31	0.34	2.58	1.00	0.02
12.30	123.89	0.35	2.57	1.00	0.02	12.35	123.95	0.35	2.56	1.00	0.02
12.50	122.58	0.34	2.59	1.00	0.05	12.57	122.45	2.00	0.00	1.00	0.00
12.61	121.70	2.00	0.00	1.00	0.00	12.66	120.23	2.00	0.00	1.00	0.00
12.70	117.27	2.00	0.00	1.00	0.00	12.76	111.01	2.00	0.00	1.00	0.00
12.81	103.19	2.00	0.00	1.00	0.00	12.88	95.46	2.00	0.00	1.00	0.00
12.97	25.33	2.00	0.00	1.00	0.00	13.03	21.86	2.00	0.00	1.00	0.00
13.07	18.95	2.00	0.00	1.00	0.00	13.14	17.31	2.00	0.00	1.00	0.00
13.23	15.55	2.00	0.00	1.00	0.00	13.29	13.99	2.00	0.00	1.00	0.00
13.34	12.80	2.00	0.00	1.00	0.00	13.41	12.66	2.00	0.00	1.00	0.00
13.46	12.65	2.00	0.00	1.00	0.00	13.52	12.40	2.00	0.00	1.00	0.00
13.59	10.60	2.00	0.00	1.00	0.00	13.65	11.30	2.00	0.00	1.00	0.00
13.73	10.92	2.00	0.00	1.00	0.00	13.81	10.42	2.00	0.00	1.00	0.00
13.88	9.94	2.00	0.00	1.00	0.00	13.92	9.81	2.00	0.00	1.00	0.00
14.00	9.80	2.00	0.00	1.00	0.00	14.08	9.78	2.00	0.00	1.00	0.00
14.12	9.78	2.00	0.00	1.00	0.00	14.21	10.71	2.00	0.00	1.00	0.00
14.26	11.06	2.00	0.00	1.00	0.00	14.35	10.92	2.00	0.00	1.00	0.00
14.39	10.69	2.00	0.00	1.00	0.00	14.47	9.85	2.00	0.00	1.00	0.00
14.52	9.24	2.00	0.00	1.00	0.00	14.61	9.23	2.00	0.00	1.00	0.00
14.66	9.22	2.00	0.00	1.00	0.00	14.74	9.21	2.00	0.00	1.00	0.00
14.79	9.20	2.00	0.00	1.00	0.00	14.87	8.72	2.00	0.00	1.00	0.00
14.91	8.71	2.00	0.00	1.00	0.00	14.97	9.05	2.00	0.00	1.00	0.00
15.06	8.91	2.00	0.00	1.00	0.00	15.10	8.78	2.00	0.00	1.00	0.00
15.20	8.76	2.00	0.00	1.00	0.00	15.23	9.11	2.00	0.00	1.00	0.00
15.32	8.74	2.00	0.00	1.00	0.00	15.41	8.73	2.00	0.00	1.00	0.00
15.46	8.67	2.00	0.00	1.00	0.00	15.54	8.60	2.00	0.00	1.00	0.00
15.58	8.59	2.00	0.00	1.00	0.00	15.64	8.58	2.00	0.00	1.00	0.00
15.70	8.68	2.00	0.00	1.00	0.00	15.75	8.67	2.00	0.00	1.00	0.00
15.84	8.65	2.00	0.00	1.00	0.00	15.90	8.54	2.00	0.00	1.00	0.00
15.96	8.53	2.00	0.00	1.00	0.00	16.06	8.05	2.00	0.00	1.00	0.00
16.11	7.13	2.00	0.00	1.00	0.00	16.15	7.81	2.00	0.00	1.00	0.00
16.22	7.12	2.00	0.00	1.00	0.00	16.27	7.85	2.00	0.00	1.00	0.00
16.37	7.44	2.00	0.00	1.00	0.00	16.42	7.88	2.00	0.00	1.00	0.00
16.50	8.21	2.00	0.00	1.00	0.00	16.54	8.54	2.00	0.00	1.00	0.00
16.62	9.21	2.00	0.00	1.00	0.00	16.68	9.65	2.00	0.00	1.00	0.00
16.77	10.19	2.00	0.00	1.00	0.00	16.83	11.97	2.00	0.00	1.00	0.00
16.87	12.51	2.00	0.00	1.00	0.00	16.95	14.04	2.00	0.00	1.00	0.00
17.03	16.31	2.00	0.00	1.00	0.00	17.07	17.38	2.00	0.00	1.00	0.00
17.16	21.25	2.00	0.00	1.00	0.00	17.21	24.13	2.00	0.00	1.00	0.00
17.30	89.60	2.00	0.00	1.00	0.00	17.33	92.80	2.00	0.00	1.00	0.00
17.43	98.61	2.00	0.00	1.00	0.00	17.47	100.96	2.00	0.00	1.00	0.00
17.55	105.65	2.00	0.00	1.00	0.00	17.62	108.97	2.00	0.00	1.00	0.00
17.66	110.22	2.00	0.00	1.00	0.00	17.75	112.86	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
17.79	114.76	2.00	0.00	1.00	0.00	17.87	116.96	0.28	2.73	1.00	0.03
17.95	120.28	0.29	2.65	1.00	0.03	18.00	121.31	0.30	2.62	1.00	0.01
18.09	123.15	0.30	2.58	1.00	0.03	18.13	122.96	0.30	2.59	1.00	0.01
18.18	122.35	0.30	2.60	1.00	0.01	18.26	118.42	0.28	2.69	1.00	0.03
18.31	115.62	0.27	2.76	1.00	0.02	18.40	111.76	0.26	2.86	1.00	0.03
18.44	109.52	0.25	2.92	1.00	0.01	18.53	108.31	0.24	2.96	1.00	0.03
18.57	108.34	0.24	2.96	1.00	0.02	18.66	109.16	0.25	2.93	1.00	0.03
18.70	110.33	0.25	2.90	1.00	0.02	18.80	114.38	0.26	2.79	1.00	0.03
18.84	116.48	0.27	2.74	1.00	0.01	18.90	117.79	0.28	2.71	1.00	0.02
19.01	119.93	0.29	2.66	1.00	0.04	19.06	121.17	0.29	2.63	1.00	0.01
19.11	123.30	0.30	2.58	1.00	0.01	19.20	100.05	0.22	3.21	1.00	0.04
19.31	103.23	0.23	3.11	1.00	0.04	19.37	105.62	0.23	3.04	1.00	0.02
19.41	108.06	0.24	2.97	1.00	0.02	19.46	112.06	0.25	2.86	1.00	0.02
19.51	115.41	0.27	2.77	1.00	0.01	19.55	119.76	0.28	2.66	1.00	0.01
19.65	125.23	0.31	2.54	1.00	0.03	19.69	127.49	0.32	2.49	1.00	0.01
19.78	132.21	0.35	2.39	1.00	0.03	19.82	133.27	0.36	2.37	1.00	0.01
19.91	135.61	0.37	2.32	1.00	0.03	19.96	137.04	0.38	2.30	1.00	0.01
20.04	139.24	0.40	2.26	1.00	0.02	20.09	140.35	0.41	2.24	1.00	0.01
20.17	140.26	0.41	2.24	1.00	0.02	20.22	139.93	0.41	2.24	1.00	0.01
20.30	138.98	0.40	2.26	1.00	0.02	20.37	139.06	0.40	2.26	1.00	0.02
20.44	139.37	0.40	2.25	1.00	0.02	20.49	139.26	0.40	2.26	1.00	0.01
20.57	140.15	0.41	2.24	1.00	0.02	20.61	140.43	0.41	2.24	1.00	0.01
20.70	140.51	0.41	2.23	1.00	0.02	20.74	139.96	0.41	2.24	1.00	0.01
20.83	138.04	0.39	2.28	1.00	0.02	20.90	136.39	0.38	2.31	1.00	0.02
20.95	135.46	0.37	2.33	1.00	0.02	21.03	133.77	0.36	2.36	1.00	0.02
21.08	133.13	0.35	2.37	1.00	0.01	21.16	133.24	0.35	2.37	1.00	0.02
21.20	131.39	0.34	2.41	1.00	0.01	21.29	127.97	0.32	2.48	1.00	0.03
21.35	123.11	0.29	2.58	1.00	0.02	21.40	114.01	0.26	2.80	1.00	0.02
21.49	112.57	2.00	0.00	1.00	0.00	21.54	116.08	2.00	0.00	1.00	0.00
21.59	120.87	2.00	0.00	1.00	0.00	21.66	124.12	2.00	0.00	1.00	0.00
21.76	118.32	2.00	0.00	1.00	0.00	21.82	111.35	2.00	0.00	1.00	0.00
21.89	100.63	2.00	0.00	1.00	0.00	21.95	92.11	2.00	0.00	1.00	0.00
22.03	92.41	0.20	3.48	1.00	0.03	22.08	32.42	2.00	0.00	1.00	0.00
22.15	32.41	2.00	0.00	1.00	0.00	22.20	102.64	2.00	0.00	1.00	0.00
22.26	111.63	2.00	0.00	1.00	0.00	22.32	118.46	2.00	0.00	1.00	0.00
22.39	120.61	2.00	0.00	1.00	0.00	22.45	116.22	2.00	0.00	1.00	0.00
22.52	112.52	2.00	0.00	1.00	0.00	22.61	103.45	2.00	0.00	1.00	0.00
22.65	99.33	2.00	0.00	1.00	0.00	22.74	31.49	2.00	0.00	1.00	0.00
22.79	28.82	2.00	0.00	1.00	0.00	22.88	25.37	2.00	0.00	1.00	0.00
22.92	24.11	2.00	0.00	1.00	0.00	23.02	21.98	2.00	0.00	1.00	0.00
23.08	20.92	2.00	0.00	1.00	0.00	23.13	21.94	2.00	0.00	1.00	0.00
23.19	21.54	2.00	0.00	1.00	0.00	23.24	21.90	2.00	0.00	1.00	0.00
23.31	21.30	2.00	0.00	1.00	0.00	23.36	20.80	2.00	0.00	1.00	0.00
23.46	21.52	2.00	0.00	1.00	0.00	23.58	25.42	2.00	0.00	1.00	0.00
23.63	27.83	2.00	0.00	1.00	0.00	23.71	29.47	2.00	0.00	1.00	0.00
23.77	31.47	2.00	0.00	1.00	0.00	23.85	35.51	2.00	0.00	1.00	0.00
23.90	103.74	2.00	0.00	1.00	0.00	24.02	117.38	2.00	0.00	1.00	0.00
24.10	123.32	2.00	0.00	1.00	0.00	24.15	126.86	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
24.21	126.93	2.00	0.00	1.00	0.00	24.28	121.95	2.00	0.00	1.00	0.00
24.35	120.10	2.00	0.00	1.00	0.00	24.42	86.36	2.00	0.00	1.00	0.00
24.54	90.36	0.19	3.56	1.00	0.05	24.59	93.44	0.20	3.44	1.00	0.02
24.66	98.14	0.21	3.28	1.00	0.03	24.70	100.48	0.21	3.20	1.00	0.01
24.75	103.69	0.22	3.10	1.00	0.02	24.84	109.54	0.24	2.92	1.00	0.03
24.88	111.19	0.24	2.88	1.00	0.01	24.97	114.55	0.25	2.79	1.00	0.03
25.01	116.30	0.26	2.75	1.00	0.01	25.10	115.54	0.26	2.76	1.00	0.03
25.15	115.21	0.26	2.77	1.00	0.02	25.21	114.31	0.25	2.80	1.00	0.02
25.27	113.43	2.00	0.00	1.00	0.00	25.36	115.23	2.00	0.00	1.00	0.00
25.40	115.86	2.00	0.00	1.00	0.00	25.49	115.48	2.00	0.00	1.00	0.00
25.54	111.65	2.00	0.00	1.00	0.00	25.64	96.66	2.00	0.00	1.00	0.00
25.70	29.29	2.00	0.00	1.00	0.00	25.76	23.17	2.00	0.00	1.00	0.00
25.81	19.14	2.00	0.00	1.00	0.00	25.87	16.39	2.00	0.00	1.00	0.00
25.94	14.72	2.00	0.00	1.00	0.00	25.99	13.88	2.00	0.00	1.00	0.00
26.11	11.66	2.00	0.00	1.00	0.00	26.14	11.02	2.00	0.00	1.00	0.00
26.21	10.91	2.00	0.00	1.00	0.00	26.26	10.35	2.00	0.00	1.00	0.00
26.37	8.50	2.00	0.00	1.00	0.00	26.42	8.22	2.00	0.00	1.00	0.00
26.47	8.22	2.00	0.00	1.00	0.00	26.55	8.21	2.00	0.00	1.00	0.00
26.60	8.02	2.00	0.00	1.00	0.00	26.67	7.92	2.00	0.00	1.00	0.00
26.73	7.91	2.00	0.00	1.00	0.00	26.80	7.63	2.00	0.00	1.00	0.00
26.86	7.72	2.00	0.00	1.00	0.00	26.91	7.81	2.00	0.00	1.00	0.00
26.99	7.80	2.00	0.00	1.00	0.00	27.04	8.15	2.00	0.00	1.00	0.00
27.12	8.24	2.00	0.00	1.00	0.00	27.17	8.23	2.00	0.00	1.00	0.00
27.25	8.23	2.00	0.00	1.00	0.00	27.30	8.22	2.00	0.00	1.00	0.00
27.36	8.17	2.00	0.00	1.00	0.00	27.44	8.21	2.00	0.00	1.00	0.00
27.55	8.19	2.00	0.00	1.00	0.00	27.58	8.27	2.00	0.00	1.00	0.00
27.64	8.27	2.00	0.00	1.00	0.00	27.73	8.80	2.00	0.00	1.00	0.00
27.78	9.16	2.00	0.00	1.00	0.00	27.82	9.25	2.00	0.00	1.00	0.00
27.97	9.67	2.00	0.00	1.00	0.00	28.01	9.67	2.00	0.00	1.00	0.00
28.06	9.49	2.00	0.00	1.00	0.00	28.15	8.94	2.00	0.00	1.00	0.00
28.20	8.47	2.00	0.00	1.00	0.00	28.29	8.02	2.00	0.00	1.00	0.00
28.35	8.01	2.00	0.00	1.00	0.00	28.41	8.01	2.00	0.00	1.00	0.00
28.45	8.18	2.00	0.00	1.00	0.00	28.50	8.53	2.00	0.00	1.00	0.00
28.59	9.42	2.00	0.00	1.00	0.00	28.63	9.32	2.00	0.00	1.00	0.00
28.72	9.85	2.00	0.00	1.00	0.00	28.77	10.01	2.00	0.00	1.00	0.00
28.83	10.36	2.00	0.00	1.00	0.00	28.89	10.80	2.00	0.00	1.00	0.00
29.00	12.11	2.00	0.00	1.00	0.00	29.06	12.63	2.00	0.00	1.00	0.00
29.11	12.79	2.00	0.00	1.00	0.00	29.16	12.87	2.00	0.00	1.00	0.00
29.24	12.86	2.00	0.00	1.00	0.00	29.29	12.68	2.00	0.00	1.00	0.00
29.34	12.40	2.00	0.00	1.00	0.00	29.40	12.74	2.00	0.00	1.00	0.00
29.47	13.25	2.00	0.00	1.00	0.00	29.59	17.52	2.00	0.00	1.00	0.00
29.64	22.14	2.00	0.00	1.00	0.00	29.70	83.00	2.00	0.00	1.00	0.00
29.74	85.77	2.00	0.00	1.00	0.00	29.82	87.67	0.18	3.67	1.00	0.04
29.87	88.65	0.19	3.63	1.00	0.02	29.95	88.14	0.18	3.65	1.00	0.03
30.05	86.44	2.00	0.00	1.00	0.00	30.18	84.50	2.00	0.00	1.00	0.00
30.26	22.46	2.00	0.00	1.00	0.00	30.30	18.37	2.00	0.00	1.00	0.00
30.32	14.29	2.00	0.00	1.00	0.00	30.34	14.42	2.00	0.00	1.00	0.00
30.40	14.54	2.00	0.00	1.00	0.00	30.47	13.57	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
30.52	13.21	2.00	0.00	1.00	0.00	30.60	12.60	2.00	0.00	1.00	0.00
30.66	12.07	2.00	0.00	1.00	0.00	30.73	11.97	2.00	0.00	1.00	0.00
30.82	11.17	2.00	0.00	1.00	0.00	30.87	11.00	2.00	0.00	1.00	0.00
30.92	11.08	2.00	0.00	1.00	0.00	31.04	11.06	2.00	0.00	1.00	0.00
31.09	11.31	2.00	0.00	1.00	0.00	31.17	11.47	2.00	0.00	1.00	0.00
31.22	11.46	2.00	0.00	1.00	0.00	31.29	11.62	2.00	0.00	1.00	0.00
31.35	11.79	2.00	0.00	1.00	0.00	31.40	11.86	2.00	0.00	1.00	0.00
31.48	11.59	2.00	0.00	1.00	0.00	31.53	11.58	2.00	0.00	1.00	0.00
31.58	11.57	2.00	0.00	1.00	0.00	31.74	11.55	2.00	0.00	1.00	0.00
31.80	12.14	2.00	0.00	1.00	0.00	31.86	12.64	2.00	0.00	1.00	0.00
31.92	13.05	2.00	0.00	1.00	0.00	31.98	13.30	2.00	0.00	1.00	0.00
32.04	13.20	2.00	0.00	1.00	0.00	32.10	13.36	2.00	0.00	1.00	0.00
32.16	13.10	2.00	0.00	1.00	0.00	32.23	13.34	2.00	0.00	1.00	0.00
32.29	12.64	2.00	0.00	1.00	0.00	32.36	13.31	2.00	0.00	1.00	0.00
32.42	14.74	2.00	0.00	1.00	0.00	32.49	16.41	2.00	0.00	1.00	0.00
32.62	20.83	2.00	0.00	1.00	0.00	32.68	21.74	2.00	0.00	1.00	0.00
32.74	21.47	2.00	0.00	1.00	0.00	32.81	20.94	2.00	0.00	1.00	0.00
32.87	20.17	2.00	0.00	1.00	0.00	32.93	19.23	2.00	0.00	1.00	0.00
32.98	18.12	2.00	0.00	1.00	0.00	33.05	16.94	2.00	0.00	1.00	0.00
33.12	16.33	2.00	0.00	1.00	0.00	33.19	16.65	2.00	0.00	1.00	0.00
33.25	17.23	2.00	0.00	1.00	0.00	33.30	17.72	2.00	0.00	1.00	0.00
33.38	17.52	2.00	0.00	1.00	0.00	33.43	17.64	2.00	0.00	1.00	0.00
33.50	17.58	2.00	0.00	1.00	0.00	33.55	18.56	2.00	0.00	1.00	0.00
33.61	19.37	2.00	0.00	1.00	0.00	33.68	20.43	2.00	0.00	1.00	0.00
33.75	22.07	2.00	0.00	1.00	0.00	33.81	23.37	2.00	0.00	1.00	0.00
33.89	24.17	2.00	0.00	1.00	0.00	33.94	24.81	2.00	0.00	1.00	0.00
34.07	25.26	2.00	0.00	1.00	0.00	34.12	24.83	2.00	0.00	1.00	0.00
34.18	24.81	2.00	0.00	1.00	0.00	34.29	30.35	2.00	0.00	1.00	0.00
34.38	37.54	2.00	0.00	1.00	0.00	34.43	106.29	0.22	3.02	1.00	0.02
34.55	109.03	0.23	2.94	1.00	0.04	34.61	107.30	0.23	2.99	1.00	0.02
34.69	41.54	2.00	0.00	1.00	0.00	34.75	38.64	2.00	0.00	1.00	0.00
34.82	35.99	2.00	0.00	1.00	0.00	34.88	34.50	2.00	0.00	1.00	0.00
34.95	33.56	2.00	0.00	1.00	0.00	35.07	31.63	2.00	0.00	1.00	0.00
35.14	29.65	2.00	0.00	1.00	0.00	35.20	27.02	2.00	0.00	1.00	0.00
35.26	29.67	2.00	0.00	1.00	0.00	35.33	24.94	2.00	0.00	1.00	0.00
35.39	29.70	2.00	0.00	1.00	0.00	35.46	38.83	2.00	0.00	1.00	0.00
35.53	115.38	2.00	0.00	1.00	0.00	35.57	130.09	2.00	0.00	1.00	0.00
35.64	143.73	2.00	0.00	1.00	0.00	35.70	150.06	2.00	0.00	1.00	0.00
35.77	146.33	2.00	0.00	1.00	0.00	35.83	133.11	2.00	0.00	1.00	0.00
35.89	119.21	2.00	0.00	1.00	0.00	35.97	123.01	0.28	2.59	1.00	0.02
36.01	124.40	0.29	2.55	1.00	0.01	36.14	123.48	0.28	2.57	1.00	0.04
36.19	117.24	0.26	2.72	1.00	0.01	36.23	116.87	0.26	2.73	1.00	0.01
36.30	118.25	0.26	2.70	1.00	0.02	36.36	122.44	0.28	2.60	1.00	0.02
36.45	131.08	0.32	2.41	1.00	0.03	36.50	136.91	0.36	2.30	1.00	0.01
36.62	148.93	0.47	2.09	1.00	0.03	36.67	150.54	0.49	2.07	1.00	0.01
36.72	149.70	0.48	2.08	1.00	0.01	36.80	144.07	0.42	2.17	1.00	0.02
36.84	139.00	0.37	2.26	1.00	0.01	36.91	136.99	0.36	2.30	1.00	0.02
36.97	142.24	0.40	2.20	1.00	0.02	37.02	150.55	0.49	2.07	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
37.10	160.47	0.65	1.70	1.00	0.02	37.15	168.81	0.86	1.06	1.00	0.01
37.24	178.62	1.26	0.45	1.00	0.00	37.29	184.15	1.60	0.19	1.00	0.00
37.39	202.26	2.00	0.00	1.00	0.00	37.46	212.81	2.00	0.00	1.00	0.00
37.51	222.51	2.00	0.00	1.00	0.00	37.55	229.28	2.00	0.00	1.00	0.00
37.65	236.44	2.00	0.00	1.00	0.00	37.68	238.10	2.00	0.00	1.00	0.00
37.76	238.02	2.00	0.00	1.00	0.00	37.81	237.35	2.00	0.00	1.00	0.00
37.90	234.32	2.00	0.00	1.00	0.00	37.95	233.57	2.00	0.00	1.00	0.00
38.03	232.68	2.00	0.00	1.00	0.00	38.10	228.95	2.00	0.00	1.00	0.00
38.17	221.56	2.00	0.00	1.00	0.00	38.24	212.80	2.00	0.00	1.00	0.00
38.30	201.12	2.00	0.00	1.00	0.00	38.38	187.98	1.92	0.03	1.00	0.00
38.43	174.61	1.07	0.67	1.00	0.00	38.52	161.38	0.67	1.65	1.00	0.02
38.57	143.90	2.00	0.00	1.00	0.00	38.66	138.90	2.00	0.00	1.00	0.00
38.71	126.90	2.00	0.00	1.00	0.00	38.78	131.58	2.00	0.00	1.00	0.00
38.85	124.28	2.00	0.00	1.00	0.00	38.92	113.02	2.00	0.00	1.00	0.00
39.01	103.07	2.00	0.00	1.00	0.00	39.02	94.68	2.00	0.00	1.00	0.00
39.04	97.34	0.20	3.30	1.00	0.01	39.13	96.19	0.20	3.34	1.00	0.03
39.18	32.78	2.00	0.00	1.00	0.00	39.28	26.18	2.00	0.00	1.00	0.00
39.34	24.22	2.00	0.00	1.00	0.00	39.39	23.44	2.00	0.00	1.00	0.00
39.45	23.89	2.00	0.00	1.00	0.00	39.54	29.71	2.00	0.00	1.00	0.00
39.59	33.01	2.00	0.00	1.00	0.00	39.66	35.30	2.00	0.00	1.00	0.00
39.71	36.83	2.00	0.00	1.00	0.00	39.81	36.55	2.00	0.00	1.00	0.00
39.92	40.98	2.00	0.00	1.00	0.00	39.97	112.72	2.00	0.00	1.00	0.00
40.02	125.63	2.00	0.00	1.00	0.00	40.10	139.00	2.00	0.00	1.00	0.00
40.15	153.03	2.00	0.00	1.00	0.00	40.25	168.17	2.00	0.00	1.00	0.00
40.32	166.43	2.00	0.00	1.00	0.00	40.37	165.38	2.00	0.00	1.00	0.00
40.44	169.31	0.87	1.02	1.00	0.01	40.50	172.68	0.99	0.79	1.00	0.01
40.54	176.90	1.17	0.54	1.00	0.00	40.67	192.64	2.00	0.00	1.00	0.00
40.72	198.52	2.00	0.00	1.00	0.00	40.77	201.44	2.00	0.00	1.00	0.00
40.90	200.14	2.00	0.00	1.00	0.00	40.94	197.71	2.00	0.00	1.00	0.00
41.01	191.68	2.00	0.00	1.00	0.00	41.07	186.68	1.81	0.08	1.00	0.00
41.25	194.05	2.00	0.00	1.00	0.00	41.38	191.20	2.00	0.00	1.00	0.00
41.45	188.28	1.95	0.02	1.00	0.00	41.52	190.59	2.00	0.00	1.00	0.00
41.57	193.96	2.00	0.00	1.00	0.00	41.64	197.54	2.00	0.00	1.00	0.00
41.70	200.59	2.00	0.00	1.00	0.00	41.77	198.44	2.00	0.00	1.00	0.00
41.83	193.18	2.00	0.00	1.00	0.00	41.88	177.71	1.21	0.49	1.00	0.00
41.89	162.37	0.69	1.59	1.00	0.00	41.95	171.75	0.96	0.84	1.00	0.01
42.00	167.73	2.00	0.00	1.00	0.00	42.09	159.71	2.00	0.00	1.00	0.00
42.13	156.95	2.00	0.00	1.00	0.00	42.21	162.32	2.00	0.00	1.00	0.00
42.26	167.92	2.00	0.00	1.00	0.00	42.35	170.24	2.00	0.00	1.00	0.00
42.46	157.10	2.00	0.00	1.00	0.00	42.52	145.19	2.00	0.00	1.00	0.00
42.57	134.73	2.00	0.00	1.00	0.00	42.61	123.16	2.00	0.00	1.00	0.00
42.66	114.72	2.00	0.00	1.00	0.00	42.75	42.68	2.00	0.00	1.00	0.00
42.80	40.92	2.00	0.00	1.00	0.00	42.90	34.36	2.00	0.00	1.00	0.00
43.01	36.62	2.00	0.00	1.00	0.00	43.06	111.19	2.00	0.00	1.00	0.00
43.10	126.95	2.00	0.00	1.00	0.00	43.15	141.13	2.00	0.00	1.00	0.00
43.25	156.07	2.00	0.00	1.00	0.00	43.32	158.21	2.00	0.00	1.00	0.00
43.36	158.77	2.00	0.00	1.00	0.00	43.41	158.55	2.00	0.00	1.00	0.00
43.47	159.84	2.00	0.00	1.00	0.00	43.51	160.68	0.66	1.69	1.00	0.01

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
43.68	165.85	0.78	1.28	1.00	0.03	43.72	166.89	0.81	1.19	1.00	0.01
43.78	167.75	0.83	1.12	1.00	0.01	43.81	167.95	0.84	1.10	1.00	0.00
43.89	169.28	0.88	1.00	1.00	0.01	43.94	170.60	0.92	0.91	1.00	0.01
43.98	171.46	0.95	0.85	1.00	0.00	44.04	172.78	1.00	0.77	1.00	0.01
44.11	174.15	1.06	0.69	1.00	0.01	44.20	176.41	1.15	0.56	1.00	0.01
44.25	176.71	1.17	0.54	1.00	0.00	44.31	175.68	1.12	0.60	1.00	0.00
44.38	173.80	1.04	0.71	1.00	0.01	44.43	178.04	1.24	0.47	1.00	0.00
44.51	187.89	1.92	0.03	1.00	0.00	44.56	192.71	2.00	0.00	1.00	0.00
44.64	190.47	2.00	0.00	1.00	0.00	44.69	190.40	2.00	0.00	1.00	0.00
44.77	188.76	2.00	0.00	1.00	0.00	44.86	188.59	1.98	0.01	1.00	0.00
44.90	188.12	1.94	0.02	1.00	0.00	44.95	188.04	1.93	0.03	1.00	0.00
45.03	182.90	2.00	0.00	1.00	0.00	45.12	170.03	2.00	0.00	1.00	0.00
45.17	168.20	2.00	0.00	1.00	0.00	45.23	176.70	2.00	0.00	1.00	0.00
45.35	148.00	2.00	0.00	1.00	0.00	45.43	129.48	2.00	0.00	1.00	0.00
45.49	117.34	2.00	0.00	1.00	0.00	45.56	45.90	2.00	0.00	1.00	0.00
45.61	39.12	2.00	0.00	1.00	0.00	45.69	36.60	2.00	0.00	1.00	0.00
45.74	36.80	2.00	0.00	1.00	0.00	45.87	36.75	2.00	0.00	1.00	0.00
45.93	36.80	2.00	0.00	1.00	0.00	46.05	35.60	2.00	0.00	1.00	0.00
46.18	35.11	2.00	0.00	1.00	0.00	46.23	34.44	2.00	0.00	1.00	0.00
46.31	33.32	2.00	0.00	1.00	0.00	46.37	34.28	2.00	0.00	1.00	0.00
46.49	34.13	2.00	0.00	1.00	0.00	46.58	38.14	2.00	0.00	1.00	0.00
46.62	41.98	2.00	0.00	1.00	0.00	46.68	45.53	2.00	0.00	1.00	0.00
46.76	49.60	2.00	0.00	1.00	0.00	46.81	53.66	2.00	0.00	1.00	0.00
46.89	124.26	2.00	0.00	1.00	0.00	46.94	130.50	2.00	0.00	1.00	0.00
47.02	140.59	2.00	0.00	1.00	0.00	47.08	155.27	2.00	0.00	1.00	0.00
47.12	161.46	2.00	0.00	1.00	0.00	47.21	185.55	2.00	0.00	1.00	0.00
47.25	189.78	2.00	0.00	1.00	0.00	47.32	193.70	2.00	0.00	1.00	0.00
47.39	192.23	2.00	0.00	1.00	0.00	47.46	181.57	2.00	0.00	1.00	0.00
47.53	165.19	2.00	0.00	1.00	0.00	47.61	162.05	2.00	0.00	1.00	0.00
47.66	161.05	0.68	1.67	1.00	0.01	47.75	154.36	0.56	2.01	1.00	0.02
47.78	150.19	0.50	2.07	1.00	0.01	47.88	148.30	0.48	2.10	1.00	0.02
47.92	146.29	0.46	2.14	1.00	0.01	47.97	142.40	2.00	0.00	1.00	0.00
48.05	141.06	2.00	0.00	1.00	0.00	48.11	149.00	2.00	0.00	1.00	0.00
48.19	144.40	2.00	0.00	1.00	0.00	48.24	126.33	2.00	0.00	1.00	0.00
48.32	109.23	2.00	0.00	1.00	0.00	48.36	39.38	2.00	0.00	1.00	0.00
48.45	30.30	2.00	0.00	1.00	0.00	48.53	39.18	2.00	0.00	1.00	0.00
48.58	25.01	2.00	0.00	1.00	0.00	48.71	38.99	2.00	0.00	1.00	0.00
48.76	40.90	2.00	0.00	1.00	0.00	48.80	41.74	2.00	0.00	1.00	0.00
48.85	41.66	2.00	0.00	1.00	0.00	48.89	42.36	2.00	0.00	1.00	0.00
48.96	45.83	2.00	0.00	1.00	0.00	49.05	51.04	2.00	0.00	1.00	0.00
49.08	53.48	2.00	0.00	1.00	0.00	49.16	123.80	0.30	2.57	1.00	0.02
49.24	123.20	2.00	0.00	1.00	0.00	49.28	123.09	2.00	0.00	1.00	0.00
49.38	127.94	2.00	0.00	1.00	0.00	49.42	133.48	2.00	0.00	1.00	0.00
49.49	150.02	2.00	0.00	1.00	0.00	49.57	170.91	2.00	0.00	1.00	0.00
49.62	174.02	2.00	0.00	1.00	0.00	49.69	168.75	2.00	0.00	1.00	0.00
49.77	148.66	2.00	0.00	1.00	0.00	49.82	149.62	2.00	0.00	1.00	0.00
49.90	151.03	2.00	0.00	1.00	0.00	49.95	150.53	2.00	0.00	1.00	0.00
50.00	135.68	2.00	0.00	1.00	0.00	50.10	139.63	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)

Total estimated settlement: 3.29

Abbreviations

$Q_{tn,cs}$:	Equivalent clean sand normalized cone resistance
FS:	Factor of safety against liquefaction
e_v (%):	Post-liquefaction volumentric strain
DF:	e_v depth weighting factor
Settlement:	Calculated settlement

:: Post-earthquake settlement due to soil liquefaction ::

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
5.05	166.78	1.39	0.35	1.00	0.00	5.11	167.53	1.42	0.33	1.00	0.00
5.18	168.23	1.44	0.31	1.00	0.00	5.24	168.43	1.45	0.30	1.00	0.00
5.32	167.57	1.39	0.35	1.00	0.00	5.46	166.26	1.31	0.42	1.00	0.01
5.52	167.06	1.34	0.39	1.00	0.00	5.59	168.15	1.39	0.35	1.00	0.00
5.65	168.91	1.42	0.33	1.00	0.00	5.73	168.89	1.41	0.33	1.00	0.00
5.79	166.00	1.27	0.47	1.00	0.00	5.86	164.57	1.20	0.54	1.00	0.00
5.93	164.88	1.21	0.53	1.00	0.00	6.00	163.98	1.16	0.58	1.00	0.00
6.13	161.48	1.06	0.73	1.00	0.01	6.21	159.75	1.00	0.84	1.00	0.01
6.26	157.76	0.94	0.98	1.00	0.01	6.35	156.18	0.89	1.10	1.00	0.01
6.40	154.70	0.85	1.23	1.00	0.01	6.54	148.25	0.71	1.95	1.00	0.03
6.62	143.35	0.63	2.18	1.00	0.02	6.68	138.91	0.57	2.26	1.00	0.02
6.75	134.17	0.52	2.35	1.00	0.02	6.79	129.70	0.48	2.44	1.00	0.01
6.88	123.09	0.42	2.58	1.00	0.03	6.99	107.78	0.34	2.97	1.00	0.04
7.11	90.84	0.28	3.54	1.00	0.05	7.14	95.03	0.29	3.38	1.00	0.01
7.17	99.71	0.31	3.22	1.00	0.01	7.24	100.53	0.31	3.20	1.00	0.03
7.29	102.18	0.31	3.14	1.00	0.02	7.37	104.11	0.32	3.08	1.00	0.03
7.44	105.03	0.32	3.05	1.00	0.03	7.51	105.64	0.32	3.04	1.00	0.02
7.55	106.03	0.32	3.03	1.00	0.02	7.64	107.96	0.33	2.97	1.00	0.03
7.68	108.47	0.33	2.95	1.00	0.01	7.92	109.94	0.33	2.91	1.00	0.08
7.99	111.40	0.34	2.87	1.00	0.02	8.05	112.48	0.34	2.84	1.00	0.02
8.19	116.23	0.36	2.75	1.00	0.05	8.25	117.23	0.36	2.72	1.00	0.02
8.32	117.99	0.36	2.70	1.00	0.02	8.52	113.84	0.34	2.81	1.00	0.07
8.66	109.33	0.32	2.93	1.00	0.05	8.72	107.16	0.31	2.99	1.00	0.02
8.79	105.37	0.30	3.04	1.00	0.02	8.92	105.32	0.30	3.05	1.00	0.05
8.98	106.56	0.30	3.01	1.00	0.02	9.05	107.71	0.31	2.98	1.00	0.02
9.14	109.27	0.31	2.93	1.00	0.03	9.19	109.79	0.31	2.92	1.00	0.02
9.27	109.53	0.31	2.92	1.00	0.03	9.34	108.83	0.31	2.94	1.00	0.02
9.41	106.92	0.30	3.00	1.00	0.03	9.46	104.04	0.29	3.09	1.00	0.02
9.54	102.85	0.29	3.12	1.00	0.03	9.60	104.48	0.29	3.07	1.00	0.02
9.67	91.59	0.25	3.51	1.00	0.03	9.76	93.00	0.25	3.46	1.00	0.04
9.81	93.70	0.26	3.43	1.00	0.02	9.89	94.09	0.26	3.42	1.00	0.03
9.95	89.99	0.24	3.57	1.00	0.02	9.96	90.24	0.25	3.56	1.00	0.01
9.99	90.13	0.24	3.57	1.00	0.01	10.08	90.22	0.24	3.56	1.00	0.04
10.14	88.74	2.00	0.00	1.00	0.00	10.18	88.81	2.00	0.00	1.00	0.00
10.27	101.45	2.00	0.00	1.00	0.00	10.33	105.74	2.00	0.00	1.00	0.00
10.38	107.43	2.00	0.00	1.00	0.00	10.47	102.26	2.00	0.00	1.00	0.00
10.55	96.24	2.00	0.00	1.00	0.00	10.61	90.10	2.00	0.00	1.00	0.00
10.69	25.80	2.00	0.00	1.00	0.00	10.75	21.21	2.00	0.00	1.00	0.00
10.82	18.12	2.00	0.00	1.00	0.00	10.87	15.00	2.00	0.00	1.00	0.00
10.96	12.76	2.00	0.00	1.00	0.00	11.09	11.81	2.00	0.00	1.00	0.00
11.16	11.28	2.00	0.00	1.00	0.00	11.23	11.00	2.00	0.00	1.00	0.00
11.29	10.59	2.00	0.00	1.00	0.00	11.36	10.32	2.00	0.00	1.00	0.00
11.44	9.77	2.00	0.00	1.00	0.00	11.57	9.09	2.00	0.00	1.00	0.00
11.64	9.08	2.00	0.00	1.00	0.00	11.71	8.80	2.00	0.00	1.00	0.00
11.78	9.31	2.00	0.00	1.00	0.00	11.84	11.23	2.00	0.00	1.00	0.00
11.91	13.91	2.00	0.00	1.00	0.00	11.98	15.68	2.00	0.00	1.00	0.00
12.06	15.77	2.00	0.00	1.00	0.00	12.12	14.85	2.00	0.00	1.00	0.00
12.20	14.70	2.00	0.00	1.00	0.00	12.33	14.66	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
12.39	14.51	2.00	0.00	1.00	0.00	12.46	17.13	2.00	0.00	1.00	0.00
12.55	19.43	2.00	0.00	1.00	0.00	12.57	17.56	2.00	0.00	1.00	0.00
12.60	17.54	2.00	0.00	1.00	0.00	12.72	26.23	2.00	0.00	1.00	0.00
12.77	29.55	2.00	0.00	1.00	0.00	12.85	90.10	0.22	3.57	1.00	0.03
12.91	29.34	2.00	0.00	1.00	0.00	12.99	27.85	2.00	0.00	1.00	0.00
13.04	27.82	2.00	0.00	1.00	0.00	13.12	27.78	2.00	0.00	1.00	0.00
13.19	27.75	2.00	0.00	1.00	0.00	13.25	90.92	2.00	0.00	1.00	0.00
13.30	96.07	2.00	0.00	1.00	0.00	13.39	101.32	2.00	0.00	1.00	0.00
13.45	101.41	2.00	0.00	1.00	0.00	13.52	101.55	2.00	0.00	1.00	0.00
13.58	96.67	2.00	0.00	1.00	0.00	13.65	89.92	2.00	0.00	1.00	0.00
13.74	25.29	2.00	0.00	1.00	0.00	13.79	21.83	2.00	0.00	1.00	0.00
13.87	19.17	2.00	0.00	1.00	0.00	13.92	16.86	2.00	0.00	1.00	0.00
14.01	16.00	2.00	0.00	1.00	0.00	14.05	15.74	2.00	0.00	1.00	0.00
14.14	15.62	2.00	0.00	1.00	0.00	14.22	15.11	2.00	0.00	1.00	0.00
14.28	14.26	2.00	0.00	1.00	0.00	14.40	13.25	2.00	0.00	1.00	0.00
14.49	13.23	2.00	0.00	1.00	0.00	14.55	13.22	2.00	0.00	1.00	0.00
14.63	13.44	2.00	0.00	1.00	0.00	14.69	13.67	2.00	0.00	1.00	0.00
14.82	13.88	2.00	0.00	1.00	0.00	14.89	14.09	2.00	0.00	1.00	0.00
14.95	14.67	2.00	0.00	1.00	0.00	15.03	16.18	2.00	0.00	1.00	0.00
15.12	17.46	2.00	0.00	1.00	0.00	15.19	18.01	2.00	0.00	1.00	0.00
15.25	17.99	2.00	0.00	1.00	0.00	15.33	17.72	2.00	0.00	1.00	0.00
15.38	17.35	2.00	0.00	1.00	0.00	15.47	17.22	2.00	0.00	1.00	0.00
15.52	17.43	2.00	0.00	1.00	0.00	15.60	16.81	2.00	0.00	1.00	0.00
15.67	16.08	2.00	0.00	1.00	0.00	15.73	15.47	2.00	0.00	1.00	0.00
15.75	15.18	2.00	0.00	1.00	0.00	15.76	13.46	2.00	0.00	1.00	0.00
15.85	14.84	2.00	0.00	1.00	0.00	15.89	14.83	2.00	0.00	1.00	0.00
15.98	14.22	2.00	0.00	1.00	0.00	16.08	14.08	2.00	0.00	1.00	0.00
16.14	14.06	2.00	0.00	1.00	0.00	16.20	14.05	2.00	0.00	1.00	0.00
16.26	13.56	2.00	0.00	1.00	0.00	16.34	13.66	2.00	0.00	1.00	0.00
16.39	13.52	2.00	0.00	1.00	0.00	16.47	12.68	2.00	0.00	1.00	0.00
16.54	11.97	2.00	0.00	1.00	0.00	16.60	11.96	2.00	0.00	1.00	0.00
16.67	11.59	2.00	0.00	1.00	0.00	16.74	11.35	2.00	0.00	1.00	0.00
16.82	11.33	2.00	0.00	1.00	0.00	16.87	11.32	2.00	0.00	1.00	0.00
16.95	11.30	2.00	0.00	1.00	0.00	17.01	11.63	2.00	0.00	1.00	0.00
17.08	11.96	2.00	0.00	1.00	0.00	17.22	12.73	2.00	0.00	1.00	0.00
17.27	13.05	2.00	0.00	1.00	0.00	17.36	13.72	2.00	0.00	1.00	0.00
17.49	15.04	2.00	0.00	1.00	0.00	17.56	15.58	2.00	0.00	1.00	0.00
17.62	16.58	2.00	0.00	1.00	0.00	17.68	17.45	2.00	0.00	1.00	0.00
17.75	18.43	2.00	0.00	1.00	0.00	17.80	19.62	2.00	0.00	1.00	0.00
17.88	21.80	2.00	0.00	1.00	0.00	17.96	24.51	2.00	0.00	1.00	0.00
18.02	26.45	2.00	0.00	1.00	0.00	18.10	27.71	2.00	0.00	1.00	0.00
18.24	31.10	2.00	0.00	1.00	0.00	18.30	92.59	2.00	0.00	1.00	0.00
18.37	93.50	2.00	0.00	1.00	0.00	18.43	91.77	2.00	0.00	1.00	0.00
18.58	95.09	2.00	0.00	1.00	0.00	18.64	98.77	0.22	3.25	1.00	0.02
18.66	96.52	0.21	3.33	1.00	0.01	18.72	101.96	0.23	3.15	1.00	0.02
18.80	101.91	0.23	3.15	1.00	0.03	18.85	101.87	0.23	3.15	1.00	0.02
18.94	102.38	0.23	3.14	1.00	0.03	18.98	102.55	0.23	3.13	1.00	0.02
19.07	101.78	0.23	3.16	1.00	0.03	19.14	101.65	0.23	3.16	1.00	0.02

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
19.20	101.86	0.23	3.15	1.00	0.02	19.25	102.09	0.23	3.15	1.00	0.02
19.30	103.38	0.23	3.11	1.00	0.02	19.38	106.19	0.24	3.02	1.00	0.03
19.46	107.24	0.24	2.99	1.00	0.03	19.52	106.86	0.24	3.00	1.00	0.02
19.60	108.32	0.24	2.96	1.00	0.03	19.73	111.12	0.25	2.88	1.00	0.04
19.79	111.55	0.25	2.87	1.00	0.02	19.87	113.13	0.26	2.83	1.00	0.03
20.00	117.41	0.27	2.72	1.00	0.04	20.05	119.86	0.28	2.66	1.00	0.02
20.13	122.67	0.30	2.59	1.00	0.02	20.19	124.14	0.30	2.56	1.00	0.02
20.26	125.59	0.31	2.53	1.00	0.02	20.39	128.08	0.32	2.47	1.00	0.04
20.45	129.02	0.33	2.45	1.00	0.02	20.53	130.17	0.34	2.43	1.00	0.02
20.59	130.62	0.34	2.42	1.00	0.02	20.72	131.94	0.35	2.40	1.00	0.04
20.80	132.30	0.35	2.39	1.00	0.02	20.85	132.57	0.35	2.38	1.00	0.01
20.93	132.11	0.35	2.39	1.00	0.02	21.00	130.09	0.33	2.43	1.00	0.02
21.06	128.09	0.32	2.47	1.00	0.02	21.20	118.25	0.28	2.70	1.00	0.04
21.28	116.98	0.27	2.73	1.00	0.03	21.34	117.07	0.27	2.73	1.00	0.02
21.41	118.40	0.28	2.69	1.00	0.02	21.48	123.80	0.30	2.57	1.00	0.02
21.55	120.07	0.28	2.65	1.00	0.02	21.62	114.26	0.26	2.80	1.00	0.02
21.68	118.58	0.28	2.69	1.00	0.02	21.76	122.32	0.29	2.60	1.00	0.03
21.82	123.47	0.30	2.57	1.00	0.02	21.84	119.25	0.28	2.67	1.00	0.01
21.85	117.80	0.27	2.71	1.00	0.00	21.94	122.96	0.29	2.59	1.00	0.03
21.99	122.64	0.29	2.59	1.00	0.01	22.06	121.39	0.29	2.62	1.00	0.02
22.14	120.16	0.28	2.65	1.00	0.03	22.21	120.24	0.28	2.65	1.00	0.02
22.31	119.84	0.28	2.66	1.00	0.03	22.39	119.50	0.28	2.67	1.00	0.03
22.45	118.42	0.27	2.69	1.00	0.02	22.50	116.23	0.27	2.75	1.00	0.02
22.54	112.94	0.25	2.83	1.00	0.01	22.60	107.44	2.00	0.00	1.00	0.00
22.65	106.30	2.00	0.00	1.00	0.00	22.73	108.95	2.00	0.00	1.00	0.00
22.79	106.87	2.00	0.00	1.00	0.00	22.87	98.79	2.00	0.00	1.00	0.00
22.93	30.07	2.00	0.00	1.00	0.00	23.00	23.72	2.00	0.00	1.00	0.00
23.07	19.35	2.00	0.00	1.00	0.00	23.14	17.02	2.00	0.00	1.00	0.00
23.22	17.79	2.00	0.00	1.00	0.00	23.27	20.60	2.00	0.00	1.00	0.00
23.35	24.97	2.00	0.00	1.00	0.00	23.41	30.39	2.00	0.00	1.00	0.00
23.49	34.80	2.00	0.00	1.00	0.00	23.56	98.43	0.21	3.27	1.00	0.03
23.62	97.97	0.21	3.28	1.00	0.02	23.68	95.55	0.20	3.36	1.00	0.02
23.76	93.18	0.20	3.45	1.00	0.03	23.84	91.22	0.20	3.53	1.00	0.03
23.91	27.81	2.00	0.00	1.00	0.00	23.98	23.73	2.00	0.00	1.00	0.00
24.11	16.63	2.00	0.00	1.00	0.00	24.18	14.32	2.00	0.00	1.00	0.00
24.24	13.00	2.00	0.00	1.00	0.00	24.36	14.18	2.00	0.00	1.00	0.00
24.42	12.77	2.00	0.00	1.00	0.00	24.48	14.05	2.00	0.00	1.00	0.00
24.52	14.44	2.00	0.00	1.00	0.00	24.56	9.35	2.00	0.00	1.00	0.00
24.64	23.38	2.00	0.00	1.00	0.00	24.68	24.54	2.00	0.00	1.00	0.00
24.78	26.07	2.00	0.00	1.00	0.00	24.81	27.42	2.00	0.00	1.00	0.00
24.90	31.95	2.00	0.00	1.00	0.00	24.97	101.12	2.00	0.00	1.00	0.00
25.02	105.60	2.00	0.00	1.00	0.00	25.09	110.38	2.00	0.00	1.00	0.00
25.18	108.48	2.00	0.00	1.00	0.00	25.22	107.41	2.00	0.00	1.00	0.00
25.26	107.16	2.00	0.00	1.00	0.00	25.39	108.06	0.23	2.97	1.00	0.05
25.44	108.62	0.24	2.95	1.00	0.02	25.48	109.63	0.24	2.92	1.00	0.01
25.57	111.34	0.24	2.87	1.00	0.03	25.61	112.38	0.25	2.85	1.00	0.02
25.70	114.91	0.26	2.78	1.00	0.03	25.74	116.08	0.26	2.75	1.00	0.01
25.79	116.72	0.26	2.73	1.00	0.01	25.88	116.27	0.26	2.75	1.00	0.03

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
25.94	114.86	0.26	2.78	1.00	0.02	26.01	113.27	0.25	2.82	1.00	0.02
26.06	112.82	0.25	2.83	1.00	0.02	26.12	113.01	0.25	2.83	1.00	0.02
26.19	113.12	2.00	0.00	1.00	0.00	26.30	113.96	2.00	0.00	1.00	0.00
26.36	113.56	2.00	0.00	1.00	0.00	26.42	110.03	2.00	0.00	1.00	0.00
26.48	104.02	2.00	0.00	1.00	0.00	26.55	95.28	2.00	0.00	1.00	0.00
26.60	27.40	2.00	0.00	1.00	0.00	26.67	20.79	2.00	0.00	1.00	0.00
26.72	16.19	2.00	0.00	1.00	0.00	26.78	13.22	2.00	0.00	1.00	0.00
26.85	11.58	2.00	0.00	1.00	0.00	26.97	9.26	2.00	0.00	1.00	0.00
27.03	8.48	2.00	0.00	1.00	0.00	27.08	7.99	2.00	0.00	1.00	0.00
27.12	6.55	2.00	0.00	1.00	0.00	27.20	7.13	2.00	0.00	1.00	0.00
27.24	7.12	2.00	0.00	1.00	0.00	27.30	7.02	2.00	0.00	1.00	0.00
27.43	6.92	2.00	0.00	1.00	0.00	27.48	7.01	2.00	0.00	1.00	0.00
27.52	6.81	2.00	0.00	1.00	0.00	27.61	7.00	2.00	0.00	1.00	0.00
27.65	7.19	2.00	0.00	1.00	0.00	27.70	7.47	2.00	0.00	1.00	0.00
27.80	7.75	2.00	0.00	1.00	0.00	27.85	7.74	2.00	0.00	1.00	0.00
27.90	7.84	2.00	0.00	1.00	0.00	28.05	7.72	2.00	0.00	1.00	0.00
28.10	7.91	2.00	0.00	1.00	0.00	28.14	8.10	2.00	0.00	1.00	0.00
28.18	8.00	2.00	0.00	1.00	0.00	28.29	7.80	2.00	0.00	1.00	0.00
28.36	7.70	2.00	0.00	1.00	0.00	28.41	7.60	2.00	0.00	1.00	0.00
28.50	7.12	2.00	0.00	1.00	0.00	28.57	6.73	2.00	0.00	1.00	0.00
28.62	6.73	2.00	0.00	1.00	0.00	28.68	6.83	2.00	0.00	1.00	0.00
28.73	6.82	2.00	0.00	1.00	0.00	28.84	7.95	2.00	0.00	1.00	0.00
28.89	8.60	2.00	0.00	1.00	0.00	28.96	9.16	2.00	0.00	1.00	0.00
29.02	9.72	2.00	0.00	1.00	0.00	29.07	9.06	2.00	0.00	1.00	0.00
29.15	8.95	2.00	0.00	1.00	0.00	29.23	9.41	2.00	0.00	1.00	0.00
29.29	9.21	2.00	0.00	1.00	0.00	29.38	9.68	2.00	0.00	1.00	0.00
29.42	10.70	2.00	0.00	1.00	0.00	29.46	12.19	2.00	0.00	1.00	0.00
29.56	16.08	2.00	0.00	1.00	0.00	29.62	17.37	2.00	0.00	1.00	0.00
29.68	18.36	2.00	0.00	1.00	0.00	29.73	19.29	2.00	0.00	1.00	0.00
29.86	21.37	2.00	0.00	1.00	0.00	29.99	24.00	2.00	0.00	1.00	0.00
30.05	23.89	2.00	0.00	1.00	0.00	30.13	22.57	2.00	0.00	1.00	0.00
30.17	20.43	2.00	0.00	1.00	0.00	30.26	17.84	2.00	0.00	1.00	0.00
30.32	16.07	2.00	0.00	1.00	0.00	30.39	15.87	2.00	0.00	1.00	0.00
30.47	17.14	2.00	0.00	1.00	0.00	30.53	18.68	2.00	0.00	1.00	0.00
30.60	20.21	2.00	0.00	1.00	0.00	30.66	21.75	2.00	0.00	1.00	0.00
30.75	22.36	2.00	0.00	1.00	0.00	30.81	22.07	2.00	0.00	1.00	0.00
30.88	20.95	2.00	0.00	1.00	0.00	30.93	19.47	2.00	0.00	1.00	0.00
31.02	17.36	2.00	0.00	1.00	0.00	31.06	15.25	2.00	0.00	1.00	0.00
31.28	11.30	2.00	0.00	1.00	0.00	31.35	10.57	2.00	0.00	1.00	0.00
31.38	8.38	2.00	0.00	1.00	0.00	31.44	9.73	2.00	0.00	1.00	0.00
31.51	9.91	2.00	0.00	1.00	0.00	31.59	10.26	2.00	0.00	1.00	0.00
31.64	10.26	2.00	0.00	1.00	0.00	31.74	10.15	2.00	0.00	1.00	0.00
31.79	9.96	2.00	0.00	1.00	0.00	31.83	9.69	2.00	0.00	1.00	0.00
31.90	9.59	2.00	0.00	1.00	0.00	31.99	9.31	2.00	0.00	1.00	0.00
32.04	9.31	2.00	0.00	1.00	0.00	32.20	9.37	2.00	0.00	1.00	0.00
32.25	9.28	2.00	0.00	1.00	0.00	32.30	9.72	2.00	0.00	1.00	0.00
32.37	10.61	2.00	0.00	1.00	0.00	32.43	11.41	2.00	0.00	1.00	0.00
32.47	12.03	2.00	0.00	1.00	0.00	32.52	12.12	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
32.57	12.01	2.00	0.00	1.00	0.00	32.70	11.55	2.00	0.00	1.00	0.00
32.74	11.45	2.00	0.00	1.00	0.00	32.81	11.35	2.00	0.00	1.00	0.00
32.87	11.70	2.00	0.00	1.00	0.00	32.92	12.58	2.00	0.00	1.00	0.00
32.98	13.38	2.00	0.00	1.00	0.00	33.05	14.07	2.00	0.00	1.00	0.00
33.11	14.34	2.00	0.00	1.00	0.00	33.22	14.84	2.00	0.00	1.00	0.00
33.28	15.27	2.00	0.00	1.00	0.00	33.36	15.62	2.00	0.00	1.00	0.00
33.40	15.07	2.00	0.00	1.00	0.00	33.48	13.55	2.00	0.00	1.00	0.00
33.59	13.53	2.00	0.00	1.00	0.00	33.66	13.61	2.00	0.00	1.00	0.00
33.72	13.78	2.00	0.00	1.00	0.00	33.78	13.76	2.00	0.00	1.00	0.00
33.84	12.78	2.00	0.00	1.00	0.00	33.89	12.24	2.00	0.00	1.00	0.00
33.97	11.88	2.00	0.00	1.00	0.00	34.02	11.87	2.00	0.00	1.00	0.00
34.08	11.86	2.00	0.00	1.00	0.00	34.20	11.84	2.00	0.00	1.00	0.00
34.26	12.80	2.00	0.00	1.00	0.00	34.37	13.83	2.00	0.00	1.00	0.00
34.42	15.05	2.00	0.00	1.00	0.00	34.49	15.08	2.00	0.00	1.00	0.00
34.54	15.07	2.00	0.00	1.00	0.00	34.62	15.10	2.00	0.00	1.00	0.00
34.66	15.53	2.00	0.00	1.00	0.00	34.73	15.60	2.00	0.00	1.00	0.00
34.80	14.98	2.00	0.00	1.00	0.00	34.88	14.87	2.00	0.00	1.00	0.00
34.93	14.69	2.00	0.00	1.00	0.00	35.01	13.63	2.00	0.00	1.00	0.00
35.06	13.62	2.00	0.00	1.00	0.00	35.11	13.26	2.00	0.00	1.00	0.00
35.21	12.47	2.00	0.00	1.00	0.00	35.25	11.07	2.00	0.00	1.00	0.00
35.34	10.28	2.00	0.00	1.00	0.00	35.38	10.02	2.00	0.00	1.00	0.00
35.44	10.01	2.00	0.00	1.00	0.00	35.50	10.17	2.00	0.00	1.00	0.00
35.60	10.68	2.00	0.00	1.00	0.00	35.64	10.84	2.00	0.00	1.00	0.00
35.71	11.09	2.00	0.00	1.00	0.00	35.77	11.18	2.00	0.00	1.00	0.00
35.86	10.99	2.00	0.00	1.00	0.00	35.92	10.98	2.00	0.00	1.00	0.00
36.03	10.97	2.00	0.00	1.00	0.00	36.06	10.96	2.00	0.00	1.00	0.00
36.12	11.03	2.00	0.00	1.00	0.00	36.21	11.97	2.00	0.00	1.00	0.00
36.27	12.56	2.00	0.00	1.00	0.00	36.30	13.24	2.00	0.00	1.00	0.00
36.39	13.91	2.00	0.00	1.00	0.00	36.45	14.50	2.00	0.00	1.00	0.00
36.52	15.34	2.00	0.00	1.00	0.00	36.58	16.19	2.00	0.00	1.00	0.00
36.65	17.28	2.00	0.00	1.00	0.00	36.79	18.18	2.00	0.00	1.00	0.00
36.92	16.12	2.00	0.00	1.00	0.00	37.00	15.41	2.00	0.00	1.00	0.00
37.05	15.23	2.00	0.00	1.00	0.00	37.14	15.56	2.00	0.00	1.00	0.00
37.24	16.47	2.00	0.00	1.00	0.00	37.26	14.68	2.00	0.00	1.00	0.00
37.28	18.33	2.00	0.00	1.00	0.00	37.35	24.69	2.00	0.00	1.00	0.00
37.41	28.66	2.00	0.00	1.00	0.00	37.48	32.56	2.00	0.00	1.00	0.00
37.55	99.41	2.00	0.00	1.00	0.00	37.61	105.97	2.00	0.00	1.00	0.00
37.75	117.33	2.00	0.00	1.00	0.00	37.78	122.63	2.00	0.00	1.00	0.00
37.83	127.69	2.00	0.00	1.00	0.00	37.90	133.98	2.00	0.00	1.00	0.00
37.94	132.37	2.00	0.00	1.00	0.00	38.03	121.59	2.00	0.00	1.00	0.00
38.07	120.07	2.00	0.00	1.00	0.00	38.17	110.13	2.00	0.00	1.00	0.00
38.28	108.42	0.23	2.96	1.00	0.04	38.31	116.92	0.26	2.73	1.00	0.01
38.37	130.87	0.32	2.42	1.00	0.02	38.42	136.42	0.36	2.31	1.00	0.01
38.59	133.74	0.34	2.36	1.00	0.05	38.64	131.65	0.33	2.40	1.00	0.01
38.69	134.05	0.34	2.35	1.00	0.02	38.82	129.10	0.31	2.45	1.00	0.04
38.90	134.24	0.34	2.35	1.00	0.02	38.95	140.79	0.39	2.23	1.00	0.01
39.03	142.76	0.41	2.19	1.00	0.02	39.10	142.05	0.40	2.21	1.00	0.02
39.17	141.51	0.40	2.22	1.00	0.02	39.23	141.08	0.39	2.22	1.00	0.02

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
39.37	139.18	0.38	2.26	1.00	0.04	39.51	138.23	0.37	2.28	1.00	0.04
39.56	142.89	0.41	2.19	1.00	0.02	39.64	145.47	0.43	2.15	1.00	0.02
39.70	150.56	0.49	2.07	1.00	0.01	39.82	153.87	0.54	2.02	1.00	0.03
39.84	154.14	0.54	2.01	1.00	0.01	39.94	157.62	0.60	1.87	1.00	0.02
40.01	152.13	2.00	0.00	1.00	0.00	40.05	139.99	2.00	0.00	1.00	0.00
40.12	125.01	2.00	0.00	1.00	0.00	40.18	112.18	2.00	0.00	1.00	0.00
40.23	103.18	2.00	0.00	1.00	0.00	40.31	35.84	2.00	0.00	1.00	0.00
40.36	30.77	2.00	0.00	1.00	0.00	40.45	26.54	2.00	0.00	1.00	0.00
40.50	23.57	2.00	0.00	1.00	0.00	40.63	32.55	2.00	0.00	1.00	0.00
40.71	105.05	2.00	0.00	1.00	0.00	40.77	111.63	2.00	0.00	1.00	0.00
40.85	114.60	2.00	0.00	1.00	0.00	40.90	114.33	2.00	0.00	1.00	0.00
40.98	109.17	2.00	0.00	1.00	0.00	41.06	100.68	2.00	0.00	1.00	0.00
41.11	31.88	2.00	0.00	1.00	0.00	41.17	26.64	2.00	0.00	1.00	0.00
41.25	23.76	2.00	0.00	1.00	0.00	41.31	21.63	2.00	0.00	1.00	0.00
41.38	22.43	2.00	0.00	1.00	0.00	41.47	25.49	2.00	0.00	1.00	0.00
41.53	27.26	2.00	0.00	1.00	0.00	41.60	95.26	2.00	0.00	1.00	0.00
41.66	114.32	2.00	0.00	1.00	0.00	41.73	122.98	2.00	0.00	1.00	0.00
41.80	115.21	2.00	0.00	1.00	0.00	41.87	124.60	2.00	0.00	1.00	0.00
41.95	124.51	0.29	2.55	1.00	0.02	42.00	120.46	0.27	2.64	1.00	0.02
42.09	134.48	0.35	2.35	1.00	0.02	42.15	143.71	0.42	2.18	1.00	0.01
42.22	128.15	2.00	0.00	1.00	0.00	42.26	131.58	2.00	0.00	1.00	0.00
42.33	128.21	2.00	0.00	1.00	0.00	42.40	123.23	2.00	0.00	1.00	0.00
42.44	116.43	2.00	0.00	1.00	0.00	42.49	106.81	2.00	0.00	1.00	0.00
42.50	36.47	2.00	0.00	1.00	0.00	42.54	101.52	0.22	3.16	1.00	0.01
42.59	36.44	2.00	0.00	1.00	0.00	42.65	31.32	2.00	0.00	1.00	0.00
42.76	31.16	2.00	0.00	1.00	0.00	42.81	31.02	2.00	0.00	1.00	0.00
42.89	110.64	2.00	0.00	1.00	0.00	43.02	155.77	2.00	0.00	1.00	0.00
43.08	163.57	2.00	0.00	1.00	0.00	43.16	169.97	2.00	0.00	1.00	0.00
43.20	173.39	2.00	0.00	1.00	0.00	43.26	177.37	2.00	0.00	1.00	0.00
43.33	179.86	2.00	0.00	1.00	0.00	43.38	180.62	2.00	0.00	1.00	0.00
43.43	180.19	2.00	0.00	1.00	0.00	43.50	178.18	1.24	0.47	1.00	0.00
43.55	177.16	1.19	0.52	1.00	0.00	43.60	176.82	1.17	0.54	1.00	0.00
43.67	177.50	1.20	0.51	1.00	0.00	43.72	179.19	1.29	0.42	1.00	0.00
43.78	181.10	1.40	0.33	1.00	0.00	43.89	186.07	1.76	0.11	1.00	0.00
43.95	186.37	1.79	0.09	1.00	0.00	44.00	184.20	1.61	0.18	1.00	0.00
44.06	180.07	1.34	0.37	1.00	0.00	44.13	173.75	1.04	0.71	1.00	0.01
44.21	163.36	0.72	1.52	1.00	0.01	44.26	152.83	0.53	2.03	1.00	0.01
44.35	146.29	0.45	2.14	1.00	0.02	44.40	145.56	0.44	2.15	1.00	0.01
44.48	153.09	0.53	2.03	1.00	0.02	44.54	166.95	0.81	1.19	1.00	0.01
44.62	170.99	0.93	0.89	1.00	0.01	44.66	168.08	0.84	1.10	1.00	0.01
44.80	167.94	0.84	1.11	1.00	0.02	44.87	168.23	0.85	1.08	1.00	0.01
44.90	168.22	0.85	1.08	1.00	0.00	45.04	168.14	0.84	1.09	1.00	0.02
45.12	167.42	2.00	0.00	1.00	0.00	45.25	164.32	2.00	0.00	1.00	0.00
45.31	161.96	2.00	0.00	1.00	0.00	45.44	155.24	2.00	0.00	1.00	0.00
45.52	149.94	2.00	0.00	1.00	0.00	45.58	141.78	2.00	0.00	1.00	0.00
45.72	118.57	2.00	0.00	1.00	0.00	45.79	116.93	2.00	0.00	1.00	0.00
45.85	115.71	2.00	0.00	1.00	0.00	45.99	113.71	2.00	0.00	1.00	0.00
46.06	123.76	2.00	0.00	1.00	0.00	46.12	118.10	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
46.19	106.13	2.00	0.00	1.00	0.00
46.33	26.82	2.00	0.00	1.00	0.00
46.47	19.95	2.00	0.00	1.00	0.00
46.68	17.62	2.00	0.00	1.00	0.00
46.81	15.47	2.00	0.00	1.00	0.00
46.95	14.09	2.00	0.00	1.00	0.00
47.08	13.77	2.00	0.00	1.00	0.00
47.30	14.71	2.00	0.00	1.00	0.00
47.44	14.99	2.00	0.00	1.00	0.00
47.57	14.52	2.00	0.00	1.00	0.00
47.70	14.12	2.00	0.00	1.00	0.00
47.83	13.96	2.00	0.00	1.00	0.00
47.97	13.94	2.00	0.00	1.00	0.00
48.11	14.07	2.00	0.00	1.00	0.00
48.24	13.53	2.00	0.00	1.00	0.00
48.31	13.08	2.00	0.00	1.00	0.00
48.49	18.20	2.00	0.00	1.00	0.00
48.69	18.23	2.00	0.00	1.00	0.00
48.88	14.56	2.00	0.00	1.00	0.00
49.01	12.25	2.00	0.00	1.00	0.00
49.23	12.96	2.00	0.00	1.00	0.00
49.36	15.09	2.00	0.00	1.00	0.00
49.50	18.40	2.00	0.00	1.00	0.00
49.63	35.28	2.00	0.00	1.00	0.00
49.77	48.99	2.00	0.00	1.00	0.00
49.90	115.40	0.26	2.77	1.00	0.02
50.04	42.15	2.00	0.00	1.00	0.00
50.20	99.05	0.22	3.24	1.00	0.03
50.34	28.81	2.00	0.00	1.00	0.00
50.53	31.71	2.00	0.00	1.00	0.00
50.66	117.65	0.27	2.71	1.00	0.02
50.80	123.48	2.00	0.00	1.00	0.00
50.95	157.18	2.00	0.00	1.00	0.00
51.14	171.92	0.98	0.80	1.00	0.01
51.27	173.17	1.03	0.73	1.00	0.00
51.59	161.52	0.69	1.64	1.00	0.01
51.71	160.79	2.00	0.00	1.00	0.00
51.88	164.29	2.00	0.00	1.00	0.00
51.97	139.20	2.00	0.00	1.00	0.00
52.12	37.07	2.00	0.00	1.00	0.00
52.24	26.17	2.00	0.00	1.00	0.00
52.42	18.38	2.00	0.00	1.00	0.00
52.51	14.97	2.00	0.00	1.00	0.00
52.68	13.88	2.00	0.00	1.00	0.00
52.80	12.87	2.00	0.00	1.00	0.00
52.96	13.14	2.00	0.00	1.00	0.00
53.08	13.12	2.00	0.00	1.00	0.00
53.17	13.11	2.00	0.00	1.00	0.00
46.26	34.77	2.00	0.00	1.00	0.00
46.42	22.18	2.00	0.00	1.00	0.00
46.60	18.85	2.00	0.00	1.00	0.00
46.73	16.54	2.00	0.00	1.00	0.00
46.87	14.48	2.00	0.00	1.00	0.00
47.03	13.93	2.00	0.00	1.00	0.00
47.21	14.27	2.00	0.00	1.00	0.00
47.35	14.93	2.00	0.00	1.00	0.00
47.48	14.76	2.00	0.00	1.00	0.00
47.62	14.29	2.00	0.00	1.00	0.00
47.78	14.04	2.00	0.00	1.00	0.00
47.91	13.95	2.00	0.00	1.00	0.00
48.05	14.08	2.00	0.00	1.00	0.00
48.19	13.99	2.00	0.00	1.00	0.00
48.26	12.19	2.00	0.00	1.00	0.00
48.43	16.86	2.00	0.00	1.00	0.00
48.61	18.77	2.00	0.00	1.00	0.00
48.75	17.39	2.00	0.00	1.00	0.00
48.96	13.21	2.00	0.00	1.00	0.00
49.09	13.09	2.00	0.00	1.00	0.00
49.28	14.14	2.00	0.00	1.00	0.00
49.41	16.12	2.00	0.00	1.00	0.00
49.56	25.05	2.00	0.00	1.00	0.00
49.69	44.81	2.00	0.00	1.00	0.00
49.85	51.22	2.00	0.00	1.00	0.00
49.98	110.24	0.25	2.90	1.00	0.03
50.12	101.62	0.22	3.16	1.00	0.03
50.26	33.81	2.00	0.00	1.00	0.00
50.39	24.98	2.00	0.00	1.00	0.00
50.61	46.73	2.00	0.00	1.00	0.00
50.74	114.48	2.00	0.00	1.00	0.00
50.87	146.15	2.00	0.00	1.00	0.00
51.00	162.91	2.00	0.00	1.00	0.00
51.22	179.73	1.34	0.38	1.00	0.00
51.53	163.00	0.72	1.50	1.00	0.05
51.67	160.77	2.00	0.00	1.00	0.00
51.79	168.07	2.00	0.00	1.00	0.00
51.93	151.86	2.00	0.00	1.00	0.00
52.07	46.58	2.00	0.00	1.00	0.00
52.19	30.32	2.00	0.00	1.00	0.00
52.34	20.86	2.00	0.00	1.00	0.00
52.47	16.35	2.00	0.00	1.00	0.00
52.64	14.11	2.00	0.00	1.00	0.00
52.73	13.38	2.00	0.00	1.00	0.00
52.86	12.65	2.00	0.00	1.00	0.00
53.02	13.13	2.00	0.00	1.00	0.00
53.13	13.12	2.00	0.00	1.00	0.00
53.23	13.10	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
53.30	13.09	2.00	0.00	1.00	0.00	53.40	14.08	2.00	0.00	1.00	0.00
53.45	14.92	2.00	0.00	1.00	0.00	53.53	15.41	2.00	0.00	1.00	0.00
53.57	15.40	2.00	0.00	1.00	0.00	53.69	13.69	2.00	0.00	1.00	0.00
53.75	15.27	2.00	0.00	1.00	0.00	53.79	12.75	2.00	0.00	1.00	0.00
53.92	15.14	2.00	0.00	1.00	0.00	53.97	17.62	2.00	0.00	1.00	0.00
54.02	20.40	2.00	0.00	1.00	0.00	54.08	22.76	2.00	0.00	1.00	0.00
54.14	27.15	2.00	0.00	1.00	0.00	54.19	33.49	2.00	0.00	1.00	0.00
54.25	35.90	2.00	0.00	1.00	0.00	54.30	35.52	2.00	0.00	1.00	0.00
54.36	32.87	2.00	0.00	1.00	0.00	54.41	29.20	2.00	0.00	1.00	0.00
54.47	24.77	2.00	0.00	1.00	0.00	54.54	21.37	2.00	0.00	1.00	0.00
54.62	16.52	2.00	0.00	1.00	0.00	54.68	18.77	2.00	0.00	1.00	0.00
54.73	17.78	2.00	0.00	1.00	0.00	54.80	18.12	2.00	0.00	1.00	0.00
54.90	107.82	0.24	2.97	1.00	0.04	54.98	135.79	0.37	2.32	1.00	0.02
55.03	134.09	0.36	2.35	1.00	0.01	55.09	136.02	2.00	0.00	1.00	0.00
55.16	145.38	2.00	0.00	1.00	0.00	55.24	154.35	2.00	0.00	1.00	0.00
55.37	144.98	2.00	0.00	1.00	0.00	55.43	134.16	2.00	0.00	1.00	0.00
55.51	120.02	2.00	0.00	1.00	0.00	55.57	42.21	2.00	0.00	1.00	0.00
55.64	34.33	2.00	0.00	1.00	0.00	55.71	29.07	2.00	0.00	1.00	0.00
55.78	24.68	2.00	0.00	1.00	0.00	55.86	21.52	2.00	0.00	1.00	0.00
55.91	18.75	2.00	0.00	1.00	0.00	56.00	16.84	2.00	0.00	1.00	0.00
56.07	18.30	2.00	0.00	1.00	0.00	56.14	17.87	2.00	0.00	1.00	0.00
56.18	18.00	2.00	0.00	1.00	0.00	56.28	19.88	2.00	0.00	1.00	0.00
56.33	21.91	2.00	0.00	1.00	0.00	56.40	24.01	2.00	0.00	1.00	0.00
56.50	28.11	2.00	0.00	1.00	0.00	56.55	27.74	2.00	0.00	1.00	0.00
56.60	26.03	2.00	0.00	1.00	0.00	56.67	24.40	2.00	0.00	1.00	0.00
56.72	24.52	2.00	0.00	1.00	0.00	56.77	26.35	2.00	0.00	1.00	0.00
56.89	36.25	2.00	0.00	1.00	0.00	56.94	104.70	2.00	0.00	1.00	0.00
56.99	109.27	2.00	0.00	1.00	0.00	57.06	110.80	2.00	0.00	1.00	0.00
57.12	112.22	2.00	0.00	1.00	0.00	57.19	112.35	2.00	0.00	1.00	0.00
57.25	110.10	2.00	0.00	1.00	0.00	57.32	107.61	2.00	0.00	1.00	0.00
57.38	103.34	2.00	0.00	1.00	0.00	57.43	37.03	2.00	0.00	1.00	0.00
57.51	33.27	2.00	0.00	1.00	0.00	57.58	31.16	2.00	0.00	1.00	0.00
57.65	30.97	2.00	0.00	1.00	0.00	57.70	92.55	0.21	3.47	1.00	0.02
57.78	94.45	0.21	3.40	1.00	0.03	57.84	33.28	2.00	0.00	1.00	0.00
57.91	30.29	2.00	0.00	1.00	0.00	57.97	25.90	2.00	0.00	1.00	0.00
58.05	21.56	2.00	0.00	1.00	0.00	58.09	18.58	2.00	0.00	1.00	0.00
58.17	16.77	2.00	0.00	1.00	0.00	58.22	15.33	2.00	0.00	1.00	0.00
58.31	13.81	2.00	0.00	1.00	0.00	58.35	12.87	2.00	0.00	1.00	0.00
58.44	12.72	2.00	0.00	1.00	0.00	58.58	16.85	2.00	0.00	1.00	0.00
58.62	24.82	2.00	0.00	1.00	0.00	58.70	31.12	2.00	0.00	1.00	0.00
58.76	32.05	2.00	0.00	1.00	0.00	58.82	28.94	2.00	0.00	1.00	0.00
58.89	24.11	2.00	0.00	1.00	0.00	58.95	19.40	2.00	0.00	1.00	0.00
58.95	16.45	2.00	0.00	1.00	0.00	59.01	17.40	2.00	0.00	1.00	0.00
59.07	15.14	2.00	0.00	1.00	0.00	59.13	14.12	2.00	0.00	1.00	0.00
59.19	13.24	2.00	0.00	1.00	0.00	59.29	12.15	2.00	0.00	1.00	0.00
59.34	11.88	2.00	0.00	1.00	0.00	59.43	11.80	2.00	0.00	1.00	0.00
59.49	12.00	2.00	0.00	1.00	0.00	59.59	13.60	2.00	0.00	1.00	0.00
59.65	13.86	2.00	0.00	1.00	0.00	59.69	13.52	2.00	0.00	1.00	0.00

:: Post-earthquake settlement due to soil liquefaction :: (continued)

Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)	Depth (ft)	$q_{c1N,cs}$	FS	e_v (%)	DF	Settlement (in)
59.74	13.44	2.00	0.00	1.00	0.00	59.81	13.97	2.00	0.00	1.00	0.00
59.91	21.16	2.00	0.00	1.00	0.00	59.96	29.03	2.00	0.00	1.00	0.00
60.02	36.71	2.00	0.00	1.00	0.00	60.14	109.64	2.00	0.00	1.00	0.00
60.19	115.47	2.00	0.00	1.00	0.00	60.25	122.94	2.00	0.00	1.00	0.00
60.31	130.85	2.00	0.00	1.00	0.00	60.36	135.03	2.00	0.00	1.00	0.00
60.41	136.84	2.00	0.00	1.00	0.00	60.48	139.46	2.00	0.00	1.00	0.00
60.53	138.23	2.00	0.00	1.00	0.00	60.58	134.85	2.00	0.00	1.00	0.00
60.64	130.79	2.00	0.00	1.00	0.00	60.76	122.05	2.00	0.00	1.00	0.00
60.80	118.12	2.00	0.00	1.00	0.00	60.85	49.23	2.00	0.00	1.00	0.00
60.93	47.54	2.00	0.00	1.00	0.00	60.98	48.75	2.00	0.00	1.00	0.00
61.09	137.69	2.00	0.00	1.00	0.00	61.15	156.50	2.00	0.00	1.00	0.00
61.20	170.37	2.00	0.00	1.00	0.00	61.25	176.64	2.00	0.00	1.00	0.00
61.37	178.70	1.32	0.39	1.00	0.01	61.42	176.07	1.19	0.52	1.00	0.00
61.47	172.68	1.04	0.71	1.00	0.00	61.53	170.33	0.96	0.85	1.00	0.01
61.59	164.01	2.00	0.00	1.00	0.00	61.64	159.17	2.00	0.00	1.00	0.00
61.70	154.50	2.00	0.00	1.00	0.00	61.76	149.67	2.00	0.00	1.00	0.00
61.82	144.58	2.00	0.00	1.00	0.00	61.88	127.41	2.00	0.00	1.00	0.00
61.95	127.07	0.33	2.50	1.00	0.02	62.04	117.02	0.28	2.73	1.00	0.03
62.12	42.95	2.00	0.00	1.00	0.00	62.14	39.38	2.00	0.00	1.00	0.00
62.23	33.68	2.00	0.00	1.00	0.00	62.30	29.15	2.00	0.00	1.00	0.00
62.34	26.93	2.00	0.00	1.00	0.00	62.43	24.38	2.00	0.00	1.00	0.00
62.48	23.69	2.00	0.00	1.00	0.00	62.56	22.45	2.00	0.00	1.00	0.00
62.61	21.70	2.00	0.00	1.00	0.00	62.70	20.41	2.00	0.00	1.00	0.00
62.74	21.95	2.00	0.00	1.00	0.00	62.85	36.49	2.00	0.00	1.00	0.00
62.96	125.00	2.00	0.00	1.00	0.00	63.01	136.17	2.00	0.00	1.00	0.00
63.10	136.35	2.00	0.00	1.00	0.00	63.15	127.49	2.00	0.00	1.00	0.00
63.20	122.64	2.00	0.00	1.00	0.00	63.27	131.56	2.00	0.00	1.00	0.00
63.36	148.60	2.00	0.00	1.00	0.00	63.45	156.46	0.62	1.95	1.00	0.02
63.50	158.71	0.66	1.80	1.00	0.01	63.61	160.66	0.70	1.63	1.00	0.02
63.76	162.00	0.73	1.49	1.00	0.03	63.81	164.95	0.80	1.23	1.00	0.01
63.86	167.24	0.87	1.05	1.00	0.01	63.92	167.38	0.87	1.04	1.00	0.01
63.98	165.51	0.82	1.18	1.00	0.01	64.02	163.00	0.76	1.39	1.00	0.01
64.07	161.43	0.72	1.55	1.00	0.01	64.12	160.88	0.71	1.60	1.00	0.01
64.18	160.48	0.70	1.64	1.00	0.01	64.24	160.56	0.70	1.63	1.00	0.01
64.34	160.74	0.71	1.62	1.00	0.02	64.43	166.38	0.84	1.11	1.00	0.01
64.48	166.57	0.85	1.09	1.00	0.01	64.55	166.65	0.85	1.09	1.00	0.01
64.60	167.56	0.88	1.02	1.00	0.01	64.69	171.83	1.02	0.74	1.00	0.01
64.74	174.50	1.13	0.59	1.00	0.00	64.79	177.89	1.29	0.42	1.00	0.00
64.89	166.21	2.00	0.00	1.00	0.00	64.93	168.31	2.00	0.00	1.00	0.00
64.98	170.33	2.00	0.00	1.00	0.00	65.07	174.45	2.00	0.00	1.00	0.00
65.14	175.78	2.00	0.00	1.00	0.00	65.19	177.05	2.00	0.00	1.00	0.00

Total estimated settlement: 4.56

Abbreviations

$Q_{tn,cs}$: Equivalent clean sand normalized cone resistance
FS: Factor of safety against liquefaction
e_v (%): Post-liquefaction volumentric strain
DF: e_v depth weighting factor
Settlement: Calculated settlement

APPENDIX F

WELL PERMIT DOCUMENTS

J. Anzora

APPLICATION FOR WELL/EXPLORATORY BORING PERMIT

RECEIVED HCA

ORANGE COUNTY HEALTH CARE AGENCY
ENVIRONMENTAL HEALTH DIVISION

1241 E. DYER ROAD, SUITE 120
SANTA ANA, CA 92705-5611

JAN 12 2022

EHOCWELLS@OCHCA.COM
714-433-6000

ENVIRONMENTAL HLTH

WELL PERMIT NO. 21-12-30

Permit expires on 12.30.2022.

For multiple cities, addresses, or locations, complete a separate permit application.

PROPOSED START DATE

CITY	WELL LOCATION / STREET INTERSECTION
Cypress	5665 and 5757 Plaza Drive / off of Katella and Valley View

LONGTITUDE (DECIMAL)	LATITUDE (DECIMAL)	OVERSIGHT AGENCY (if applicable)

EMAIL PERMIT TO: ehaaker@g3soilworks.com

■ Consultant ☐ Driller ☐ Well Owner

SERVICE ■ **Construction** ☐ **Destruction (Fee is per well)**

WATER WELLS (complete one permit application for per water well)

☐ Public Domestic/Municipal ☐ Private Domestic & No. of connections ___ ☐ Irrigation

☐ CATHODIC WELL (complete one permit application for per cathodic well)

NON-PRODUCTION WELLS (fee is the same as monitoring well construction) Total No. of Wells 5

■ Monitoring 5 ☐ Air Sparge ___ ☐ Soil Vapor Extraction ___ ☐ Electrical Grounding Well ___

☐ Water Extraction ___ ☐ Inclinometer ___ ☐ Injection/Recharge ___ ☐ Geothermal Heat Exchange ___

☐ Piezometer ___ ☐ Horizontal ___ ☐ Soil Vapor Probes ___ ☐ Other ___

EXPLORATORY BORINGS

(complete separate permits for probe survey and soil boring. Also complete the WELL & EXPLORATORY BORING DESTRUCTION section on the next page.)

☐ Probe Survey (CPT or Direct Push Only) ___
☐ Probe Survey Soil Vapor Probes (Direct Push) ___
☐ Soil Boring (hollow stem auger, mud rotary, sonic, or bucket auger, etc...) ___

FOR ACCOUNTING USE ONLY

HSO NO 417390 CHECK NO. 3901

DATE 1/13/22 AMOUNT $1005-

INTL LN

APPROVAL BY OTHER AGENCIES

JURISDICTION ___

REMARKS ___

AUTHORIZED SIGNATURE DATE

FOR OFFICE USE ONLY
NO PERMIT IS DEEMED COMPLETED UNTIL THE FOLLOWING ARE MARKED AND SIGNED OFF:

☐ NOTIFICATION OF COMPLETION RECEIVED
☐ FINAL INSPECTION
☐ ALL REQUIRED DOCUMENTS RECEIVED

PRINT NAME PHONE NUMBER

DISPOSITION OF PERMIT (FOR OFFICE USE ONLY)

☒ APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:

NOTIFY THIS AGENCY AT LEAST 48 HOURS:

☒ PRIOR TO ANY CHANGES OF THE WORK PLAN.
☐ PRIOR TO SEALING THE ANNULAR SPACE.
☐ PRIOR TO FILLING OF CONDUCTOR CASING.

☒ SUBMIT TO THIS AGENCY, WITHIN 30 DAYS OF COMPLETION OF WORK, A COPY OF THE WELL COMPLETION REPORT(S) AND/OR DRILLING LOG(S). PLEASE REFERENCE PERMIT NO.

☒ SECURE ALL WELLS TO PREVENT TAMPERING.

☒ NOTIFY WHEN ALL WORK IS COMPLETED AND INCLUDE THE DEPTH TO FIRST ENCOUNTERED WATER, PHOTO DOCUMENTATION, AND/OR COPIES OF CEMENT TICKETS/CALCULATIONS.

☐ WORK COMPLETED PRIOR TO SUBMITTING PERMIT APPLICATION TO THIS AGENCY

☐ OTHER ___

Juan Anzora 12.29.2021

PERMIT ISSUED BY DATE

Juan Anzora 7144336287

PRINT NAME PHONE NUMBER

WHEN SIGNED BY AN ORANGE COUNTY HEALTH CARE AGENCY REPRESENTATIVE, THIS APPLICATION IS A VALID PERMIT.

(R10/21)

I hereby agree to comply with all applicable requirements of the Health Care Agency and with all ordinances and laws of the County of Orange and of the State of California pertaining to well construction, reconstruction and destruction, including the requirements to maintain the integrity of all significant confining zones. A violation of the California Well Standards and the local Well Ordinances may constitute a misdemeanor (County Well Ordinance Sec. 4-5-31).

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WELL OWNER	
WELL OWNER'S NAME GLC Cypress LLC	EMAIL ADDRESS blair.dahl@goodman.com
WELL OWNER'S ADDRESS / CITY / STATE/ ZIP CODE 18201 Von Karman Avenue, Suite 1170, Irvine, CA 92612	TELEPHONE NUMBER (949) 407-0118
WELL OWNER'S SIGNATURE Alan Cockburn Digitally signed by Alan Cockburn Date: 2021.12.23 17:38:22 -08'00'	DATE

CONSULTING FIRM		
NAME OF CONSULTING FIRM G3SoiWorks, Inc.	BUSINESS ADDRESS/CITY/STATE/ZIP CODE 350 Fischer Avenue, Costa Mesa, CA 92626	PROFESSIONAL LICENSE NUMBER PG 9409, CEG 2708
CONSULTANT'S SIGNATURE Erik Haaker Digitally signed by Erik Haaker Date: 2021.12.23 14:22:54 -08'00'	DATE	EMAIL ADDRESS ehaaker@g3soilworks.com

DRILLING CONTRACTOR		
NAME OF DRILLER J & H Drilling Company	EMAIL ADDRESS steve@mrdrillco.com	C-57 LICENSE NUMBER 740854
DRILLER'S SIGNATURE Steve Molera		DATE 12/29/2021

REQUIRED DOCUMENTS

WATER & STORMWATER DRY INJECTION WELL CONSTRUCTION

☐ An approval from the Division of Drinking Water (DDW) for public or municipal water wells.

☐ A cross-section well diagram detailing total depth, borehole diameter, depth and thickness of the sanitary seal(s), type(s) of casing(s), and length(s) of screen(s) / slotting. A top view is required for nested wells that demonstrate the radial thickness separation.

☐ Indicate the number of water aquifers the well will be screened through.

☐ A site map using a 250-foot radius from the proposed water well location that includes locations and distances to:

- All existing, active, inactive, and/or abandoned water wells.
- All existing, abandoned, and/or proposed sewer lines, recycled water lines, and storm drain lines.
- All active and/or abandoned leach fields, cesspits, and septic tanks.
- All animal enclosures (e.g., stables, coops, kennels, etc.).
- All water courses and/or bodies of water, including, but not limited to: rivers, creeks, ponds, retention ponds, and/or swimming pools.
- All other underground storage tanks and open (regulated) remediation sites.
- All nearby structures (e.g., commercial and residential buildings, houses, storage sheds) sanitary hazards and their locations.

NON-PRODUCTION WELL CONSTRUCTION

■ Written work plan. For regulated sites, an approved work plan by the overseeing regulatory agency must be included for the installation of any type of nested well.

■ Site map(s) showing the locations of the proposed wells (no topographical maps).

■ A cross-section well diagram detailing total depth, borehole diameter, depth and thickness of the sanitary seal(s), type(s) of casing(s), and length(s) of screen(s) / slotting. A top view is required for nested wells that demonstrates a 2-inch radial thickness separation between casings and casing and wall of the borehole.

WELL & EXPLORATORY BORING DESTRUCTION

☐ Written work plan. For regulated sites, an approval of the work plan by the overseeing regulatory agency must be included.

☐ Site map(s) showing the locations of the wells to be destroyed (no topographical maps).

☐ Type and amount of sealant (show calculations for water wells):

Total depth ________ feet Borehole diameter __________ inches Sealing material: Select One of the Approved Materials

☐ Method of destruction:

☐ Pressure grout / removal of top 5 feet casing / removal of well boxes ☐ Overdrill ☐ Excavation

☐ Other

(R10/21)

Notes: - Not to scale;
- Refer to notes for depths / dimensions;
- For illustrative purposes only
- Refer to Work Plan for more information.

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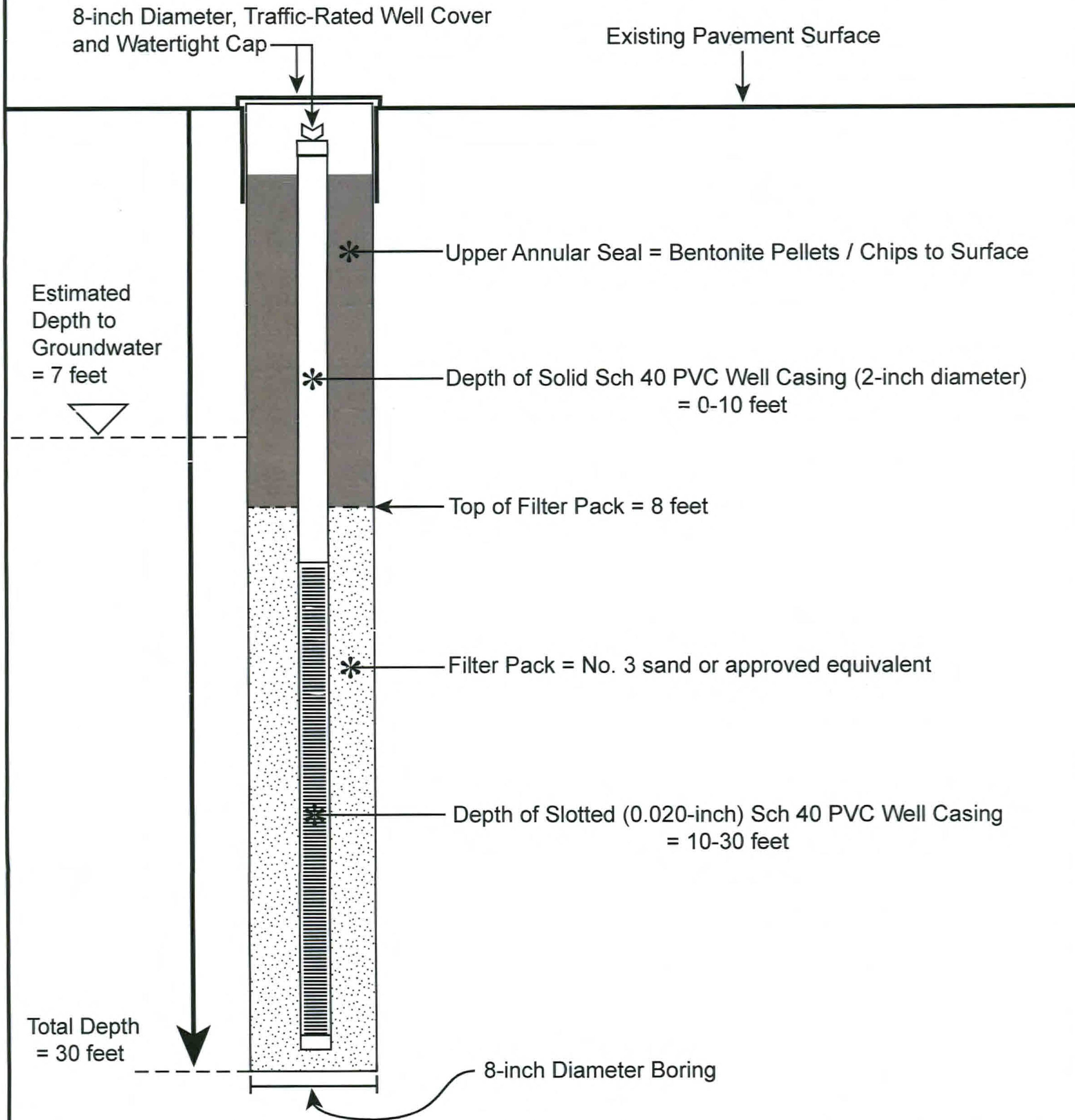
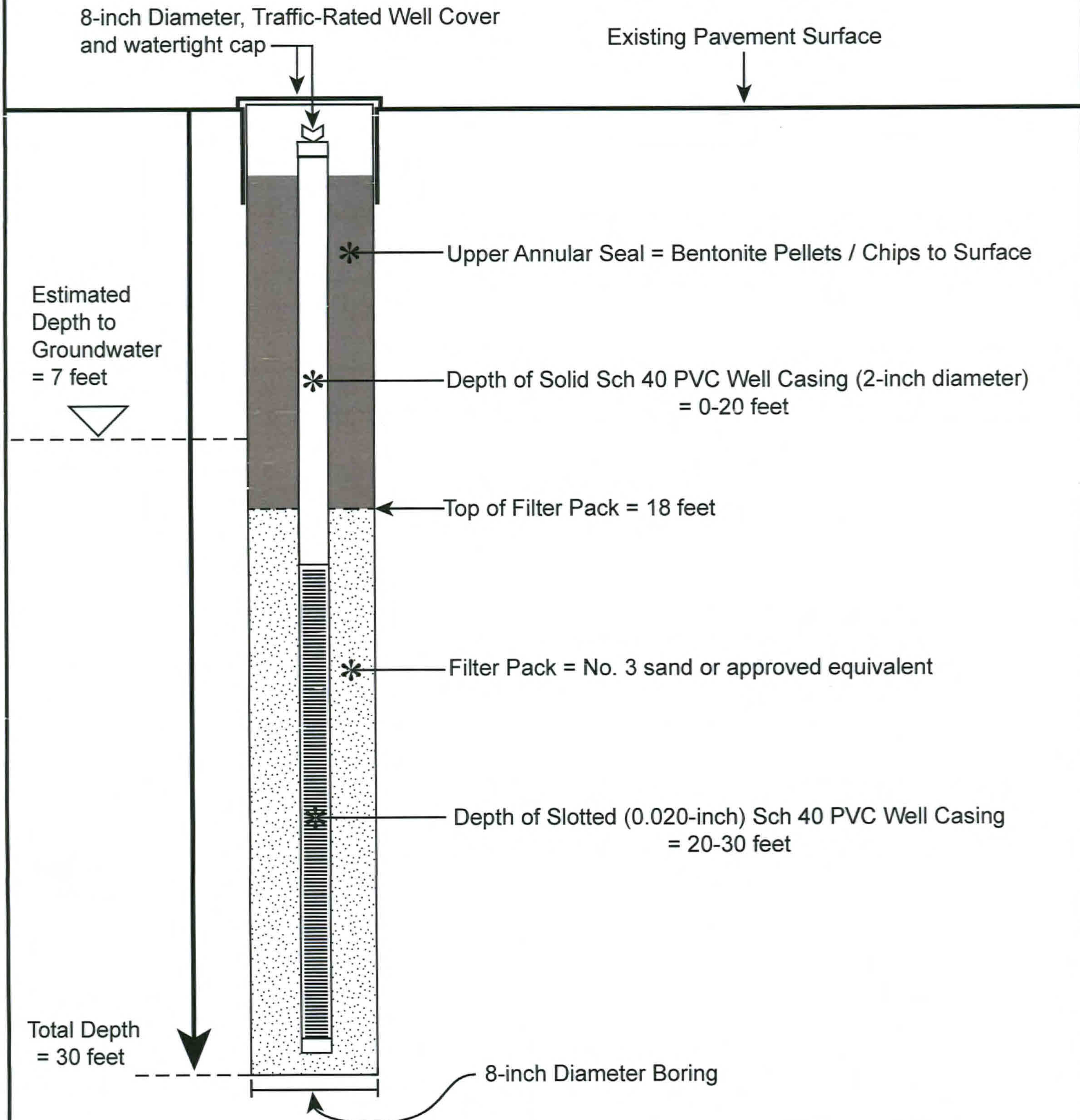


Well Construction Diagram (B-1 & B-5)	Project No. 1-1209	Dec. 2021	G3SoilWorks 350 Fischer Ave. Front Costa Mesa, CA 92626 Phone: (714) 668 5600 www.G3SoilWorks.com
5665-5757 Plaza Drive	Cypress, CA	Figure 2	

Notes: - Not to scale;
- Refer to notes for depths / dimensions;
- For illustrative purposes only
- Refer to Work Plan for more information.



Well Construction Diagram (B-2 & B-4)	Project No. 1-1209	Dec. 2021	G3SoilWorks 350 Fischer Ave. Front Costa Mesa, CA 92626 Phone: (714) 668 5600 www.G3SoilWorks.com
5665-5757 Plaza Drive	Cypress, CA	Figure 3	

Notes: - Not to scale;
- Refer to notes for depths / dimensions;
- For illustrative purposes only
- Refer to Work Plan for more information.

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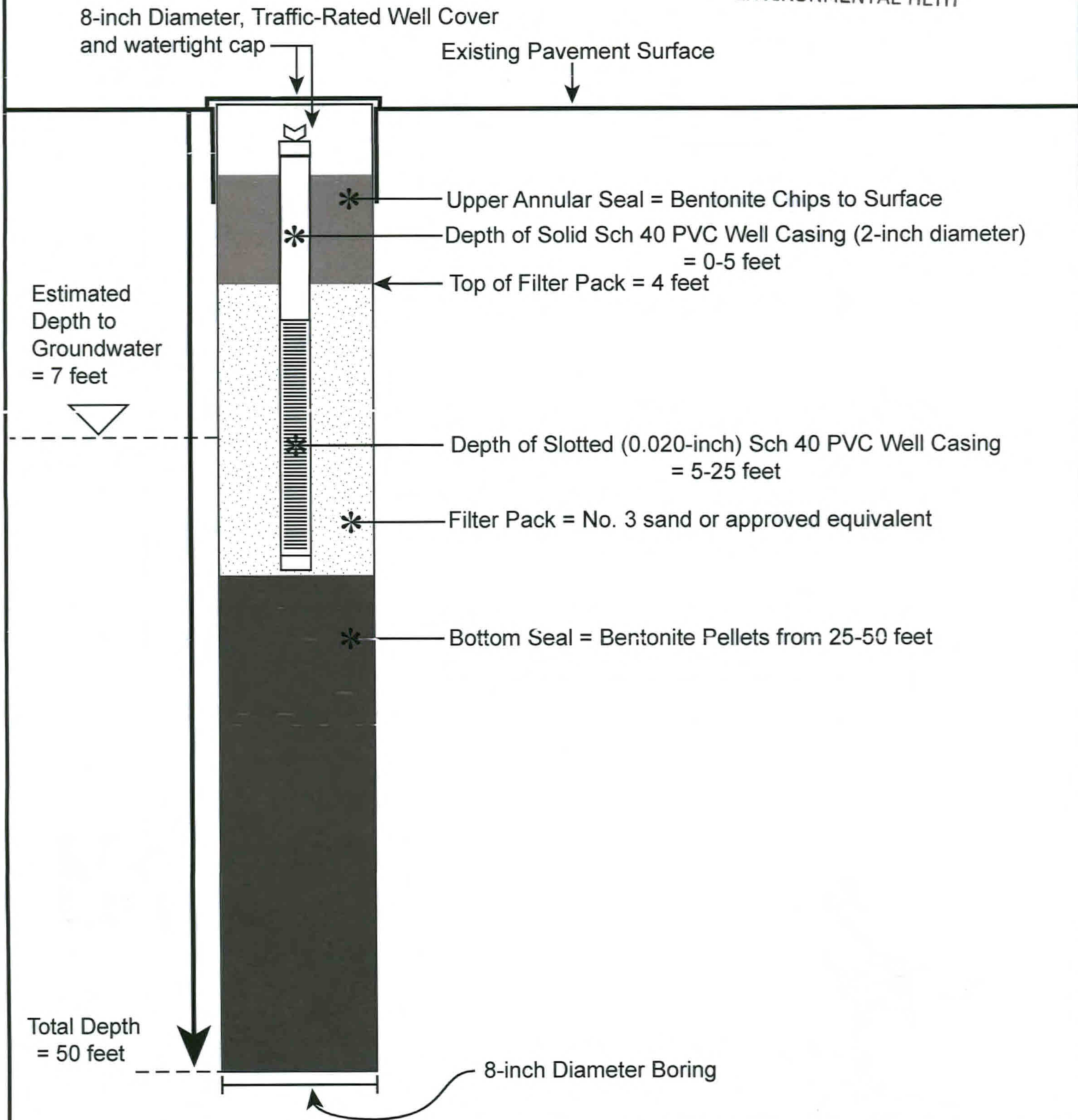

Well Construction Diagram (B-3)		Project No. 1-1209	Dec. 2021
5665-5757 Plaza Drive	Cypress, CA		Figure 4

G3SoilWorks

350 Fischer Ave. Front
Costa Mesa, CA 92626
Phone: (714) 668 5600
www.G3SoilWorks.com

Well Location Map	Proj. No. 1-1209	Dec. 2021
5665 and 5757 Plaza Drive	Cypress, CA	Figure 1

G3 SoilWorks
350 Fischer Ave. Front
Costa Mesa, CA 92626
Phone: (714) 668 5600
www.G3SoilWorks.com

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JAN 12 2022

G3SoilWorks

ENVIRONMENTAL HLTH

GEOLOGY · GEOTECH · GROUNDWATER

Orange County Health Care Agency
Environmental Health Division
1241 East Dyer Road, Suite 120
Santa Ana, CA 92705

December 27, 2021
Project No. 1-1209

Attention: Mr. Juan Anzora

Subject: **Work Plan for Well Construction Permit Application**
Geotechnical Investigation for
Proposed Commercial / Industrial Development
5665 and 5757 Plaza Drive
Cypress, California

References: Orange County Health Care Agency – Environmental Health Division
Application for Well Destruction Permit, dated December 23, 2021.

Dear Mr. Anzora,

G3SoilWorks, Inc. (G3), is providing this Work Plan for the construction of five (5) temporary monitoring wells to be located at the subject address. The proposed Work Plan and supporting information presented herein are provided as an attachment to the referenced Orange County Health Care Agency – Environmental Health Division (OCHCA-EHD) Application for Well Construction Permit dated December 23, 2021.

PURPOSE / INTENT

The purpose of our work, in accordance with this Work Plan, will be to construct five (5) temporary monitoring wells at the subject property for the purposes of monitoring groundwater elevations as part of our geotechnical investigation for the proposed commercial / industrial development. The wells will be constructed in accordance with County requirements (i.e., Bulletin for Annular Sealing Material, Bulletin for Destruction of Monitoring Wells and Soil Borings, California Well Standards, etc.) and California Well Standards.

PROJECT DESCRIPTION / BACKGROUND

As shown on Figure 1 (attached), the subject site is located northerly adjacent to Katella Avenue and Plaza Drive, between Walker Street and Valley View Street, in the City of Cypress. The property is generally flat-lying to very gently sloping and is occupied by paved parking areas at the proposed well locations. A total of five (5) temporary monitoring wells are to be constructed as part of G3's geotechnical investigation for the subject proposed commercial / industrial development. These wells are to be constructed in accordance with the attached well construction diagrams (Figures 2-4) and will range in depth from 25 to 30 feet below existing ground surface. One of the wells (B-3) will be drilled to 50 feet for the purposes of geotechnical sampling and testing, then sealed and set to a depth of 25 feet as shown on Figure 4.

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SOILS AND GROUNDWATER

Based on review of available geologic mapping and subsurface information, the site is underlain by Quaternary alluvium associated with the ancestral Santa Ana River. Soils include anastomosed / interfingered and interbedded sequences of poorly-graded sand, silty sand, sandy silt, and silty clay. Shallow groundwater is anticipated at depths of approximately 7 feet below ground surface and is understood to be "first water" of non-beneficial use.

METHODOLOGY / WORK PLAN

The proposed temporary monitoring wells will be located within the limits of the property as shown Figure 1 (attached). The wells will be constructed by a C-57 licensed drilling contractor according to the attached well construction diagrams (Figures 2-4), with oversight and documentation by G3. The wells will remain in place for monitoring purposes until construction of the proposed commercial / industrial development begins. At some point during the construction phase, a well destruction permit application will be submitted for County review and approval, and the wells will be destroyed by a licensed C-57 drilling contractor in accordance with the approved well destruction permit.

DISCUSSION / CONCLUSION

It is our opinion that the above work plan meets the intent of California Well Standards and conforms with applicable County requirements for well construction. Our work will be performed in accordance with the approved well construction permit and work plan proposed herein.

CLOSURE

We thank you for your assistance and look forward to working with you in the future. If you have any questions or require additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,

G3SoilWorks, Inc.

CERTIFIED ENGINEERING GEOLOGIST
ERIK C. HAAKER
No. 2708
EXP. 2/28/23
STATE OF CALIFORNIA

By: Erik Haaker

Erik C. Haaker, P.G., C.E.G.
Senior Engineering Geologist

Attachments:
Figure 1 – Well Location Map
Figure 2 – Well Construction Diagram (B-1 & B-5)
Figure 3 – Well Construction Diagram (B-2 & B-4)
Figure 4 – Well Construction Diagram (B-3)
OCHCA-EHD Application for Well Construction Permit

Distribution: Addressee (PDF electronic mail)

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ENVIRONMENTAL HLTH

ORANGE COUNTY HEALTH CARE AGENCY
ENVIRONMENTAL HEALTH DIVISION
HEALTH SERVICE ORDER

417390

Wells

Date 1/13/22 Initials Ur

Client Name GLC Cypress LLC

Address 5665 & 5757 Plaza Dr. off Katella & Valley View

Cypress Ca. Ph#

Paid By G3 Soilworks Inc.

Address 350 Fischer Ave - Front

Costa Mesa Ca. 92626 Ph# (714) 668-5600

Please circle the respective service code(s)

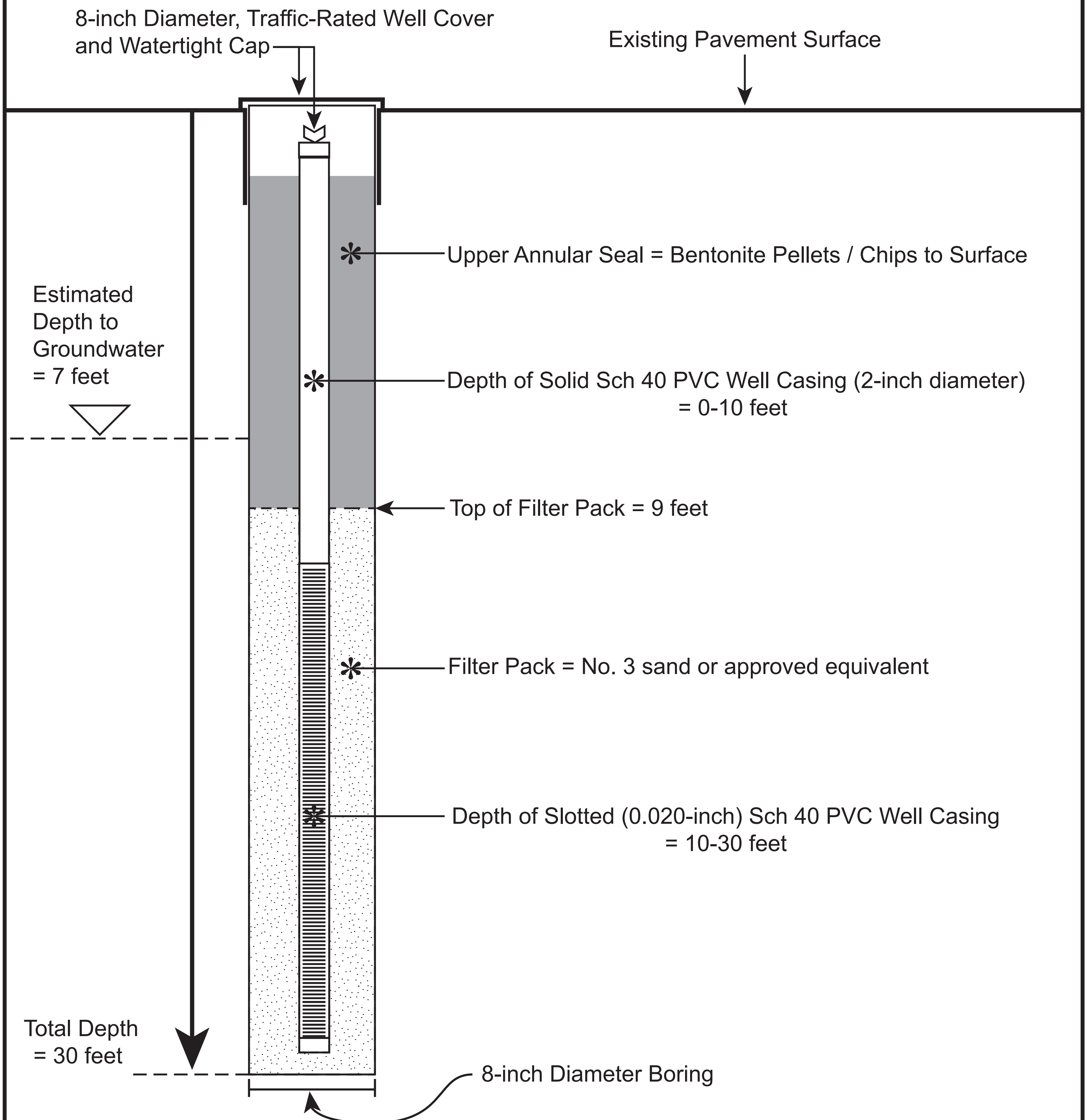
01	FPS/HSF (Acct/Bat#)	$
02	FPS Plan Check/Foods (PC#)	$
03	FPS Plan Check/Pools (PC#)	$
04	Food Vehicles Cat Decal No(s)	$
05	FPS/Court Restitution/Judgment Name Case#	$
06	Hotels/Motels (Acct/Bat#)	$
07	Massage Parlor (Acct/Bat#)	$
08	Noise	$
09	Liquid Waste Hauler	$
10	Farm Labor Camp Registration	$
11	Aboveground Petroleum Storage Act	$
12	Hazardous Waste (Acct/Bat#)	$
13	CUPA Administrative Enforcement Orders	$
14	Hazardous Waste Restitution/Judgment Name Case#	$
15	Hazardous Waste Clean-up	$
16	Medical Waste/Body Art)	$
17	UST/HSF (Acct/Bat#)	$
18	UST Plan Check (PC#)	$
19	UST State Surcharge	$
20	UST Restitution/Judgment Name Case#	$
21	Wells (Const 5 Recon Destr) Water Cath Init. Monit.) Add. Monit. #Wells Driller Consultant	$ 1009
22	Backflow/Cross Connection Client(s)	$
23	Small Water Systems	$
24	CUPA - Base Fee	$
25	CUPA - CalArp	$
26	FOG- OC Sanitation District	$
27	Tierred Permitting	$
	OTHER	$
	OTHER	$
	OTHER	$
	OTHER	$ 1009

PAID BY CHECK NO: 3901

APPENDIX G

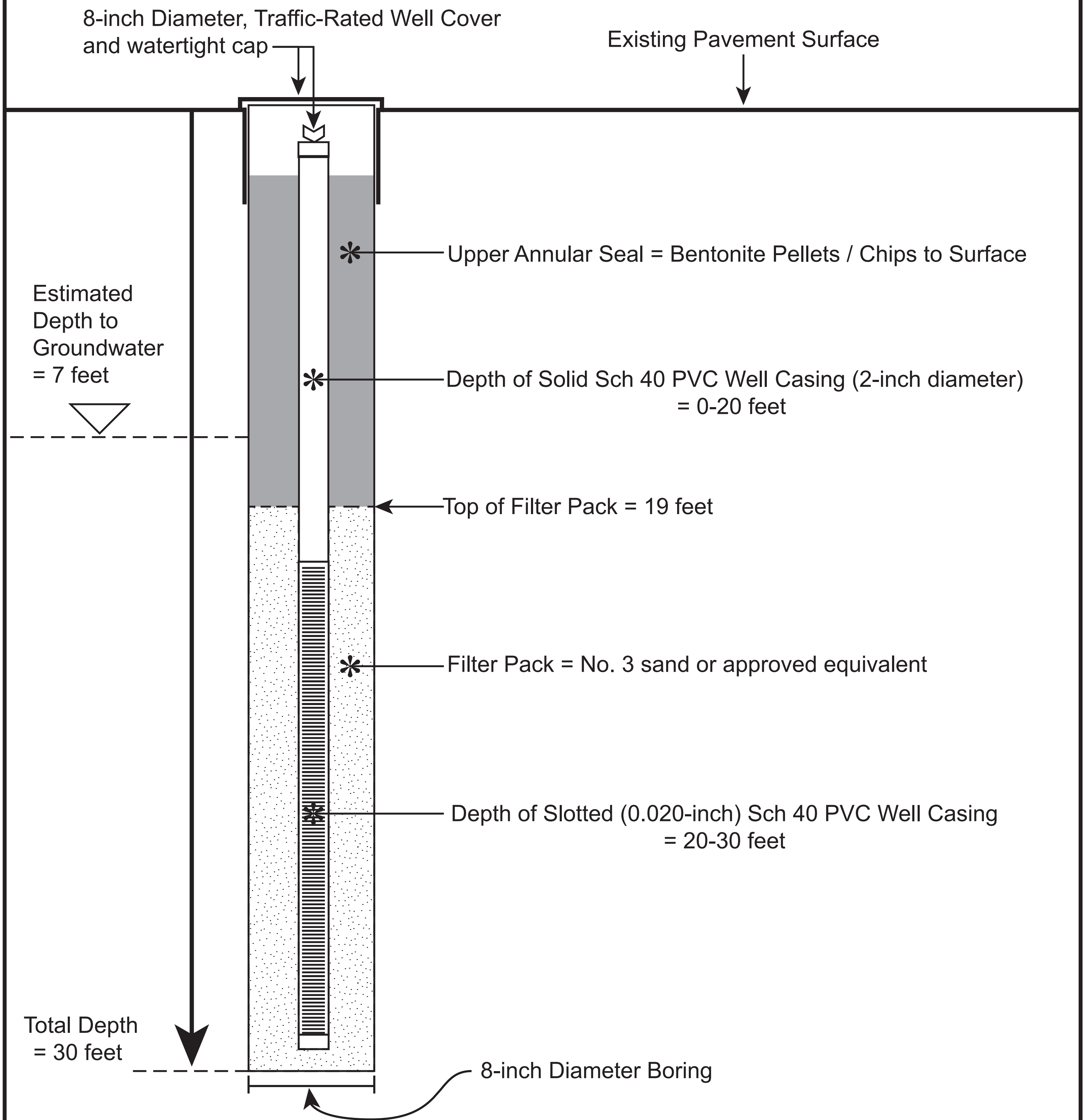
AS-BUILT WELL DIAGRAMS

Notes: - Not to scale;
- Refer to notes for depths / dimensions;
- For illustrative purposes only
- Refer to Work Plan for more information.



As-Built Well Diagram (B-1 & B-5)		Project No. 1-1209	May 2022	G3SoilWorks 350 Fischer Ave. Front Costa Mesa, CA 92626 Phone: (714) 668 5600 www.G3SoilWorks.com
5665-5757 Plaza Drive	Cypress, CA		Detail 1	

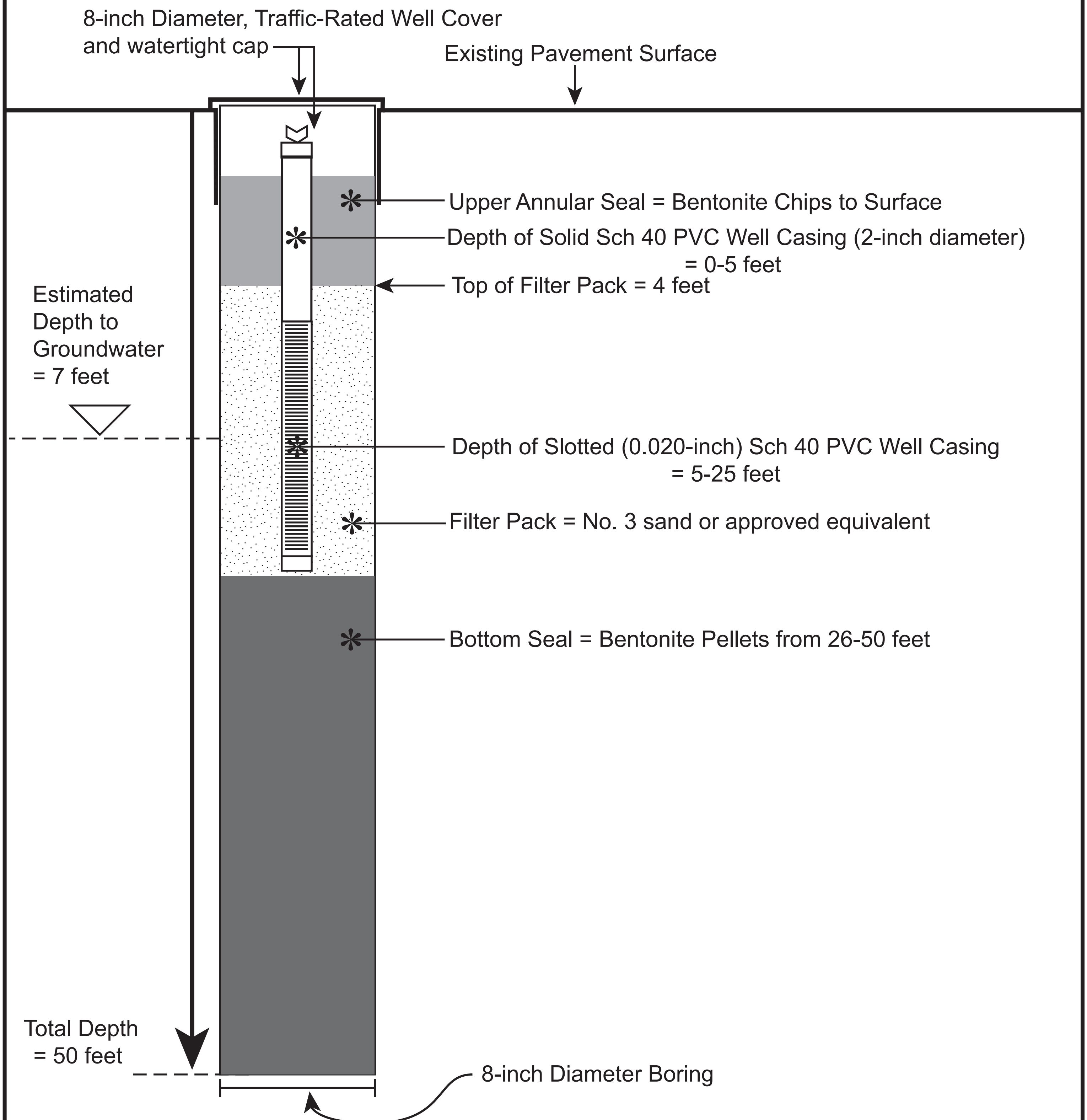
Notes: - Not to scale;
- Refer to notes for depths / dimensions;
- For illustrative purposes only
- Refer to Work Plan for more information.



As-Built Well Diagram (B-2 & B-4)		Project No. 1-1209	May 2022
5665-5757 Plaza Drive	Cypress, CA		Detail 2

G3SoilWorks
350 Fischer Ave. Front
Costa Mesa, CA 92626
Phone: (714) 668 5600
www.G3SoilWorks.com

Notes: - Not to scale;
- Refer to notes for depths / dimensions;
- For illustrative purposes only
- Refer to Work Plan for more information.



As-Built Well Diagram (B-3)		Project No. 1-1209	Apr. 2022	G3SoilWorks 350 Fischer Ave. Front Costa Mesa, CA 92626 Phone: (714) 668 5600 www.G3SoilWorks.com
5665-5757 Plaza Drive	Cypress, CA		Detail 3	

APPENDIX H

ASCE 7-16 SEISMIC DESIGN CRITERIA

Hazards by Location

Search Information

Address:	5757 Plaza Dr, Cypress, CA 90630, USA
Coordinates:	33.8054078, -118.0321031
Elevation:	35 ft
Timestamp:	2022-05-04T17:12:53.366Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D-default

Basic Parameters

Name	Value	Description
S_S	1.451	MCE_R ground motion (period=0.2s)
S_1	0.515	MCE_R ground motion (period=1.0s)
S_{MS}	1.742	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.161	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

▾Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.911	Coefficient of risk (0.2s)
CR_1	0.914	Coefficient of risk (1.0s)
PGA	0.622	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.746	Site modified peak ground acceleration

T_L	8	Long-period transition period (s)
SsRT	1.451	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.593	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.465	Factored deterministic acceleration value (0.2s)
S1RT	0.515	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.563	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.836	Factored deterministic acceleration value (1.0s)
PGAd	0.999	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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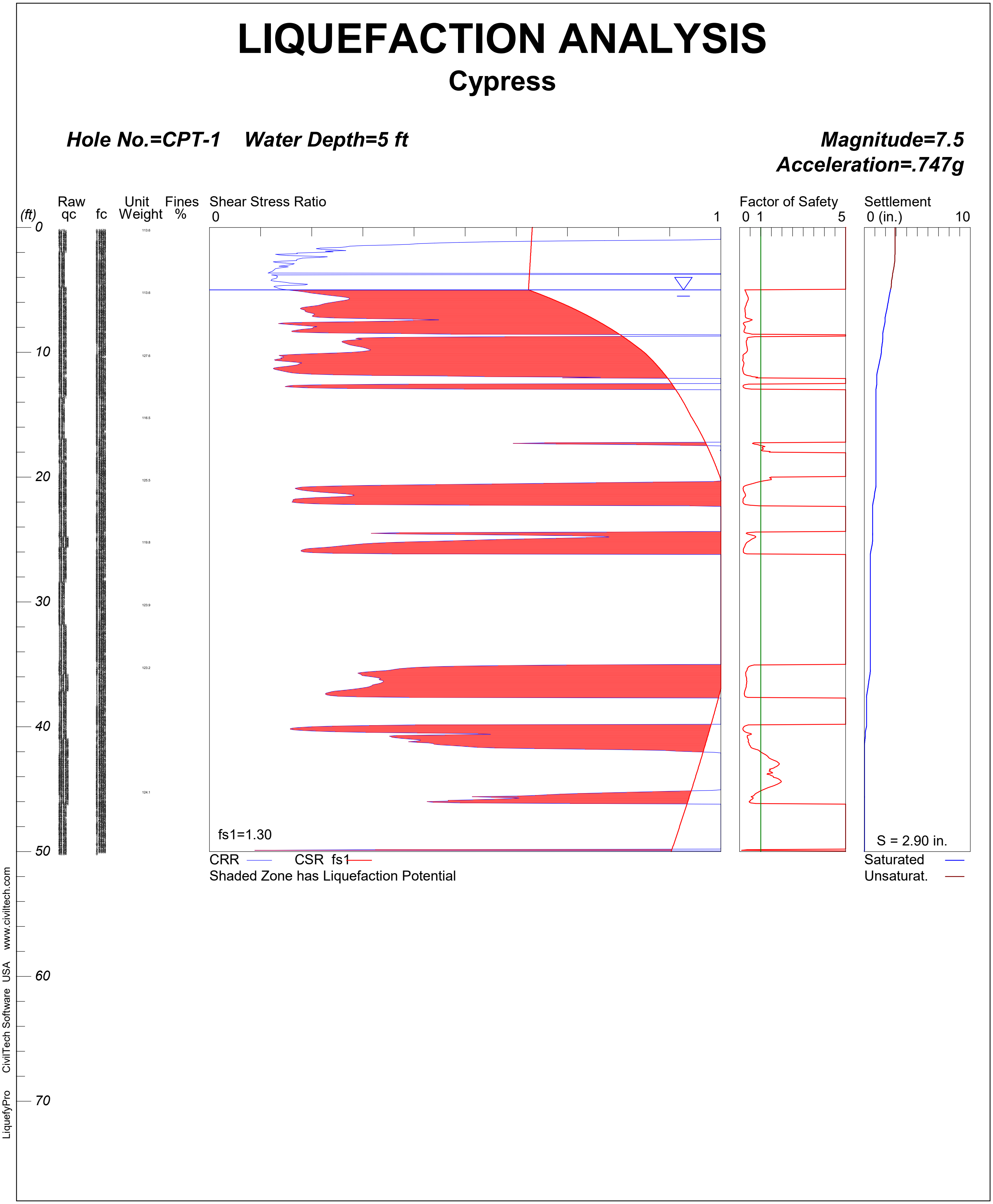
Per ASCE 7-16 section 11.4.8, a site response analysis is required for structures on Site Class F unless any of the exceptions listed in section 20.3.1 are applicable. Provided that the proposed structure has a fundamental period of vibration of equal to or less than 0.5s, the site class and corresponding values can be determined by the procedures outlined in section 11 in lieu of performing a site response analysis. The values for S_{M1}, S_{D1}, F_v, and SDC have been tabulated in accordance with ASCE 7-16 procedures and are included in the table below. The applicability of the exemption and the parameters provided below should be verified by the Structural Engineer for conformance to local laws and ordinances.

Parameter	Value	Description
S_{M1}	0.919	Site-modified spectral acceleration value
S_{D1}	0.613	Numeric seismic design value at 1.0s SA
F_v	1.785	Site amplification factor at 1.0s
SDC	D	Seismic design category

APPENDIX I

LIQUEFACTION ANALYSES


LIQUEFACTION ANALYSIS
Cypress
Hole No.=CPT-1
Water Depth=5 ft
Magnitude=7.5
Acceleration=.747g
(ft)
Raw qc
fc
Unit Weight
Fines %
Shear Stress Ratio
0
1
Factor of Safety
0 1 5
Settlement
0 (in.) 10
0
10
20
30
40
50
60
70
fs1=1.30
S = 2.90 in.
CRR
CSR fs1
Shaded Zone has Liquefaction Potential
Saturated
Unsaturat.
LiquefyPro CivilTech Software USA www.civiltech.com

****
****

LIQUEFACTION ANALYSIS SUMMARY

****
****

Font: Courier New, Regular, Size 8 is recommended for this report.
Licensed to , 5/4/2022 12:33:40 PM

Input File Name: S:\PROJECTS\1000s GEOTECH PROJECTS\1-1209 Goodman Cypress\Calcs\Liquefaction\KYCPT1.liq
Title: Cypress
Subtitle: CPT-1

Surface Elev.=
Hole No.=CPT-1
Depth of Hole= 50.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 7.00 ft
Max. Acceleration= 0.75 g
Earthquake Magnitude= 7.50

Input Data:

Surface Elev.=
Hole No.=CPT-1
Depth of Hole=50.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 7.00 ft
Max. Acceleration=0.75 g
Earthquake Magnitude=7.50
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. CPT Calculation Method: Modify Robertson*
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth	qc	fs	Rf	gamma	Fines	D50
ft	atm	atm	pcf	%	mm	

0.00	0.19	0.56	293.63	113.60	0.00	0.50
0.07	55.17	0.76	1.38	113.60	0.00	0.50
0.15	84.29	0.97	1.15	113.60	0.00	0.50
0.20	85.12	1.08	1.27	113.60	0.00	0.50
0.28	81.97	1.25	1.53	113.60	0.00	0.50
0.34	77.34	1.38	1.78	113.60	0.00	0.50
0.41	72.98	1.41	1.93	113.60	0.00	0.50
0.47	69.08	1.40	2.03	113.60	0.00	0.50
0.53	64.82	1.35	2.09	113.60	0.00	0.50
0.60	61.11	1.30	2.13	113.60	0.00	0.50
0.66	55.27	1.22	2.20	113.60	0.00	0.50
0.72	51.93	1.17	2.25	113.60	0.00	0.50
0.81	45.16	1.08	2.38	113.60	0.00	0.50
0.87	41.08	0.98	2.39	113.60	0.00	0.50
0.94	37.74	0.94	2.50	113.60	0.00	0.50
1.00	35.70	0.91	2.56	113.60	0.00	0.50
1.06	32.55	0.82	2.53	113.60	0.00	0.50
1.12	28.65	0.75	2.62	113.60	0.00	0.50
1.18	25.59	0.71	2.78	113.60	0.00	0.50
1.27	21.88	0.65	2.95	113.60	0.00	0.50
1.33	17.80	0.58	3.24	113.60	0.00	0.50
1.39	16.69	0.52	3.14	113.60	0.00	0.50
1.46	16.69	0.47	2.80	113.60	0.00	0.50
1.52	14.74	0.41	2.75	113.60	0.00	0.50
1.58	12.89	0.36	2.79	113.60	0.00	0.50
1.66	12.80	0.31	2.42	113.60	0.00	0.50
1.72	11.13	0.27	2.38	113.60	0.00	0.50
1.78	9.55	0.23	2.38	113.60	0.00	0.50
1.84	8.53	0.20	2.30	113.60	0.00	0.50
1.90	8.16	0.17	2.07	113.60	0.00	0.50
1.97	7.60	0.16	2.06	113.60	0.00	0.50
2.04	6.95	0.11	1.61	113.60	0.00	0.50
2.12	6.77	0.11	1.56	113.60	0.00	0.50
2.19	6.58	0.11	1.63	113.60	0.00	0.50
2.25	6.31	0.11	1.79	113.60	0.00	0.50
2.31	5.75	0.11	1.99	113.60	0.00	0.50
2.37	5.38	0.10	1.94	113.60	0.00	0.50
2.43	5.38	0.09	1.73	113.60	0.00	0.50
2.50	5.29	0.09	1.66	113.60	0.00	0.50
2.58	5.29	0.08	1.59	113.60	0.00	0.50
2.65	5.29	0.08	1.59	113.60	0.00	0.50
2.70	5.66	0.08	1.47	113.60	0.00	0.50
2.77	6.03	0.08	1.35	113.60	0.00	0.50
2.83	5.84	0.09	1.48	113.60	0.00	0.50
2.89	5.66	0.09	1.57	113.60	0.00	0.50
2.97	5.66	0.09	1.52	113.60	0.00	0.50
3.04	5.66	0.08	1.45	113.60	0.00	0.50
3.10	5.66	0.08	1.35	113.60	0.00	0.50
3.16	5.29	0.07	1.36	113.60	0.00	0.50
3.22	5.10	0.07	1.29	113.60	0.00	0.50

3.29	4.82	0.06	1.28	113.60	0.00	0.50
3.35	4.82	0.06	1.28	113.60	0.00	0.50
3.43	4.82	0.06	1.20	113.60	0.00	0.50
3.50	4.82	0.06	1.29	113.60	0.00	0.50
3.56	4.73	0.07	1.47	113.60	0.00	0.50
3.62	4.64	0.08	1.63	113.60	0.00	0.50
3.68	4.54	0.08	1.80	113.60	0.00	0.50
3.75	4.54	0.09	1.89	113.60	0.00	0.50
3.81	5.10	0.09	1.71	113.60	0.00	0.50
3.87	5.56	0.08	1.53	113.60	0.00	0.50
3.95	5.56	0.08	1.38	113.60	0.00	0.50
4.02	5.66	0.07	1.28	113.60	0.00	0.50
4.08	5.66	0.07	1.24	113.60	0.00	0.50
4.14	5.38	0.07	1.31	113.60	0.00	0.50
4.20	5.38	0.07	1.32	113.60	0.00	0.50
4.27	5.38	0.09	1.59	113.60	0.00	0.50
4.35	6.21	0.11	1.76	113.60	0.00	0.50
4.42	6.77	0.13	1.89	113.60	0.00	0.50
4.48	6.95	0.14	2.07	113.60	0.00	0.50
4.54	8.62	0.16	1.87	113.60	0.00	0.50
4.60	10.94	0.19	1.72	113.60	0.00	0.50
4.66	13.35	0.22	1.66	113.60	0.00	0.50
4.72	17.53	0.27	1.54	113.60	0.00	0.50
4.81	24.67	0.33	1.34	113.60	0.00	0.50
4.87	29.77	0.33	1.10	113.60	0.00	0.50
4.93	34.22	0.31	0.90	113.60	0.00	0.50
5.00	38.85	0.32	0.83	113.60	0.00	0.50
5.06	42.66	0.35	0.83	113.60	0.00	0.50
5.13	45.62	0.38	0.84	113.60	0.00	0.50
5.19	47.20	0.42	0.88	113.60	0.00	0.50
5.25	48.40	0.45	0.93	113.60	0.00	0.50
5.34	51.74	0.48	0.94	113.60	0.00	0.50
5.39	53.50	0.51	0.96	113.60	0.00	0.50
5.46	55.36	0.56	1.00	113.60	0.00	0.50
5.52	56.84	0.60	1.06	113.60	0.00	0.50
5.59	57.95	0.65	1.12	113.60	0.00	0.50
5.65	58.23	0.69	1.18	113.60	0.00	0.50
5.73	57.68	0.73	1.26	113.60	0.00	0.50
5.79	56.47	0.75	1.32	113.60	0.00	0.50
5.85	54.15	0.77	1.42	113.60	0.00	0.50
5.91	51.37	0.78	1.52	113.60	0.00	0.50
5.98	48.40	0.79	1.64	113.60	0.00	0.50
6.04	45.62	0.79	1.73	113.60	0.00	0.50
6.12	41.82	0.78	1.86	113.60	0.00	0.50
6.19	38.95	0.78	1.99	113.60	0.00	0.50
6.25	38.76	0.75	1.94	113.60	0.00	0.50
6.32	38.76	0.70	1.81	113.60	0.00	0.50
6.38	38.58	0.65	1.67	113.60	0.00	0.50
6.44	41.82	0.59	1.40	113.60	0.00	0.50
6.50	45.44	0.53	1.16	113.60	0.00	0.50

6.57	49.15	0.49	1.00	113.60	0.00	0.50
6.63	52.67	0.47	0.89	113.60	0.00	0.50
6.69	54.15	0.44	0.81	113.60	0.00	0.50
6.77	57.12	0.40	0.69	113.60	0.00	0.50
6.83	58.88	0.41	0.70	113.60	0.00	0.50
6.90	59.44	0.45	0.76	113.60	0.00	0.50
6.96	57.95	0.52	0.90	113.60	0.00	0.50
7.03	54.43	0.59	1.08	113.60	0.00	0.50
7.09	49.05	0.67	1.37	113.60	0.00	0.50
7.15	42.75	0.76	1.78	113.60	0.00	0.50
7.24	34.87	0.85	2.45	113.60	0.00	0.50
7.30	29.21	0.86	2.94	113.60	0.00	0.50
7.37	24.85	0.82	3.30	113.60	0.00	0.50
7.42	24.85	0.79	3.18	113.60	0.00	0.50
7.51	24.85	0.75	3.01	113.60	0.00	0.50
7.57	26.71	0.73	2.72	113.60	0.00	0.50
7.64	32.45	0.51	1.57	113.60	0.00	0.50
7.70	38.85	0.37	0.95	113.60	0.00	0.50
7.77	44.88	0.44	0.98	113.60	0.00	0.50
7.83	49.89	0.52	1.04	113.60	0.00	0.50
7.90	52.85	0.63	1.20	113.60	0.00	0.50
7.97	53.50	0.72	1.35	113.60	0.00	0.50
8.01	45.71	0.75	1.64	113.60	0.00	0.50
8.07	51.09	0.71	1.39	113.60	0.00	0.50
8.17	48.40	0.58	1.21	113.60	0.00	0.50
8.23	44.05	0.58	1.32	113.60	0.00	0.50
8.30	37.56	0.58	1.55	113.60	0.00	0.50
8.33	33.85	0.58	1.71	113.60	0.00	0.50
8.40	27.17	0.58	2.12	113.60	0.00	0.50
8.49	20.77	0.60	2.90	113.60	0.00	0.50
8.56	17.06	0.63	3.70	113.60	0.00	0.50
8.62	14.65	0.69	4.69	113.60	0.00	0.50
8.68	16.69	0.76	4.58	113.60	0.00	0.50
8.75	23.00	0.82	3.55	113.60	0.00	0.50
8.81	28.19	0.83	2.95	113.60	0.00	0.50
8.88	30.69	0.86	2.80	113.60	0.00	0.50
8.94	31.81	0.93	2.91	113.60	0.00	0.50
9.01	35.05	0.98	2.80	113.60	0.00	0.50
9.08	39.97	1.02	2.55	113.60	0.00	0.50
9.14	43.03	1.03	2.40	113.60	0.00	0.50
9.21	44.69	1.05	2.35	113.60	0.00	0.50
9.27	45.90	1.07	2.34	113.60	0.00	0.50
9.34	46.92	1.09	2.33	113.60	0.00	0.50
9.40	48.77	1.11	2.28	113.60	0.00	0.50
9.47	51.00	1.15	2.25	113.60	0.00	0.50
9.53	52.95	1.18	2.22	113.60	0.00	0.50
9.60	54.25	1.21	2.23	113.60	0.00	0.50
9.66	53.69	1.24	2.31	113.60	0.00	0.50
9.73	51.46	1.26	2.45	113.60	0.00	0.50
9.79	47.85	1.26	2.64	113.60	0.00	0.50

9.86	43.40	1.21	2.79	113.60	0.00	0.50
9.92	38.11	1.09	2.87	113.60	0.00	0.50
9.99	33.38	0.95	2.83	113.60	0.00	0.50
10.05	29.58	0.78	2.63	127.60	0.00	0.50
10.12	27.08	0.62	2.29	127.60	0.00	0.50
10.18	25.13	0.49	1.95	127.60	0.00	0.50
10.25	24.20	0.40	1.67	127.60	0.00	0.50
10.32	22.90	0.40	1.74	127.60	0.00	0.50
10.38	22.44	0.41	1.82	127.60	0.00	0.50
10.44	23.00	0.39	1.71	127.60	0.00	0.50
10.51	23.55	0.41	1.75	127.60	0.00	0.50
10.57	25.13	0.39	1.55	127.60	0.00	0.50
10.64	28.93	0.40	1.39	127.60	0.00	0.50
10.71	34.96	0.53	1.51	127.60	0.00	0.50
10.78	42.38	0.65	1.53	127.60	0.00	0.50
10.84	48.22	0.71	1.46	127.60	0.00	0.50
10.92	44.42	0.70	1.57	127.60	0.00	0.50
10.99	47.38	0.67	1.41	127.60	0.00	0.50
11.06	43.58	0.64	1.46	127.60	0.00	0.50
11.12	39.87	0.58	1.46	127.60	0.00	0.50
11.18	37.00	0.49	1.32	127.60	0.00	0.50
11.25	34.77	0.41	1.19	127.60	0.00	0.50
11.31	32.92	0.40	1.22	127.60	0.00	0.50
11.38	31.43	0.43	1.38	127.60	0.00	0.50
11.44	30.14	0.47	1.56	127.60	0.00	0.50
11.50	29.02	0.49	1.70	127.60	0.00	0.50
11.57	28.10	0.52	1.83	127.60	0.00	0.50
11.64	28.10	0.54	1.93	127.60	0.00	0.50
11.70	28.10	0.59	2.10	127.60	0.00	0.50
11.77	28.10	0.66	2.36	127.60	0.00	0.50
11.83	27.63	0.75	2.71	127.60	0.00	0.50
11.90	26.52	0.82	3.11	127.60	0.00	0.50
11.96	25.41	0.87	3.44	127.60	0.00	0.50
12.02	23.65	0.92	3.90	127.60	0.00	0.50
12.09	23.09	0.99	4.29	127.60	0.00	0.50
12.15	21.23	1.03	4.85	127.60	0.00	0.50
12.22	19.19	0.96	4.99	127.60	0.00	0.50
12.28	16.69	0.91	5.45	127.60	0.00	0.50
12.34	16.78	0.92	5.50	127.60	0.00	0.50
12.41	16.78	0.83	4.95	127.60	0.00	0.50
12.48	16.88	0.69	4.12	127.60	0.00	0.50
12.54	18.64	0.58	3.12	127.60	0.00	0.50
12.61	23.27	0.50	2.14	127.60	0.00	0.50
12.68	31.81	0.60	1.90	127.60	0.00	0.50
12.74	36.26	0.57	1.57	127.60	0.00	0.50
12.80	33.75	0.64	1.91	127.60	0.00	0.50
12.86	28.65	0.67	2.34	127.60	0.00	0.50
12.96	20.68	0.64	3.08	127.60	0.00	0.50
12.99	18.92	0.62	3.26	127.60	0.00	0.50
13.09	14.56	0.56	3.83	127.60	0.00	0.50

13.12	13.26	0.53	4.03	127.60	0.00	0.50
13.19	11.78	0.48	4.07	127.60	0.00	0.50
13.28	10.57	0.35	3.28	127.60	0.00	0.50
13.35	10.20	0.25	2.45	127.60	0.00	0.50
13.41	10.11	0.20	1.97	127.60	0.00	0.50
13.47	9.83	0.18	1.86	127.60	0.00	0.50
13.54	9.74	0.17	1.77	127.60	0.00	0.50
13.60	9.74	0.17	1.77	127.60	0.00	0.50
13.67	9.74	0.17	1.77	127.60	0.00	0.50
13.74	9.74	0.17	1.76	127.60	0.00	0.50
13.80	9.46	0.17	1.82	127.60	0.00	0.50
13.86	9.37	0.17	1.84	127.60	0.00	0.50
13.93	9.27	0.17	1.85	127.60	0.00	0.50
14.00	8.90	0.17	1.87	127.60	0.00	0.50
14.07	8.81	0.17	1.90	127.60	0.00	0.50
14.11	8.81	0.17	1.94	127.60	0.00	0.50
14.19	8.81	0.18	2.01	127.60	0.00	0.50
14.26	8.81	0.18	2.09	127.60	0.00	0.50
14.32	8.62	0.18	2.12	127.60	0.00	0.50
14.39	8.44	0.17	2.05	127.60	0.00	0.50
14.46	8.25	0.17	2.04	127.60	0.00	0.50
14.52	8.07	0.17	2.09	127.60	0.00	0.50
14.59	7.88	0.17	2.18	127.60	0.00	0.50
14.65	7.88	0.17	2.15	127.60	0.00	0.50
14.72	7.97	0.16	2.07	127.60	0.00	0.50
14.78	7.79	0.16	2.09	127.60	0.00	0.50
14.85	7.79	0.16	2.00	127.60	0.00	0.50
14.91	7.51	0.15	1.97	127.60	0.00	0.50
14.98	7.05	0.14	2.02	127.60	0.00	0.50
15.04	6.95	0.14	1.99	116.50	0.00	0.50
15.11	6.68	0.14	2.05	116.50	0.00	0.50
15.17	6.49	0.13	2.07	116.50	0.00	0.50
15.23	6.49	0.13	1.97	116.50	0.00	0.50
15.30	6.49	0.12	1.80	116.50	0.00	0.50
15.36	6.49	0.11	1.65	116.50	0.00	0.50
15.43	6.40	0.10	1.61	116.50	0.00	0.50
15.50	6.31	0.10	1.64	116.50	0.00	0.50
15.56	6.21	0.10	1.66	116.50	0.00	0.50
15.63	6.21	0.10	1.67	116.50	0.00	0.50
15.69	6.21	0.11	1.72	116.50	0.00	0.50
15.75	6.21	0.11	1.73	116.50	0.00	0.50
15.82	6.21	0.11	1.73	116.50	0.00	0.50
15.88	6.21	0.11	1.77	116.50	0.00	0.50
15.97	6.21	0.12	1.87	116.50	0.00	0.50
16.04	6.31	0.12	1.91	116.50	0.00	0.50
16.11	6.40	0.13	1.95	116.50	0.00	0.50
16.17	6.49	0.13	1.96	116.50	0.00	0.50
16.21	6.68	0.13	1.90	116.50	0.00	0.50
16.27	6.86	0.13	1.84	116.50	0.00	0.50
16.34	7.51	0.12	1.63	116.50	0.00	0.50

16.43	8.35	0.13	1.50	116.50	0.00	0.50
16.49	8.90	0.14	1.54	116.50	0.00	0.50
16.56	8.81	0.15	1.71	116.50	0.00	0.50
16.62	8.44	0.18	2.19	116.50	0.00	0.50
16.69	8.44	0.28	3.28	116.50	0.00	0.50
16.75	10.48	0.35	3.32	116.50	0.00	0.50
16.82	14.93	0.34	2.30	116.50	0.00	0.50
16.88	17.53	0.38	2.17	116.50	0.00	0.50
16.95	16.88	0.47	2.81	116.50	0.00	0.50
17.01	15.30	0.61	4.00	116.50	0.00	0.50
17.08	14.74	0.75	5.07	116.50	0.00	0.50
17.13	15.11	0.83	5.52	116.50	0.00	0.50
17.19	25.96	0.94	3.63	116.50	0.00	0.50
17.26	30.60	1.01	3.32	116.50	0.00	0.50
17.32	31.99	1.08	3.39	116.50	0.00	0.50
17.42	32.92	1.25	3.79	116.50	0.00	0.50
17.48	34.03	1.39	4.10	116.50	0.00	0.50
17.55	36.91	1.56	4.22	116.50	0.00	0.50
17.61	40.43	1.71	4.22	116.50	0.00	0.50
17.68	42.47	1.84	4.34	116.50	0.00	0.50
17.74	43.95	1.95	4.45	116.50	0.00	0.50
17.80	45.71	2.03	4.43	116.50	0.00	0.50
17.87	46.83	2.06	4.40	116.50	0.00	0.50
17.93	44.60	2.00	4.49	116.50	0.00	0.50
18.00	37.00	1.81	4.89	116.50	0.00	0.50
18.07	26.52	1.51	5.68	116.50	0.00	0.50
18.13	19.66	1.22	6.20	116.50	0.00	0.50
18.20	15.76	0.97	6.17	116.50	0.00	0.50
18.26	12.98	0.71	5.50	116.50	0.00	0.50
18.33	11.03	0.47	4.28	116.50	0.00	0.50
18.40	10.11	0.31	3.05	116.50	0.00	0.50
18.46	9.83	0.28	2.81	116.50	0.00	0.50
18.52	9.83	0.35	3.60	116.50	0.00	0.50
18.59	9.92	0.43	4.37	116.50	0.00	0.50
18.65	10.48	0.46	4.42	116.50	0.00	0.50
18.72	11.13	0.46	4.14	116.50	0.00	0.50
18.78	12.05	0.46	3.79	116.50	0.00	0.50
18.84	12.15	0.45	3.74	116.50	0.00	0.50
18.91	11.78	0.47	3.97	116.50	0.00	0.50
18.98	11.87	0.47	3.98	116.50	0.00	0.50
19.04	12.61	0.47	3.74	116.50	0.00	0.50
19.11	13.17	0.46	3.52	116.50	0.00	0.50
19.17	13.82	0.44	3.19	116.50	0.00	0.50
19.24	14.47	0.49	3.38	116.50	0.00	0.50
19.31	15.11	0.59	3.93	116.50	0.00	0.50
19.37	16.23	0.73	4.49	116.50	0.00	0.50
19.44	18.08	0.89	4.92	116.50	0.00	0.50
19.50	19.19	1.09	5.68	116.50	0.00	0.50
19.57	20.68	1.30	6.29	116.50	0.00	0.50
19.63	23.00	1.35	5.87	116.50	0.00	0.50

19.70	25.87	1.28	4.96	116.50	0.00	0.50
19.76	28.19	1.43	5.07	116.50	0.00	0.50
19.83	30.97	1.57	5.06	116.50	0.00	0.50
19.90	34.40	1.70	4.95	116.50	0.00	0.50
19.96	37.18	1.79	4.82	116.50	0.00	0.50
20.02	41.08	1.85	4.51	125.50	0.00	0.50
20.09	42.28	1.91	4.52	125.50	0.00	0.50
20.16	42.38	1.95	4.59	125.50	0.00	0.50
20.22	42.56	1.92	4.52	125.50	0.00	0.50
20.28	42.56	1.86	4.36	125.50	0.00	0.50
20.35	42.38	1.78	4.19	125.50	0.00	0.50
20.42	42.19	1.70	4.02	125.50	0.00	0.50
20.48	42.28	1.63	3.85	125.50	0.00	0.50
20.54	42.84	1.57	3.68	125.50	0.00	0.50
20.61	44.60	1.49	3.35	125.50	0.00	0.50
20.67	47.11	1.34	2.85	125.50	0.00	0.50
20.77	51.46	1.02	1.98	125.50	0.00	0.50
20.80	52.58	0.91	1.74	125.50	0.00	0.50
20.90	55.08	0.82	1.48	125.50	0.00	0.50
20.96	56.01	0.84	1.49	125.50	0.00	0.50
21.03	56.01	0.89	1.60	125.50	0.00	0.50
21.09	55.08	0.98	1.78	125.50	0.00	0.50
21.16	54.06	1.08	2.00	125.50	0.00	0.50
21.22	55.03	1.18	2.14	125.50	0.00	0.50
21.29	53.78	1.29	2.40	125.50	0.00	0.50
21.35	54.99	1.39	2.53	125.50	0.00	0.50
21.41	56.38	1.45	2.58	125.50	0.00	0.50
21.48	57.86	1.48	2.57	125.50	0.00	0.50
21.55	59.35	1.43	2.41	125.50	0.00	0.50
21.61	61.48	1.25	2.04	125.50	0.00	0.50
21.68	63.33	0.96	1.52	125.50	0.00	0.50
21.75	64.63	0.75	1.16	125.50	0.00	0.50
21.81	64.82	0.69	1.06	125.50	0.00	0.50
21.87	64.26	0.71	1.10	125.50	0.00	0.50
21.94	62.31	0.73	1.17	125.50	0.00	0.50
22.01	58.79	0.75	1.28	125.50	0.00	0.50
22.07	54.06	0.91	1.68	125.50	0.00	0.50
22.14	48.40	1.06	2.19	125.50	0.00	0.50
22.20	43.03	1.22	2.83	125.50	0.00	0.50
22.27	37.00	1.35	3.64	125.50	0.00	0.50
22.34	34.12	1.39	4.07	125.50	0.00	0.50
22.40	31.71	1.36	4.29	125.50	0.00	0.50
22.47	29.02	1.30	4.48	125.50	0.00	0.50
22.53	25.69	1.21	4.72	125.50	0.00	0.50
22.60	21.42	1.11	5.18	125.50	0.00	0.50
22.67	17.80	1.00	5.63	125.50	0.00	0.50
22.73	15.86	0.90	5.69	125.50	0.00	0.50
22.80	14.74	0.81	5.52	125.50	0.00	0.50
22.86	14.93	0.72	4.84	125.50	0.00	0.50
22.93	15.39	0.65	4.23	125.50	0.00	0.50

22.99	15.30	0.61	3.96	125.50	0.00	0.50
23.06	14.56	0.55	3.77	125.50	0.00	0.50
23.12	13.91	0.48	3.43	125.50	0.00	0.50
23.19	13.17	0.43	3.28	125.50	0.00	0.50
23.25	12.80	0.41	3.17	125.50	0.00	0.50
23.31	13.12	0.39	2.99	125.50	0.00	0.50
23.38	12.33	0.37	3.03	125.50	0.00	0.50
23.44	13.07	0.35	2.71	125.50	0.00	0.50
23.51	13.54	0.33	2.43	125.50	0.00	0.50
23.57	13.35	0.29	2.16	125.50	0.00	0.50
23.64	12.89	0.24	1.86	125.50	0.00	0.50
23.70	12.24	0.22	1.81	125.50	0.00	0.50
23.76	11.78	0.22	1.87	125.50	0.00	0.50
23.82	11.13	0.22	1.97	125.50	0.00	0.50
23.89	10.76	0.25	2.28	125.50	0.00	0.50
23.95	10.76	0.32	3.01	125.50	0.00	0.50
24.02	10.85	0.42	3.89	125.50	0.00	0.50
24.08	12.24	0.55	4.47	125.50	0.00	0.50
24.15	15.76	0.74	4.69	125.50	0.00	0.50
24.22	20.96	0.98	4.68	125.50	0.00	0.50
24.28	26.89	1.19	4.44	125.50	0.00	0.50
24.35	33.38	1.39	4.17	125.50	0.00	0.50
24.41	42.19	1.56	3.69	125.50	0.00	0.50
24.48	58.98	1.71	2.89	125.50	0.00	0.50
24.54	90.13	1.88	2.09	125.50	0.00	0.50
24.61	125.92	2.09	1.66	125.50	0.00	0.50
24.68	149.94	2.27	1.51	125.50	0.00	0.50
24.74	160.33	2.37	1.48	125.50	0.00	0.50
24.81	162.83	2.34	1.44	125.50	0.00	0.50
24.88	157.82	2.16	1.37	125.50	0.00	0.50
24.94	150.68	1.98	1.31	125.50	0.00	0.50
25.00	142.24	1.88	1.32	119.80	0.00	0.50
25.08	133.34	1.82	1.37	119.80	0.00	0.50
25.14	126.02	1.68	1.33	119.80	0.00	0.50
25.20	119.53	1.46	1.22	119.80	0.00	0.50
25.26	114.06	1.28	1.13	119.80	0.00	0.50
25.33	108.58	1.21	1.11	119.80	0.00	0.50
25.39	104.50	1.17	1.12	119.80	0.00	0.50
25.46	99.87	1.14	1.14	119.80	0.00	0.50
25.53	95.79	1.10	1.14	119.80	0.00	0.50
25.59	91.80	1.06	1.16	119.80	0.00	0.50
25.66	88.09	0.95	1.08	119.80	0.00	0.50
25.72	84.20	0.77	0.92	119.80	0.00	0.50
25.82	76.96	0.82	1.07	119.80	0.00	0.50
25.86	73.63	0.86	1.17	119.80	0.00	0.50
25.92	65.47	0.95	1.45	119.80	0.00	0.50
25.99	56.75	1.03	1.82	119.80	0.00	0.50
26.06	43.40	1.02	2.36	119.80	0.00	0.50
26.13	36.44	0.98	2.69	119.80	0.00	0.50
26.19	29.86	0.93	3.12	119.80	0.00	0.50

26.26	24.67	0.88	3.57	119.80	0.00	0.50
26.32	19.84	0.79	4.00	119.80	0.00	0.50
26.39	16.60	0.72	4.35	119.80	0.00	0.50
26.45	14.09	0.65	4.63	119.80	0.00	0.50
26.52	12.15	0.54	4.45	119.80	0.00	0.50
26.59	11.31	0.43	3.78	119.80	0.00	0.50
26.65	11.13	0.37	3.33	119.80	0.00	0.50
26.71	10.85	0.34	3.11	119.80	0.00	0.50
26.78	10.76	0.31	2.89	119.80	0.00	0.50
26.85	10.76	0.29	2.72	119.80	0.00	0.50
26.91	10.66	0.28	2.61	119.80	0.00	0.50
26.98	10.66	0.27	2.50	119.80	0.00	0.50
27.04	10.39	0.26	2.54	119.80	0.00	0.50
27.11	10.39	0.27	2.58	119.80	0.00	0.50
27.17	10.39	0.27	2.58	119.80	0.00	0.50
27.23	10.48	0.26	2.46	119.80	0.00	0.50
27.30	10.57	0.25	2.35	119.80	0.00	0.50
27.36	10.85	0.25	2.32	119.80	0.00	0.50
27.46	10.85	0.25	2.34	119.80	0.00	0.50
27.52	10.66	0.26	2.39	119.80	0.00	0.50
27.59	10.39	0.26	2.46	119.80	0.00	0.50
27.65	10.29	0.26	2.54	119.80	0.00	0.50
27.72	10.29	0.27	2.62	119.80	0.00	0.50
27.78	10.29	0.28	2.72	119.80	0.00	0.50
27.85	10.29	0.29	2.81	119.80	0.00	0.50
27.91	10.29	0.29	2.79	119.80	0.00	0.50
27.98	10.20	0.28	2.75	119.80	0.00	0.50
28.04	10.20	0.27	2.69	119.80	0.00	0.50
28.11	10.11	0.27	2.66	119.80	0.00	0.50
28.17	10.01	0.26	2.63	119.80	0.00	0.50
28.23	9.83	0.26	2.63	119.80	0.00	0.50
28.30	9.74	0.25	2.61	119.80	0.00	0.50
28.36	9.74	0.25	2.53	119.80	0.00	0.50
28.43	9.55	0.24	2.52	119.80	0.00	0.50
28.49	9.37	0.23	2.48	119.80	0.00	0.50
28.56	9.09	0.23	2.51	119.80	0.00	0.50
28.62	8.99	0.23	2.55	119.80	0.00	0.50
28.69	8.99	0.23	2.57	119.80	0.00	0.50
28.75	9.18	0.23	2.54	119.80	0.00	0.50
28.82	9.46	0.23	2.48	119.80	0.00	0.50
28.88	9.64	0.24	2.47	119.80	0.00	0.50
28.95	9.46	0.25	2.62	119.80	0.00	0.50
29.01	8.53	0.26	3.00	119.80	0.00	0.50
29.07	9.27	0.26	2.76	119.80	0.00	0.50
29.14	9.18	0.24	2.64	119.80	0.00	0.50
29.20	9.09	0.23	2.55	119.80	0.00	0.50
29.26	8.90	0.23	2.60	119.80	0.00	0.50
29.33	8.53	0.23	2.71	119.80	0.00	0.50
29.40	8.44	0.23	2.73	119.80	0.00	0.50
29.46	8.44	0.24	2.87	119.80	0.00	0.50

29.53	8.62	0.24	2.76	119.80	0.00	0.50
29.62	8.90	0.23	2.56	119.80	0.00	0.50
29.69	9.27	0.23	2.48	119.80	0.00	0.50
29.75	9.27	0.24	2.63	119.80	0.00	0.50
29.82	9.27	0.27	2.87	119.80	0.00	0.50
29.88	9.27	0.28	3.05	119.80	0.00	0.50
29.94	9.27	0.28	3.06	119.80	0.00	0.50
30.01	9.37	0.27	2.92	123.90	0.00	0.50
30.08	9.27	0.27	2.93	123.90	0.00	0.50
30.14	8.90	0.25	2.84	123.90	0.00	0.50
30.20	8.35	0.22	2.59	123.90	0.00	0.50
30.27	7.70	0.20	2.55	123.90	0.00	0.50
30.34	7.14	0.19	2.65	123.90	0.00	0.50
30.40	6.58	0.19	2.81	123.90	0.00	0.50
30.47	6.12	0.18	2.97	123.90	0.00	0.50
30.53	6.63	0.18	2.68	123.90	0.00	0.50
30.60	6.68	0.17	2.56	123.90	0.00	0.50
30.66	7.88	0.16	2.09	123.90	0.00	0.50
30.73	8.16	0.16	1.95	123.90	0.00	0.50
30.80	8.25	0.16	1.97	123.90	0.00	0.50
30.86	8.35	0.17	2.03	123.90	0.00	0.50
30.93	8.81	0.18	2.04	123.90	0.00	0.50
30.99	9.27	0.19	2.01	123.90	0.00	0.50
31.06	9.46	0.19	1.97	123.90	0.00	0.50
31.12	9.27	0.19	2.01	123.90	0.00	0.50
31.19	9.27	0.19	2.01	123.90	0.00	0.50
31.25	9.27	0.19	2.03	123.90	0.00	0.50
31.32	9.27	0.20	2.21	123.90	0.00	0.50
31.38	8.99	0.23	2.58	123.90	0.00	0.50
31.45	8.81	0.26	2.92	123.90	0.00	0.50
31.52	9.09	0.29	3.14	123.90	0.00	0.50
31.58	9.74	0.32	3.25	123.90	0.00	0.50
31.64	10.01	0.35	3.45	123.90	0.00	0.50
31.70	11.41	0.35	3.10	123.90	0.00	0.50
31.77	11.78	0.30	2.56	123.90	0.00	0.50
31.84	12.33	0.23	1.86	123.90	0.00	0.50
31.91	12.70	0.34	2.64	123.90	0.00	0.50
31.97	13.35	0.46	3.42	123.90	0.00	0.50
32.03	14.74	0.58	3.93	123.90	0.00	0.50
32.10	17.25	0.68	3.94	123.90	0.00	0.50
32.18	17.34	0.76	4.37	123.90	0.00	0.50
32.24	18.08	0.80	4.44	123.90	0.00	0.50
32.31	17.43	0.84	4.80	123.90	0.00	0.50
32.37	15.58	0.85	5.45	123.90	0.00	0.50
32.43	14.09	0.81	5.78	123.90	0.00	0.50
32.49	13.17	0.77	5.82	123.90	0.00	0.50
32.56	12.43	0.72	5.79	123.90	0.00	0.50
32.62	12.61	0.63	5.00	123.90	0.00	0.50
32.68	12.43	0.51	4.14	123.90	0.00	0.50
32.75	12.24	0.40	3.24	123.90	0.00	0.50

32.81	11.87	0.31	2.57	123.90	0.00	0.50
32.88	11.22	0.26	2.30	123.90	0.00	0.50
32.95	10.85	0.24	2.17	123.90	0.00	0.50
33.01	10.39	0.23	2.22	123.90	0.00	0.50
33.08	10.48	0.23	2.20	123.90	0.00	0.50
33.15	10.48	0.24	2.25	123.90	0.00	0.50
33.21	10.76	0.24	2.18	123.90	0.00	0.50
33.28	10.48	0.22	2.11	123.90	0.00	0.50
33.34	10.48	0.22	2.05	123.90	0.00	0.50
33.40	10.85	0.22	2.05	123.90	0.00	0.50
33.47	11.13	0.22	2.00	123.90	0.00	0.50
33.54	11.22	0.21	1.86	123.90	0.00	0.50
33.60	10.57	0.24	2.30	123.90	0.00	0.50
33.67	10.29	0.25	2.46	123.90	0.00	0.50
33.73	10.39	0.27	2.58	123.90	0.00	0.50
33.80	10.48	0.28	2.68	123.90	0.00	0.50
33.87	10.25	0.29	2.79	123.90	0.00	0.50
33.93	10.11	0.29	2.83	123.90	0.00	0.50
34.00	10.66	0.29	2.73	123.90	0.00	0.50
34.07	10.57	0.31	2.90	123.90	0.00	0.50
34.13	10.85	0.31	2.89	123.90	0.00	0.50
34.20	11.13	0.32	2.88	123.90	0.00	0.50
34.26	11.50	0.36	3.13	123.90	0.00	0.50
34.32	12.05	0.46	3.80	123.90	0.00	0.50
34.39	12.52	0.61	4.84	123.90	0.00	0.50
34.45	14.00	0.78	5.58	123.90	0.00	0.50
34.52	16.78	0.94	5.62	123.90	0.00	0.50
34.58	20.96	1.04	4.98	123.90	0.00	0.50
34.65	25.96	1.12	4.32	123.90	0.00	0.50
34.71	31.34	1.25	3.99	123.90	0.00	0.50
34.78	36.72	1.40	3.82	123.90	0.00	0.50
34.85	39.87	1.52	3.82	123.90	0.00	0.50
34.94	43.67	1.68	3.84	123.90	0.00	0.50
35.01	47.57	1.82	3.82	123.90	0.00	0.50
35.04	50.26	1.90	3.77	123.20	0.00	0.50
35.11	55.73	2.01	3.61	123.20	0.00	0.50
35.17	61.02	2.08	3.40	123.20	0.00	0.50
35.24	64.72	2.10	3.25	123.20	0.00	0.50
35.31	68.16	2.13	3.12	123.20	0.00	0.50
35.37	73.16	2.18	2.98	123.20	0.00	0.50
35.44	79.56	2.24	2.82	123.20	0.00	0.50
35.50	87.26	2.23	2.55	123.20	0.00	0.50
35.57	96.72	2.05	2.12	123.20	0.00	0.50
35.64	104.69	1.79	1.71	123.20	0.00	0.50
35.70	110.90	1.60	1.44	123.20	0.00	0.50
35.76	115.91	1.52	1.31	123.20	0.00	0.50
35.83	120.64	1.44	1.20	123.20	0.00	0.50
35.89	123.70	1.36	1.10	123.20	0.00	0.50
35.96	126.76	1.41	1.11	123.20	0.00	0.50
36.03	128.80	1.47	1.14	123.20	0.00	0.50

36.09	129.17	1.54	1.20	123.20	0.00	0.50
36.16	127.78	1.61	1.26	123.20	0.00	0.50
36.22	123.88	1.68	1.35	123.20	0.00	0.50
36.32	124.16	1.76	1.42	123.20	0.00	0.50
36.38	122.59	1.80	1.47	123.20	0.00	0.50
36.44	121.10	1.83	1.51	123.20	0.00	0.50
36.51	119.53	1.83	1.53	123.20	0.00	0.50
36.57	117.58	1.82	1.55	123.20	0.00	0.50
36.63	114.52	1.82	1.59	123.20	0.00	0.50
36.70	114.24	1.82	1.59	123.20	0.00	0.50
36.76	112.02	1.83	1.64	123.20	0.00	0.50
36.82	109.42	1.85	1.69	123.20	0.00	0.50
36.89	105.71	1.83	1.73	123.20	0.00	0.50
36.96	100.80	1.80	1.79	123.20	0.00	0.50
37.02	95.23	1.77	1.86	123.20	0.00	0.50
37.09	90.69	1.71	1.88	123.20	0.00	0.50
37.14	82.90	1.64	1.98	123.20	0.00	0.50
37.21	83.46	1.57	1.89	123.20	0.00	0.50
37.30	80.49	1.53	1.90	123.20	0.00	0.50
37.36	75.57	1.52	2.01	123.20	0.00	0.50
37.43	69.92	1.52	2.18	123.20	0.00	0.50
37.49	63.24	1.50	2.37	123.20	0.00	0.50
37.56	57.03	1.47	2.58	123.20	0.00	0.50
37.63	50.44	1.47	2.92	123.20	0.00	0.50
37.69	43.12	1.47	3.41	123.20	0.00	0.50
37.75	35.98	1.46	4.06	123.20	0.00	0.50
37.82	29.49	1.42	4.82	123.20	0.00	0.50
37.89	25.78	1.35	5.24	123.20	0.00	0.50
37.95	22.72	1.27	5.58	123.20	0.00	0.50
38.02	20.68	1.14	5.52	123.20	0.00	0.50
38.09	18.73	1.02	5.45	123.20	0.00	0.50
38.15	17.71	0.91	5.14	123.20	0.00	0.50
38.22	17.53	0.83	4.75	123.20	0.00	0.50
38.28	17.53	0.68	3.86	123.20	0.00	0.50
38.35	17.62	0.53	3.00	123.20	0.00	0.50
38.41	17.53	0.56	3.21	123.20	0.00	0.50
38.48	17.34	0.60	3.46	123.20	0.00	0.50
38.54	16.88	0.63	3.73	123.20	0.00	0.50
38.61	16.04	0.65	4.08	123.20	0.00	0.50
38.67	15.67	0.67	4.31	123.20	0.00	0.50
38.73	15.39	0.69	4.46	123.20	0.00	0.50
38.80	14.93	0.70	4.67	123.20	0.00	0.50
38.87	14.84	0.68	4.56	123.20	0.00	0.50
38.93	14.84	0.63	4.28	123.20	0.00	0.50
38.99	14.84	0.61	4.08	123.20	0.00	0.50
39.05	14.84	0.60	4.02	123.20	0.00	0.50
39.12	15.11	0.59	3.93	123.20	0.00	0.50
39.18	15.49	0.59	3.79	123.20	0.00	0.50
39.25	15.67	0.60	3.84	123.20	0.00	0.50
39.32	16.04	0.61	3.83	123.20	0.00	0.50

39.39	16.78	0.69	4.11	123.20	0.00	0.50
39.45	18.17	0.79	4.35	123.20	0.00	0.50
39.52	21.33	0.84	3.93	123.20	0.00	0.50
39.59	23.74	0.95	4.00	123.20	0.00	0.50
39.66	26.71	1.11	4.15	123.20	0.00	0.50
39.72	30.88	1.24	4.03	123.20	0.00	0.50
39.78	38.30	1.34	3.50	123.20	0.00	0.50
39.85	46.18	1.39	3.02	123.20	0.00	0.50
39.91	49.70	1.39	2.79	123.20	0.00	0.50
39.98	56.47	1.32	2.34	123.20	0.00	0.50
40.04	64.35	1.19	1.84	123.20	0.00	0.50
40.12	71.68	0.99	1.38	123.20	0.00	0.50
40.19	76.41	0.89	1.16	123.20	0.00	0.50
40.25	77.89	0.99	1.28	123.20	0.00	0.50
40.31	76.13	1.25	1.64	123.20	0.00	0.50
40.38	70.75	1.58	2.24	123.20	0.00	0.50
40.45	64.26	1.80	2.81	123.20	0.00	0.50
40.51	59.16	2.00	3.38	123.20	0.00	0.50
40.58	58.79	2.17	3.69	123.20	0.00	0.50
40.64	65.56	2.30	3.51	123.20	0.00	0.50
40.71	83.55	2.36	2.83	123.20	0.00	0.50
40.78	105.62	2.42	2.29	123.20	0.00	0.50
40.84	124.16	2.13	1.72	123.20	0.00	0.50
40.91	136.22	1.99	1.46	123.20	0.00	0.50
40.97	142.80	1.95	1.36	123.20	0.00	0.50
41.04	149.76	1.97	1.32	123.20	0.00	0.50
41.08	151.52	1.95	1.28	123.20	0.00	0.50
41.15	150.87	1.90	1.26	123.20	0.00	0.50
41.22	135.94	2.13	1.56	123.20	0.00	0.50
41.28	140.39	2.37	1.69	123.20	0.00	0.50
41.35	131.58	2.63	2.00	123.20	0.00	0.50
41.42	120.27	2.83	2.35	123.20	0.00	0.50
41.48	109.70	3.03	2.76	123.20	0.00	0.50
41.54	119.16	3.11	2.61	123.20	0.00	0.50
41.63	118.04	3.28	2.78	123.20	0.00	0.50
41.69	136.59	3.30	2.41	123.20	0.00	0.50
41.76	164.04	3.37	2.05	123.20	0.00	0.50
41.83	186.29	3.58	1.92	123.20	0.00	0.50
41.89	198.35	3.72	1.87	123.20	0.00	0.50
41.93	198.99	3.76	1.89	123.20	0.00	0.50
41.99	210.68	3.57	1.69	123.20	0.00	0.50
42.07	222.83	3.46	1.55	123.20	0.00	0.50
42.13	230.52	3.49	1.52	123.20	0.00	0.50
42.20	236.92	3.65	1.54	123.20	0.00	0.50
42.28	241.37	3.85	1.59	123.20	0.00	0.50
42.34	244.80	3.95	1.61	123.20	0.00	0.50
42.40	248.60	3.97	1.60	123.20	0.00	0.50
42.47	253.43	3.89	1.53	123.20	0.00	0.50
42.54	260.29	3.84	1.48	123.20	0.00	0.50
42.61	269.37	3.83	1.42	123.20	0.00	0.50

42.67	277.35	3.84	1.38	123.20	0.00	0.50
42.74	286.07	3.87	1.35	123.20	0.00	0.50
42.79	292.37	3.87	1.32	123.20	0.00	0.50
42.85	296.64	3.81	1.28	123.20	0.00	0.50
42.92	303.87	3.73	1.23	123.20	0.00	0.50
42.99	305.82	3.68	1.20	123.20	0.00	0.50
43.05	304.15	3.64	1.20	123.20	0.00	0.50
43.12	301.27	3.60	1.20	123.20	0.00	0.50
43.18	298.21	3.54	1.19	123.20	0.00	0.50
43.24	293.39	3.43	1.17	123.20	0.00	0.50
43.34	286.53	3.38	1.18	123.20	0.00	0.50
43.40	282.36	2.32	0.82	123.20	0.00	0.50
43.47	286.67	2.00	0.70	123.20	0.00	0.50
43.54	280.59	2.26	0.80	123.20	0.00	0.50
43.60	286.81	2.44	0.85	123.20	0.00	0.50
43.67	292.93	2.62	0.90	123.20	0.00	0.50
43.73	294.13	2.72	0.93	123.20	0.00	0.50
43.77	260.38	2.78	1.07	123.20	0.00	0.50
43.84	281.99	2.97	1.05	123.20	0.00	0.50
43.91	280.59	3.32	1.18	123.20	0.00	0.50
43.98	284.30	3.77	1.33	123.20	0.00	0.50
44.03	272.99	3.97	1.46	123.20	0.00	0.50
44.11	287.46	4.23	1.47	123.20	0.00	0.50
44.17	289.50	4.43	1.53	123.20	0.00	0.50
44.24	289.13	4.71	1.63	123.20	0.00	0.50
44.30	286.53	4.97	1.73	123.20	0.00	0.50
44.37	287.83	5.12	1.78	123.20	0.00	0.50
44.43	285.79	5.16	1.81	123.20	0.00	0.50
44.50	280.69	5.16	1.84	123.20	0.00	0.50
44.57	274.47	5.14	1.87	123.20	0.00	0.50
44.63	267.52	5.12	1.91	123.20	0.00	0.50
44.70	259.36	5.09	1.96	123.20	0.00	0.50
44.76	251.01	4.98	1.98	123.20	0.00	0.50
44.83	240.63	4.85	2.02	123.20	0.00	0.50
44.89	233.03	4.77	2.04	123.20	0.00	0.50
44.96	223.57	4.64	2.07	123.20	0.00	0.50
45.03	213.83	4.47	2.09	124.10	0.00	0.50
45.09	207.62	4.31	2.08	124.10	0.00	0.50
45.15	201.22	4.16	2.07	124.10	0.00	0.50
45.21	193.43	4.02	2.08	124.10	0.00	0.50
45.29	185.18	3.82	2.07	124.10	0.00	0.50
45.35	180.45	3.59	1.99	124.10	0.00	0.50
45.42	177.39	3.40	1.92	124.10	0.00	0.50
45.49	177.39	3.23	1.82	124.10	0.00	0.50
45.55	177.85	2.93	1.65	124.10	0.00	0.50
45.61	178.18	2.17	1.22	124.10	0.00	0.50
45.70	183.32	2.80	1.53	124.10	0.00	0.50
45.76	178.50	2.83	1.58	124.10	0.00	0.50
45.83	164.22	2.87	1.75	124.10	0.00	0.50
45.90	144.84	2.91	2.01	124.10	0.00	0.50

45.94	83.92	2.93	3.49	124.10	0.00	0.50
46.00	111.74	2.95	2.64	124.10	0.00	0.50
46.07	93.01	2.96	3.18	124.10	0.00	0.50
46.13	73.72	2.80	3.80	124.10	0.00	0.50
46.20	56.66	2.56	4.52	124.10	0.00	0.50
46.26	44.14	2.21	5.00	124.10	0.00	0.50
46.33	35.51	1.87	5.26	124.10	0.00	0.50
46.42	26.33	1.47	5.58	124.10	0.00	0.50
46.46	25.41	1.36	5.35	124.10	0.00	0.50
46.53	26.20	1.14	4.37	124.10	0.00	0.50
46.59	25.04	0.97	3.89	124.10	0.00	0.50
46.65	26.06	0.84	3.24	124.10	0.00	0.50
46.72	27.26	0.82	3.01	124.10	0.00	0.50
46.82	26.52	0.82	3.09	124.10	0.00	0.50
46.88	25.41	0.87	3.42	124.10	0.00	0.50
46.92	25.13	0.92	3.67	124.10	0.00	0.50
47.01	23.27	1.04	4.47	124.10	0.00	0.50
47.07	22.90	1.09	4.74	124.10	0.00	0.50
47.14	24.20	1.13	4.69	124.10	0.00	0.50
47.21	27.26	1.23	4.50	124.10	0.00	0.50
47.27	30.32	1.44	4.74	124.10	0.00	0.50
47.34	33.20	1.68	5.07	124.10	0.00	0.50
47.40	36.07	1.94	5.38	124.10	0.00	0.50
47.46	38.85	2.21	5.69	124.10	0.00	0.50
47.53	41.73	2.18	5.22	124.10	0.00	0.50
47.59	44.88	2.04	4.55	124.10	0.00	0.50
47.65	47.01	2.25	4.79	124.10	0.00	0.50
47.72	51.37	2.58	5.01	124.10	0.00	0.50
47.78	55.82	2.87	5.13	124.10	0.00	0.50
47.85	61.20	3.17	5.18	124.10	0.00	0.50
47.91	63.98	3.38	5.28	124.10	0.00	0.50
47.97	68.16	3.52	5.16	124.10	0.00	0.50
48.03	62.96	3.60	5.73	124.10	0.00	0.50
48.10	57.95	3.47	5.99	124.10	0.00	0.50
48.19	56.56	2.78	4.92	124.10	0.00	0.50
48.26	56.01	2.52	4.50	124.10	0.00	0.50
48.32	53.69	2.29	4.26	124.10	0.00	0.50
48.39	47.01	2.00	4.24	124.10	0.00	0.50
48.46	38.67	1.81	4.69	124.10	0.00	0.50
48.52	32.92	1.71	5.19	124.10	0.00	0.50
48.56	31.71	1.66	5.24	124.10	0.00	0.50
48.66	35.14	1.56	4.43	124.10	0.00	0.50
48.72	35.79	1.48	4.13	124.10	0.00	0.50
48.78	33.66	1.34	3.99	124.10	0.00	0.50
48.85	30.51	1.19	3.90	124.10	0.00	0.50
48.91	27.35	1.09	3.98	124.10	0.00	0.50
48.97	24.48	1.04	4.27	124.10	0.00	0.50
49.04	22.16	1.04	4.68	124.10	0.00	0.50
49.10	21.33	1.01	4.74	124.10	0.00	0.50
49.16	21.23	0.97	4.59	124.10	0.00	0.50

49.23	22.44	0.98	4.37	124.10	0.00	0.50
49.29	24.39	1.13	4.63	124.10	0.00	0.50
49.35	27.63	1.22	4.42	124.10	0.00	0.50
49.41	30.88	1.27	4.10	124.10	0.00	0.50
49.50	33.85	1.68	4.96	124.10	0.00	0.50
49.57	36.16	1.98	5.47	124.10	0.00	0.50
49.63	40.34	2.11	5.23	124.10	0.00	0.50
49.70	46.83	2.01	4.28	124.10	0.00	0.50
49.77	54.25	1.95	3.60	124.10	0.00	0.50
49.83	54.52	1.94	3.55	124.10	0.00	0.50
49.90	48.96	0.00	0.00	124.10	0.00	0.50
49.97	48.64	0.00	0.00	124.10	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Settlement of Saturated Sands=2.47 in.
Settlement of Unsaturated Sands=0.43 in.
Total Settlement of Saturated and Unsaturated Sands=2.90 in.
Differential Settlement=1.450 to 1.914 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.63	5.00	2.47	0.43	2.90
0.05	2.08	0.63	5.00	2.47	0.43	2.90
0.10	2.08	0.63	5.00	2.47	0.43	2.90
0.15	2.08	0.63	5.00	2.47	0.43	2.90
0.20	2.08	0.63	5.00	2.47	0.43	2.90
0.25	2.08	0.63	5.00	2.47	0.43	2.90
0.30	2.08	0.63	5.00	2.47	0.43	2.90
0.35	2.08	0.63	5.00	2.47	0.43	2.90
0.40	2.08	0.63	5.00	2.47	0.43	2.90
0.45	2.08	0.63	5.00	2.47	0.43	2.90
0.50	2.08	0.63	5.00	2.47	0.43	2.90
0.55	2.08	0.63	5.00	2.47	0.43	2.90
0.60	2.08	0.63	5.00	2.47	0.43	2.90
0.65	2.08	0.63	5.00	2.47	0.43	2.90
0.70	2.08	0.63	5.00	2.47	0.43	2.90
0.75	2.08	0.63	5.00	2.47	0.43	2.90
0.80	1.89	0.63	5.00	2.47	0.43	2.90
0.85	1.50	0.63	5.00	2.47	0.43	2.90
0.90	1.24	0.63	5.00	2.47	0.43	2.90
0.95	1.06	0.63	5.00	2.47	0.43	2.90
1.00	0.94	0.63	5.00	2.47	0.43	2.90
1.05	0.77	0.63	5.00	2.47	0.43	2.90
1.10	0.64	0.63	5.00	2.47	0.43	2.90
1.15	0.55	0.63	5.00	2.47	0.43	2.90
1.20	0.49	0.63	5.00	2.47	0.43	2.90

1.25	0.44	0.63	5.00	2.47	0.43	2.90
1.30	0.41	0.63	5.00	2.47	0.43	2.90
1.35	0.39	0.63	5.00	2.47	0.43	2.90
1.40	0.36	0.63	5.00	2.47	0.43	2.90
1.45	0.30	0.63	5.00	2.47	0.43	2.90
1.50	0.27	0.63	5.00	2.47	0.43	2.90
1.55	0.27	0.63	5.00	2.47	0.43	2.90
1.60	0.26	0.63	5.00	2.47	0.43	2.90
1.65	0.22	0.63	5.00	2.47	0.43	2.90
1.70	0.21	0.63	5.00	2.47	0.43	2.90
1.75	0.22	0.63	5.00	2.47	0.43	2.90
1.80	0.25	0.63	5.00	2.47	0.43	2.90
1.85	0.27	0.63	5.00	2.47	0.43	2.90
1.90	0.23	0.63	5.00	2.47	0.43	2.90
1.95	0.24	0.63	5.00	2.47	0.43	2.90
2.00	0.21	0.63	5.00	2.47	0.43	2.90
2.05	0.17	0.63	5.00	2.47	0.43	2.90
2.10	0.17	0.63	5.00	2.47	0.43	2.89
2.15	0.13	0.63	5.00	2.47	0.42	2.89
2.20	0.14	0.63	5.00	2.47	0.42	2.89
2.25	0.15	0.63	5.00	2.47	0.42	2.89
2.30	0.20	0.63	5.00	2.47	0.42	2.89
2.35	0.23	0.63	5.00	2.47	0.42	2.89
2.40	0.22	0.63	5.00	2.47	0.42	2.89
2.45	0.18	0.63	5.00	2.47	0.42	2.89
2.50	0.18	0.63	5.00	2.47	0.42	2.89
2.55	0.17	0.63	5.00	2.47	0.42	2.88
2.60	0.17	0.63	5.00	2.47	0.41	2.88
2.65	0.17	0.63	5.00	2.47	0.41	2.88
2.70	0.14	0.63	5.00	2.47	0.41	2.88
2.75	0.12	0.63	5.00	2.47	0.40	2.87
2.80	0.13	0.63	5.00	2.47	0.39	2.86
2.85	0.15	0.63	5.00	2.47	0.38	2.85
2.90	0.17	0.63	5.00	2.47	0.37	2.84
2.95	0.16	0.63	5.00	2.47	0.36	2.83
3.00	0.16	0.63	5.00	2.47	0.36	2.83
3.05	0.15	0.63	5.00	2.47	0.35	2.82
3.10	0.14	0.63	5.00	2.47	0.34	2.81
3.15	0.15	0.63	5.00	2.47	0.33	2.80
3.20	0.14	0.63	5.00	2.47	0.32	2.79
3.25	0.14	0.63	5.00	2.47	0.31	2.78
3.30	0.13	0.63	5.00	2.47	0.30	2.77
3.35	0.13	0.63	5.00	2.47	0.29	2.76
3.40	0.13	0.63	5.00	2.47	0.28	2.74
3.45	0.12	0.63	5.00	2.47	0.26	2.73
3.50	0.12	0.63	5.00	2.47	0.25	2.72
3.55	0.12	0.63	5.00	2.47	0.24	2.71
3.60	0.12	0.63	5.00	2.47	0.23	2.70
3.65	0.11	0.63	5.00	2.47	0.22	2.69
3.70	2.00	0.63	5.00	2.47	0.21	2.68

3.75	2.00	0.63	5.00	2.47	0.21	2.68
3.80	0.12	0.63	5.00	2.47	0.21	2.68
3.85	0.13	0.63	5.00	2.47	0.20	2.66
3.90	0.13	0.63	5.00	2.47	0.19	2.65
3.95	0.13	0.63	5.00	2.47	0.17	2.64
4.00	0.13	0.63	5.00	2.47	0.16	2.63
4.05	0.13	0.63	5.00	2.47	0.15	2.62
4.10	0.13	0.63	5.00	2.47	0.14	2.61
4.15	0.12	0.63	5.00	2.47	0.13	2.60
4.20	0.12	0.63	5.00	2.47	0.12	2.59
4.25	0.12	0.62	5.00	2.47	0.11	2.58
4.30	0.13	0.62	5.00	2.47	0.10	2.57
4.35	0.14	0.62	5.00	2.47	0.09	2.56
4.40	0.15	0.62	5.00	2.47	0.09	2.56
4.45	0.16	0.62	5.00	2.47	0.09	2.56
4.50	0.18	0.62	5.00	2.47	0.09	2.56
4.55	0.19	0.62	5.00	2.47	0.09	2.56
4.60	0.19	0.62	5.00	2.47	0.09	2.56
4.65	0.14	0.62	5.00	2.47	0.08	2.55
4.70	0.13	0.62	5.00	2.47	0.08	2.55
4.75	0.13	0.62	5.00	2.47	0.07	2.54
4.80	0.13	0.62	5.00	2.47	0.06	2.52
4.85	0.13	0.62	5.00	2.47	0.04	2.51
4.90	0.14	0.62	5.00	2.47	0.03	2.50
4.95	0.14	0.62	5.00	2.47	0.01	2.48
5.00	0.15	0.62	0.24*	2.47	0.00	2.47
5.05	0.16	0.63	0.26*	2.46	0.00	2.46
5.10	0.17	0.63	0.28*	2.44	0.00	2.44
5.15	0.18	0.63	0.29*	2.43	0.00	2.43
5.20	0.19	0.64	0.30*	2.42	0.00	2.42
5.25	0.20	0.64	0.31*	2.40	0.00	2.40
5.30	0.21	0.64	0.32*	2.39	0.00	2.39
5.35	0.22	0.65	0.34*	2.38	0.00	2.38
5.40	0.23	0.65	0.35*	2.37	0.00	2.37
5.45	0.24	0.65	0.36*	2.36	0.00	2.36
5.50	0.25	0.66	0.38*	2.35	0.00	2.35
5.55	0.26	0.66	0.39*	2.34	0.00	2.34
5.60	0.27	0.66	0.40*	2.33	0.00	2.33
5.65	0.27	0.66	0.41*	2.31	0.00	2.31
5.70	0.27	0.67	0.41*	2.30	0.00	2.30
5.75	0.27	0.67	0.41*	2.29	0.00	2.29
5.80	0.27	0.67	0.40*	2.29	0.00	2.29
5.85	0.26	0.68	0.39*	2.28	0.00	2.28
5.90	0.26	0.68	0.38*	2.27	0.00	2.27
5.95	0.25	0.68	0.36*	2.26	0.00	2.26
6.00	0.24	0.69	0.35*	2.25	0.00	2.25
6.05	0.23	0.69	0.34*	2.24	0.00	2.24
6.10	0.23	0.69	0.33*	2.23	0.00	2.23
6.15	0.22	0.69	0.32*	2.22	0.00	2.22
6.20	0.22	0.70	0.31*	2.21	0.00	2.21

6.25	0.21	0.70	0.30*	2.20	0.00	2.20
6.30	0.20	0.70	0.29*	2.18	0.00	2.18
6.35	0.19	0.70	0.27*	2.17	0.00	2.17
6.40	0.18	0.71	0.26*	2.16	0.00	2.16
6.45	0.18	0.71	0.25*	2.15	0.00	2.15
6.50	0.18	0.71	0.25*	2.14	0.00	2.14
6.55	0.18	0.71	0.25*	2.13	0.00	2.13
6.60	0.18	0.72	0.26*	2.12	0.00	2.12
6.65	0.19	0.72	0.26*	2.10	0.00	2.10
6.70	0.19	0.72	0.26*	2.09	0.00	2.09
6.75	0.19	0.72	0.26*	2.08	0.00	2.08
6.80	0.19	0.73	0.27*	2.06	0.00	2.06
6.85	0.20	0.73	0.27*	2.05	0.00	2.05
6.90	0.20	0.73	0.28*	2.04	0.00	2.04
6.95	0.21	0.73	0.28*	2.03	0.00	2.03
7.00	0.20	0.74	0.28*	2.02	0.00	2.02
7.05	0.20	0.74	0.27*	2.00	0.00	2.00
7.10	0.20	0.74	0.27*	1.99	0.00	1.99
7.15	0.20	0.74	0.27*	1.98	0.00	1.98
7.20	0.22	0.75	0.29*	1.97	0.00	1.97
7.25	0.24	0.75	0.33*	1.96	0.00	1.96
7.30	0.31	0.75	0.41*	1.95	0.00	1.95
7.35	0.40	0.75	0.53*	1.95	0.00	1.95
7.40	0.45	0.75	0.59*	1.95	0.00	1.95
7.45	0.40	0.76	0.53*	1.95	0.00	1.95
7.50	0.36	0.76	0.48*	1.95	0.00	1.95
7.55	0.28	0.76	0.37*	1.95	0.00	1.95
7.60	0.18	0.76	0.24*	1.95	0.00	1.95
7.65	0.14	0.77	0.19*	1.94	0.00	1.94
7.70	0.13	0.77	0.18*	1.93	0.00	1.93
7.75	0.15	0.77	0.19*	1.91	0.00	1.91
7.80	0.16	0.77	0.21*	1.90	0.00	1.90
7.85	0.18	0.77	0.23*	1.89	0.00	1.89
7.90	0.20	0.78	0.25*	1.87	0.00	1.87
7.95	0.21	0.78	0.27*	1.86	0.00	1.86
8.00	0.20	0.78	0.26*	1.85	0.00	1.85
8.05	0.20	0.78	0.26*	1.84	0.00	1.84
8.10	0.20	0.78	0.25*	1.83	0.00	1.83
8.15	0.18	0.79	0.23*	1.82	0.00	1.82
8.20	0.17	0.79	0.22*	1.81	0.00	1.81
8.25	0.17	0.79	0.21*	1.79	0.00	1.79
8.30	0.16	0.79	0.20*	1.78	0.00	1.78
8.35	0.16	0.79	0.20*	1.77	0.00	1.77
8.40	0.18	0.80	0.22*	1.76	0.00	1.76
8.45	0.23	0.80	0.29*	1.75	0.00	1.75
8.50	0.37	0.80	0.47*	1.74	0.00	1.74
8.55	0.47	0.80	0.59*	1.74	0.00	1.74
8.60	2.00	0.80	5.00	1.74	0.00	1.74
8.65	2.00	0.81	5.00	1.74	0.00	1.74
8.70	2.00	0.81	5.00	1.74	0.00	1.74

8.75	0.58	0.81	0.71*	1.74	0.00	1.74
8.80	0.36	0.81	0.45*	1.74	0.00	1.74
8.85	0.29	0.81	0.36*	1.74	0.00	1.74
8.90	0.29	0.81	0.35*	1.74	0.00	1.74
8.95	0.30	0.82	0.37*	1.74	0.00	1.74
9.00	0.29	0.82	0.35*	1.73	0.00	1.73
9.05	0.27	0.82	0.33*	1.73	0.00	1.73
9.10	0.26	0.82	0.32*	1.72	0.00	1.72
9.15	0.26	0.82	0.31*	1.72	0.00	1.72
9.20	0.26	0.82	0.32*	1.71	0.00	1.71
9.25	0.26	0.83	0.32*	1.70	0.00	1.70
9.30	0.27	0.83	0.32*	1.69	0.00	1.69
9.35	0.27	0.83	0.33*	1.68	0.00	1.68
9.40	0.27	0.83	0.33*	1.68	0.00	1.68
9.45	0.28	0.83	0.34*	1.67	0.00	1.67
9.50	0.29	0.83	0.34*	1.66	0.00	1.66
9.55	0.29	0.84	0.35*	1.65	0.00	1.65
9.60	0.30	0.84	0.36*	1.64	0.00	1.64
9.65	0.30	0.84	0.36*	1.64	0.00	1.64
9.70	0.31	0.84	0.37*	1.63	0.00	1.63
9.75	0.31	0.84	0.37*	1.62	0.00	1.62
9.80	0.32	0.84	0.37*	1.62	0.00	1.62
9.85	0.31	0.85	0.37*	1.61	0.00	1.61
9.90	0.31	0.85	0.36*	1.61	0.00	1.61
9.95	0.30	0.85	0.35*	1.61	0.00	1.61
10.00	0.28	0.85	0.33*	1.61	0.00	1.61
10.05	0.25	0.85	0.29*	1.60	0.00	1.60
10.10	0.21	0.85	0.25*	1.60	0.00	1.60
10.15	0.18	0.85	0.21*	1.59	0.00	1.59
10.20	0.15	0.86	0.18*	1.58	0.00	1.58
10.25	0.14	0.86	0.16*	1.56	0.00	1.56
10.30	0.14	0.86	0.16*	1.55	0.00	1.55
10.35	0.14	0.86	0.17*	1.54	0.00	1.54
10.40	0.14	0.86	0.17*	1.53	0.00	1.53
10.45	0.14	0.86	0.16*	1.52	0.00	1.52
10.50	0.14	0.86	0.16*	1.50	0.00	1.50
10.55	0.13	0.86	0.15*	1.49	0.00	1.49
10.60	0.13	0.87	0.15*	1.48	0.00	1.48
10.65	0.13	0.87	0.15*	1.47	0.00	1.47
10.70	0.14	0.87	0.16*	1.45	0.00	1.45
10.75	0.16	0.87	0.18*	1.44	0.00	1.44
10.80	0.17	0.87	0.20*	1.43	0.00	1.43
10.85	0.18	0.87	0.21*	1.41	0.00	1.41
10.90	0.18	0.87	0.20*	1.40	0.00	1.40
10.95	0.17	0.87	0.20*	1.39	0.00	1.39
11.00	0.17	0.87	0.20*	1.38	0.00	1.38
11.05	0.16	0.88	0.19*	1.37	0.00	1.37
11.10	0.16	0.88	0.18*	1.35	0.00	1.35
11.15	0.15	0.88	0.17*	1.34	0.00	1.34
11.20	0.13	0.88	0.15*	1.33	0.00	1.33

11.25	0.13	0.88	0.14*	1.32	0.00	1.32
11.30	0.12	0.88	0.14*	1.30	0.00	1.30
11.35	0.13	0.88	0.14*	1.29	0.00	1.29
11.40	0.13	0.88	0.15*	1.27	0.00	1.27
11.45	0.14	0.88	0.16*	1.26	0.00	1.26
11.50	0.14	0.88	0.16*	1.25	0.00	1.25
11.55	0.15	0.89	0.17*	1.23	0.00	1.23
11.60	0.15	0.89	0.17*	1.22	0.00	1.22
11.65	0.16	0.89	0.18*	1.21	0.00	1.21
11.70	0.18	0.89	0.20*	1.20	0.00	1.20
11.75	0.20	0.89	0.22*	1.19	0.00	1.19
11.80	0.24	0.89	0.27*	1.18	0.00	1.18
11.85	0.32	0.89	0.36*	1.17	0.00	1.17
11.90	0.47	0.89	0.52*	1.17	0.00	1.17
11.95	0.54	0.89	0.60*	1.17	0.00	1.17
12.00	0.77	0.89	0.86*	1.17	0.00	1.17
12.05	0.69	0.90	0.77*	1.17	0.00	1.17
12.10	2.00	0.90	5.00	1.17	0.00	1.17
12.15	2.00	0.90	5.00	1.17	0.00	1.17
12.20	2.00	0.90	5.00	1.17	0.00	1.17
12.25	2.00	0.90	5.00	1.17	0.00	1.17
12.30	2.00	0.90	5.00	1.17	0.00	1.17
12.35	2.00	0.90	5.00	1.17	0.00	1.17
12.40	2.00	0.90	5.00	1.17	0.00	1.17
12.45	2.00	0.90	5.00	1.17	0.00	1.17
12.50	2.00	0.90	5.00	1.17	0.00	1.17
12.55	0.39	0.90	0.43*	1.17	0.00	1.17
12.60	0.22	0.91	0.24*	1.17	0.00	1.17
12.65	0.16	0.91	0.18*	1.16	0.00	1.16
12.70	0.15	0.91	0.17*	1.15	0.00	1.15
12.75	0.15	0.91	0.16*	1.14	0.00	1.14
12.80	0.16	0.91	0.18*	1.13	0.00	1.13
12.85	0.19	0.91	0.21*	1.12	0.00	1.12
12.90	0.27	0.91	0.30*	1.11	0.00	1.11
12.95	0.50	0.91	0.55*	1.11	0.00	1.11
13.00	2.00	0.91	5.00	1.11	0.00	1.11
13.05	2.00	0.91	5.00	1.11	0.00	1.11
13.10	2.00	0.91	5.00	1.11	0.00	1.11
13.15	2.00	0.91	5.00	1.11	0.00	1.11
13.20	2.00	0.92	5.00	1.11	0.00	1.11
13.25	2.00	0.92	5.00	1.11	0.00	1.11
13.30	2.00	0.92	5.00	1.11	0.00	1.11
13.35	2.00	0.92	5.00	1.11	0.00	1.11
13.40	2.00	0.92	5.00	1.11	0.00	1.11
13.45	2.00	0.92	5.00	1.11	0.00	1.11
13.50	2.00	0.92	5.00	1.11	0.00	1.11
13.55	2.00	0.92	5.00	1.11	0.00	1.11
13.60	2.00	0.92	5.00	1.11	0.00	1.11
13.65	2.00	0.92	5.00	1.11	0.00	1.11
13.70	2.00	0.92	5.00	1.11	0.00	1.11

13.75	2.00	0.92	5.00	1.11	0.00	1.11
13.80	2.00	0.92	5.00	1.11	0.00	1.11
13.85	2.00	0.92	5.00	1.11	0.00	1.11
13.90	2.00	0.93	5.00	1.11	0.00	1.11
13.95	2.00	0.93	5.00	1.11	0.00	1.11
14.00	2.00	0.93	5.00	1.11	0.00	1.11
14.05	2.00	0.93	5.00	1.11	0.00	1.11
14.10	2.00	0.93	5.00	1.11	0.00	1.11
14.15	2.00	0.93	5.00	1.11	0.00	1.11
14.20	2.00	0.93	5.00	1.11	0.00	1.11
14.25	2.00	0.93	5.00	1.11	0.00	1.11
14.30	2.00	0.93	5.00	1.11	0.00	1.11
14.35	2.00	0.93	5.00	1.11	0.00	1.11
14.40	2.00	0.93	5.00	1.11	0.00	1.11
14.45	2.00	0.93	5.00	1.11	0.00	1.11
14.50	2.00	0.93	5.00	1.11	0.00	1.11
14.55	2.00	0.93	5.00	1.11	0.00	1.11
14.60	2.00	0.93	5.00	1.11	0.00	1.11
14.65	2.00	0.94	5.00	1.11	0.00	1.11
14.70	2.00	0.94	5.00	1.11	0.00	1.11
14.75	2.00	0.94	5.00	1.11	0.00	1.11
14.80	2.00	0.94	5.00	1.11	0.00	1.11
14.85	2.00	0.94	5.00	1.11	0.00	1.11
14.90	2.00	0.94	5.00	1.11	0.00	1.11
14.95	2.00	0.94	5.00	1.11	0.00	1.11
15.00	2.00	0.94	5.00	1.11	0.00	1.11
15.05	2.00	0.94	5.00	1.11	0.00	1.11
15.10	2.00	0.94	5.00	1.11	0.00	1.11
15.15	2.00	0.94	5.00	1.11	0.00	1.11
15.20	2.00	0.94	5.00	1.11	0.00	1.11
15.25	2.00	0.94	5.00	1.11	0.00	1.11
15.30	2.00	0.94	5.00	1.11	0.00	1.11
15.35	2.00	0.94	5.00	1.11	0.00	1.11
15.40	2.00	0.95	5.00	1.11	0.00	1.11
15.45	2.00	0.95	5.00	1.11	0.00	1.11
15.50	2.00	0.95	5.00	1.11	0.00	1.11
15.55	2.00	0.95	5.00	1.11	0.00	1.11
15.60	2.00	0.95	5.00	1.11	0.00	1.11
15.65	2.00	0.95	5.00	1.11	0.00	1.11
15.70	2.00	0.95	5.00	1.11	0.00	1.11
15.75	2.00	0.95	5.00	1.11	0.00	1.11
15.80	2.00	0.95	5.00	1.11	0.00	1.11
15.85	2.00	0.95	5.00	1.11	0.00	1.11
15.90	2.00	0.95	5.00	1.11	0.00	1.11
15.95	2.00	0.95	5.00	1.11	0.00	1.11
16.00	2.00	0.95	5.00	1.11	0.00	1.11
16.05	2.00	0.95	5.00	1.11	0.00	1.11
16.10	2.00	0.96	5.00	1.11	0.00	1.11
16.15	2.00	0.96	5.00	1.11	0.00	1.11
16.20	2.00	0.96	5.00	1.11	0.00	1.11

16.25	2.00	0.96	5.00	1.11	0.00	1.11
16.30	2.00	0.96	5.00	1.11	0.00	1.11
16.35	2.00	0.96	5.00	1.11	0.00	1.11
16.40	2.00	0.96	5.00	1.11	0.00	1.11
16.45	2.00	0.96	5.00	1.11	0.00	1.11
16.50	2.00	0.96	5.00	1.11	0.00	1.11
16.55	2.00	0.96	5.00	1.11	0.00	1.11
16.60	2.00	0.96	5.00	1.11	0.00	1.11
16.65	2.00	0.96	5.00	1.11	0.00	1.11
16.70	2.00	0.96	5.00	1.11	0.00	1.11
16.75	2.00	0.96	5.00	1.11	0.00	1.11
16.80	2.00	0.96	5.00	1.11	0.00	1.11
16.85	2.00	0.97	5.00	1.11	0.00	1.11
16.90	2.00	0.97	5.00	1.11	0.00	1.11
16.95	2.00	0.97	5.00	1.11	0.00	1.11
17.00	2.00	0.97	5.00	1.11	0.00	1.11
17.05	2.00	0.97	5.00	1.11	0.00	1.11
17.10	2.00	0.97	5.00	1.11	0.00	1.11
17.15	2.00	0.97	5.00	1.11	0.00	1.11
17.20	2.00	0.97	5.00	1.11	0.00	1.11
17.25	0.66	0.97	0.68*	1.11	0.00	1.11
17.30	0.59	0.97	0.61*	1.11	0.00	1.11
17.35	0.68	0.97	0.70*	1.11	0.00	1.11
17.40	0.84	0.97	0.86*	1.11	0.00	1.11
17.45	0.92	0.97	0.95*	1.11	0.00	1.11
17.50	1.06	0.97	1.09	1.11	0.00	1.11
17.55	1.16	0.97	1.19	1.11	0.00	1.11
17.60	1.05	0.97	1.07	1.11	0.00	1.11
17.65	1.03	0.97	1.06	1.11	0.00	1.11
17.70	1.07	0.98	1.10	1.11	0.00	1.11
17.75	1.10	0.98	1.13	1.11	0.00	1.11
17.80	1.04	0.98	1.07	1.11	0.00	1.11
17.85	1.00	0.98	1.02	1.11	0.00	1.11
17.90	1.06	0.98	1.08	1.11	0.00	1.11
17.95	1.40	0.98	1.44	1.11	0.00	1.11
18.00	1.37	0.98	1.40	1.11	0.00	1.11
18.05	2.00	0.98	5.00	1.11	0.00	1.11
18.10	2.00	0.98	5.00	1.11	0.00	1.11
18.15	2.00	0.98	5.00	1.11	0.00	1.11
18.20	2.00	0.98	5.00	1.11	0.00	1.11
18.25	2.00	0.98	5.00	1.11	0.00	1.11
18.30	2.00	0.98	5.00	1.11	0.00	1.11
18.35	2.00	0.98	5.00	1.11	0.00	1.11
18.40	2.00	0.98	5.00	1.11	0.00	1.11
18.45	2.00	0.98	5.00	1.11	0.00	1.11
18.50	2.00	0.98	5.00	1.11	0.00	1.11
18.55	2.00	0.98	5.00	1.11	0.00	1.11
18.60	2.00	0.98	5.00	1.11	0.00	1.11
18.65	2.00	0.99	5.00	1.11	0.00	1.11
18.70	2.00	0.99	5.00	1.11	0.00	1.11

18.75	2.00	0.99	5.00	1.11	0.00	1.11
18.80	2.00	0.99	5.00	1.11	0.00	1.11
18.85	2.00	0.99	5.00	1.11	0.00	1.11
18.90	2.00	0.99	5.00	1.11	0.00	1.11
18.95	2.00	0.99	5.00	1.11	0.00	1.11
19.00	2.00	0.99	5.00	1.11	0.00	1.11
19.05	2.00	0.99	5.00	1.11	0.00	1.11
19.10	2.00	0.99	5.00	1.11	0.00	1.11
19.15	2.00	0.99	5.00	1.11	0.00	1.11
19.20	2.00	0.99	5.00	1.11	0.00	1.11
19.25	2.00	0.99	5.00	1.11	0.00	1.11
19.30	2.00	0.99	5.00	1.11	0.00	1.11
19.35	2.00	0.99	5.00	1.11	0.00	1.11
19.40	2.00	0.99	5.00	1.11	0.00	1.11
19.45	2.00	0.99	5.00	1.11	0.00	1.11
19.50	2.00	0.99	5.00	1.11	0.00	1.11
19.55	2.00	0.99	5.00	1.11	0.00	1.11
19.60	2.00	0.99	5.00	1.11	0.00	1.11
19.65	2.00	1.00	5.00	1.11	0.00	1.11
19.70	2.00	1.00	5.00	1.11	0.00	1.11
19.75	2.00	1.00	5.00	1.11	0.00	1.11
19.80	2.00	1.00	5.00	1.11	0.00	1.11
19.85	2.00	1.00	5.00	1.11	0.00	1.11
19.90	2.00	1.00	5.00	1.11	0.00	1.11
19.95	2.00	1.00	5.00	1.11	0.00	1.11
20.00	1.48	1.00	1.49	1.11	0.00	1.11
20.05	1.41	1.00	1.42	1.11	0.00	1.11
20.10	1.49	1.00	1.49	1.11	0.00	1.11
20.15	1.48	1.00	1.49	1.11	0.00	1.11
20.20	1.50	1.00	1.50	1.11	0.00	1.11
20.25	1.32	1.00	1.32	1.11	0.00	1.11
20.30	1.14	1.00	1.14	1.11	0.00	1.11
20.35	0.99	1.00	0.99*	1.11	0.00	1.11
20.40	0.87	1.00	0.87*	1.11	0.00	1.11
20.45	0.76	1.00	0.76*	1.11	0.00	1.11
20.50	0.65	1.00	0.65*	1.11	0.00	1.11
20.55	0.55	1.00	0.55*	1.11	0.00	1.11
20.60	0.44	1.00	0.44*	1.11	0.00	1.11
20.65	0.34	1.00	0.33*	1.11	0.00	1.11
20.70	0.26	1.00	0.26*	1.11	0.00	1.11
20.75	0.21	1.00	0.21*	1.10	0.00	1.10
20.80	0.18	1.00	0.18*	1.09	0.00	1.09
20.85	0.17	1.00	0.17*	1.08	0.00	1.08
20.90	0.17	1.00	0.17*	1.07	0.00	1.07
20.95	0.17	1.00	0.17*	1.05	0.00	1.05
21.00	0.17	1.00	0.17*	1.04	0.00	1.04
21.05	0.18	1.00	0.18*	1.03	0.00	1.03
21.10	0.19	1.00	0.19*	1.02	0.00	1.02
21.15	0.20	1.01	0.20*	1.01	0.00	1.01
21.20	0.22	1.01	0.22*	1.00	0.00	1.00

21.25	0.23	1.01	0.23*	0.99	0.00	0.99
21.30	0.25	1.01	0.25*	0.98	0.00	0.98
21.35	0.27	1.01	0.27*	0.97	0.00	0.97
21.40	0.28	1.01	0.28*	0.96	0.00	0.96
21.45	0.28	1.01	0.28*	0.96	0.00	0.96
21.50	0.28	1.01	0.28*	0.95	0.00	0.95
21.55	0.27	1.01	0.26*	0.94	0.00	0.94
21.60	0.24	1.01	0.24*	0.94	0.00	0.94
21.65	0.21	1.01	0.20*	0.93	0.00	0.93
21.70	0.18	1.01	0.18*	0.92	0.00	0.92
21.75	0.17	1.01	0.17*	0.90	0.00	0.90
21.80	0.16	1.01	0.16*	0.89	0.00	0.89
21.85	0.16	1.01	0.16*	0.88	0.00	0.88
21.90	0.16	1.01	0.16*	0.87	0.00	0.87
21.95	0.16	1.01	0.16*	0.85	0.00	0.85
22.00	0.16	1.01	0.16*	0.84	0.00	0.84
22.05	0.17	1.01	0.17*	0.83	0.00	0.83
22.10	0.19	1.01	0.18*	0.82	0.00	0.82
22.15	0.22	1.01	0.21*	0.80	0.00	0.80
22.20	0.29	1.01	0.28*	0.80	0.00	0.80
22.25	0.51	1.01	0.50*	0.79	0.00	0.79
22.30	0.94	1.01	0.93*	0.79	0.00	0.79
22.35	2.00	1.01	5.00	0.79	0.00	0.79
22.40	2.00	1.01	5.00	0.79	0.00	0.79
22.45	2.00	1.01	5.00	0.79	0.00	0.79
22.50	2.00	1.01	5.00	0.79	0.00	0.79
22.55	2.00	1.01	5.00	0.79	0.00	0.79
22.60	2.00	1.01	5.00	0.79	0.00	0.79
22.65	2.00	1.01	5.00	0.79	0.00	0.79
22.70	2.00	1.01	5.00	0.79	0.00	0.79
22.75	2.00	1.01	5.00	0.79	0.00	0.79
22.80	2.00	1.01	5.00	0.79	0.00	0.79
22.85	2.00	1.01	5.00	0.79	0.00	0.79
22.90	2.00	1.01	5.00	0.79	0.00	0.79
22.95	2.00	1.01	5.00	0.79	0.00	0.79
23.00	2.00	1.01	5.00	0.79	0.00	0.79
23.05	2.00	1.01	5.00	0.79	0.00	0.79
23.10	2.00	1.01	5.00	0.79	0.00	0.79
23.15	2.00	1.01	5.00	0.79	0.00	0.79
23.20	2.00	1.02	5.00	0.79	0.00	0.79
23.25	2.00	1.02	5.00	0.79	0.00	0.79
23.30	2.00	1.02	5.00	0.79	0.00	0.79
23.35	2.00	1.02	5.00	0.79	0.00	0.79
23.40	2.00	1.02	5.00	0.79	0.00	0.79
23.45	2.00	1.02	5.00	0.79	0.00	0.79
23.50	2.00	1.02	5.00	0.79	0.00	0.79
23.55	2.00	1.02	5.00	0.79	0.00	0.79
23.60	2.00	1.02	5.00	0.79	0.00	0.79
23.65	2.00	1.02	5.00	0.79	0.00	0.79
23.70	2.00	1.02	5.00	0.79	0.00	0.79

23.75	2.00	1.02	5.00	0.79	0.00	0.79
23.80	2.00	1.02	5.00	0.79	0.00	0.79
23.85	2.00	1.02	5.00	0.79	0.00	0.79
23.90	2.00	1.02	5.00	0.79	0.00	0.79
23.95	2.00	1.02	5.00	0.79	0.00	0.79
24.00	2.00	1.02	5.00	0.79	0.00	0.79
24.05	2.00	1.02	5.00	0.79	0.00	0.79
24.10	2.00	1.02	5.00	0.79	0.00	0.79
24.15	2.00	1.02	5.00	0.79	0.00	0.79
24.20	2.00	1.02	5.00	0.79	0.00	0.79
24.25	2.00	1.02	5.00	0.79	0.00	0.79
24.30	2.00	1.02	5.00	0.79	0.00	0.79
24.35	2.00	1.02	5.00	0.79	0.00	0.79
24.40	0.78	1.02	0.76*	0.79	0.00	0.79
24.45	0.37	1.02	0.36*	0.79	0.00	0.79
24.50	0.32	1.02	0.31*	0.79	0.00	0.79
24.55	0.37	1.02	0.36*	0.79	0.00	0.79
24.60	0.48	1.02	0.47*	0.78	0.00	0.78
24.65	0.61	1.02	0.59*	0.78	0.00	0.78
24.70	0.71	1.02	0.70*	0.78	0.00	0.78
24.75	0.77	1.02	0.76*	0.78	0.00	0.78
24.80	0.78	1.02	0.77*	0.78	0.00	0.78
24.85	0.74	1.02	0.72*	0.78	0.00	0.78
24.90	0.68	1.02	0.66*	0.78	0.00	0.78
24.95	0.62	1.02	0.60*	0.78	0.00	0.78
25.00	0.56	1.02	0.55*	0.78	0.00	0.78
25.05	0.52	1.02	0.51*	0.78	0.00	0.78
25.10	0.48	1.02	0.47*	0.78	0.00	0.78
25.15	0.43	1.02	0.42*	0.78	0.00	0.78
25.20	0.38	1.02	0.37*	0.77	0.00	0.77
25.25	0.35	1.02	0.34*	0.76	0.00	0.76
25.30	0.32	1.02	0.31*	0.76	0.00	0.76
25.35	0.30	1.02	0.29*	0.75	0.00	0.75
25.40	0.29	1.02	0.28*	0.74	0.00	0.74
25.45	0.27	1.02	0.27*	0.73	0.00	0.73
25.50	0.26	1.02	0.25*	0.72	0.00	0.72
25.55	0.25	1.02	0.24*	0.71	0.00	0.71
25.60	0.24	1.02	0.23*	0.70	0.00	0.70
25.65	0.22	1.02	0.21*	0.68	0.00	0.68
25.70	0.20	1.03	0.20*	0.67	0.00	0.67
25.75	0.19	1.03	0.18*	0.66	0.00	0.66
25.80	0.18	1.03	0.18*	0.65	0.00	0.65
25.85	0.18	1.03	0.18*	0.64	0.00	0.64
25.90	0.18	1.03	0.17*	0.62	0.00	0.62
25.95	0.18	1.03	0.18*	0.61	0.00	0.61
26.00	0.19	1.03	0.18*	0.60	0.00	0.60
26.05	0.20	1.03	0.20*	0.59	0.00	0.59
26.10	0.24	1.03	0.23*	0.58	0.00	0.58
26.15	0.36	1.03	0.35*	0.57	0.00	0.57
26.20	2.00	1.03	5.00	0.57	0.00	0.57

26.25	2.00	1.03	5.00	0.57	0.00	0.57
26.30	2.00	1.03	5.00	0.57	0.00	0.57
26.35	2.00	1.03	5.00	0.57	0.00	0.57
26.40	2.00	1.03	5.00	0.57	0.00	0.57
26.45	2.00	1.03	5.00	0.57	0.00	0.57
26.50	2.00	1.03	5.00	0.57	0.00	0.57
26.55	2.00	1.03	5.00	0.57	0.00	0.57
26.60	2.00	1.03	5.00	0.57	0.00	0.57
26.65	2.00	1.03	5.00	0.57	0.00	0.57
26.70	2.00	1.03	5.00	0.57	0.00	0.57
26.75	2.00	1.03	5.00	0.57	0.00	0.57
26.80	2.00	1.03	5.00	0.57	0.00	0.57
26.85	2.00	1.03	5.00	0.57	0.00	0.57
26.90	2.00	1.03	5.00	0.57	0.00	0.57
26.95	2.00	1.03	5.00	0.57	0.00	0.57
27.00	2.00	1.03	5.00	0.57	0.00	0.57
27.05	2.00	1.03	5.00	0.57	0.00	0.57
27.10	2.00	1.03	5.00	0.57	0.00	0.57
27.15	2.00	1.03	5.00	0.57	0.00	0.57
27.20	2.00	1.03	5.00	0.57	0.00	0.57
27.25	2.00	1.03	5.00	0.57	0.00	0.57
27.30	2.00	1.03	5.00	0.57	0.00	0.57
27.35	2.00	1.03	5.00	0.57	0.00	0.57
27.40	2.00	1.03	5.00	0.57	0.00	0.57
27.45	2.00	1.03	5.00	0.57	0.00	0.57
27.50	2.00	1.03	5.00	0.57	0.00	0.57
27.55	2.00	1.03	5.00	0.57	0.00	0.57
27.60	2.00	1.03	5.00	0.57	0.00	0.57
27.65	2.00	1.03	5.00	0.57	0.00	0.57
27.70	2.00	1.03	5.00	0.57	0.00	0.57
27.75	2.00	1.03	5.00	0.57	0.00	0.57
27.80	2.00	1.03	5.00	0.57	0.00	0.57
27.85	2.00	1.03	5.00	0.57	0.00	0.57
27.90	2.00	1.03	5.00	0.57	0.00	0.57
27.95	2.00	1.03	5.00	0.57	0.00	0.57
28.00	2.00	1.03	5.00	0.57	0.00	0.57
28.05	2.00	1.03	5.00	0.57	0.00	0.57
28.10	2.00	1.03	5.00	0.57	0.00	0.57
28.15	2.00	1.03	5.00	0.57	0.00	0.57
28.20	2.00	1.03	5.00	0.57	0.00	0.57
28.25	2.00	1.03	5.00	0.57	0.00	0.57
28.30	2.00	1.03	5.00	0.57	0.00	0.57
28.35	2.00	1.04	5.00	0.57	0.00	0.57
28.40	2.00	1.04	5.00	0.57	0.00	0.57
28.45	2.00	1.04	5.00	0.57	0.00	0.57
28.50	2.00	1.04	5.00	0.57	0.00	0.57
28.55	2.00	1.04	5.00	0.57	0.00	0.57
28.60	2.00	1.04	5.00	0.57	0.00	0.57
28.65	2.00	1.04	5.00	0.57	0.00	0.57
28.70	2.00	1.04	5.00	0.57	0.00	0.57

28.75	2.00	1.04	5.00	0.57	0.00	0.57
28.80	2.00	1.04	5.00	0.57	0.00	0.57
28.85	2.00	1.04	5.00	0.57	0.00	0.57
28.90	2.00	1.04	5.00	0.57	0.00	0.57
28.95	2.00	1.04	5.00	0.57	0.00	0.57
29.00	2.00	1.04	5.00	0.57	0.00	0.57
29.05	2.00	1.04	5.00	0.57	0.00	0.57
29.10	2.00	1.04	5.00	0.57	0.00	0.57
29.15	2.00	1.04	5.00	0.57	0.00	0.57
29.20	2.00	1.04	5.00	0.57	0.00	0.57
29.25	2.00	1.04	5.00	0.57	0.00	0.57
29.30	2.00	1.04	5.00	0.57	0.00	0.57
29.35	2.00	1.04	5.00	0.57	0.00	0.57
29.40	2.00	1.04	5.00	0.57	0.00	0.57
29.45	2.00	1.04	5.00	0.57	0.00	0.57
29.50	2.00	1.04	5.00	0.57	0.00	0.57
29.55	2.00	1.04	5.00	0.57	0.00	0.57
29.60	2.00	1.04	5.00	0.57	0.00	0.57
29.65	2.00	1.04	5.00	0.57	0.00	0.57
29.70	2.00	1.04	5.00	0.57	0.00	0.57
29.75	2.00	1.04	5.00	0.57	0.00	0.57
29.80	2.00	1.04	5.00	0.57	0.00	0.57
29.85	2.00	1.04	5.00	0.57	0.00	0.57
29.90	2.00	1.04	5.00	0.57	0.00	0.57
29.95	2.00	1.04	5.00	0.57	0.00	0.57
30.00	2.00	1.04	5.00	0.57	0.00	0.57
30.05	2.00	1.04	5.00	0.57	0.00	0.57
30.10	2.00	1.04	5.00	0.57	0.00	0.57
30.15	2.00	1.04	5.00	0.57	0.00	0.57
30.20	2.00	1.04	5.00	0.57	0.00	0.57
30.25	2.00	1.04	5.00	0.57	0.00	0.57
30.30	2.00	1.04	5.00	0.57	0.00	0.57
30.35	2.00	1.04	5.00	0.57	0.00	0.57
30.40	2.00	1.04	5.00	0.57	0.00	0.57
30.45	2.00	1.04	5.00	0.57	0.00	0.57
30.50	2.00	1.04	5.00	0.57	0.00	0.57
30.55	2.00	1.04	5.00	0.57	0.00	0.57
30.60	2.00	1.04	5.00	0.57	0.00	0.57
30.65	2.00	1.04	5.00	0.57	0.00	0.57
30.70	2.00	1.04	5.00	0.57	0.00	0.57
30.75	2.00	1.04	5.00	0.57	0.00	0.57
30.80	2.00	1.04	5.00	0.57	0.00	0.57
30.85	2.00	1.04	5.00	0.57	0.00	0.57
30.90	2.00	1.04	5.00	0.57	0.00	0.57
30.95	2.00	1.03	5.00	0.57	0.00	0.57
31.00	2.00	1.03	5.00	0.57	0.00	0.57
31.05	2.00	1.03	5.00	0.57	0.00	0.57
31.10	2.00	1.03	5.00	0.57	0.00	0.57
31.15	2.00	1.03	5.00	0.57	0.00	0.57
31.20	2.00	1.03	5.00	0.57	0.00	0.57

31.25	2.00	1.03	5.00	0.57	0.00	0.57
31.30	2.00	1.03	5.00	0.57	0.00	0.57
31.35	2.00	1.03	5.00	0.57	0.00	0.57
31.40	2.00	1.03	5.00	0.57	0.00	0.57
31.45	2.00	1.03	5.00	0.57	0.00	0.57
31.50	2.00	1.03	5.00	0.57	0.00	0.57
31.55	2.00	1.03	5.00	0.57	0.00	0.57
31.60	2.00	1.03	5.00	0.57	0.00	0.57
31.65	2.00	1.03	5.00	0.57	0.00	0.57
31.70	2.00	1.03	5.00	0.57	0.00	0.57
31.75	2.00	1.03	5.00	0.57	0.00	0.57
31.80	2.00	1.03	5.00	0.57	0.00	0.57
31.85	2.00	1.03	5.00	0.57	0.00	0.57
31.90	2.00	1.03	5.00	0.57	0.00	0.57
31.95	2.00	1.03	5.00	0.57	0.00	0.57
32.00	2.00	1.03	5.00	0.57	0.00	0.57
32.05	2.00	1.03	5.00	0.57	0.00	0.57
32.10	2.00	1.03	5.00	0.57	0.00	0.57
32.15	2.00	1.03	5.00	0.57	0.00	0.57
32.20	2.00	1.03	5.00	0.57	0.00	0.57
32.25	2.00	1.03	5.00	0.57	0.00	0.57
32.30	2.00	1.03	5.00	0.57	0.00	0.57
32.35	2.00	1.03	5.00	0.57	0.00	0.57
32.40	2.00	1.03	5.00	0.57	0.00	0.57
32.45	2.00	1.03	5.00	0.57	0.00	0.57
32.50	2.00	1.03	5.00	0.57	0.00	0.57
32.55	2.00	1.03	5.00	0.57	0.00	0.57
32.60	2.00	1.03	5.00	0.57	0.00	0.57
32.65	2.00	1.03	5.00	0.57	0.00	0.57
32.70	2.00	1.03	5.00	0.57	0.00	0.57
32.75	2.00	1.03	5.00	0.57	0.00	0.57
32.80	2.00	1.03	5.00	0.57	0.00	0.57
32.85	2.00	1.02	5.00	0.57	0.00	0.57
32.90	2.00	1.02	5.00	0.57	0.00	0.57
32.95	2.00	1.02	5.00	0.57	0.00	0.57
33.00	2.00	1.02	5.00	0.57	0.00	0.57
33.05	2.00	1.02	5.00	0.57	0.00	0.57
33.10	2.00	1.02	5.00	0.57	0.00	0.57
33.15	2.00	1.02	5.00	0.57	0.00	0.57
33.20	2.00	1.02	5.00	0.57	0.00	0.57
33.25	2.00	1.02	5.00	0.57	0.00	0.57
33.30	2.00	1.02	5.00	0.57	0.00	0.57
33.35	2.00	1.02	5.00	0.57	0.00	0.57
33.40	2.00	1.02	5.00	0.57	0.00	0.57
33.45	2.00	1.02	5.00	0.57	0.00	0.57
33.50	2.00	1.02	5.00	0.57	0.00	0.57
33.55	2.00	1.02	5.00	0.57	0.00	0.57
33.60	2.00	1.02	5.00	0.57	0.00	0.57
33.65	2.00	1.02	5.00	0.57	0.00	0.57
33.70	2.00	1.02	5.00	0.57	0.00	0.57

33.75	2.00	1.02	5.00	0.57	0.00	0.57
33.80	2.00	1.02	5.00	0.57	0.00	0.57
33.85	2.00	1.02	5.00	0.57	0.00	0.57
33.90	2.00	1.02	5.00	0.57	0.00	0.57
33.95	2.00	1.02	5.00	0.57	0.00	0.57
34.00	2.00	1.02	5.00	0.57	0.00	0.57
34.05	2.00	1.02	5.00	0.57	0.00	0.57
34.10	2.00	1.02	5.00	0.57	0.00	0.57
34.15	2.00	1.02	5.00	0.57	0.00	0.57
34.20	2.00	1.02	5.00	0.57	0.00	0.57
34.25	2.00	1.02	5.00	0.57	0.00	0.57
34.30	2.00	1.02	5.00	0.57	0.00	0.57
34.35	2.00	1.02	5.00	0.57	0.00	0.57
34.40	2.00	1.02	5.00	0.57	0.00	0.57
34.45	2.00	1.02	5.00	0.57	0.00	0.57
34.50	2.00	1.02	5.00	0.57	0.00	0.57
34.55	2.00	1.01	5.00	0.57	0.00	0.57
34.60	2.00	1.01	5.00	0.57	0.00	0.57
34.65	2.00	1.01	5.00	0.57	0.00	0.57
34.70	2.00	1.01	5.00	0.57	0.00	0.57
34.75	2.00	1.01	5.00	0.57	0.00	0.57
34.80	2.00	1.01	5.00	0.57	0.00	0.57
34.85	2.00	1.01	5.00	0.57	0.00	0.57
34.90	2.00	1.01	5.00	0.57	0.00	0.57
34.95	2.00	1.01	5.00	0.57	0.00	0.57
35.00	2.00	1.01	5.00	0.57	0.00	0.57
35.05	0.70	1.01	0.69*	0.57	0.00	0.57
35.10	0.56	1.01	0.56*	0.57	0.00	0.57
35.15	0.48	1.01	0.47*	0.57	0.00	0.57
35.20	0.43	1.01	0.43*	0.57	0.00	0.57
35.25	0.40	1.01	0.40*	0.57	0.00	0.57
35.30	0.39	1.01	0.38*	0.57	0.00	0.57
35.35	0.37	1.01	0.37*	0.57	0.00	0.57
35.40	0.36	1.01	0.36*	0.57	0.00	0.57
35.45	0.36	1.01	0.35*	0.57	0.00	0.57
35.50	0.35	1.01	0.34*	0.57	0.00	0.57
35.55	0.33	1.01	0.32*	0.57	0.00	0.57
35.60	0.31	1.01	0.31*	0.57	0.00	0.57
35.65	0.30	1.01	0.29*	0.56	0.00	0.56
35.70	0.29	1.01	0.29*	0.55	0.00	0.55
35.75	0.29	1.01	0.29*	0.54	0.00	0.54
35.80	0.30	1.01	0.29*	0.53	0.00	0.53
35.85	0.30	1.01	0.30*	0.52	0.00	0.52
35.90	0.30	1.01	0.30*	0.51	0.00	0.51
35.95	0.31	1.01	0.31*	0.50	0.00	0.50
36.00	0.32	1.01	0.32*	0.49	0.00	0.49
36.05	0.33	1.01	0.32*	0.48	0.00	0.48
36.10	0.33	1.01	0.33*	0.47	0.00	0.47
36.15	0.33	1.01	0.33*	0.46	0.00	0.46
36.20	0.33	1.00	0.33*	0.46	0.00	0.46

36.25	0.33	1.00	0.33*	0.45	0.00	0.45
36.30	0.34	1.00	0.34*	0.44	0.00	0.44
36.35	0.34	1.00	0.34*	0.43	0.00	0.43
36.40	0.34	1.00	0.34*	0.42	0.00	0.42
36.45	0.34	1.00	0.34*	0.41	0.00	0.41
36.50	0.33	1.00	0.33*	0.40	0.00	0.40
36.55	0.33	1.00	0.33*	0.40	0.00	0.40
36.60	0.32	1.00	0.32*	0.39	0.00	0.39
36.65	0.32	1.00	0.32*	0.38	0.00	0.38
36.70	0.32	1.00	0.32*	0.37	0.00	0.37
36.75	0.32	1.00	0.31*	0.36	0.00	0.36
36.80	0.31	1.00	0.31*	0.35	0.00	0.35
36.85	0.31	1.00	0.31*	0.35	0.00	0.35
36.90	0.30	1.00	0.30*	0.34	0.00	0.34
36.95	0.29	1.00	0.29*	0.33	0.00	0.33
37.00	0.28	1.00	0.28*	0.32	0.00	0.32
37.05	0.27	1.00	0.27*	0.31	0.00	0.31
37.10	0.26	1.00	0.26*	0.30	0.00	0.30
37.15	0.24	1.00	0.25*	0.29	0.00	0.29
37.20	0.24	1.00	0.24*	0.28	0.00	0.28
37.25	0.23	1.00	0.23*	0.27	0.00	0.27
37.30	0.23	1.00	0.23*	0.26	0.00	0.26
37.35	0.23	1.00	0.23*	0.25	0.00	0.25
37.40	0.23	1.00	0.23*	0.24	0.00	0.24
37.45	0.23	1.00	0.23*	0.23	0.00	0.23
37.50	0.24	1.00	0.24*	0.23	0.00	0.23
37.55	0.25	1.00	0.25*	0.22	0.00	0.22
37.60	0.29	1.00	0.29*	0.21	0.00	0.21
37.65	0.39	1.00	0.39*	0.21	0.00	0.21
37.70	2.00	1.00	5.00	0.21	0.00	0.21
37.75	2.00	0.99	5.00	0.21	0.00	0.21
37.80	2.00	0.99	5.00	0.21	0.00	0.21
37.85	2.00	0.99	5.00	0.21	0.00	0.21
37.90	2.00	0.99	5.00	0.21	0.00	0.21
37.95	2.00	0.99	5.00	0.21	0.00	0.21
38.00	2.00	0.99	5.00	0.21	0.00	0.21
38.05	2.00	0.99	5.00	0.21	0.00	0.21
38.10	2.00	0.99	5.00	0.21	0.00	0.21
38.15	2.00	0.99	5.00	0.21	0.00	0.21
38.20	2.00	0.99	5.00	0.21	0.00	0.21
38.25	2.00	0.99	5.00	0.21	0.00	0.21
38.30	2.00	0.99	5.00	0.21	0.00	0.21
38.35	2.00	0.99	5.00	0.21	0.00	0.21
38.40	2.00	0.99	5.00	0.21	0.00	0.21
38.45	2.00	0.99	5.00	0.21	0.00	0.21
38.50	2.00	0.99	5.00	0.21	0.00	0.21
38.55	2.00	0.99	5.00	0.21	0.00	0.21
38.60	2.00	0.99	5.00	0.21	0.00	0.21
38.65	2.00	0.99	5.00	0.21	0.00	0.21
38.70	2.00	0.99	5.00	0.21	0.00	0.21

38.75	2.00	0.99	5.00	0.21	0.00	0.21
38.80	2.00	0.99	5.00	0.21	0.00	0.21
38.85	2.00	0.99	5.00	0.21	0.00	0.21
38.90	2.00	0.99	5.00	0.21	0.00	0.21
38.95	2.00	0.99	5.00	0.21	0.00	0.21
39.00	2.00	0.99	5.00	0.21	0.00	0.21
39.05	2.00	0.99	5.00	0.21	0.00	0.21
39.10	2.00	0.99	5.00	0.21	0.00	0.21
39.15	2.00	0.99	5.00	0.21	0.00	0.21
39.20	2.00	0.99	5.00	0.21	0.00	0.21
39.25	2.00	0.98	5.00	0.21	0.00	0.21
39.30	2.00	0.98	5.00	0.21	0.00	0.21
39.35	2.00	0.98	5.00	0.21	0.00	0.21
39.40	2.00	0.98	5.00	0.21	0.00	0.21
39.45	2.00	0.98	5.00	0.21	0.00	0.21
39.50	2.00	0.98	5.00	0.21	0.00	0.21
39.55	2.00	0.98	5.00	0.21	0.00	0.21
39.60	2.00	0.98	5.00	0.21	0.00	0.21
39.65	2.00	0.98	5.00	0.21	0.00	0.21
39.70	2.00	0.98	5.00	0.21	0.00	0.21
39.75	2.00	0.98	5.00	0.21	0.00	0.21
39.80	2.00	0.98	5.00	0.21	0.00	0.21
39.85	0.40	0.98	0.41*	0.21	0.00	0.21
39.90	0.31	0.98	0.32*	0.21	0.00	0.21
39.95	0.24	0.98	0.25*	0.21	0.00	0.21
40.00	0.20	0.98	0.20*	0.20	0.00	0.20
40.05	0.18	0.98	0.18*	0.19	0.00	0.19
40.10	0.16	0.98	0.17*	0.18	0.00	0.18
40.15	0.16	0.98	0.16*	0.17	0.00	0.17
40.20	0.16	0.98	0.16*	0.15	0.00	0.15
40.25	0.17	0.98	0.17*	0.14	0.00	0.14
40.30	0.18	0.98	0.19*	0.13	0.00	0.13
40.35	0.21	0.98	0.21*	0.12	0.00	0.12
40.40	0.25	0.98	0.25*	0.11	0.00	0.11
40.45	0.31	0.98	0.31*	0.10	0.00	0.10
40.50	0.41	0.98	0.42*	0.10	0.00	0.10
40.55	0.53	0.98	0.54*	0.10	0.00	0.10
40.60	0.55	0.98	0.56*	0.10	0.00	0.10
40.65	0.46	0.98	0.47*	0.10	0.00	0.10
40.70	0.37	0.97	0.38*	0.10	0.00	0.10
40.75	0.35	0.97	0.36*	0.10	0.00	0.10
40.80	0.36	0.97	0.36*	0.09	0.00	0.09
40.85	0.36	0.97	0.37*	0.09	0.00	0.09
40.90	0.37	0.97	0.38*	0.08	0.00	0.08
40.95	0.38	0.97	0.39*	0.07	0.00	0.07
41.00	0.40	0.97	0.41*	0.07	0.00	0.07
41.05	0.41	0.97	0.42*	0.06	0.00	0.06
41.10	0.41	0.97	0.42*	0.05	0.00	0.05
41.15	0.40	0.97	0.42*	0.05	0.00	0.05
41.20	0.39	0.97	0.40*	0.04	0.00	0.04

41.25	0.41	0.97	0.42*	0.03	0.00	0.03
41.30	0.43	0.97	0.44*	0.03	0.00	0.03
41.35	0.44	0.97	0.45*	0.02	0.00	0.02
41.40	0.44	0.97	0.45*	0.02	0.00	0.02
41.45	0.45	0.97	0.47*	0.02	0.00	0.02
41.50	0.47	0.97	0.49*	0.02	0.00	0.02
41.55	0.49	0.97	0.51*	0.02	0.00	0.02
41.60	0.51	0.97	0.52*	0.02	0.00	0.02
41.65	0.52	0.97	0.54*	0.02	0.00	0.02
41.70	0.56	0.97	0.58*	0.02	0.00	0.02
41.75	0.64	0.97	0.66*	0.02	0.00	0.02
41.80	0.73	0.97	0.76*	0.02	0.00	0.02
41.85	0.83	0.97	0.86*	0.02	0.00	0.02
41.90	0.89	0.97	0.92*	0.02	0.00	0.02
41.95	0.91	0.97	0.94*	0.02	0.00	0.02
42.00	0.94	0.97	0.98*	0.02	0.00	0.02
42.05	0.99	0.97	1.02	0.02	0.00	0.02
42.10	1.04	0.96	1.08	0.02	0.00	0.02
42.15	1.09	0.96	1.13	0.02	0.00	0.02
42.20	1.15	0.96	1.19	0.02	0.00	0.02
42.25	1.19	0.96	1.23	0.02	0.00	0.02
42.30	1.23	0.96	1.28	0.02	0.00	0.02
42.35	1.27	0.96	1.31	0.02	0.00	0.02
42.40	1.30	0.96	1.35	0.02	0.00	0.02
42.45	1.31	0.96	1.37	0.02	0.00	0.02
42.50	1.34	0.96	1.40	0.02	0.00	0.02
42.55	1.38	0.96	1.44	0.02	0.00	0.02
42.60	1.44	0.96	1.50	0.02	0.00	0.02
42.65	1.51	0.96	1.57	0.02	0.00	0.02
42.70	1.58	0.96	1.64	0.02	0.00	0.02
42.75	1.64	0.96	1.71	0.02	0.00	0.02
42.80	1.70	0.96	1.77	0.02	0.00	0.02
42.85	1.73	0.96	1.80	0.02	0.00	0.02
42.90	1.77	0.96	1.84	0.02	0.00	0.02
42.95	1.79	0.96	1.87	0.02	0.00	0.02
43.00	1.79	0.96	1.87	0.02	0.00	0.02
43.05	1.77	0.96	1.85	0.02	0.00	0.02
43.10	1.73	0.96	1.81	0.02	0.00	0.02
43.15	1.70	0.96	1.77	0.02	0.00	0.02
43.20	1.65	0.96	1.72	0.02	0.00	0.02
43.25	1.59	0.96	1.66	0.02	0.00	0.02
43.30	1.54	0.96	1.61	0.02	0.00	0.02
43.35	1.46	0.96	1.53	0.02	0.00	0.02
43.40	1.34	0.96	1.41	0.02	0.00	0.02
43.45	1.38	0.95	1.45	0.02	0.00	0.02
43.50	1.36	0.95	1.42	0.02	0.00	0.02
43.55	1.33	0.95	1.39	0.02	0.00	0.02
43.60	1.39	0.95	1.46	0.02	0.00	0.02
43.65	1.46	0.95	1.53	0.02	0.00	0.02
43.70	1.49	0.95	1.56	0.02	0.00	0.02

43.75	1.26	0.95	1.32	0.02	0.00	0.02
43.80	1.23	0.95	1.29	0.02	0.00	0.02
43.85	1.37	0.95	1.44	0.02	0.00	0.02
43.90	1.41	0.95	1.48	0.02	0.00	0.02
43.95	1.49	0.95	1.56	0.02	0.00	0.02
44.00	1.51	0.95	1.59	0.02	0.00	0.02
44.05	1.52	0.95	1.60	0.02	0.00	0.02
44.10	1.63	0.95	1.72	0.02	0.00	0.02
44.15	1.71	0.95	1.80	0.02	0.00	0.02
44.20	1.76	0.95	1.86	0.02	0.00	0.02
44.25	1.80	0.95	1.90	0.02	0.00	0.02
44.30	1.82	0.95	1.92	0.02	0.00	0.02
44.35	1.86	0.95	1.96	0.02	0.00	0.02
44.40	1.86	0.95	1.97	0.02	0.00	0.02
44.45	1.84	0.95	1.94	0.02	0.00	0.02
44.50	1.80	0.95	1.90	0.02	0.00	0.02
44.55	1.74	0.95	1.84	0.02	0.00	0.02
44.60	1.68	0.95	1.78	0.02	0.00	0.02
44.65	1.62	0.95	1.71	0.02	0.00	0.02
44.70	1.56	0.95	1.65	0.02	0.00	0.02
44.75	1.48	0.94	1.57	0.02	0.00	0.02
44.80	1.40	0.94	1.48	0.02	0.00	0.02
44.85	1.32	0.94	1.39	0.02	0.00	0.02
44.90	1.24	0.94	1.32	0.02	0.00	0.02
44.95	1.17	0.94	1.25	0.02	0.00	0.02
45.00	1.11	0.94	1.17	0.02	0.00	0.02
45.05	1.04	0.94	1.11	0.02	0.00	0.02
45.10	0.98	0.94	1.04	0.02	0.00	0.02
45.15	0.92	0.94	0.98*	0.02	0.00	0.02
45.20	0.87	0.94	0.92*	0.02	0.00	0.02
45.25	0.82	0.94	0.87*	0.02	0.00	0.02
45.30	0.77	0.94	0.82*	0.02	0.00	0.02
45.35	0.72	0.94	0.77*	0.02	0.00	0.02
45.40	0.68	0.94	0.73*	0.02	0.00	0.02
45.45	0.66	0.94	0.70*	0.02	0.00	0.02
45.50	0.64	0.94	0.68*	0.02	0.00	0.02
45.55	0.60	0.94	0.64*	0.02	0.00	0.02
45.60	0.51	0.94	0.55*	0.02	0.00	0.02
45.65	0.55	0.94	0.59*	0.02	0.00	0.02
45.70	0.61	0.94	0.65*	0.02	0.00	0.02
45.75	0.59	0.94	0.63*	0.02	0.00	0.02
45.80	0.56	0.94	0.59*	0.02	0.00	0.02
45.85	0.52	0.94	0.55*	0.02	0.00	0.02
45.90	0.47	0.94	0.50*	0.02	0.00	0.02
45.95	0.47	0.94	0.50*	0.02	0.00	0.02
46.00	0.43	0.94	0.45*	0.02	0.00	0.02
46.05	0.44	0.93	0.47*	0.02	0.00	0.02
46.10	0.49	0.93	0.52*	0.02	0.00	0.02
46.15	0.71	0.93	0.76*	0.02	0.00	0.02
46.20	2.00	0.93	5.00	0.02	0.00	0.02

46.25	2.00	0.93	5.00	0.02	0.00	0.02
46.30	2.00	0.93	5.00	0.02	0.00	0.02
46.35	2.00	0.93	5.00	0.02	0.00	0.02
46.40	2.00	0.93	5.00	0.02	0.00	0.02
46.45	2.00	0.93	5.00	0.02	0.00	0.02
46.50	2.00	0.93	5.00	0.02	0.00	0.02
46.55	2.00	0.93	5.00	0.02	0.00	0.02
46.60	2.00	0.93	5.00	0.02	0.00	0.02
46.65	2.00	0.93	5.00	0.02	0.00	0.02
46.70	2.00	0.93	5.00	0.02	0.00	0.02
46.75	2.00	0.93	5.00	0.02	0.00	0.02
46.80	2.00	0.93	5.00	0.02	0.00	0.02
46.85	2.00	0.93	5.00	0.02	0.00	0.02
46.90	2.00	0.93	5.00	0.02	0.00	0.02
46.95	2.00	0.93	5.00	0.02	0.00	0.02
47.00	2.00	0.93	5.00	0.02	0.00	0.02
47.05	2.00	0.93	5.00	0.02	0.00	0.02
47.10	2.00	0.93	5.00	0.02	0.00	0.02
47.15	2.00	0.93	5.00	0.02	0.00	0.02
47.20	2.00	0.93	5.00	0.02	0.00	0.02
47.25	2.00	0.93	5.00	0.02	0.00	0.02
47.30	2.00	0.92	5.00	0.02	0.00	0.02
47.35	2.00	0.92	5.00	0.02	0.00	0.02
47.40	2.00	0.92	5.00	0.02	0.00	0.02
47.45	2.00	0.92	5.00	0.02	0.00	0.02
47.50	2.00	0.92	5.00	0.02	0.00	0.02
47.55	2.00	0.92	5.00	0.02	0.00	0.02
47.60	2.00	0.92	5.00	0.02	0.00	0.02
47.65	2.00	0.92	5.00	0.02	0.00	0.02
47.70	2.00	0.92	5.00	0.02	0.00	0.02
47.75	2.00	0.92	5.00	0.02	0.00	0.02
47.80	2.00	0.92	5.00	0.02	0.00	0.02
47.85	2.00	0.92	5.00	0.02	0.00	0.02
47.90	2.00	0.92	5.00	0.02	0.00	0.02
47.95	2.00	0.92	5.00	0.02	0.00	0.02
48.00	2.00	0.92	5.00	0.02	0.00	0.02
48.05	2.00	0.92	5.00	0.02	0.00	0.02
48.10	2.00	0.92	5.00	0.02	0.00	0.02
48.15	2.00	0.92	5.00	0.02	0.00	0.02
48.20	2.00	0.92	5.00	0.02	0.00	0.02
48.25	2.00	0.92	5.00	0.02	0.00	0.02
48.30	2.00	0.92	5.00	0.02	0.00	0.02
48.35	2.00	0.92	5.00	0.02	0.00	0.02
48.40	2.00	0.92	5.00	0.02	0.00	0.02
48.45	2.00	0.92	5.00	0.02	0.00	0.02
48.50	2.00	0.92	5.00	0.02	0.00	0.02
48.55	2.00	0.91	5.00	0.02	0.00	0.02
48.60	2.00	0.91	5.00	0.02	0.00	0.02
48.65	2.00	0.91	5.00	0.02	0.00	0.02
48.70	2.00	0.91	5.00	0.02	0.00	0.02

48.75	2.00	0.91	5.00	0.02	0.00	0.02
48.80	2.00	0.91	5.00	0.02	0.00	0.02
48.85	2.00	0.91	5.00	0.02	0.00	0.02
48.90	2.00	0.91	5.00	0.02	0.00	0.02
48.95	2.00	0.91	5.00	0.02	0.00	0.02
49.00	2.00	0.91	5.00	0.02	0.00	0.02
49.05	2.00	0.91	5.00	0.02	0.00	0.02
49.10	2.00	0.91	5.00	0.02	0.00	0.02
49.15	2.00	0.91	5.00	0.02	0.00	0.02
49.20	2.00	0.91	5.00	0.02	0.00	0.02
49.25	2.00	0.91	5.00	0.02	0.00	0.02
49.30	2.00	0.91	5.00	0.02	0.00	0.02
49.35	2.00	0.91	5.00	0.02	0.00	0.02
49.40	2.00	0.91	5.00	0.02	0.00	0.02
49.45	2.00	0.91	5.00	0.02	0.00	0.02
49.50	2.00	0.91	5.00	0.02	0.00	0.02
49.55	2.00	0.91	5.00	0.02	0.00	0.02
49.60	2.00	0.91	5.00	0.02	0.00	0.02
49.65	2.00	0.91	5.00	0.02	0.00	0.02
49.70	2.00	0.91	5.00	0.02	0.00	0.02
49.75	2.00	0.91	5.00	0.02	0.00	0.02
49.80	2.00	0.90	5.00	0.02	0.00	0.02
49.85	0.32	0.90	0.36*	0.02	0.00	0.02
49.90	0.09	0.90	0.10*	0.02	0.00	0.02
49.95	2.00	0.90	5.00	0.00	0.00	0.00
50.00	2.00	0.90	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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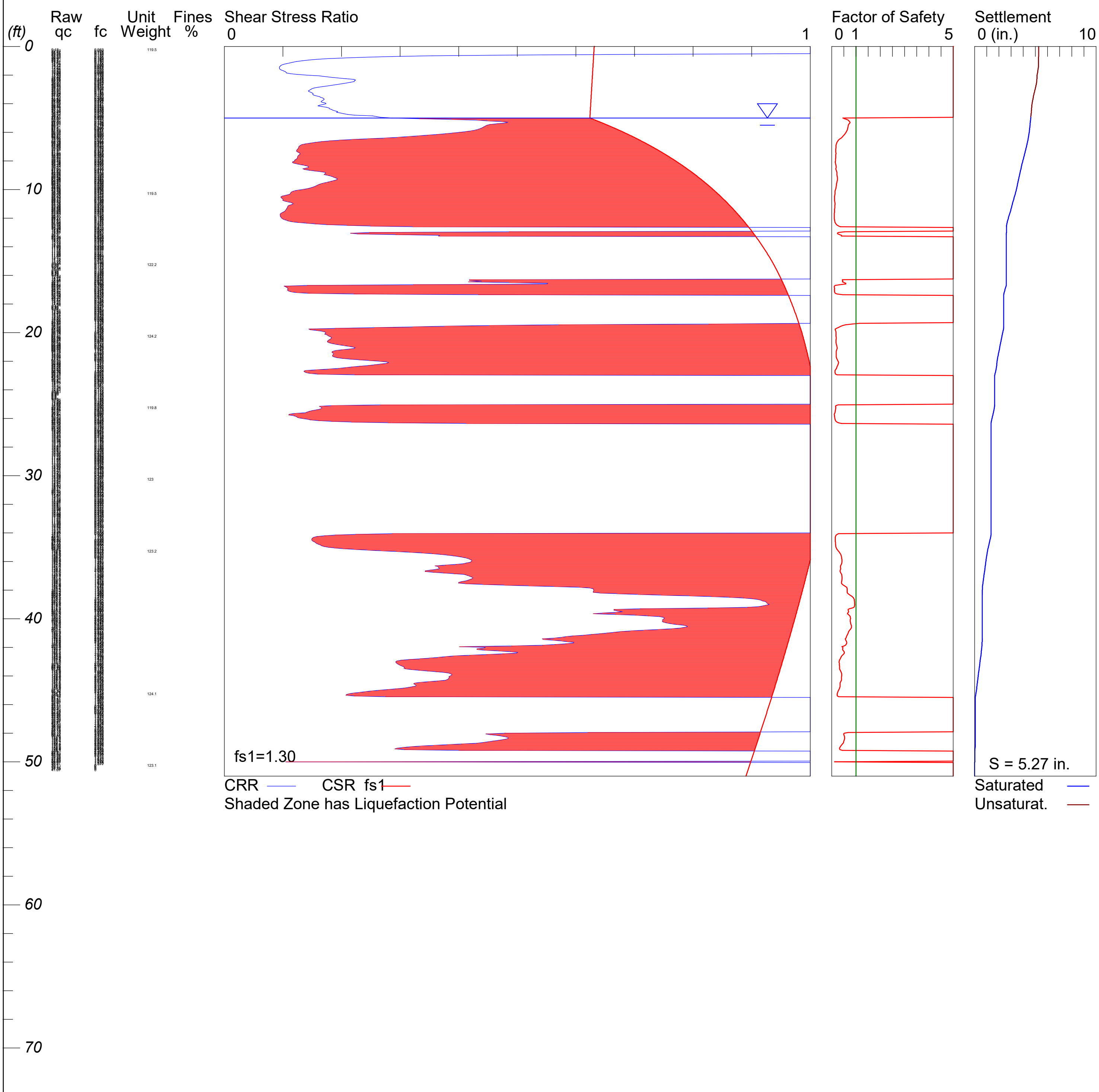
1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

LIQUEFACTION ANALYSIS
Cypress

Hole No.=CPT-2   Water Depth=5 ft

Magnitude=7.5
Acceleration=.747g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: S:\PROJECTS\1000s GEOTECH PROJECTS\1-1209 Goodman Cypress\Calcs\Liquefaction\KYCPT2.liq
Title: Cypress
Subtitle: CPT-2

Surface Elev.=
Hole No.=CPT-2
Depth of Hole= 51.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 7.00 ft
Max. Acceleration= 0.75 g
Earthquake Magnitude= 7.50

Input Data:

Surface Elev.=
Hole No.=CPT-2
Depth of Hole=51.00 ft
Water Table during Earthquake= 5.00 ft
Water Table during In-Situ Testing= 7.00 ft
Max. Acceleration=0.75 g
Earthquake Magnitude=7.50
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. CPT Calculation Method: Modify Robertson*
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth	qc	fs	Rf	gamma	Fines	D50
ft	atm	atm	pcf	%	mm	

0.00	0.18	0.06	35.00	119.50	0.00	0.50
0.09	32.67	0.09	0.27	119.50	0.00	0.50
0.15	57.87	0.10	0.17	119.50	0.00	0.50
0.21	55.47	0.12	0.21	119.50	0.00	0.50
0.27	53.35	0.13	0.25	119.50	0.00	0.50
0.33	49.47	0.14	0.28	119.50	0.00	0.50
0.40	44.49	0.15	0.34	119.50	0.00	0.50
0.48	38.12	0.15	0.40	119.50	0.00	0.50
0.54	33.69	0.16	0.46	119.50	0.00	0.50
0.61	29.90	0.16	0.55	119.50	0.00	0.50
0.67	26.30	0.16	0.62	119.50	0.00	0.50
0.73	23.72	0.16	0.67	119.50	0.00	0.50
0.80	21.50	0.15	0.70	119.50	0.00	0.50
0.86	19.47	0.13	0.67	119.50	0.00	0.50
0.92	17.81	0.12	0.69	119.50	0.00	0.50
0.99	16.34	0.12	0.71	119.50	0.00	0.50
1.07	14.77	0.10	0.66	119.50	0.00	0.50
1.13	14.12	0.09	0.65	119.50	0.00	0.50
1.20	13.01	0.08	0.61	119.50	0.00	0.50
1.26	12.37	0.06	0.49	119.50	0.00	0.50
1.32	11.44	0.05	0.48	119.50	0.00	0.50
1.38	10.98	0.05	0.50	119.50	0.00	0.50
1.49	10.43	0.05	0.53	119.50	0.00	0.50
1.53	10.94	0.06	0.51	119.50	0.00	0.50
1.59	10.52	0.06	0.61	119.50	0.00	0.50
1.65	10.89	0.08	0.73	119.50	0.00	0.50
1.71	11.63	0.10	0.84	119.50	0.00	0.50
1.77	12.83	0.11	0.88	119.50	0.00	0.50
1.86	15.23	0.11	0.71	119.50	0.00	0.50
1.92	18.46	0.13	0.69	119.50	0.00	0.50
1.98	21.87	0.18	0.80	119.50	0.00	0.50
2.05	25.75	0.25	0.96	119.50	0.00	0.50
2.11	28.98	0.25	0.85	119.50	0.00	0.50
2.17	32.12	0.25	0.76	119.50	0.00	0.50
2.23	35.53	0.24	0.69	119.50	0.00	0.50
2.32	39.59	0.25	0.63	119.50	0.00	0.50
2.38	39.50	0.25	0.64	119.50	0.00	0.50
2.44	40.24	0.25	0.62	119.50	0.00	0.50
2.51	39.87	0.25	0.62	119.50	0.00	0.50
2.57	39.59	0.23	0.59	119.50	0.00	0.50
2.63	39.13	0.22	0.56	119.50	0.00	0.50
2.69	38.40	0.21	0.54	119.50	0.00	0.50
2.76	37.19	0.20	0.54	119.50	0.00	0.50
2.84	34.98	0.19	0.55	119.50	0.00	0.50
2.91	33.50	0.19	0.56	119.50	0.00	0.50
2.97	33.13	0.18	0.56	119.50	0.00	0.50
3.03	33.04	0.18	0.55	119.50	0.00	0.50
3.09	32.76	0.18	0.55	119.50	0.00	0.50
3.15	32.67	0.19	0.60	119.50	0.00	0.50
3.22	31.84	0.25	0.78	119.50	0.00	0.50

3.30	31.29	0.28	0.90	119.50	0.00	0.50
3.36	31.20	0.29	0.93	119.50	0.00	0.50
3.43	31.47	0.31	0.98	119.50	0.00	0.50
3.49	30.92	0.37	1.19	119.50	0.00	0.50
3.55	28.89	0.41	1.41	119.50	0.00	0.50
3.62	27.87	0.44	1.59	119.50	0.00	0.50
3.68	25.66	0.46	1.78	119.50	0.00	0.50
3.75	27.32	0.45	1.65	119.50	0.00	0.50
3.81	25.57	0.45	1.75	119.50	0.00	0.50
3.88	26.77	0.44	1.65	119.50	0.00	0.50
3.96	26.86	0.48	1.80	119.50	0.00	0.50
4.02	26.86	0.49	1.81	119.50	0.00	0.50
4.09	27.78	0.45	1.63	119.50	0.00	0.50
4.15	30.00	0.43	1.43	119.50	0.00	0.50
4.21	32.12	0.46	1.43	119.50	0.00	0.50
4.28	31.93	0.51	1.61	119.50	0.00	0.50
4.34	33.23	0.51	1.53	119.50	0.00	0.50
4.40	34.61	0.52	1.51	119.50	0.00	0.50
4.47	36.73	0.52	1.41	119.50	0.00	0.50
4.54	39.04	0.54	1.38	119.50	0.00	0.50
4.61	38.21	0.55	1.43	119.50	0.00	0.50
4.67	40.70	0.57	1.39	119.50	0.00	0.50
4.73	42.55	0.58	1.36	119.50	0.00	0.50
4.80	43.66	0.63	1.44	119.50	0.00	0.50
4.86	45.50	0.78	1.71	119.50	0.00	0.50
4.94	50.95	0.73	1.44	119.50	0.00	0.50
5.01	56.30	0.73	1.30	119.50	0.00	0.50
5.07	67.65	0.73	1.08	119.50	0.00	0.50
5.13	78.08	0.72	0.92	119.50	0.00	0.50
5.20	81.40	0.71	0.87	119.50	0.00	0.50
5.26	85.00	0.72	0.84	119.50	0.00	0.50
5.32	86.67	0.72	0.83	119.50	0.00	0.50
5.40	87.31	0.64	0.73	119.50	0.00	0.50
5.46	87.40	0.60	0.68	119.50	0.00	0.50
5.52	87.50	0.60	0.69	119.50	0.00	0.50
5.59	87.31	0.62	0.71	119.50	0.00	0.50
5.65	87.13	0.63	0.73	119.50	0.00	0.50
5.71	86.85	0.65	0.75	119.50	0.00	0.50
5.78	86.57	0.67	0.77	119.50	0.00	0.50
5.86	86.02	0.68	0.79	119.50	0.00	0.50
5.92	85.19	0.69	0.81	119.50	0.00	0.50
5.98	83.80	0.70	0.83	119.50	0.00	0.50
6.04	82.51	0.70	0.85	119.50	0.00	0.50
6.11	80.67	0.70	0.87	119.50	0.00	0.50
6.17	78.45	0.70	0.89	119.50	0.00	0.50
6.24	75.96	0.69	0.91	119.50	0.00	0.50
6.32	72.18	0.68	0.94	119.50	0.00	0.50
6.38	69.04	0.66	0.96	119.50	0.00	0.50
6.45	64.79	0.57	0.88	119.50	0.00	0.50
6.51	60.18	0.49	0.81	119.50	0.00	0.50

6.57	54.36	0.47	0.87	119.50	0.00	0.50
6.64	48.64	0.45	0.93	119.50	0.00	0.50
6.70	44.86	0.43	0.95	119.50	0.00	0.50
6.76	41.63	0.40	0.97	119.50	0.00	0.50
6.83	36.55	0.38	1.05	119.50	0.00	0.50
6.89	35.07	0.37	1.07	119.50	0.00	0.50
6.97	32.58	0.37	1.14	119.50	0.00	0.50
7.04	31.57	0.38	1.19	119.50	0.00	0.50
7.11	31.10	0.37	1.20	119.50	0.00	0.50
7.17	31.20	0.37	1.18	119.50	0.00	0.50
7.23	31.66	0.35	1.12	119.50	0.00	0.50
7.29	32.86	0.34	1.04	119.50	0.00	0.50
7.36	34.43	0.34	0.99	119.50	0.00	0.50
7.42	35.90	0.35	0.99	119.50	0.00	0.50
7.48	36.83	0.37	1.00	119.50	0.00	0.50
7.55	36.46	0.36	0.99	119.50	0.00	0.50
7.63	35.81	0.35	0.97	119.50	0.00	0.50
7.69	36.27	0.34	0.93	119.50	0.00	0.50
7.76	37.38	0.32	0.87	119.50	0.00	0.50
7.82	38.12	0.31	0.82	119.50	0.00	0.50
7.88	37.19	0.30	0.82	119.50	0.00	0.50
7.94	36.36	0.29	0.80	119.50	0.00	0.50
8.01	35.44	0.31	0.87	119.50	0.00	0.50
8.07	34.15	0.28	0.81	119.50	0.00	0.50
8.14	32.49	0.31	0.95	119.50	0.00	0.50
8.21	30.55	0.38	1.24	119.50	0.00	0.50
8.29	27.60	0.44	1.58	119.50	0.00	0.50
8.36	27.04	0.46	1.70	119.50	0.00	0.50
8.42	27.73	0.48	1.73	119.50	0.00	0.50
8.49	27.87	0.47	1.69	119.50	0.00	0.50
8.56	34.52	0.44	1.28	119.50	0.00	0.50
8.62	42.92	0.41	0.96	119.50	0.00	0.50
8.69	49.93	0.40	0.80	119.50	0.00	0.50
8.75	55.65	0.40	0.71	119.50	0.00	0.50
8.81	59.81	0.39	0.66	119.50	0.00	0.50
8.88	60.82	0.35	0.58	119.50	0.00	0.50
8.95	60.36	0.35	0.58	119.50	0.00	0.50
9.01	61.28	0.39	0.63	119.50	0.00	0.50
9.07	63.96	0.38	0.60	119.50	0.00	0.50
9.13	64.93	0.38	0.59	119.50	0.00	0.50
9.20	66.18	0.39	0.59	119.50	0.00	0.50
9.27	65.90	0.43	0.65	119.50	0.00	0.50
9.33	63.87	0.46	0.73	119.50	0.00	0.50
9.40	60.27	0.50	0.83	119.50	0.00	0.50
9.46	56.39	0.54	0.95	119.50	0.00	0.50
9.53	52.52	0.56	1.06	119.50	0.00	0.50
9.59	48.92	0.57	1.16	119.50	0.00	0.50
9.65	46.61	0.57	1.22	119.50	0.00	0.50
9.72	44.76	0.56	1.26	119.50	0.00	0.50
9.79	43.38	0.56	1.28	119.50	0.00	0.50

9.85	41.53	0.54	1.29	119.50	0.00	0.50
9.92	38.58	0.52	1.35	119.50	0.00	0.50
9.99	35.16	0.47	1.34	119.50	0.00	0.50
10.05	32.49	0.39	1.21	119.50	0.00	0.50
10.12	30.09	0.34	1.14	119.50	0.00	0.50
10.18	28.24	0.32	1.14	119.50	0.00	0.50
10.25	27.13	0.31	1.16	119.50	0.00	0.50
10.31	26.03	0.31	1.18	119.50	0.00	0.50
10.38	25.75	0.27	1.06	119.50	0.00	0.50
10.44	25.75	0.20	0.79	119.50	0.00	0.50
10.51	26.40	0.16	0.61	119.50	0.00	0.50
10.57	27.78	0.16	0.57	119.50	0.00	0.50
10.64	28.43	0.19	0.66	119.50	0.00	0.50
10.70	27.32	0.20	0.75	119.50	0.00	0.50
10.76	25.75	0.20	0.78	119.50	0.00	0.50
10.83	24.18	0.25	1.05	119.50	0.00	0.50
10.90	23.26	0.29	1.27	119.50	0.00	0.50
10.97	23.26	0.32	1.37	119.50	0.00	0.50
11.03	23.26	0.32	1.37	119.50	0.00	0.50
11.10	24.55	0.29	1.19	119.50	0.00	0.50
11.16	25.38	0.28	1.10	119.50	0.00	0.50
11.23	24.46	0.28	1.13	119.50	0.00	0.50
11.29	23.63	0.26	1.12	119.50	0.00	0.50
11.36	23.63	0.26	1.09	119.50	0.00	0.50
11.42	23.63	0.25	1.07	119.50	0.00	0.50
11.49	23.63	0.24	1.03	119.50	0.00	0.50
11.56	24.37	0.22	0.92	119.50	0.00	0.50
11.63	25.10	0.19	0.76	119.50	0.00	0.50
11.69	26.03	0.16	0.61	119.50	0.00	0.50
11.76	26.77	0.15	0.57	119.50	0.00	0.50
11.82	27.41	0.16	0.57	119.50	0.00	0.50
11.89	27.41	0.16	0.58	119.50	0.00	0.50
11.95	27.97	0.17	0.61	119.50	0.00	0.50
12.02	27.13	0.19	0.70	119.50	0.00	0.50
12.09	27.04	0.23	0.84	119.50	0.00	0.50
12.15	26.86	0.27	1.01	119.50	0.00	0.50
12.22	25.38	0.31	1.20	119.50	0.00	0.50
12.29	23.54	0.35	1.47	119.50	0.00	0.50
12.35	22.15	0.38	1.70	119.50	0.00	0.50
12.42	21.32	0.40	1.88	119.50	0.00	0.50
12.48	20.49	0.41	2.00	119.50	0.00	0.50
12.54	19.29	0.42	2.19	119.50	0.00	0.50
12.61	17.81	0.51	2.84	119.50	0.00	0.50
12.67	16.52	0.60	3.64	119.50	0.00	0.50
12.73	15.51	0.64	4.13	119.50	0.00	0.50
12.80	15.87	0.65	4.11	119.50	0.00	0.50
12.87	17.07	0.67	3.91	119.50	0.00	0.50
12.93	20.30	0.65	3.18	119.50	0.00	0.50
13.00	25.10	0.62	2.45	119.50	0.00	0.50
13.07	27.04	0.62	2.31	119.50	0.00	0.50

13.13	25.38	0.63	2.49	119.50	0.00	0.50
13.19	22.43	0.61	2.72	119.50	0.00	0.50
13.25	19.47	0.56	2.89	119.50	0.00	0.50
13.32	16.71	0.51	3.07	119.50	0.00	0.50
13.38	14.67	0.50	3.38	119.50	0.00	0.50
13.45	13.29	0.46	3.48	119.50	0.00	0.50
13.52	12.74	0.41	3.23	119.50	0.00	0.50
13.61	12.37	0.33	2.64	119.50	0.00	0.50
13.67	12.18	0.28	2.26	119.50	0.00	0.50
13.74	12.09	0.25	2.07	119.50	0.00	0.50
13.81	11.81	0.24	2.02	119.50	0.00	0.50
13.87	11.72	0.23	2.01	119.50	0.00	0.50
13.91	11.72	0.23	2.01	119.50	0.00	0.50
13.97	11.72	0.23	2.00	119.50	0.00	0.50
14.05	11.35	0.23	2.04	119.50	0.00	0.50
14.12	11.54	0.23	2.00	119.50	0.00	0.50
14.18	11.35	0.23	2.04	119.50	0.00	0.50
14.25	11.35	0.23	2.04	119.50	0.00	0.50
14.31	11.35	0.24	2.12	119.50	0.00	0.50
14.38	11.35	0.26	2.30	119.50	0.00	0.50
14.44	11.54	0.27	2.33	119.50	0.00	0.50
14.51	11.91	0.27	2.29	119.50	0.00	0.50
14.57	12.00	0.27	2.22	119.50	0.00	0.50
14.64	12.18	0.26	2.14	119.50	0.00	0.50
14.70	11.72	0.25	2.12	119.50	0.00	0.50
14.76	11.35	0.23	2.05	119.50	0.00	0.50
14.86	10.71	0.21	1.92	119.50	0.00	0.50
14.92	10.34	0.19	1.82	119.50	0.00	0.50
14.98	10.06	0.18	1.75	119.50	0.00	0.50
15.04	9.78	0.17	1.77	122.20	0.00	0.50
15.11	9.69	0.17	1.74	122.20	0.00	0.50
15.18	9.97	0.17	1.72	122.20	0.00	0.50
15.24	10.34	0.17	1.67	122.20	0.00	0.50
15.30	10.34	0.17	1.63	122.20	0.00	0.50
15.37	10.06	0.16	1.63	122.20	0.00	0.50
15.44	9.69	0.17	1.70	122.20	0.00	0.50
15.51	9.23	0.18	1.91	122.20	0.00	0.50
15.57	8.86	0.20	2.21	122.20	0.00	0.50
15.64	9.18	0.23	2.54	122.20	0.00	0.50
15.70	8.49	0.29	3.45	122.20	0.00	0.50
15.77	9.14	0.37	3.99	122.20	0.00	0.50
15.83	10.52	0.42	4.00	122.20	0.00	0.50
15.90	12.64	0.45	3.54	122.20	0.00	0.50
15.96	14.77	0.49	3.28	122.20	0.00	0.50
16.03	16.24	0.56	3.44	122.20	0.00	0.50
16.10	17.54	0.63	3.61	122.20	0.00	0.50
16.17	18.46	0.67	3.65	122.20	0.00	0.50
16.23	20.21	0.68	3.34	122.20	0.00	0.50
16.30	22.70	0.66	2.92	122.20	0.00	0.50
16.36	25.20	0.68	2.70	122.20	0.00	0.50

16.43	25.57	0.73	2.85	122.20	0.00	0.50
16.49	25.66	0.77	3.00	122.20	0.00	0.50
16.55	25.57	0.79	3.10	122.20	0.00	0.50
16.62	25.57	0.83	3.25	122.20	0.00	0.50
16.69	28.98	0.57	1.97	122.20	0.00	0.50
16.75	34.70	0.24	0.68	122.20	0.00	0.50
16.82	40.52	0.25	0.61	122.20	0.00	0.50
16.89	44.30	0.22	0.50	122.20	0.00	0.50
16.95	45.87	0.21	0.46	122.20	0.00	0.50
17.01	43.38	0.23	0.53	122.20	0.00	0.50
17.08	41.35	0.27	0.66	122.20	0.00	0.50
17.15	40.43	0.35	0.88	122.20	0.00	0.50
17.21	35.16	0.47	1.34	122.20	0.00	0.50
17.28	29.35	0.60	2.06	122.20	0.00	0.50
17.34	24.37	0.72	2.96	122.20	0.00	0.50
17.41	20.21	0.78	3.87	122.20	0.00	0.50
17.47	17.72	0.77	4.35	122.20	0.00	0.50
17.54	16.34	0.71	4.33	122.20	0.00	0.50
17.61	15.51	0.59	3.83	122.20	0.00	0.50
17.67	14.21	0.47	3.27	122.20	0.00	0.50
17.74	12.46	0.36	2.91	122.20	0.00	0.50
17.80	11.44	0.29	2.54	122.20	0.00	0.50
17.87	10.34	0.25	2.38	122.20	0.00	0.50
17.93	9.41	0.23	2.43	122.20	0.00	0.50
18.00	9.46	0.24	2.51	122.20	0.00	0.50
18.06	9.46	0.26	2.76	122.20	0.00	0.50
18.13	9.51	0.28	2.95	122.20	0.00	0.50
18.20	10.61	0.29	2.72	122.20	0.00	0.50
18.26	11.91	0.30	2.55	122.20	0.00	0.50
18.33	13.38	0.34	2.52	122.20	0.00	0.50
18.39	14.21	0.38	2.70	122.20	0.00	0.50
18.45	14.67	0.42	2.88	122.20	0.00	0.50
18.52	14.77	0.44	2.98	122.20	0.00	0.50
18.58	15.14	0.44	2.90	122.20	0.00	0.50
18.65	15.97	0.44	2.77	122.20	0.00	0.50
18.71	17.35	0.50	2.89	122.20	0.00	0.50
18.78	18.55	0.63	3.39	122.20	0.00	0.50
18.84	19.20	0.79	4.09	122.20	0.00	0.50
18.91	19.66	0.96	4.86	122.20	0.00	0.50
18.97	21.04	1.10	5.22	122.20	0.00	0.50
19.03	24.92	1.22	4.89	122.20	0.00	0.50
19.10	29.53	1.32	4.47	122.20	0.00	0.50
19.17	32.58	1.39	4.28	122.20	0.00	0.50
19.24	33.60	1.44	4.29	122.20	0.00	0.50
19.30	34.33	1.46	4.26	122.20	0.00	0.50
19.37	36.64	1.48	4.03	122.20	0.00	0.50
19.43	40.15	1.50	3.73	122.20	0.00	0.50
19.50	44.03	1.51	3.42	122.20	0.00	0.50
19.56	47.35	1.49	3.14	122.20	0.00	0.50
19.63	50.85	1.42	2.79	122.20	0.00	0.50

19.69	53.99	1.04	1.94	122.20	0.00	0.50
19.76	56.76	0.50	0.88	122.20	0.00	0.50
19.83	59.16	0.64	1.08	122.20	0.00	0.50
19.90	60.73	0.75	1.23	122.20	0.00	0.50
19.96	62.30	0.79	1.26	122.20	0.00	0.50
20.02	63.31	0.78	1.24	124.20	0.00	0.50
20.10	61.56	0.78	1.27	124.20	0.00	0.50
20.16	64.98	0.78	1.20	124.20	0.00	0.50
20.22	65.16	0.79	1.22	124.20	0.00	0.50
20.29	65.44	0.83	1.27	124.20	0.00	0.50
20.35	65.81	0.85	1.29	124.20	0.00	0.50
20.42	66.27	0.83	1.25	124.20	0.00	0.50
20.49	66.64	0.80	1.20	124.20	0.00	0.50
20.56	67.38	0.77	1.14	124.20	0.00	0.50
20.62	68.48	0.74	1.08	124.20	0.00	0.50
20.68	69.04	0.75	1.08	124.20	0.00	0.50
20.75	69.59	0.80	1.14	124.20	0.00	0.50
20.82	69.68	0.88	1.26	124.20	0.00	0.50
20.88	69.59	0.96	1.38	124.20	0.00	0.50
20.95	69.04	1.06	1.53	124.20	0.00	0.50
21.01	68.21	1.14	1.67	124.20	0.00	0.50
21.08	68.76	1.17	1.71	124.20	0.00	0.50
21.14	71.16	1.08	1.51	124.20	0.00	0.50
21.21	73.47	0.89	1.21	124.20	0.00	0.50
21.27	74.76	0.76	1.02	124.20	0.00	0.50
21.34	75.50	0.72	0.95	124.20	0.00	0.50
21.40	75.68	0.72	0.96	124.20	0.00	0.50
21.47	76.05	0.75	0.99	124.20	0.00	0.50
21.53	73.74	0.78	1.06	124.20	0.00	0.50
21.60	71.07	0.82	1.16	124.20	0.00	0.50
21.67	67.10	0.89	1.33	124.20	0.00	0.50
21.73	63.04	0.98	1.55	124.20	0.00	0.50
21.79	59.16	1.07	1.81	124.20	0.00	0.50
21.86	55.84	1.18	2.12	124.20	0.00	0.50
21.93	52.89	1.27	2.40	124.20	0.00	0.50
21.99	50.58	1.32	2.60	124.20	0.00	0.50
22.05	48.55	1.32	2.73	124.20	0.00	0.50
22.12	47.16	1.30	2.76	124.20	0.00	0.50
22.18	46.61	1.26	2.70	124.20	0.00	0.50
22.24	47.26	1.24	2.63	124.20	0.00	0.50
22.31	49.65	1.24	2.49	124.20	0.00	0.50
22.37	53.44	1.21	2.26	124.20	0.00	0.50
22.47	56.58	1.10	1.95	124.20	0.00	0.50
22.50	56.76	1.06	1.87	124.20	0.00	0.50
22.57	56.76	0.88	1.55	124.20	0.00	0.50
22.64	55.75	0.58	1.05	124.20	0.00	0.50
22.70	54.27	0.57	1.05	124.20	0.00	0.50
22.77	52.33	0.61	1.17	124.20	0.00	0.50
22.84	49.01	0.69	1.41	124.20	0.00	0.50
22.90	43.10	0.78	1.81	124.20	0.00	0.50

22.97	31.38	0.86	2.72	124.20	0.00	0.50
23.03	26.21	0.91	3.47	124.20	0.00	0.50
23.10	20.21	0.91	4.49	124.20	0.00	0.50
23.16	16.80	0.84	5.02	124.20	0.00	0.50
23.23	16.06	0.75	4.67	124.20	0.00	0.50
23.29	15.41	0.63	4.11	124.20	0.00	0.50
23.36	14.12	0.52	3.70	124.20	0.00	0.50
23.42	12.00	0.44	3.67	124.20	0.00	0.50
23.49	10.80	0.38	3.53	124.20	0.00	0.50
23.59	10.34	0.26	2.55	124.20	0.00	0.50
23.62	10.34	0.22	2.08	124.20	0.00	0.50
23.71	10.43	0.14	1.35	124.20	0.00	0.50
23.78	10.61	0.12	1.13	124.20	0.00	0.50
23.85	10.80	0.11	1.03	124.20	0.00	0.50
23.91	10.43	0.12	1.10	124.20	0.00	0.50
23.97	9.88	0.13	1.27	124.20	0.00	0.50
24.03	9.69	0.13	1.38	124.20	0.00	0.50
24.10	9.69	0.13	1.38	124.20	0.00	0.50
24.17	9.60	0.12	1.29	124.20	0.00	0.50
24.23	9.60	0.12	1.24	124.20	0.00	0.50
24.30	9.60	0.12	1.25	124.20	0.00	0.50
24.36	9.60	0.12	1.29	124.20	0.00	0.50
24.43	9.78	0.14	1.38	124.20	0.00	0.50
24.49	10.06	0.16	1.54	124.20	0.00	0.50
24.56	10.52	0.19	1.77	124.20	0.00	0.50
24.63	10.98	0.22	1.99	124.20	0.00	0.50
24.69	11.63	0.26	2.28	124.20	0.00	0.50
24.76	12.64	0.34	2.71	124.20	0.00	0.50
24.82	14.67	0.43	2.96	124.20	0.00	0.50
24.88	17.54	0.51	2.88	124.20	0.00	0.50
24.95	20.95	0.56	2.66	124.20	0.00	0.50
25.01	23.81	0.58	2.44	119.80	0.00	0.50
25.08	27.87	0.57	2.06	119.80	0.00	0.50
25.14	30.46	0.58	1.90	119.80	0.00	0.50
25.21	31.84	0.62	1.94	119.80	0.00	0.50
25.27	33.32	0.66	1.98	119.80	0.00	0.50
25.34	34.80	0.68	1.96	119.80	0.00	0.50
25.41	36.92	0.69	1.87	119.80	0.00	0.50
25.47	39.50	0.69	1.75	119.80	0.00	0.50
25.53	41.44	0.68	1.65	119.80	0.00	0.50
25.60	41.53	0.65	1.57	119.80	0.00	0.50
25.67	40.70	0.43	1.07	119.80	0.00	0.50
25.74	39.69	0.38	0.94	119.80	0.00	0.50
25.80	39.04	0.47	1.21	119.80	0.00	0.50
25.87	38.76	0.52	1.35	119.80	0.00	0.50
25.93	37.93	0.53	1.39	119.80	0.00	0.50
25.99	33.41	0.52	1.57	119.80	0.00	0.50
26.05	34.06	0.58	1.71	119.80	0.00	0.50
26.11	36.18	0.64	1.78	119.80	0.00	0.50
26.18	34.52	0.70	2.03	119.80	0.00	0.50

26.25	32.76	0.75	2.28	119.80	0.00	0.50
26.34	30.09	0.79	2.64	119.80	0.00	0.50
26.40	27.97	0.80	2.85	119.80	0.00	0.50
26.46	26.49	0.77	2.93	119.80	0.00	0.50
26.53	23.35	0.72	3.10	119.80	0.00	0.50
26.59	19.29	0.66	3.43	119.80	0.00	0.50
26.66	16.34	0.60	3.68	119.80	0.00	0.50
26.72	14.21	0.53	3.72	119.80	0.00	0.50
26.78	12.09	0.44	3.61	119.80	0.00	0.50
26.85	10.71	0.37	3.43	119.80	0.00	0.50
26.91	10.24	0.31	3.05	119.80	0.00	0.50
26.98	10.34	0.26	2.50	119.80	0.00	0.50
27.04	10.43	0.21	2.04	119.80	0.00	0.50
27.11	10.61	0.19	1.81	119.80	0.00	0.50
27.17	10.52	0.19	1.77	119.80	0.00	0.50
27.24	10.34	0.19	1.81	119.80	0.00	0.50
27.31	10.34	0.19	1.80	119.80	0.00	0.50
27.37	10.34	0.18	1.73	119.80	0.00	0.50
27.43	10.15	0.18	1.75	119.80	0.00	0.50
27.49	10.15	0.19	1.82	119.80	0.00	0.50
27.58	10.15	0.19	1.82	119.80	0.00	0.50
27.65	10.43	0.19	1.80	119.80	0.00	0.50
27.71	10.43	0.19	1.83	119.80	0.00	0.50
27.78	10.61	0.19	1.82	119.80	0.00	0.50
27.85	10.61	0.20	1.85	119.80	0.00	0.50
27.91	10.61	0.20	1.88	119.80	0.00	0.50
27.97	10.61	0.20	1.92	119.80	0.00	0.50
28.04	10.61	0.21	1.96	119.80	0.00	0.50
28.11	10.52	0.22	2.04	119.80	0.00	0.50
28.17	10.52	0.23	2.15	119.80	0.00	0.50
28.24	10.52	0.24	2.27	119.80	0.00	0.50
28.30	10.80	0.25	2.34	119.80	0.00	0.50
28.37	10.98	0.26	2.40	119.80	0.00	0.50
28.43	11.17	0.26	2.36	119.80	0.00	0.50
28.50	11.35	0.28	2.46	119.80	0.00	0.50
28.57	11.44	0.28	2.47	119.80	0.00	0.50
28.63	11.44	0.28	2.44	119.80	0.00	0.50
28.69	11.44	0.27	2.33	119.80	0.00	0.50
28.74	11.31	0.27	2.37	119.80	0.00	0.50
28.81	11.44	0.28	2.43	119.80	0.00	0.50
28.87	11.17	0.27	2.38	119.80	0.00	0.50
28.93	11.44	0.29	2.55	119.80	0.00	0.50
29.00	12.09	0.32	2.68	119.80	0.00	0.50
29.07	12.64	0.35	2.78	119.80	0.00	0.50
29.16	13.94	0.39	2.77	119.80	0.00	0.50
29.20	14.12	0.40	2.83	119.80	0.00	0.50
29.26	14.67	0.44	2.99	119.80	0.00	0.50
29.33	15.14	0.48	3.18	119.80	0.00	0.50
29.42	14.21	0.47	3.32	119.80	0.00	0.50
29.49	13.66	0.48	3.51	119.80	0.00	0.50

29.55	13.29	0.48	3.63	119.80	0.00	0.50
29.59	13.20	0.49	3.70	119.80	0.00	0.50
29.68	13.84	0.48	3.45	119.80	0.00	0.50
29.75	14.49	0.42	2.92	119.80	0.00	0.50
29.81	14.49	0.40	2.75	119.80	0.00	0.50
29.88	14.49	0.40	2.74	119.80	0.00	0.50
29.94	13.48	0.40	3.00	119.80	0.00	0.50
30.01	13.48	0.40	2.97	123.00	0.00	0.50
30.07	13.20	0.40	3.04	123.00	0.00	0.50
30.13	13.52	0.42	3.12	123.00	0.00	0.50
30.20	13.01	0.47	3.57	123.00	0.00	0.50
30.26	13.57	0.53	3.94	123.00	0.00	0.50
30.33	14.21	0.63	4.40	123.00	0.00	0.50
30.39	15.23	0.70	4.62	123.00	0.00	0.50
30.47	16.80	0.78	4.65	123.00	0.00	0.50
30.53	18.09	0.86	4.75	123.00	0.00	0.50
30.60	18.74	0.92	4.90	123.00	0.00	0.50
30.66	19.11	0.95	4.98	123.00	0.00	0.50
30.73	19.57	0.96	4.89	123.00	0.00	0.50
30.79	20.40	0.92	4.50	123.00	0.00	0.50
30.86	20.95	0.81	3.88	123.00	0.00	0.50
30.92	21.14	0.68	3.24	123.00	0.00	0.50
30.99	20.21	0.59	2.93	123.00	0.00	0.50
31.05	19.29	0.57	2.97	123.00	0.00	0.50
31.12	17.44	0.55	3.14	123.00	0.00	0.50
31.18	15.60	0.54	3.44	123.00	0.00	0.50
31.23	13.01	0.52	3.99	123.00	0.00	0.50
31.32	14.12	0.26	1.82	123.00	0.00	0.50
31.39	12.83	0.25	1.92	123.00	0.00	0.50
31.45	12.18	0.25	2.02	123.00	0.00	0.50
31.52	11.44	0.25	2.23	123.00	0.00	0.50
31.58	10.98	0.26	2.38	123.00	0.00	0.50
31.64	10.61	0.26	2.45	123.00	0.00	0.50
31.70	10.61	0.26	2.41	123.00	0.00	0.50
31.77	10.61	0.25	2.38	123.00	0.00	0.50
31.83	10.61	0.24	2.30	123.00	0.00	0.50
31.90	10.61	0.22	2.10	123.00	0.00	0.50
31.96	10.61	0.22	2.11	123.00	0.00	0.50
32.03	10.89	0.22	2.06	123.00	0.00	0.50
32.10	10.98	0.23	2.10	123.00	0.00	0.50
32.16	10.98	0.25	2.24	123.00	0.00	0.50
32.23	10.71	0.25	2.32	123.00	0.00	0.50
32.30	10.71	0.26	2.41	123.00	0.00	0.50
32.36	10.52	0.28	2.70	123.00	0.00	0.50
32.43	10.52	0.31	2.97	123.00	0.00	0.50
32.49	10.89	0.34	3.08	123.00	0.00	0.50
32.56	10.89	0.34	3.15	123.00	0.00	0.50
32.62	10.98	0.34	3.09	123.00	0.00	0.50
32.69	11.35	0.35	3.08	123.00	0.00	0.50
32.75	11.44	0.37	3.25	123.00	0.00	0.50

32.82	11.44	0.39	3.42	123.00	0.00	0.50
32.88	11.44	0.40	3.50	123.00	0.00	0.50
32.95	11.54	0.40	3.42	123.00	0.00	0.50
33.02	11.54	0.40	3.44	123.00	0.00	0.50
33.08	11.35	0.40	3.53	123.00	0.00	0.50
33.14	11.35	0.40	3.53	123.00	0.00	0.50
33.20	10.89	0.40	3.68	123.00	0.00	0.50
33.27	10.71	0.40	3.73	123.00	0.00	0.50
33.33	10.98	0.39	3.52	123.00	0.00	0.50
33.40	11.54	0.31	2.69	123.00	0.00	0.50
33.46	12.28	0.23	1.85	123.00	0.00	0.50
33.53	13.11	0.19	1.46	123.00	0.00	0.50
33.62	13.57	0.29	2.16	123.00	0.00	0.50
33.69	13.38	0.48	3.61	123.00	0.00	0.50
33.76	13.48	0.67	4.93	123.00	0.00	0.50
33.79	14.21	0.75	5.31	123.00	0.00	0.50
33.85	17.72	0.90	5.09	123.00	0.00	0.50
33.95	27.60	1.10	3.97	123.00	0.00	0.50
34.00	39.41	1.17	2.96	123.00	0.00	0.50
34.07	44.86	1.17	2.61	123.00	0.00	0.50
34.13	50.30	1.13	2.25	123.00	0.00	0.50
34.20	58.33	1.04	1.78	123.00	0.00	0.50
34.26	66.82	0.90	1.34	123.00	0.00	0.50
34.33	74.76	0.74	0.99	123.00	0.00	0.50
34.39	79.65	0.64	0.80	123.00	0.00	0.50
34.46	81.77	0.59	0.73	123.00	0.00	0.50
34.52	82.14	0.59	0.72	123.00	0.00	0.50
34.59	81.04	0.64	0.79	123.00	0.00	0.50
34.65	80.99	0.70	0.86	123.00	0.00	0.50
34.72	80.94	0.72	0.89	123.00	0.00	0.50
34.78	84.08	0.71	0.85	123.00	0.00	0.50
34.85	89.07	0.67	0.75	123.00	0.00	0.50
34.91	94.42	0.59	0.63	123.00	0.00	0.50
34.98	101.60	0.51	0.51	123.00	0.00	0.50
35.05	109.40	0.52	0.47	123.20	0.00	0.50
35.12	118.20	0.55	0.46	123.20	0.00	0.50
35.18	126.50	0.62	0.49	123.20	0.00	0.50
35.25	135.50	0.71	0.52	123.20	0.00	0.50
35.31	143.80	0.78	0.54	123.20	0.00	0.50
35.38	150.90	0.84	0.56	123.20	0.00	0.50
35.44	155.70	0.89	0.57	123.20	0.00	0.50
35.50	158.40	0.95	0.60	123.20	0.00	0.50
35.57	160.10	1.04	0.65	123.20	0.00	0.50
35.64	160.90	1.13	0.70	123.20	0.00	0.50
35.71	160.90	1.22	0.76	123.20	0.00	0.50
35.77	160.50	1.30	0.81	123.20	0.00	0.50
35.84	159.20	1.38	0.87	123.20	0.00	0.50
35.90	157.40	1.47	0.94	123.20	0.00	0.50
35.97	154.90	1.57	1.01	123.20	0.00	0.50
36.04	152.00	1.65	1.09	123.20	0.00	0.50

36.10	147.40	1.75	1.19	123.20	0.00	0.50
36.16	141.00	1.89	1.34	123.20	0.00	0.50
36.23	133.00	1.95	1.46	123.20	0.00	0.50
36.29	125.10	1.93	1.54	123.20	0.00	0.50
36.36	119.80	2.10	1.75	123.20	0.00	0.50
36.42	120.70	2.09	1.73	123.20	0.00	0.50
36.49	128.60	1.93	1.50	123.20	0.00	0.50
36.55	132.90	1.76	1.33	123.20	0.00	0.50
36.64	135.60	1.54	1.13	123.20	0.00	0.50
36.71	141.40	1.36	0.96	123.20	0.00	0.50
36.77	150.70	1.26	0.83	123.20	0.00	0.50
36.84	157.70	1.26	0.80	123.20	0.00	0.50
36.90	161.70	1.30	0.80	123.20	0.00	0.50
36.97	161.40	1.37	0.85	123.20	0.00	0.50
37.03	160.00	1.45	0.91	123.20	0.00	0.50
37.10	159.00	1.53	0.96	123.20	0.00	0.50
37.16	158.10	1.57	1.00	123.20	0.00	0.50
37.23	156.10	1.62	1.04	123.20	0.00	0.50
37.29	154.00	1.65	1.07	123.20	0.00	0.50
37.36	151.00	1.71	1.13	123.20	0.00	0.50
37.42	147.80	1.74	1.18	123.20	0.00	0.50
37.49	146.90	1.73	1.18	123.20	0.00	0.50
37.55	152.20	1.68	1.11	123.20	0.00	0.50
37.62	165.20	1.61	0.98	123.20	0.00	0.50
37.68	178.40	1.53	0.86	123.20	0.00	0.50
37.75	193.30	1.42	0.74	123.20	0.00	0.50
37.81	201.20	1.33	0.66	123.20	0.00	0.50
37.88	202.90	1.28	0.63	123.20	0.00	0.50
37.95	203.20	1.28	0.63	123.20	0.00	0.50
38.01	203.40	1.30	0.64	123.20	0.00	0.50
38.08	203.50	1.37	0.67	123.20	0.00	0.50
38.14	203.40	1.47	0.72	123.20	0.00	0.50
38.21	204.70	1.60	0.78	123.20	0.00	0.50
38.27	208.50	1.72	0.82	123.20	0.00	0.50
38.34	213.20	1.87	0.88	123.20	0.00	0.50
38.40	218.20	2.03	0.93	123.20	0.00	0.50
38.47	222.20	2.19	0.99	123.20	0.00	0.50
38.54	223.70	2.35	1.05	123.20	0.00	0.50
38.60	222.80	2.50	1.12	123.20	0.00	0.50
38.67	221.90	2.63	1.19	123.20	0.00	0.50
38.74	219.90	2.74	1.25	123.20	0.00	0.50
38.80	218.80	2.83	1.29	123.20	0.00	0.50
38.87	218.10	2.88	1.32	123.20	0.00	0.50
38.94	217.70	2.91	1.34	123.20	0.00	0.50
39.00	217.90	2.93	1.34	123.20	0.00	0.50
39.06	216.30	2.97	1.37	123.20	0.00	0.50
39.13	214.30	3.01	1.40	123.20	0.00	0.50
39.19	211.70	3.07	1.45	123.20	0.00	0.50
39.25	209.60	2.68	1.28	123.20	0.00	0.50
39.32	207.00	1.77	0.86	123.20	0.00	0.50

39.39	204.90	1.85	0.90	123.20	0.00	0.50
39.46	204.50	1.93	0.95	123.20	0.00	0.50
39.52	204.20	2.03	0.99	123.20	0.00	0.50
39.58	197.10	2.10	1.06	123.20	0.00	0.50
39.66	190.60	2.18	1.14	123.20	0.00	0.50
39.72	199.70	2.26	1.13	123.20	0.00	0.50
39.79	200.60	2.43	1.21	123.20	0.00	0.50
39.85	200.90	2.58	1.29	123.20	0.00	0.50
39.92	200.10	2.67	1.34	123.20	0.00	0.50
39.98	198.90	2.72	1.37	123.20	0.00	0.50
40.05	197.50	2.77	1.40	123.20	0.00	0.50
40.09	197.00	2.79	1.41	123.20	0.00	0.50
40.15	196.50	2.81	1.43	123.20	0.00	0.50
40.22	196.10	2.83	1.44	123.20	0.00	0.50
40.29	196.80	2.86	1.45	123.20	0.00	0.50
40.38	198.70	2.87	1.45	123.20	0.00	0.50
40.45	201.20	2.89	1.44	123.20	0.00	0.50
40.48	201.70	2.91	1.44	123.20	0.00	0.50
40.55	202.10	2.91	1.44	123.20	0.00	0.50
40.64	200.60	2.92	1.46	123.20	0.00	0.50
40.70	197.90	2.91	1.47	123.20	0.00	0.50
40.77	193.30	2.88	1.49	123.20	0.00	0.50
40.83	189.20	2.85	1.50	123.20	0.00	0.50
40.90	186.10	2.80	1.50	123.20	0.00	0.50
40.97	184.50	2.75	1.49	123.20	0.00	0.50
41.03	182.80	2.72	1.49	123.20	0.00	0.50
41.09	180.70	2.68	1.48	123.20	0.00	0.50
41.16	178.80	2.63	1.47	123.20	0.00	0.50
41.22	175.20	2.58	1.47	123.20	0.00	0.50
41.29	175.50	2.52	1.43	123.20	0.00	0.50
41.35	175.50	2.42	1.38	123.20	0.00	0.50
41.42	175.90	2.19	1.25	123.20	0.00	0.50
41.48	187.60	1.95	1.04	123.20	0.00	0.50
41.55	198.60	1.68	0.85	123.20	0.00	0.50
41.61	206.80	1.43	0.69	123.20	0.00	0.50
41.68	207.50	1.54	0.74	123.20	0.00	0.50
41.74	203.80	1.59	0.78	123.20	0.00	0.50
41.81	197.70	1.63	0.83	123.20	0.00	0.50
41.88	190.20	1.69	0.89	123.20	0.00	0.50
41.95	157.70	1.74	1.10	123.20	0.00	0.50
42.01	172.70	1.73	1.00	123.20	0.00	0.50
42.08	167.30	1.72	1.03	123.20	0.00	0.50
42.14	164.10	1.79	1.09	123.20	0.00	0.50
42.21	164.60	1.94	1.18	123.20	0.00	0.50
42.27	170.10	2.03	1.19	123.20	0.00	0.50
42.34	178.30	1.93	1.08	123.20	0.00	0.50
42.40	184.50	1.70	0.92	123.20	0.00	0.50
42.46	183.00	1.52	0.83	123.20	0.00	0.50
42.53	174.90	1.48	0.84	123.20	0.00	0.50
42.59	166.20	1.44	0.87	123.20	0.00	0.50

42.66	157.60	1.55	0.98	123.20	0.00	0.50
42.72	147.30	1.74	1.18	123.20	0.00	0.50
42.79	133.00	1.91	1.44	123.20	0.00	0.50
42.86	116.00	2.02	1.74	123.20	0.00	0.50
42.93	101.50	2.08	2.05	123.20	0.00	0.50
42.99	93.40	2.10	2.24	123.20	0.00	0.50
43.06	89.25	2.10	2.35	123.20	0.00	0.50
43.13	87.68	2.11	2.40	123.20	0.00	0.50
43.19	88.79	2.13	2.39	123.20	0.00	0.50
43.26	91.28	2.15	2.36	123.20	0.00	0.50
43.32	97.56	2.17	2.23	123.20	0.00	0.50
43.38	104.80	2.16	2.06	123.20	0.00	0.50
43.45	111.90	2.07	1.85	123.20	0.00	0.50
43.51	118.90	1.98	1.67	123.20	0.00	0.50
43.57	125.60	1.98	1.58	123.20	0.00	0.50
43.64	133.30	2.00	1.50	123.20	0.00	0.50
43.71	139.30	2.04	1.47	123.20	0.00	0.50
43.77	143.80	2.08	1.45	123.20	0.00	0.50
43.84	145.00	2.10	1.45	123.20	0.00	0.50
43.91	145.80	2.11	1.44	123.20	0.00	0.50
43.97	146.10	2.09	1.43	123.20	0.00	0.50
44.04	146.00	2.06	1.41	123.20	0.00	0.50
44.10	147.20	2.04	1.38	123.20	0.00	0.50
44.17	147.70	2.02	1.37	123.20	0.00	0.50
44.23	146.40	2.05	1.40	123.20	0.00	0.50
44.30	142.60	2.11	1.48	123.20	0.00	0.50
44.37	135.00	2.13	1.58	123.20	0.00	0.50
44.43	128.00	2.10	1.64	123.20	0.00	0.50
44.50	121.50	2.11	1.74	123.20	0.00	0.50
44.56	116.60	2.18	1.87	123.20	0.00	0.50
44.63	109.90	2.30	2.10	123.20	0.00	0.50
44.70	101.40	2.35	2.32	123.20	0.00	0.50
44.77	97.93	2.30	2.35	123.20	0.00	0.50
44.84	95.34	2.24	2.35	123.20	0.00	0.50
44.90	98.76	2.12	2.14	123.20	0.00	0.50
44.97	104.10	1.92	1.85	123.20	0.00	0.50
45.03	105.50	1.74	1.65	124.10	0.00	0.50
45.10	104.10	1.61	1.54	124.10	0.00	0.50
45.17	99.49	1.53	1.54	124.10	0.00	0.50
45.23	92.11	1.50	1.63	124.10	0.00	0.50
45.30	84.27	1.50	1.78	124.10	0.00	0.50
45.36	73.47	1.50	2.05	124.10	0.00	0.50
45.42	61.10	1.51	2.47	124.10	0.00	0.50
45.49	48.82	1.51	3.09	124.10	0.00	0.50
45.55	40.89	1.50	3.68	124.10	0.00	0.50
45.61	33.60	1.50	4.46	124.10	0.00	0.50
45.68	27.97	1.46	5.21	124.10	0.00	0.50
45.75	26.21	1.33	5.09	124.10	0.00	0.50
45.81	25.10	1.14	4.53	124.10	0.00	0.50
45.88	23.17	0.92	3.98	124.10	0.00	0.50

45.94	21.69	0.79	3.65	124.10	0.00	0.50
46.01	20.30	0.76	3.72	124.10	0.00	0.50
46.07	20.40	0.72	3.52	124.10	0.00	0.50
46.13	20.49	0.68	3.34	124.10	0.00	0.50
46.20	21.14	0.69	3.28	124.10	0.00	0.50
46.26	22.43	0.75	3.34	124.10	0.00	0.50
46.33	24.27	0.84	3.47	124.10	0.00	0.50
46.39	26.67	0.96	3.60	124.10	0.00	0.50
46.46	28.98	1.09	3.77	124.10	0.00	0.50
46.52	30.46	1.21	3.97	124.10	0.00	0.50
46.59	31.84	1.32	4.13	124.10	0.00	0.50
46.65	32.40	1.42	4.39	124.10	0.00	0.50
46.72	32.58	1.52	4.67	124.10	0.00	0.50
46.79	32.49	1.58	4.87	124.10	0.00	0.50
46.86	33.32	1.64	4.93	124.10	0.00	0.50
46.92	35.07	1.77	5.06	124.10	0.00	0.50
46.99	37.47	1.91	5.10	124.10	0.00	0.50
47.05	40.70	1.94	4.76	124.10	0.00	0.50
47.12	41.63	1.92	4.60	124.10	0.00	0.50
47.18	38.95	1.94	4.98	124.10	0.00	0.50
47.25	36.00	2.00	5.56	124.10	0.00	0.50
47.31	36.09	1.95	5.41	124.10	0.00	0.50
47.38	36.18	1.83	5.07	124.10	0.00	0.50
47.44	42.27	2.29	5.41	124.10	0.00	0.50
47.51	48.73	2.64	5.43	124.10	0.00	0.50
47.58	54.18	3.01	5.55	124.10	0.00	0.50
47.64	57.13	3.34	5.85	124.10	0.00	0.50
47.72	65.71	3.60	5.48	124.10	0.00	0.50
47.79	67.19	3.66	5.44	124.10	0.00	0.50
47.85	69.22	3.60	5.20	124.10	0.00	0.50
47.92	80.11	3.48	4.34	124.10	0.00	0.50
47.98	99.86	3.30	3.30	124.10	0.00	0.50
48.05	121.40	3.12	2.57	124.10	0.00	0.50
48.11	138.80	3.01	2.17	124.10	0.00	0.50
48.17	149.10	2.91	1.95	124.10	0.00	0.50
48.24	154.10	2.88	1.87	124.10	0.00	0.50
48.31	155.60	2.90	1.86	124.10	0.00	0.50
48.38	155.10	2.91	1.88	124.10	0.00	0.50
48.44	150.70	2.95	1.96	124.10	0.00	0.50
48.51	144.40	3.00	2.08	124.10	0.00	0.50
48.57	137.40	3.03	2.21	124.10	0.00	0.50
48.63	130.20	3.08	2.36	124.10	0.00	0.50
48.70	120.50	3.05	2.53	124.10	0.00	0.50
48.76	113.20	2.89	2.55	124.10	0.00	0.50
48.83	108.90	2.69	2.47	124.10	0.00	0.50
48.89	108.80	2.50	2.30	124.10	0.00	0.50
48.96	110.70	2.31	2.09	124.10	0.00	0.50
49.02	108.30	2.21	2.04	124.10	0.00	0.50
49.09	99.40	2.20	2.22	124.10	0.00	0.50
49.15	82.70	2.21	2.67	124.10	0.00	0.50

49.21	65.62	2.20	3.36	124.10	0.00	0.50
49.28	52.42	2.13	4.06	124.10	0.00	0.50
49.34	45.22	2.02	4.46	124.10	0.00	0.50
49.41	39.23	1.91	4.87	124.10	0.00	0.50
49.50	31.38	1.74	5.53	124.10	0.00	0.50
49.57	27.87	1.61	5.78	124.10	0.00	0.50
49.63	27.13	1.43	5.28	124.10	0.00	0.50
49.70	27.69	1.33	4.82	124.10	0.00	0.50
49.77	28.61	1.27	4.45	124.10	0.00	0.50
49.80	29.07	1.27	4.38	124.10	0.00	0.50
49.87	30.27	1.34	4.41	124.10	0.00	0.50
49.93	31.20	1.38	4.41	124.10	0.00	0.50
50.02	30.00	0.00	0.00	123.10	0.00	0.50
50.07	33.13	0.00	0.00	123.10	0.00	0.50
50.14	33.50	0.00	0.00	123.10	0.00	0.50
50.20	34.15	0.00	0.00	123.10	0.00	0.50
50.26	37.38	0.00	0.00	123.10	0.00	0.50
50.33	41.07	0.00	0.00	123.10	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Settlement of Saturated Sands=4.62 in.
Settlement of Unsaturated Sands=0.64 in.
Total Settlement of Saturated and Unsaturated Sands=5.27 in.
Differential Settlement=2.633 to 3.475 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.63	5.00	4.62	0.64	5.27
0.05	2.08	0.63	5.00	4.62	0.64	5.27
0.10	2.08	0.63	5.00	4.62	0.64	5.27
0.15	2.08	0.63	5.00	4.62	0.64	5.27
0.20	2.08	0.63	5.00	4.62	0.64	5.27
0.25	2.08	0.63	5.00	4.62	0.64	5.27
0.30	2.08	0.63	5.00	4.62	0.64	5.27
0.35	2.08	0.63	5.00	4.62	0.64	5.27
0.40	2.08	0.63	5.00	4.62	0.64	5.27
0.45	1.58	0.63	5.00	4.62	0.64	5.27
0.50	1.04	0.63	5.00	4.62	0.64	5.27
0.55	0.70	0.63	5.00	4.62	0.64	5.27
0.60	0.49	0.63	5.00	4.62	0.64	5.27
0.65	0.35	0.63	5.00	4.62	0.64	5.26
0.70	0.29	0.63	5.00	4.62	0.64	5.26
0.75	0.24	0.63	5.00	4.62	0.64	5.26
0.80	0.21	0.63	5.00	4.62	0.64	5.26
0.85	0.18	0.63	5.00	4.62	0.64	5.26
0.90	0.16	0.63	5.00	4.62	0.64	5.26

0.95	0.14	0.63	5.00	4.62	0.64	5.26
1.00	0.13	0.63	5.00	4.62	0.64	5.26
1.05	0.12	0.63	5.00	4.62	0.64	5.26
1.10	0.12	0.63	5.00	4.62	0.64	5.26
1.15	0.11	0.63	5.00	4.62	0.64	5.26
1.20	0.11	0.63	5.00	4.62	0.64	5.26
1.25	0.10	0.63	5.00	4.62	0.63	5.26
1.30	0.10	0.63	5.00	4.62	0.63	5.26
1.35	0.10	0.63	5.00	4.62	0.63	5.26
1.40	0.09	0.63	5.00	4.62	0.63	5.25
1.45	0.09	0.63	5.00	4.62	0.62	5.25
1.50	0.09	0.63	5.00	4.62	0.62	5.24
1.55	0.09	0.63	5.00	4.62	0.61	5.23
1.60	0.10	0.63	5.00	4.62	0.60	5.22
1.65	0.10	0.63	5.00	4.62	0.59	5.21
1.70	0.10	0.63	5.00	4.62	0.58	5.20
1.75	0.10	0.63	5.00	4.62	0.57	5.20
1.80	0.11	0.63	5.00	4.62	0.56	5.19
1.85	0.11	0.63	5.00	4.62	0.55	5.18
1.90	0.11	0.63	5.00	4.62	0.54	5.17
1.95	0.12	0.63	5.00	4.62	0.53	5.15
2.00	0.14	0.63	5.00	4.62	0.52	5.15
2.05	0.16	0.63	5.00	4.62	0.52	5.14
2.10	0.17	0.63	5.00	4.62	0.51	5.14
2.15	0.18	0.63	5.00	4.62	0.51	5.14
2.20	0.19	0.63	5.00	4.62	0.51	5.13
2.25	0.21	0.63	5.00	4.62	0.50	5.13
2.30	0.22	0.63	5.00	4.62	0.50	5.13
2.35	0.22	0.63	5.00	4.62	0.50	5.12
2.40	0.22	0.63	5.00	4.62	0.49	5.12
2.45	0.22	0.63	5.00	4.62	0.49	5.11
2.50	0.22	0.63	5.00	4.62	0.48	5.11
2.55	0.21	0.63	5.00	4.62	0.47	5.10
2.60	0.20	0.63	5.00	4.62	0.46	5.08
2.65	0.19	0.63	5.00	4.62	0.45	5.07
2.70	0.19	0.63	5.00	4.62	0.44	5.06
2.75	0.18	0.63	5.00	4.62	0.42	5.05
2.80	0.17	0.63	5.00	4.62	0.41	5.03
2.85	0.16	0.63	5.00	4.62	0.40	5.02
2.90	0.15	0.63	5.00	4.62	0.38	5.01
2.95	0.15	0.63	5.00	4.62	0.37	4.99
3.00	0.15	0.63	5.00	4.62	0.35	4.98
3.05	0.15	0.63	5.00	4.62	0.34	4.96
3.10	0.14	0.63	5.00	4.62	0.32	4.95
3.15	0.14	0.63	5.00	4.62	0.31	4.93
3.20	0.15	0.63	5.00	4.62	0.30	4.92
3.25	0.15	0.63	5.00	4.62	0.28	4.91
3.30	0.15	0.63	5.00	4.62	0.27	4.89
3.35	0.15	0.63	5.00	4.62	0.25	4.88
3.40	0.15	0.63	5.00	4.62	0.24	4.87

3.45	0.16	0.63	5.00	4.62	0.23	4.85
3.50	0.16	0.63	5.00	4.62	0.22	4.84
3.55	0.16	0.63	5.00	4.62	0.20	4.83
3.60	0.17	0.63	5.00	4.62	0.19	4.82
3.65	0.17	0.63	5.00	4.62	0.18	4.81
3.70	0.17	0.63	5.00	4.62	0.17	4.79
3.75	0.17	0.63	5.00	4.62	0.16	4.78
3.80	0.17	0.63	5.00	4.62	0.15	4.77
3.85	0.16	0.63	5.00	4.62	0.14	4.76
3.90	0.17	0.63	5.00	4.62	0.13	4.75
3.95	0.17	0.63	5.00	4.62	0.12	4.74
4.00	0.17	0.63	5.00	4.62	0.11	4.73
4.05	0.17	0.63	5.00	4.62	0.10	4.72
4.10	0.16	0.63	5.00	4.62	0.09	4.71
4.15	0.16	0.63	5.00	4.62	0.08	4.71
4.20	0.17	0.63	5.00	4.62	0.08	4.70
4.25	0.17	0.62	5.00	4.62	0.07	4.70
4.30	0.18	0.62	5.00	4.62	0.07	4.69
4.35	0.18	0.62	5.00	4.62	0.06	4.69
4.40	0.18	0.62	5.00	4.62	0.06	4.68
4.45	0.18	0.62	5.00	4.62	0.06	4.68
4.50	0.19	0.62	5.00	4.62	0.05	4.67
4.55	0.19	0.62	5.00	4.62	0.05	4.67
4.60	0.19	0.62	5.00	4.62	0.04	4.66
4.65	0.20	0.62	5.00	4.62	0.03	4.66
4.70	0.20	0.62	5.00	4.62	0.03	4.65
4.75	0.21	0.62	5.00	4.62	0.02	4.65
4.80	0.22	0.62	5.00	4.62	0.02	4.64
4.85	0.25	0.62	5.00	4.62	0.01	4.64
4.90	0.26	0.62	5.00	4.62	0.01	4.63
4.95	0.27	0.62	5.00	4.62	0.00	4.63
5.00	0.29	0.62	0.46*	4.62	0.00	4.62
5.05	0.33	0.63	0.53*	4.61	0.00	4.61
5.10	0.39	0.63	0.62*	4.61	0.00	4.61
5.15	0.43	0.63	0.68*	4.60	0.00	4.60
5.20	0.45	0.64	0.71*	4.59	0.00	4.59
5.25	0.47	0.64	0.74*	4.59	0.00	4.59
5.30	0.48	0.64	0.75*	4.58	0.00	4.58
5.35	0.48	0.65	0.74*	4.58	0.00	4.58
5.40	0.47	0.65	0.72*	4.57	0.00	4.57
5.45	0.45	0.65	0.70*	4.57	0.00	4.57
5.50	0.45	0.65	0.69*	4.56	0.00	4.56
5.55	0.45	0.66	0.68*	4.55	0.00	4.55
5.60	0.44	0.66	0.67*	4.55	0.00	4.55
5.65	0.44	0.66	0.67*	4.54	0.00	4.54
5.70	0.44	0.67	0.66*	4.53	0.00	4.53
5.75	0.44	0.67	0.65*	4.53	0.00	4.53
5.80	0.43	0.67	0.64*	4.52	0.00	4.52
5.85	0.43	0.67	0.63*	4.51	0.00	4.51
5.90	0.42	0.68	0.62*	4.51	0.00	4.51

5.95	0.41	0.68	0.61*	4.50	0.00	4.50
6.00	0.40	0.68	0.59*	4.49	0.00	4.49
6.05	0.39	0.68	0.57*	4.49	0.00	4.49
6.10	0.38	0.69	0.55*	4.48	0.00	4.48
6.15	0.36	0.69	0.53*	4.47	0.00	4.47
6.20	0.35	0.69	0.50*	4.46	0.00	4.46
6.25	0.33	0.69	0.47*	4.45	0.00	4.45
6.30	0.31	0.70	0.45*	4.44	0.00	4.44
6.35	0.30	0.70	0.42*	4.43	0.00	4.43
6.40	0.27	0.70	0.39*	4.42	0.00	4.42
6.45	0.24	0.70	0.35*	4.41	0.00	4.41
6.50	0.22	0.71	0.31*	4.40	0.00	4.40
6.55	0.20	0.71	0.28*	4.39	0.00	4.39
6.60	0.18	0.71	0.25*	4.38	0.00	4.38
6.65	0.17	0.71	0.23*	4.36	0.00	4.36
6.70	0.16	0.72	0.22*	4.35	0.00	4.35
6.75	0.15	0.72	0.20*	4.34	0.00	4.34
6.80	0.14	0.72	0.19*	4.32	0.00	4.32
6.85	0.13	0.72	0.18*	4.31	0.00	4.31
6.90	0.13	0.73	0.18*	4.29	0.00	4.29
6.95	0.13	0.73	0.18*	4.28	0.00	4.28
7.00	0.13	0.73	0.17*	4.27	0.00	4.27
7.05	0.13	0.73	0.17*	4.25	0.00	4.25
7.10	0.13	0.73	0.17*	4.24	0.00	4.24
7.15	0.13	0.74	0.17*	4.22	0.00	4.22
7.20	0.12	0.74	0.17*	4.21	0.00	4.21
7.25	0.12	0.74	0.17*	4.19	0.00	4.19
7.30	0.12	0.74	0.17*	4.18	0.00	4.18
7.35	0.12	0.74	0.17*	4.16	0.00	4.16
7.40	0.13	0.75	0.17*	4.15	0.00	4.15
7.45	0.13	0.75	0.17*	4.13	0.00	4.13
7.50	0.13	0.75	0.17*	4.12	0.00	4.12
7.55	0.13	0.75	0.17*	4.10	0.00	4.10
7.60	0.13	0.75	0.17*	4.09	0.00	4.09
7.65	0.13	0.76	0.17*	4.08	0.00	4.08
7.70	0.13	0.76	0.16*	4.06	0.00	4.06
7.75	0.12	0.76	0.16*	4.05	0.00	4.05
7.80	0.12	0.76	0.16*	4.03	0.00	4.03
7.85	0.12	0.76	0.16*	4.02	0.00	4.02
7.90	0.12	0.77	0.16*	4.00	0.00	4.00
7.95	0.12	0.77	0.16*	3.98	0.00	3.98
8.00	0.12	0.77	0.16*	3.97	0.00	3.97
8.05	0.12	0.77	0.15*	3.95	0.00	3.95
8.10	0.12	0.77	0.15*	3.94	0.00	3.94
8.15	0.12	0.78	0.15*	3.92	0.00	3.92
8.20	0.12	0.78	0.16*	3.91	0.00	3.91
8.25	0.13	0.78	0.17*	3.89	0.00	3.89
8.30	0.14	0.78	0.17*	3.88	0.00	3.88
8.35	0.14	0.78	0.18*	3.87	0.00	3.87
8.40	0.14	0.78	0.18*	3.85	0.00	3.85

8.45	0.14	0.79	0.18*	3.84	0.00	3.84
8.50	0.14	0.79	0.18*	3.83	0.00	3.83
8.55	0.13	0.79	0.17*	3.82	0.00	3.82
8.60	0.14	0.79	0.17*	3.80	0.00	3.80
8.65	0.14	0.79	0.18*	3.79	0.00	3.79
8.70	0.15	0.79	0.19*	3.77	0.00	3.77
8.75	0.16	0.80	0.21*	3.76	0.00	3.76
8.80	0.17	0.80	0.22*	3.75	0.00	3.75
8.85	0.17	0.80	0.22*	3.73	0.00	3.73
8.90	0.17	0.80	0.21*	3.72	0.00	3.72
8.95	0.17	0.80	0.21*	3.71	0.00	3.71
9.00	0.18	0.80	0.22*	3.69	0.00	3.69
9.05	0.18	0.81	0.22*	3.68	0.00	3.68
9.10	0.18	0.81	0.23*	3.67	0.00	3.67
9.15	0.19	0.81	0.23*	3.65	0.00	3.65
9.20	0.19	0.81	0.24*	3.64	0.00	3.64
9.25	0.19	0.81	0.24*	3.63	0.00	3.63
9.30	0.19	0.81	0.24*	3.61	0.00	3.61
9.35	0.19	0.82	0.23*	3.60	0.00	3.60
9.40	0.18	0.82	0.23*	3.59	0.00	3.59
9.45	0.18	0.82	0.22*	3.58	0.00	3.58
9.50	0.17	0.82	0.21*	3.56	0.00	3.56
9.55	0.17	0.82	0.21*	3.55	0.00	3.55
9.60	0.16	0.82	0.20*	3.54	0.00	3.54
9.65	0.16	0.82	0.20*	3.53	0.00	3.53
9.70	0.16	0.83	0.19*	3.51	0.00	3.51
9.75	0.16	0.83	0.19*	3.50	0.00	3.50
9.80	0.15	0.83	0.19*	3.49	0.00	3.49
9.85	0.15	0.83	0.18*	3.48	0.00	3.48
9.90	0.15	0.83	0.17*	3.46	0.00	3.46
9.95	0.14	0.83	0.17*	3.45	0.00	3.45
10.00	0.13	0.83	0.16*	3.44	0.00	3.44
10.05	0.12	0.84	0.15*	3.42	0.00	3.42
10.10	0.12	0.84	0.14*	3.41	0.00	3.41
10.15	0.12	0.84	0.14*	3.39	0.00	3.39
10.20	0.11	0.84	0.14*	3.38	0.00	3.38
10.25	0.11	0.84	0.13*	3.36	0.00	3.36
10.30	0.11	0.84	0.13*	3.35	0.00	3.35
10.35	0.11	0.84	0.13*	3.33	0.00	3.33
10.40	0.10	0.85	0.12*	3.32	0.00	3.32
10.45	0.10	0.85	0.12*	3.30	0.00	3.30
10.50	0.10	0.85	0.11*	3.28	0.00	3.28
10.55	0.10	0.85	0.11*	3.26	0.00	3.26
10.60	0.10	0.85	0.12*	3.25	0.00	3.25
10.65	0.10	0.85	0.12*	3.23	0.00	3.23
10.70	0.10	0.85	0.12*	3.21	0.00	3.21
10.75	0.10	0.85	0.12*	3.19	0.00	3.19
10.80	0.10	0.86	0.12*	3.17	0.00	3.17
10.85	0.11	0.86	0.13*	3.16	0.00	3.16
10.90	0.11	0.86	0.13*	3.14	0.00	3.14

10.95	0.12	0.86	0.14*	3.13	0.00	3.13
11.00	0.12	0.86	0.14*	3.11	0.00	3.11
11.05	0.12	0.86	0.13*	3.10	0.00	3.10
11.10	0.11	0.86	0.13*	3.08	0.00	3.08
11.15	0.11	0.86	0.13*	3.07	0.00	3.07
11.20	0.11	0.86	0.12*	3.05	0.00	3.05
11.25	0.11	0.87	0.12*	3.04	0.00	3.04
11.30	0.11	0.87	0.12*	3.02	0.00	3.02
11.35	0.11	0.87	0.12*	3.00	0.00	3.00
11.40	0.11	0.87	0.12*	2.99	0.00	2.99
11.45	0.10	0.87	0.12*	2.97	0.00	2.97
11.50	0.10	0.87	0.12*	2.96	0.00	2.96
11.55	0.10	0.87	0.12*	2.94	0.00	2.94
11.60	0.10	0.87	0.11*	2.92	0.00	2.92
11.65	0.10	0.87	0.11*	2.91	0.00	2.91
11.70	0.10	0.88	0.11*	2.89	0.00	2.89
11.75	0.10	0.88	0.11*	2.87	0.00	2.87
11.80	0.10	0.88	0.11*	2.85	0.00	2.85
11.85	0.10	0.88	0.11*	2.83	0.00	2.83
11.90	0.10	0.88	0.11*	2.81	0.00	2.81
11.95	0.10	0.88	0.11*	2.79	0.00	2.79
12.00	0.10	0.88	0.11*	2.78	0.00	2.78
12.05	0.10	0.88	0.11*	2.76	0.00	2.76
12.10	0.10	0.88	0.12*	2.74	0.00	2.74
12.15	0.11	0.89	0.12*	2.72	0.00	2.72
12.20	0.11	0.89	0.12*	2.71	0.00	2.71
12.25	0.12	0.89	0.13*	2.69	0.00	2.69
12.30	0.13	0.89	0.14*	2.68	0.00	2.68
12.35	0.14	0.89	0.16*	2.66	0.00	2.66
12.40	0.16	0.89	0.17*	2.65	0.00	2.65
12.45	0.17	0.89	0.20*	2.64	0.00	2.64
12.50	0.21	0.89	0.23*	2.63	0.00	2.63
12.55	0.25	0.89	0.28*	2.62	0.00	2.62
12.60	0.32	0.89	0.36*	2.62	0.00	2.62
12.65	2.00	0.90	5.00	2.62	0.00	2.62
12.70	2.00	0.90	5.00	2.62	0.00	2.62
12.75	2.00	0.90	5.00	2.62	0.00	2.62
12.80	2.00	0.90	5.00	2.62	0.00	2.62
12.85	2.00	0.90	5.00	2.62	0.00	2.62
12.90	2.00	0.90	5.00	2.62	0.00	2.62
12.95	0.49	0.90	0.54*	2.62	0.00	2.62
13.00	0.25	0.90	0.27*	2.62	0.00	2.62
13.05	0.22	0.90	0.24*	2.61	0.00	2.61
13.10	0.23	0.90	0.25*	2.61	0.00	2.61
13.15	0.29	0.90	0.32*	2.60	0.00	2.60
13.20	0.37	0.91	0.41*	2.60	0.00	2.60
13.25	0.37	0.91	0.40*	2.60	0.00	2.60
13.30	2.00	0.91	5.00	2.60	0.00	2.60
13.35	2.00	0.91	5.00	2.60	0.00	2.60
13.40	2.00	0.91	5.00	2.60	0.00	2.60

13.45	2.00	0.91	5.00	2.60	0.00	2.60
13.50	2.00	0.91	5.00	2.60	0.00	2.60
13.55	2.00	0.91	5.00	2.60	0.00	2.60
13.60	2.00	0.91	5.00	2.60	0.00	2.60
13.65	2.00	0.91	5.00	2.60	0.00	2.60
13.70	2.00	0.91	5.00	2.60	0.00	2.60
13.75	2.00	0.92	5.00	2.60	0.00	2.60
13.80	2.00	0.92	5.00	2.60	0.00	2.60
13.85	2.00	0.92	5.00	2.60	0.00	2.60
13.90	2.00	0.92	5.00	2.60	0.00	2.60
13.95	2.00	0.92	5.00	2.60	0.00	2.60
14.00	2.00	0.92	5.00	2.60	0.00	2.60
14.05	2.00	0.92	5.00	2.60	0.00	2.60
14.10	2.00	0.92	5.00	2.60	0.00	2.60
14.15	2.00	0.92	5.00	2.60	0.00	2.60
14.20	2.00	0.92	5.00	2.60	0.00	2.60
14.25	2.00	0.92	5.00	2.60	0.00	2.60
14.30	2.00	0.92	5.00	2.60	0.00	2.60
14.35	2.00	0.92	5.00	2.60	0.00	2.60
14.40	2.00	0.93	5.00	2.60	0.00	2.60
14.45	2.00	0.93	5.00	2.60	0.00	2.60
14.50	2.00	0.93	5.00	2.60	0.00	2.60
14.55	2.00	0.93	5.00	2.60	0.00	2.60
14.60	2.00	0.93	5.00	2.60	0.00	2.60
14.65	2.00	0.93	5.00	2.60	0.00	2.60
14.70	2.00	0.93	5.00	2.60	0.00	2.60
14.75	2.00	0.93	5.00	2.60	0.00	2.60
14.80	2.00	0.93	5.00	2.60	0.00	2.60
14.85	2.00	0.93	5.00	2.60	0.00	2.60
14.90	2.00	0.93	5.00	2.60	0.00	2.60
14.95	2.00	0.93	5.00	2.60	0.00	2.60
15.00	2.00	0.93	5.00	2.60	0.00	2.60
15.05	2.00	0.94	5.00	2.60	0.00	2.60
15.10	2.00	0.94	5.00	2.60	0.00	2.60
15.15	2.00	0.94	5.00	2.60	0.00	2.60
15.20	2.00	0.94	5.00	2.60	0.00	2.60
15.25	2.00	0.94	5.00	2.60	0.00	2.60
15.30	2.00	0.94	5.00	2.60	0.00	2.60
15.35	2.00	0.94	5.00	2.60	0.00	2.60
15.40	2.00	0.94	5.00	2.60	0.00	2.60
15.45	2.00	0.94	5.00	2.60	0.00	2.60
15.50	2.00	0.94	5.00	2.60	0.00	2.60
15.55	2.00	0.94	5.00	2.60	0.00	2.60
15.60	2.00	0.94	5.00	2.60	0.00	2.60
15.65	2.00	0.94	5.00	2.60	0.00	2.60
15.70	2.00	0.94	5.00	2.60	0.00	2.60
15.75	2.00	0.94	5.00	2.60	0.00	2.60
15.80	2.00	0.94	5.00	2.60	0.00	2.60
15.85	2.00	0.95	5.00	2.60	0.00	2.60
15.90	2.00	0.95	5.00	2.60	0.00	2.60

15.95	2.00	0.95	5.00	2.60	0.00	2.60
16.00	2.00	0.95	5.00	2.60	0.00	2.60
16.05	2.00	0.95	5.00	2.60	0.00	2.60
16.10	2.00	0.95	5.00	2.60	0.00	2.60
16.15	2.00	0.95	5.00	2.60	0.00	2.60
16.20	2.00	0.95	5.00	2.60	0.00	2.60
16.25	2.00	0.95	5.00	2.60	0.00	2.60
16.30	0.42	0.95	0.44*	2.60	0.00	2.60
16.35	0.42	0.95	0.44*	2.60	0.00	2.60
16.40	0.44	0.95	0.46*	2.60	0.00	2.60
16.45	0.42	0.95	0.44*	2.60	0.00	2.60
16.50	0.49	0.95	0.51*	2.60	0.00	2.60
16.55	0.55	0.95	0.58*	2.60	0.00	2.60
16.60	0.55	0.95	0.58*	2.60	0.00	2.60
16.65	0.32	0.95	0.34*	2.60	0.00	2.60
16.70	0.14	0.96	0.15*	2.60	0.00	2.60
16.75	0.10	0.96	0.11*	2.59	0.00	2.59
16.80	0.11	0.96	0.11*	2.57	0.00	2.57
16.85	0.11	0.96	0.11*	2.55	0.00	2.55
16.90	0.11	0.96	0.11*	2.53	0.00	2.53
16.95	0.11	0.96	0.11*	2.52	0.00	2.52
17.00	0.11	0.96	0.11*	2.50	0.00	2.50
17.05	0.11	0.96	0.11*	2.48	0.00	2.48
17.10	0.11	0.96	0.11*	2.46	0.00	2.46
17.15	0.11	0.96	0.12*	2.45	0.00	2.45
17.20	0.12	0.96	0.13*	2.43	0.00	2.43
17.25	0.14	0.96	0.15*	2.42	0.00	2.42
17.30	0.22	0.96	0.23*	2.41	0.00	2.41
17.35	0.43	0.96	0.45*	2.40	0.00	2.40
17.40	2.00	0.96	5.00	2.40	0.00	2.40
17.45	2.00	0.96	5.00	2.40	0.00	2.40
17.50	2.00	0.96	5.00	2.40	0.00	2.40
17.55	2.00	0.96	5.00	2.40	0.00	2.40
17.60	2.00	0.96	5.00	2.40	0.00	2.40
17.65	2.00	0.97	5.00	2.40	0.00	2.40
17.70	2.00	0.97	5.00	2.40	0.00	2.40
17.75	2.00	0.97	5.00	2.40	0.00	2.40
17.80	2.00	0.97	5.00	2.40	0.00	2.40
17.85	2.00	0.97	5.00	2.40	0.00	2.40
17.90	2.00	0.97	5.00	2.40	0.00	2.40
17.95	2.00	0.97	5.00	2.40	0.00	2.40
18.00	2.00	0.97	5.00	2.40	0.00	2.40
18.05	2.00	0.97	5.00	2.40	0.00	2.40
18.10	2.00	0.97	5.00	2.40	0.00	2.40
18.15	2.00	0.97	5.00	2.40	0.00	2.40
18.20	2.00	0.97	5.00	2.40	0.00	2.40
18.25	2.00	0.97	5.00	2.40	0.00	2.40
18.30	2.00	0.97	5.00	2.40	0.00	2.40
18.35	2.00	0.97	5.00	2.40	0.00	2.40
18.40	2.00	0.97	5.00	2.40	0.00	2.40

18.45	2.00	0.97	5.00	2.40	0.00	2.40
18.50	2.00	0.97	5.00	2.40	0.00	2.40
18.55	2.00	0.97	5.00	2.40	0.00	2.40
18.60	2.00	0.97	5.00	2.40	0.00	2.40
18.65	2.00	0.97	5.00	2.40	0.00	2.40
18.70	2.00	0.98	5.00	2.40	0.00	2.40
18.75	2.00	0.98	5.00	2.40	0.00	2.40
18.80	2.00	0.98	5.00	2.40	0.00	2.40
18.85	2.00	0.98	5.00	2.40	0.00	2.40
18.90	2.00	0.98	5.00	2.40	0.00	2.40
18.95	2.00	0.98	5.00	2.40	0.00	2.40
19.00	2.00	0.98	5.00	2.40	0.00	2.40
19.05	2.00	0.98	5.00	2.40	0.00	2.40
19.10	2.00	0.98	5.00	2.40	0.00	2.40
19.15	2.00	0.98	5.00	2.40	0.00	2.40
19.20	2.00	0.98	5.00	2.40	0.00	2.40
19.25	2.00	0.98	5.00	2.40	0.00	2.40
19.30	2.00	0.98	5.00	2.40	0.00	2.40
19.35	1.12	0.98	1.14	2.40	0.00	2.40
19.40	0.83	0.98	0.84*	2.40	0.00	2.40
19.45	0.57	0.98	0.58*	2.40	0.00	2.40
19.50	0.45	0.98	0.46*	2.40	0.00	2.40
19.55	0.38	0.98	0.38*	2.40	0.00	2.40
19.60	0.32	0.98	0.33*	2.40	0.00	2.40
19.65	0.26	0.98	0.26*	2.40	0.00	2.40
19.70	0.19	0.98	0.19*	2.39	0.00	2.39
19.75	0.14	0.98	0.15*	2.38	0.00	2.38
19.80	0.15	0.98	0.15*	2.36	0.00	2.36
19.85	0.16	0.98	0.16*	2.35	0.00	2.35
19.90	0.17	0.98	0.17*	2.34	0.00	2.34
19.95	0.17	0.99	0.17*	2.33	0.00	2.33
20.00	0.17	0.99	0.18*	2.31	0.00	2.31
20.05	0.17	0.99	0.18*	2.30	0.00	2.30
20.10	0.17	0.99	0.17*	2.29	0.00	2.29
20.15	0.17	0.99	0.18*	2.28	0.00	2.28
20.20	0.18	0.99	0.18*	2.26	0.00	2.26
20.25	0.18	0.99	0.18*	2.25	0.00	2.25
20.30	0.18	0.99	0.18*	2.24	0.00	2.24
20.35	0.18	0.99	0.19*	2.23	0.00	2.23
20.40	0.18	0.99	0.18*	2.22	0.00	2.22
20.45	0.18	0.99	0.18*	2.20	0.00	2.20
20.50	0.18	0.99	0.18*	2.19	0.00	2.19
20.55	0.18	0.99	0.18*	2.18	0.00	2.18
20.60	0.18	0.99	0.18*	2.17	0.00	2.17
20.65	0.18	0.99	0.18*	2.15	0.00	2.15
20.70	0.18	0.99	0.18*	2.14	0.00	2.14
20.75	0.18	0.99	0.18*	2.13	0.00	2.13
20.80	0.19	0.99	0.19*	2.12	0.00	2.12
20.85	0.20	0.99	0.20*	2.11	0.00	2.11
20.90	0.20	0.99	0.21*	2.09	0.00	2.09

20.95	0.21	0.99	0.21*	2.08	0.00	2.08
21.00	0.22	0.99	0.22*	2.07	0.00	2.07
21.05	0.22	0.99	0.23*	2.06	0.00	2.06
21.10	0.22	0.99	0.22*	2.05	0.00	2.05
21.15	0.21	0.99	0.21*	2.04	0.00	2.04
21.20	0.20	0.99	0.20*	2.03	0.00	2.03
21.25	0.19	0.99	0.19*	2.02	0.00	2.02
21.30	0.19	0.99	0.19*	2.01	0.00	2.01
21.35	0.18	0.99	0.18*	1.99	0.00	1.99
21.40	0.18	0.99	0.19*	1.98	0.00	1.98
21.45	0.19	0.99	0.19*	1.97	0.00	1.97
21.50	0.19	1.00	0.19*	1.96	0.00	1.96
21.55	0.19	1.00	0.19*	1.95	0.00	1.95
21.60	0.18	1.00	0.19*	1.93	0.00	1.93
21.65	0.19	1.00	0.19*	1.92	0.00	1.92
21.70	0.19	1.00	0.19*	1.91	0.00	1.91
21.75	0.19	1.00	0.19*	1.90	0.00	1.90
21.80	0.20	1.00	0.20*	1.89	0.00	1.89
21.85	0.21	1.00	0.22*	1.88	0.00	1.88
21.90	0.23	1.00	0.23*	1.87	0.00	1.87
21.95	0.25	1.00	0.25*	1.86	0.00	1.86
22.00	0.26	1.00	0.27*	1.85	0.00	1.85
22.05	0.28	1.00	0.28*	1.84	0.00	1.84
22.10	0.28	1.00	0.28*	1.84	0.00	1.84
22.15	0.28	1.00	0.28*	1.83	0.00	1.83
22.20	0.27	1.00	0.27*	1.83	0.00	1.83
22.25	0.26	1.00	0.26*	1.82	0.00	1.82
22.30	0.25	1.00	0.25*	1.82	0.00	1.82
22.35	0.23	1.00	0.23*	1.81	0.00	1.81
22.40	0.22	1.00	0.22*	1.80	0.00	1.80
22.45	0.21	1.00	0.21*	1.79	0.00	1.79
22.50	0.20	1.00	0.19*	1.78	0.00	1.78
22.55	0.18	1.00	0.18*	1.77	0.00	1.77
22.60	0.16	1.00	0.16*	1.76	0.00	1.76
22.65	0.14	1.00	0.14*	1.74	0.00	1.74
22.70	0.14	1.00	0.14*	1.73	0.00	1.73
22.75	0.14	1.00	0.14*	1.72	0.00	1.72
22.80	0.14	1.00	0.14*	1.70	0.00	1.70
22.85	0.15	1.00	0.15*	1.69	0.00	1.69
22.90	0.16	1.00	0.16*	1.68	0.00	1.68
22.95	0.22	1.00	0.22*	1.66	0.00	1.66
23.00	2.00	1.00	5.00	1.66	0.00	1.66
23.05	2.00	1.00	5.00	1.66	0.00	1.66
23.10	2.00	1.00	5.00	1.66	0.00	1.66
23.15	2.00	1.00	5.00	1.66	0.00	1.66
23.20	2.00	1.00	5.00	1.66	0.00	1.66
23.25	2.00	1.00	5.00	1.66	0.00	1.66
23.30	2.00	1.00	5.00	1.66	0.00	1.66
23.35	2.00	1.00	5.00	1.66	0.00	1.66
23.40	2.00	1.01	5.00	1.66	0.00	1.66

23.45	2.00	1.01	5.00	1.66	0.00	1.66
23.50	2.00	1.01	5.00	1.66	0.00	1.66
23.55	2.00	1.01	5.00	1.66	0.00	1.66
23.60	2.00	1.01	5.00	1.66	0.00	1.66
23.65	2.00	1.01	5.00	1.66	0.00	1.66
23.70	2.00	1.01	5.00	1.66	0.00	1.66
23.75	2.00	1.01	5.00	1.66	0.00	1.66
23.80	2.00	1.01	5.00	1.66	0.00	1.66
23.85	2.00	1.01	5.00	1.66	0.00	1.66
23.90	2.00	1.01	5.00	1.66	0.00	1.66
23.95	2.00	1.01	5.00	1.66	0.00	1.66
24.00	2.00	1.01	5.00	1.66	0.00	1.66
24.05	2.00	1.01	5.00	1.66	0.00	1.66
24.10	2.00	1.01	5.00	1.66	0.00	1.66
24.15	2.00	1.01	5.00	1.66	0.00	1.66
24.20	2.00	1.01	5.00	1.66	0.00	1.66
24.25	2.00	1.01	5.00	1.66	0.00	1.66
24.30	2.00	1.01	5.00	1.66	0.00	1.66
24.35	2.00	1.01	5.00	1.66	0.00	1.66
24.40	2.00	1.01	5.00	1.66	0.00	1.66
24.45	2.00	1.01	5.00	1.66	0.00	1.66
24.50	2.00	1.01	5.00	1.66	0.00	1.66
24.55	2.00	1.01	5.00	1.66	0.00	1.66
24.60	2.00	1.01	5.00	1.66	0.00	1.66
24.65	2.00	1.01	5.00	1.66	0.00	1.66
24.70	2.00	1.01	5.00	1.66	0.00	1.66
24.75	2.00	1.01	5.00	1.66	0.00	1.66
24.80	2.00	1.01	5.00	1.66	0.00	1.66
24.85	2.00	1.01	5.00	1.66	0.00	1.66
24.90	2.00	1.01	5.00	1.66	0.00	1.66
24.95	2.00	1.01	5.00	1.66	0.00	1.66
25.00	2.00	1.01	5.00	1.66	0.00	1.66
25.05	0.27	1.01	0.26*	1.66	0.00	1.66
25.10	0.18	1.01	0.18*	1.66	0.00	1.66
25.15	0.16	1.01	0.16*	1.65	0.00	1.65
25.20	0.16	1.01	0.16*	1.63	0.00	1.63
25.25	0.17	1.01	0.16*	1.62	0.00	1.62
25.30	0.17	1.01	0.16*	1.61	0.00	1.61
25.35	0.16	1.01	0.16*	1.60	0.00	1.60
25.40	0.16	1.01	0.15*	1.59	0.00	1.59
25.45	0.15	1.01	0.15*	1.58	0.00	1.58
25.50	0.15	1.01	0.14*	1.57	0.00	1.57
25.55	0.14	1.01	0.14*	1.56	0.00	1.56
25.60	0.14	1.01	0.14*	1.54	0.00	1.54
25.65	0.12	1.02	0.12*	1.53	0.00	1.53
25.70	0.11	1.02	0.11*	1.52	0.00	1.52
25.75	0.11	1.02	0.11*	1.50	0.00	1.50
25.80	0.12	1.02	0.12*	1.48	0.00	1.48
25.85	0.12	1.02	0.12*	1.47	0.00	1.47
25.90	0.12	1.02	0.12*	1.46	0.00	1.46

25.95	0.13	1.02	0.12*	1.44	0.00	1.44
26.00	0.13	1.02	0.13*	1.43	0.00	1.43
26.05	0.14	1.02	0.14*	1.41	0.00	1.41
26.10	0.15	1.02	0.14*	1.40	0.00	1.40
26.15	0.16	1.02	0.16*	1.39	0.00	1.39
26.20	0.18	1.02	0.18*	1.38	0.00	1.38
26.25	0.22	1.02	0.21*	1.37	0.00	1.37
26.30	0.28	1.02	0.27*	1.36	0.00	1.36
26.35	0.41	1.02	0.41*	1.36	0.00	1.36
26.40	2.00	1.02	5.00	1.36	0.00	1.36
26.45	2.00	1.02	5.00	1.36	0.00	1.36
26.50	2.00	1.02	5.00	1.36	0.00	1.36
26.55	2.00	1.02	5.00	1.36	0.00	1.36
26.60	2.00	1.02	5.00	1.36	0.00	1.36
26.65	2.00	1.02	5.00	1.36	0.00	1.36
26.70	2.00	1.02	5.00	1.36	0.00	1.36
26.75	2.00	1.02	5.00	1.36	0.00	1.36
26.80	2.00	1.02	5.00	1.36	0.00	1.36
26.85	2.00	1.02	5.00	1.36	0.00	1.36
26.90	2.00	1.02	5.00	1.36	0.00	1.36
26.95	2.00	1.02	5.00	1.36	0.00	1.36
27.00	2.00	1.02	5.00	1.36	0.00	1.36
27.05	2.00	1.02	5.00	1.36	0.00	1.36
27.10	2.00	1.02	5.00	1.36	0.00	1.36
27.15	2.00	1.02	5.00	1.36	0.00	1.36
27.20	2.00	1.02	5.00	1.36	0.00	1.36
27.25	2.00	1.02	5.00	1.36	0.00	1.36
27.30	2.00	1.02	5.00	1.36	0.00	1.36
27.35	2.00	1.02	5.00	1.36	0.00	1.36
27.40	2.00	1.02	5.00	1.36	0.00	1.36
27.45	2.00	1.02	5.00	1.36	0.00	1.36
27.50	2.00	1.02	5.00	1.36	0.00	1.36
27.55	2.00	1.02	5.00	1.36	0.00	1.36
27.60	2.00	1.02	5.00	1.36	0.00	1.36
27.65	2.00	1.02	5.00	1.36	0.00	1.36
27.70	2.00	1.02	5.00	1.36	0.00	1.36
27.75	2.00	1.02	5.00	1.36	0.00	1.36
27.80	2.00	1.02	5.00	1.36	0.00	1.36
27.85	2.00	1.02	5.00	1.36	0.00	1.36
27.90	2.00	1.02	5.00	1.36	0.00	1.36
27.95	2.00	1.02	5.00	1.36	0.00	1.36
28.00	2.00	1.02	5.00	1.36	0.00	1.36
28.05	2.00	1.02	5.00	1.36	0.00	1.36
28.10	2.00	1.02	5.00	1.36	0.00	1.36
28.15	2.00	1.03	5.00	1.36	0.00	1.36
28.20	2.00	1.03	5.00	1.36	0.00	1.36
28.25	2.00	1.03	5.00	1.36	0.00	1.36
28.30	2.00	1.03	5.00	1.36	0.00	1.36
28.35	2.00	1.03	5.00	1.36	0.00	1.36
28.40	2.00	1.03	5.00	1.36	0.00	1.36

28.45	2.00	1.03	5.00	1.36	0.00	1.36
28.50	2.00	1.03	5.00	1.36	0.00	1.36
28.55	2.00	1.03	5.00	1.36	0.00	1.36
28.60	2.00	1.03	5.00	1.36	0.00	1.36
28.65	2.00	1.03	5.00	1.36	0.00	1.36
28.70	2.00	1.03	5.00	1.36	0.00	1.36
28.75	2.00	1.03	5.00	1.36	0.00	1.36
28.80	2.00	1.03	5.00	1.36	0.00	1.36
28.85	2.00	1.03	5.00	1.36	0.00	1.36
28.90	2.00	1.03	5.00	1.36	0.00	1.36
28.95	2.00	1.03	5.00	1.36	0.00	1.36
29.00	2.00	1.03	5.00	1.36	0.00	1.36
29.05	2.00	1.03	5.00	1.36	0.00	1.36
29.10	2.00	1.03	5.00	1.36	0.00	1.36
29.15	2.00	1.03	5.00	1.36	0.00	1.36
29.20	2.00	1.03	5.00	1.36	0.00	1.36
29.25	2.00	1.03	5.00	1.36	0.00	1.36
29.30	2.00	1.03	5.00	1.36	0.00	1.36
29.35	2.00	1.03	5.00	1.36	0.00	1.36
29.40	2.00	1.03	5.00	1.36	0.00	1.36
29.45	2.00	1.03	5.00	1.36	0.00	1.36
29.50	2.00	1.03	5.00	1.36	0.00	1.36
29.55	2.00	1.03	5.00	1.36	0.00	1.36
29.60	2.00	1.03	5.00	1.36	0.00	1.36
29.65	2.00	1.03	5.00	1.36	0.00	1.36
29.70	2.00	1.03	5.00	1.36	0.00	1.36
29.75	2.00	1.03	5.00	1.36	0.00	1.36
29.80	2.00	1.03	5.00	1.36	0.00	1.36
29.85	2.00	1.03	5.00	1.36	0.00	1.36
29.90	2.00	1.03	5.00	1.36	0.00	1.36
29.95	2.00	1.03	5.00	1.36	0.00	1.36
30.00	2.00	1.03	5.00	1.36	0.00	1.36
30.05	2.00	1.03	5.00	1.36	0.00	1.36
30.10	2.00	1.03	5.00	1.36	0.00	1.36
30.15	2.00	1.03	5.00	1.36	0.00	1.36
30.20	2.00	1.03	5.00	1.36	0.00	1.36
30.25	2.00	1.03	5.00	1.36	0.00	1.36
30.30	2.00	1.03	5.00	1.36	0.00	1.36
30.35	2.00	1.03	5.00	1.36	0.00	1.36
30.40	2.00	1.03	5.00	1.36	0.00	1.36
30.45	2.00	1.03	5.00	1.36	0.00	1.36
30.50	2.00	1.03	5.00	1.36	0.00	1.36
30.55	2.00	1.03	5.00	1.36	0.00	1.36
30.60	2.00	1.03	5.00	1.36	0.00	1.36
30.65	2.00	1.03	5.00	1.36	0.00	1.36
30.70	2.00	1.03	5.00	1.36	0.00	1.36
30.75	2.00	1.03	5.00	1.36	0.00	1.36
30.80	2.00	1.03	5.00	1.36	0.00	1.36
30.85	2.00	1.03	5.00	1.36	0.00	1.36
30.90	2.00	1.03	5.00	1.36	0.00	1.36

30.95	2.00	1.03	5.00	1.36	0.00	1.36
31.00	2.00	1.03	5.00	1.36	0.00	1.36
31.05	2.00	1.03	5.00	1.36	0.00	1.36
31.10	2.00	1.03	5.00	1.36	0.00	1.36
31.15	2.00	1.03	5.00	1.36	0.00	1.36
31.20	2.00	1.03	5.00	1.36	0.00	1.36
31.25	2.00	1.03	5.00	1.36	0.00	1.36
31.30	2.00	1.02	5.00	1.36	0.00	1.36
31.35	2.00	1.02	5.00	1.36	0.00	1.36
31.40	2.00	1.02	5.00	1.36	0.00	1.36
31.45	2.00	1.02	5.00	1.36	0.00	1.36
31.50	2.00	1.02	5.00	1.36	0.00	1.36
31.55	2.00	1.02	5.00	1.36	0.00	1.36
31.60	2.00	1.02	5.00	1.36	0.00	1.36
31.65	2.00	1.02	5.00	1.36	0.00	1.36
31.70	2.00	1.02	5.00	1.36	0.00	1.36
31.75	2.00	1.02	5.00	1.36	0.00	1.36
31.80	2.00	1.02	5.00	1.36	0.00	1.36
31.85	2.00	1.02	5.00	1.36	0.00	1.36
31.90	2.00	1.02	5.00	1.36	0.00	1.36
31.95	2.00	1.02	5.00	1.36	0.00	1.36
32.00	2.00	1.02	5.00	1.36	0.00	1.36
32.05	2.00	1.02	5.00	1.36	0.00	1.36
32.10	2.00	1.02	5.00	1.36	0.00	1.36
32.15	2.00	1.02	5.00	1.36	0.00	1.36
32.20	2.00	1.02	5.00	1.36	0.00	1.36
32.25	2.00	1.02	5.00	1.36	0.00	1.36
32.30	2.00	1.02	5.00	1.36	0.00	1.36
32.35	2.00	1.02	5.00	1.36	0.00	1.36
32.40	2.00	1.02	5.00	1.36	0.00	1.36
32.45	2.00	1.02	5.00	1.36	0.00	1.36
32.50	2.00	1.02	5.00	1.36	0.00	1.36
32.55	2.00	1.02	5.00	1.36	0.00	1.36
32.60	2.00	1.02	5.00	1.36	0.00	1.36
32.65	2.00	1.02	5.00	1.36	0.00	1.36
32.70	2.00	1.02	5.00	1.36	0.00	1.36
32.75	2.00	1.02	5.00	1.36	0.00	1.36
32.80	2.00	1.02	5.00	1.36	0.00	1.36
32.85	2.00	1.02	5.00	1.36	0.00	1.36
32.90	2.00	1.02	5.00	1.36	0.00	1.36
32.95	2.00	1.02	5.00	1.36	0.00	1.36
33.00	2.00	1.02	5.00	1.36	0.00	1.36
33.05	2.00	1.02	5.00	1.36	0.00	1.36
33.10	2.00	1.02	5.00	1.36	0.00	1.36
33.15	2.00	1.02	5.00	1.36	0.00	1.36
33.20	2.00	1.02	5.00	1.36	0.00	1.36
33.25	2.00	1.01	5.00	1.36	0.00	1.36
33.30	2.00	1.01	5.00	1.36	0.00	1.36
33.35	2.00	1.01	5.00	1.36	0.00	1.36
33.40	2.00	1.01	5.00	1.36	0.00	1.36

33.45	2.00	1.01	5.00	1.36	0.00	1.36
33.50	2.00	1.01	5.00	1.36	0.00	1.36
33.55	2.00	1.01	5.00	1.36	0.00	1.36
33.60	2.00	1.01	5.00	1.36	0.00	1.36
33.65	2.00	1.01	5.00	1.36	0.00	1.36
33.70	2.00	1.01	5.00	1.36	0.00	1.36
33.75	2.00	1.01	5.00	1.36	0.00	1.36
33.80	2.00	1.01	5.00	1.36	0.00	1.36
33.85	2.00	1.01	5.00	1.36	0.00	1.36
33.90	2.00	1.01	5.00	1.36	0.00	1.36
33.95	2.00	1.01	5.00	1.36	0.00	1.36
34.00	2.00	1.01	5.00	1.36	0.00	1.36
34.05	0.29	1.01	0.28*	1.36	0.00	1.36
34.10	0.22	1.01	0.22*	1.36	0.00	1.36
34.15	0.19	1.01	0.19*	1.35	0.00	1.35
34.20	0.17	1.01	0.17*	1.34	0.00	1.34
34.25	0.16	1.01	0.16*	1.33	0.00	1.33
34.30	0.15	1.01	0.15*	1.32	0.00	1.32
34.35	0.15	1.01	0.15*	1.30	0.00	1.30
34.40	0.15	1.01	0.15*	1.29	0.00	1.29
34.45	0.15	1.01	0.15*	1.28	0.00	1.28
34.50	0.15	1.01	0.15*	1.26	0.00	1.26
34.55	0.15	1.01	0.15*	1.25	0.00	1.25
34.60	0.15	1.01	0.15*	1.24	0.00	1.24
34.65	0.15	1.01	0.15*	1.22	0.00	1.22
34.70	0.16	1.01	0.16*	1.21	0.00	1.21
34.75	0.16	1.01	0.16*	1.19	0.00	1.19
34.80	0.16	1.01	0.16*	1.18	0.00	1.18
34.85	0.16	1.01	0.16*	1.17	0.00	1.17
34.90	0.17	1.01	0.17*	1.15	0.00	1.15
34.95	0.17	1.01	0.17*	1.14	0.00	1.14
35.00	0.18	1.01	0.18*	1.13	0.00	1.13
35.05	0.19	1.00	0.19*	1.11	0.00	1.11
35.10	0.20	1.00	0.20*	1.10	0.00	1.10
35.15	0.22	1.00	0.22*	1.09	0.00	1.09
35.20	0.24	1.00	0.24*	1.08	0.00	1.08
35.25	0.27	1.00	0.27*	1.06	0.00	1.06
35.30	0.29	1.00	0.29*	1.05	0.00	1.05
35.35	0.32	1.00	0.31*	1.04	0.00	1.04
35.40	0.34	1.00	0.34*	1.03	0.00	1.03
35.45	0.35	1.00	0.35*	1.02	0.00	1.02
35.50	0.37	1.00	0.37*	1.01	0.00	1.01
35.55	0.38	1.00	0.38*	1.00	0.00	1.00
35.60	0.39	1.00	0.39*	0.99	0.00	0.99
35.65	0.40	1.00	0.40*	0.98	0.00	0.98
35.70	0.41	1.00	0.41*	0.97	0.00	0.97
35.75	0.41	1.00	0.41*	0.96	0.00	0.96
35.80	0.42	1.00	0.42*	0.96	0.00	0.96
35.85	0.42	1.00	0.42*	0.95	0.00	0.95
35.90	0.42	1.00	0.42*	0.94	0.00	0.94

35.95	0.42	1.00	0.42*	0.93	0.00	0.93
36.00	0.42	1.00	0.42*	0.92	0.00	0.92
36.05	0.42	1.00	0.42*	0.92	0.00	0.92
36.10	0.41	1.00	0.41*	0.91	0.00	0.91
36.15	0.41	1.00	0.41*	0.90	0.00	0.90
36.20	0.39	1.00	0.40*	0.89	0.00	0.89
36.25	0.38	1.00	0.38*	0.89	0.00	0.89
36.30	0.36	1.00	0.36*	0.88	0.00	0.88
36.35	0.36	1.00	0.37*	0.87	0.00	0.87
36.40	0.37	1.00	0.37*	0.87	0.00	0.87
36.45	0.37	1.00	0.37*	0.86	0.00	0.86
36.50	0.37	1.00	0.37*	0.85	0.00	0.85
36.55	0.36	1.00	0.36*	0.84	0.00	0.84
36.60	0.35	1.00	0.35*	0.84	0.00	0.84
36.65	0.34	1.00	0.34*	0.83	0.00	0.83
36.70	0.34	1.00	0.34*	0.82	0.00	0.82
36.75	0.36	0.99	0.36*	0.81	0.00	0.81
36.80	0.37	0.99	0.38*	0.80	0.00	0.80
36.85	0.39	0.99	0.39*	0.79	0.00	0.79
36.90	0.41	0.99	0.41*	0.78	0.00	0.78
36.95	0.41	0.99	0.42*	0.77	0.00	0.77
37.00	0.42	0.99	0.42*	0.77	0.00	0.77
37.05	0.42	0.99	0.42*	0.76	0.00	0.76
37.10	0.42	0.99	0.43*	0.75	0.00	0.75
37.15	0.42	0.99	0.43*	0.74	0.00	0.74
37.20	0.42	0.99	0.43*	0.73	0.00	0.73
37.25	0.42	0.99	0.42*	0.73	0.00	0.73
37.30	0.42	0.99	0.42*	0.72	0.00	0.72
37.35	0.41	0.99	0.42*	0.71	0.00	0.71
37.40	0.41	0.99	0.41*	0.70	0.00	0.70
37.45	0.40	0.99	0.40*	0.69	0.00	0.69
37.50	0.40	0.99	0.40*	0.69	0.00	0.69
37.55	0.41	0.99	0.42*	0.68	0.00	0.68
37.60	0.44	0.99	0.45*	0.67	0.00	0.67
37.65	0.48	0.99	0.48*	0.66	0.00	0.66
37.70	0.52	0.99	0.53*	0.66	0.00	0.66
37.75	0.56	0.99	0.57*	0.65	0.00	0.65
37.80	0.61	0.99	0.61*	0.65	0.00	0.65
37.85	0.62	0.99	0.63*	0.64	0.00	0.64
37.90	0.63	0.99	0.64*	0.64	0.00	0.64
37.95	0.63	0.99	0.64*	0.64	0.00	0.64
38.00	0.63	0.99	0.64*	0.64	0.00	0.64
38.05	0.63	0.99	0.64*	0.63	0.00	0.63
38.10	0.63	0.99	0.64*	0.63	0.00	0.63
38.15	0.63	0.99	0.64*	0.63	0.00	0.63
38.20	0.64	0.99	0.65*	0.63	0.00	0.63
38.25	0.67	0.99	0.68*	0.63	0.00	0.63
38.30	0.71	0.98	0.72*	0.63	0.00	0.63
38.35	0.75	0.98	0.76*	0.63	0.00	0.63
38.40	0.79	0.98	0.81*	0.63	0.00	0.63

38.45	0.83	0.98	0.84*	0.63	0.00	0.63
38.50	0.86	0.98	0.88*	0.63	0.00	0.63
38.55	0.89	0.98	0.90*	0.63	0.00	0.63
38.60	0.90	0.98	0.92*	0.63	0.00	0.63
38.65	0.91	0.98	0.93*	0.63	0.00	0.63
38.70	0.92	0.98	0.93*	0.63	0.00	0.63
38.75	0.92	0.98	0.94*	0.63	0.00	0.63
38.80	0.92	0.98	0.94*	0.63	0.00	0.63
38.85	0.93	0.98	0.94*	0.63	0.00	0.63
38.90	0.93	0.98	0.94*	0.63	0.00	0.63
38.95	0.93	0.98	0.95*	0.63	0.00	0.63
39.00	0.93	0.98	0.95*	0.63	0.00	0.63
39.05	0.93	0.98	0.94*	0.63	0.00	0.63
39.10	0.92	0.98	0.94*	0.63	0.00	0.63
39.15	0.91	0.98	0.93*	0.63	0.00	0.63
39.20	0.89	0.98	0.91*	0.63	0.00	0.63
39.25	0.83	0.98	0.84*	0.63	0.00	0.63
39.30	0.71	0.98	0.73*	0.63	0.00	0.63
39.35	0.66	0.98	0.68*	0.63	0.00	0.63
39.40	0.67	0.98	0.68*	0.63	0.00	0.63
39.45	0.67	0.98	0.69*	0.63	0.00	0.63
39.50	0.68	0.98	0.70*	0.63	0.00	0.63
39.55	0.67	0.98	0.68*	0.63	0.00	0.63
39.60	0.65	0.98	0.66*	0.63	0.00	0.63
39.65	0.63	0.98	0.65*	0.63	0.00	0.63
39.70	0.67	0.98	0.68*	0.63	0.00	0.63
39.75	0.70	0.98	0.72*	0.63	0.00	0.63
39.80	0.72	0.97	0.74*	0.63	0.00	0.63
39.85	0.74	0.97	0.76*	0.63	0.00	0.63
39.90	0.75	0.97	0.77*	0.63	0.00	0.63
39.95	0.75	0.97	0.77*	0.63	0.00	0.63
40.00	0.75	0.97	0.77*	0.63	0.00	0.63
40.05	0.75	0.97	0.77*	0.63	0.00	0.63
40.10	0.75	0.97	0.77*	0.63	0.00	0.63
40.15	0.75	0.97	0.77*	0.63	0.00	0.63
40.20	0.75	0.97	0.77*	0.63	0.00	0.63
40.25	0.75	0.97	0.77*	0.63	0.00	0.63
40.30	0.76	0.97	0.78*	0.63	0.00	0.63
40.35	0.76	0.97	0.79*	0.63	0.00	0.63
40.40	0.77	0.97	0.79*	0.63	0.00	0.63
40.45	0.78	0.97	0.81*	0.63	0.00	0.63
40.50	0.79	0.97	0.81*	0.63	0.00	0.63
40.55	0.79	0.97	0.82*	0.63	0.00	0.63
40.60	0.79	0.97	0.81*	0.63	0.00	0.63
40.65	0.78	0.97	0.80*	0.63	0.00	0.63
40.70	0.76	0.97	0.79*	0.63	0.00	0.63
40.75	0.74	0.97	0.76*	0.63	0.00	0.63
40.80	0.72	0.97	0.74*	0.63	0.00	0.63
40.85	0.69	0.97	0.72*	0.63	0.00	0.63
40.90	0.68	0.97	0.70*	0.63	0.00	0.63

40.95	0.66	0.97	0.69*	0.63	0.00	0.63
41.00	0.65	0.97	0.68*	0.63	0.00	0.63
41.05	0.64	0.97	0.66*	0.63	0.00	0.63
41.10	0.63	0.97	0.65*	0.63	0.00	0.63
41.15	0.61	0.97	0.64*	0.63	0.00	0.63
41.20	0.59	0.97	0.62*	0.63	0.00	0.63
41.25	0.58	0.96	0.60*	0.63	0.00	0.63
41.30	0.58	0.96	0.60*	0.63	0.00	0.63
41.35	0.56	0.96	0.58*	0.63	0.00	0.63
41.40	0.54	0.96	0.56*	0.63	0.00	0.63
41.45	0.54	0.96	0.57*	0.63	0.00	0.63
41.50	0.56	0.96	0.58*	0.62	0.00	0.62
41.55	0.57	0.96	0.60*	0.62	0.00	0.62
41.60	0.58	0.96	0.61*	0.62	0.00	0.62
41.65	0.60	0.96	0.62*	0.62	0.00	0.62
41.70	0.60	0.96	0.62*	0.61	0.00	0.61
41.75	0.58	0.96	0.61*	0.61	0.00	0.61
41.80	0.56	0.96	0.59*	0.61	0.00	0.61
41.85	0.54	0.96	0.57*	0.60	0.00	0.60
41.90	0.49	0.96	0.51*	0.60	0.00	0.60
41.95	0.40	0.96	0.42*	0.60	0.00	0.60
42.00	0.45	0.96	0.46*	0.59	0.00	0.59
42.05	0.44	0.96	0.46*	0.58	0.00	0.58
42.10	0.43	0.96	0.45*	0.57	0.00	0.57
42.15	0.43	0.96	0.45*	0.57	0.00	0.57
42.20	0.44	0.96	0.46*	0.56	0.00	0.56
42.25	0.47	0.96	0.49*	0.55	0.00	0.55
42.30	0.49	0.96	0.51*	0.55	0.00	0.55
42.35	0.50	0.96	0.52*	0.54	0.00	0.54
42.40	0.50	0.96	0.52*	0.54	0.00	0.54
42.45	0.47	0.96	0.50*	0.53	0.00	0.53
42.50	0.45	0.96	0.47*	0.53	0.00	0.53
42.55	0.42	0.96	0.44*	0.52	0.00	0.52
42.60	0.39	0.96	0.41*	0.51	0.00	0.51
42.65	0.38	0.96	0.39*	0.50	0.00	0.50
42.70	0.37	0.95	0.38*	0.49	0.00	0.49
42.75	0.35	0.95	0.37*	0.49	0.00	0.49
42.80	0.33	0.95	0.35*	0.48	0.00	0.48
42.85	0.31	0.95	0.33*	0.47	0.00	0.47
42.90	0.30	0.95	0.32*	0.46	0.00	0.46
42.95	0.29	0.95	0.31*	0.45	0.00	0.45
43.00	0.29	0.95	0.31*	0.44	0.00	0.44
43.05	0.29	0.95	0.31*	0.44	0.00	0.44
43.10	0.29	0.95	0.31*	0.43	0.00	0.43
43.15	0.30	0.95	0.31*	0.42	0.00	0.42
43.20	0.30	0.95	0.31*	0.42	0.00	0.42
43.25	0.30	0.95	0.32*	0.41	0.00	0.41
43.30	0.30	0.95	0.32*	0.40	0.00	0.40
43.35	0.31	0.95	0.32*	0.40	0.00	0.40
43.40	0.31	0.95	0.32*	0.39	0.00	0.39

43.45	0.31	0.95	0.32*	0.38	0.00	0.38
43.50	0.31	0.95	0.33*	0.37	0.00	0.37
43.55	0.32	0.95	0.34*	0.36	0.00	0.36
43.60	0.33	0.95	0.35*	0.36	0.00	0.36
43.65	0.35	0.95	0.37*	0.35	0.00	0.35
43.70	0.36	0.95	0.38*	0.34	0.00	0.34
43.75	0.38	0.95	0.40*	0.33	0.00	0.33
43.80	0.38	0.95	0.40*	0.32	0.00	0.32
43.85	0.39	0.95	0.41*	0.32	0.00	0.32
43.90	0.39	0.95	0.41*	0.31	0.00	0.31
43.95	0.39	0.95	0.41*	0.30	0.00	0.30
44.00	0.39	0.95	0.41*	0.30	0.00	0.30
44.05	0.38	0.94	0.41*	0.29	0.00	0.29
44.10	0.38	0.94	0.41*	0.28	0.00	0.28
44.15	0.38	0.94	0.41*	0.27	0.00	0.27
44.20	0.38	0.94	0.41*	0.27	0.00	0.27
44.25	0.38	0.94	0.40*	0.26	0.00	0.26
44.30	0.38	0.94	0.40*	0.25	0.00	0.25
44.35	0.36	0.94	0.39*	0.24	0.00	0.24
44.40	0.35	0.94	0.37*	0.24	0.00	0.24
44.45	0.33	0.94	0.35*	0.23	0.00	0.23
44.50	0.32	0.94	0.34*	0.22	0.00	0.22
44.55	0.32	0.94	0.34*	0.21	0.00	0.21
44.60	0.33	0.94	0.35*	0.20	0.00	0.20
44.65	0.33	0.94	0.35*	0.20	0.00	0.20
44.70	0.33	0.94	0.35*	0.19	0.00	0.19
44.75	0.32	0.94	0.34*	0.19	0.00	0.19
44.80	0.31	0.94	0.33*	0.18	0.00	0.18
44.85	0.31	0.94	0.33*	0.17	0.00	0.17
44.90	0.29	0.94	0.31*	0.17	0.00	0.17
44.95	0.28	0.94	0.30*	0.16	0.00	0.16
45.00	0.26	0.94	0.28*	0.15	0.00	0.15
45.05	0.25	0.94	0.27*	0.14	0.00	0.14
45.10	0.24	0.94	0.26*	0.13	0.00	0.13
45.15	0.23	0.94	0.25*	0.12	0.00	0.12
45.20	0.22	0.94	0.23*	0.11	0.00	0.11
45.25	0.21	0.94	0.23*	0.10	0.00	0.10
45.30	0.21	0.94	0.22*	0.09	0.00	0.09
45.35	0.21	0.94	0.22*	0.08	0.00	0.08
45.40	0.22	0.93	0.24*	0.07	0.00	0.07
45.45	0.28	0.93	0.29*	0.06	0.00	0.06
45.50	2.00	0.93	5.00	0.06	0.00	0.06
45.55	2.00	0.93	5.00	0.06	0.00	0.06
45.60	2.00	0.93	5.00	0.06	0.00	0.06
45.65	2.00	0.93	5.00	0.06	0.00	0.06
45.70	2.00	0.93	5.00	0.06	0.00	0.06
45.75	2.00	0.93	5.00	0.06	0.00	0.06
45.80	2.00	0.93	5.00	0.06	0.00	0.06
45.85	2.00	0.93	5.00	0.06	0.00	0.06
45.90	2.00	0.93	5.00	0.06	0.00	0.06

45.95	2.00	0.93	5.00	0.06	0.00	0.06
46.00	2.00	0.93	5.00	0.06	0.00	0.06
46.05	2.00	0.93	5.00	0.06	0.00	0.06
46.10	2.00	0.93	5.00	0.06	0.00	0.06
46.15	2.00	0.93	5.00	0.06	0.00	0.06
46.20	2.00	0.93	5.00	0.06	0.00	0.06
46.25	2.00	0.93	5.00	0.06	0.00	0.06
46.30	2.00	0.93	5.00	0.06	0.00	0.06
46.35	2.00	0.93	5.00	0.06	0.00	0.06
46.40	2.00	0.93	5.00	0.06	0.00	0.06
46.45	2.00	0.93	5.00	0.06	0.00	0.06
46.50	2.00	0.93	5.00	0.06	0.00	0.06
46.55	2.00	0.93	5.00	0.06	0.00	0.06
46.60	2.00	0.93	5.00	0.06	0.00	0.06
46.65	2.00	0.93	5.00	0.06	0.00	0.06
46.70	2.00	0.92	5.00	0.06	0.00	0.06
46.75	2.00	0.92	5.00	0.06	0.00	0.06
46.80	2.00	0.92	5.00	0.06	0.00	0.06
46.85	2.00	0.92	5.00	0.06	0.00	0.06
46.90	2.00	0.92	5.00	0.06	0.00	0.06
46.95	2.00	0.92	5.00	0.06	0.00	0.06
47.00	2.00	0.92	5.00	0.06	0.00	0.06
47.05	2.00	0.92	5.00	0.06	0.00	0.06
47.10	2.00	0.92	5.00	0.06	0.00	0.06
47.15	2.00	0.92	5.00	0.06	0.00	0.06
47.20	2.00	0.92	5.00	0.06	0.00	0.06
47.25	2.00	0.92	5.00	0.06	0.00	0.06
47.30	2.00	0.92	5.00	0.06	0.00	0.06
47.35	2.00	0.92	5.00	0.06	0.00	0.06
47.40	2.00	0.92	5.00	0.06	0.00	0.06
47.45	2.00	0.92	5.00	0.06	0.00	0.06
47.50	2.00	0.92	5.00	0.06	0.00	0.06
47.55	2.00	0.92	5.00	0.06	0.00	0.06
47.60	2.00	0.92	5.00	0.06	0.00	0.06
47.65	2.00	0.92	5.00	0.06	0.00	0.06
47.70	2.00	0.92	5.00	0.06	0.00	0.06
47.75	2.00	0.92	5.00	0.06	0.00	0.06
47.80	2.00	0.92	5.00	0.06	0.00	0.06
47.85	2.00	0.92	5.00	0.06	0.00	0.06
47.90	2.00	0.92	5.00	0.06	0.00	0.06
47.95	0.62	0.91	0.68*	0.06	0.00	0.06
48.00	0.48	0.91	0.52*	0.06	0.00	0.06
48.05	0.45	0.91	0.49*	0.06	0.00	0.06
48.10	0.45	0.91	0.50*	0.06	0.00	0.06
48.15	0.46	0.91	0.51*	0.06	0.00	0.06
48.20	0.47	0.91	0.52*	0.06	0.00	0.06
48.25	0.48	0.91	0.53*	0.06	0.00	0.06
48.30	0.48	0.91	0.53*	0.06	0.00	0.06
48.35	0.49	0.91	0.53*	0.06	0.00	0.06
48.40	0.48	0.91	0.53*	0.06	0.00	0.06

48.45	0.48	0.91	0.52*	0.06	0.00	0.06
48.50	0.47	0.91	0.51*	0.06	0.00	0.06
48.55	0.46	0.91	0.50*	0.06	0.00	0.06
48.60	0.45	0.91	0.49*	0.06	0.00	0.06
48.65	0.44	0.91	0.49*	0.06	0.00	0.06
48.70	0.43	0.91	0.47*	0.06	0.00	0.06
48.75	0.40	0.91	0.45*	0.06	0.00	0.06
48.80	0.38	0.91	0.42*	0.06	0.00	0.06
48.85	0.36	0.91	0.39*	0.06	0.00	0.06
48.90	0.33	0.91	0.37*	0.05	0.00	0.05
48.95	0.32	0.91	0.35*	0.05	0.00	0.05
49.00	0.30	0.91	0.33*	0.04	0.00	0.04
49.05	0.29	0.91	0.33*	0.03	0.00	0.03
49.10	0.29	0.91	0.32*	0.03	0.00	0.03
49.15	0.31	0.91	0.34*	0.02	0.00	0.02
49.20	0.40	0.90	0.44*	0.02	0.00	0.02
49.25	2.00	0.90	5.00	0.02	0.00	0.02
49.30	2.00	0.90	5.00	0.02	0.00	0.02
49.35	2.00	0.90	5.00	0.02	0.00	0.02
49.40	2.00	0.90	5.00	0.02	0.00	0.02
49.45	2.00	0.90	5.00	0.02	0.00	0.02
49.50	2.00	0.90	5.00	0.02	0.00	0.02
49.55	2.00	0.90	5.00	0.02	0.00	0.02
49.60	2.00	0.90	5.00	0.02	0.00	0.02
49.65	2.00	0.90	5.00	0.02	0.00	0.02
49.70	2.00	0.90	5.00	0.02	0.00	0.02
49.75	2.00	0.90	5.00	0.02	0.00	0.02
49.80	2.00	0.90	5.00	0.02	0.00	0.02
49.85	2.00	0.90	5.00	0.02	0.00	0.02
49.90	2.00	0.90	5.00	0.02	0.00	0.02
49.95	2.00	0.90	5.00	0.02	0.00	0.02
50.00	0.10	0.90	0.12*	0.02	0.00	0.02
50.05	2.00	0.90	5.00	0.00	0.00	0.00
50.10	2.00	0.90	5.00	0.00	0.00	0.00
50.15	2.00	0.90	5.00	0.00	0.00	0.00
50.20	2.00	0.90	5.00	0.00	0.00	0.00
50.25	2.00	0.90	5.00	0.00	0.00	0.00
50.30	2.00	0.90	5.00	0.00	0.00	0.00
50.35	2.00	0.90	5.00	0.00	0.00	0.00
50.40	2.00	0.90	5.00	0.00	0.00	0.00
50.45	2.00	0.89	5.00	0.00	0.00	0.00
50.50	2.00	0.89	5.00	0.00	0.00	0.00
50.55	2.00	0.89	5.00	0.00	0.00	0.00
50.60	2.00	0.89	5.00	0.00	0.00	0.00
50.65	2.00	0.89	5.00	0.00	0.00	0.00
50.70	2.00	0.89	5.00	0.00	0.00	0.00
50.75	2.00	0.89	5.00	0.00	0.00	0.00
50.80	2.00	0.89	5.00	0.00	0.00	0.00
50.85	2.00	0.89	5.00	0.00	0.00	0.00
50.90	2.00	0.89	5.00	0.00	0.00	0.00

50.95	2.00	0.89	5.00	0.00	0.00	0.00
51.00	2.00	0.89	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

Attachment C . ... Worksheet "B" - DCV Calculations

Worksheet B: Simple Design Capture Volume Sizing Method AREA A

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter design capture storm depth from Figure III.1, d (inches)	d=	0.85	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=	0.85	inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), A (acres)	A=	8.45	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.92	
3	Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$	C=	0.84	
4	Calculate runoff volume, $V_{design}= (C \times d_{remainder} \times A \times 43560 \times (1/12))$	V_{design}=	25,766	cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate				
1	Enter measured infiltration rate, $K_{observed}$[1] (in/hr) (Appendix VII)	$K_{observed}$=	xxx	In/hr
2	Enter combined safety factor from Worksheet H, S_{total} (unitless)	S_{total}=	xxx	
3	Calculate design infiltration rate, $K_{design} = K_{observed} / S_{total}$	K_{design}=	xxx	In/hr
Step 3b: Determine minimum BMP footprint				
4	Enter drawdown time, T (max 48 hours)	T=	48	Hours
5	Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$	D_{max}=	xxx	feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$	A_{min}=	xxx	sq-ft

[1]$K_{observed}$ is the vertical infiltration measured in the field, before applying a factor of safety. If field testing measures a rate that is different than the vertical infiltration rate (for example, three-dimensional borehole percolation rate), then this rate must be adjusted by an acceptable method (for example, Porchet method) to yield the field estimate of vertical infiltration rate, $K_{observed}$. See Appendix VII.

Attachment D . ... Worksheet "I" – Groundwater Feasibility

Worksheet I: Summary of Groundwater-related Feasibility Criteria

1	Is project large or small? (as defined by **Table VIII.2**) circle one	Large		Small
2	What is the tributary area to the BMP?	A	8.45	acres
3	What type of BMP is proposed?	Modular Bio-Filtration		
4	What is the infiltrating surface area of the proposed BMP?	A_{BMP}	N/A	sq-ft
5	What land use activities are present in the tributary area (list all) Industrial			
6	What land use-based risk category is applicable?	L	M	H
7	If M or H, what pretreatment and source isolation BMPs have been considered and are proposed (describe all): Inlet filters and hydrodynamic separator			
8	What minimum separation to mounded seasonally high groundwater applies to the proposed BMP? See Section **VIII.2** (circle one)	5 ft		10 ft
9	Provide rationale for selection of applicable minimum separation to seasonally high mounded groundwater: Soils Report indicates that the historic high groundwater level for the site is approximately 6-9 feet below the ground surface.			
10	What is separation from the infiltrating surface to seasonally high groundwater?	SHGWT	2'	ft
11	What is separation from the infiltrating surface to mounded seasonally high groundwater?	Mounded SHGWT	N/A	ft
12	Describe assumptions and methods used for mounding analysis: N/A			
13	Is the site within a plume protection boundary (See **Figure**	Y	N	N/A

Worksheet I: Summary of Groundwater-related Feasibility Criteria

	VIII.2)?	
14	Is the site within a selenium source area or other natural plume area (See Figure VIII.2)?	Y N N/A
15	Is the site within 250 feet of a contaminated site?	Y N N/A
16	If site-specific study has been prepared, provide citation and briefly summarize relevant findings: No	
17	Is the site within 100 feet of a water supply well, spring, septic system?	Y N N/A
18	Is infiltration feasible on the site relative to groundwater-related criteria?	Y N
Provide rationale for feasibility determination: Due to high groundwater elevations relative to the surface elevations make traditional infiltration BMPs infeasible considering OCTGD groundwater separation minimums.		

Note: if a single criterion or group of criteria would render infiltration infeasible, it is not necessary to evaluate every question in this worksheet.

Attachment F.. ....Maintenance Covenant & Operations and Maintenance Plan

Operations and Maintenance (O&M) Plan
Maintenance Covenant and Agreement

Preliminary
Water Quality Management Plan for

GCC CYPRESS BUILDING 3

5665 Plaza Drive

APN: 241-101-25

PCL 2 LLA 2000-03

Prepared For:

GLC CYPRESS LLC

949-407-0118

Blair.Dahl@goodman.com

Prepared On:

9/20/23

Table of Contents

Attachments

Recording Requested by:
City of Cypress
Engineering Division

When Recorded Mail to:
CITY OF CYPRESS
ATTN: ENGINEERING DIVISION
PO BOX 609
CYPRESS, CA 90630

THIS SPACE IS FOR RECORDER'S USE

The undersigned grantor declares that this transaction is exempt for the payment of a documentary transfer tax pursuant to Revenue and Taxation Code section 11922.

This document is being recorded for the benefit of the City of Cypress and is exempt from payment of a recordation fee pursuant to Government Code Section 27383.

COVENANT AND AGREEMENT REGARDING OPERATIONS AND MAINTENANCE PLAN TO FUND AND MAINTAIN WATER QUALITY BMPS, CONSENT TO INSPECT, AND INDEMNIFICATION

This Agreement Regarding Operations and Maintenance Plan to Fund and Maintain Water Quality BMPs, Consent to Inspect and Indemnification and Covenant Running With the Land (“Agreement”) is made on this ___ day of _________, 202_, by and between The City of Cypress, a California municipal corporation (“Covenantee” or “City”) and the undersigned property owner(s) (“Covenanter”).

RECITALS

A. Covenanter is the owner of the following real property (“Property”) at **5757 Plaza Drive, Cypress CA, Parcel 3 of Lot Line Adjustment 2000-03, APN: 241-101-26.**

B. The City is the owner of interests in that certain real property within the city of Cypress, County of Orange, State of California, containing storm drains, pipelines, and related appurtenances constituting the City’s municipal separate storm sewer system (the City’s “Storm Drain System”).

C. Covenanter intends to develop, improve, and/or use the Property in such a way that approval of the City for such development, improvement, and/or use is required pursuant to applicable laws.

D. As a condition for said approval by the City, City required Covenanter, and Covenanter desires to, restrict the use of property according to the conditions, covenants, equitable servitudes, and restrictions contained herein for the express benefit of the City’s Storm Drain System.

NOW, THEREFORE, incorporating the foregoing Recitals and in consideration thereof, in consideration of the covenants and conditions contained herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, and expressly for the benefit of, and to bind, their successors in interest, the parties hereto agree as follows:

AGREEMENT

1. <u>Operations and Maintenance ("O&M") Plan for Best Management Practices ("BMPs")</u>

Covenanter, and each successive owner of an interest in all or any part of the Property ("Owner(s)") shall, throughout the period of their respective ownership, implement, and fund implementation of, the O&M Plan for the Property, which was approved by the City as part of the Water Quality Management Plan ("WQMP") required for development of the Property, and shall operate and maintain the BMPs described in the O&M Plan for the Property, which includes:

a. Description of all post-construction BMPs (non-structural and structural),
b. Description of the Property owner's(s') responsibilities and required training of persons performing BMP implementation, operation and maintenance,
c. Implementation frequency and operating schedule,
d. Inspection/Maintenance frequency and schedule,
e. Specific maintenance activities,
f. Required permits from resource agencies, if any,
g. Forms to be used in documenting implementation, operation and maintenance activities,
h. Recordkeeping requirements.

A copy of the approved O&M Plan is described in the current WQMP for the project, as it may be amended from time to time according to its terms, which is on file with the City of Cypress Engineering department, and is incorporated herein by reference.

2. <u>Compliance with Cypress City Code and Consent to Inspect</u>

Owners shall use and maintain the property in full compliance with the provisions of the O&M Plan and the Cypress City Code section 13.21 et seq., as it may be amended from time to time. Owners hereby consent to inspection of the Property by an inspector authorized by the City Manager, or his or her designee, for the purpose for verifying compliance with the provisions of this Agreement.

3. <u>Indemnification</u>

Owners agree to indemnify, defend, and hold harmless the City, its elected officers, employees, agents, and contractors from and against any and all liability, expense, including costs and legal fees, and claims of damage of any nature whatsoever including, but not limited to, death, bodily injury, personal injury, or property damage arising from or connected with the City inspection of the Property expect where such liability, expense, or claim for damage results from the sole negligence or willful misconduct of the City.

4. <u>Rights and Obligations Run with the Land</u>

Unless terminated in accordance with paragraph 5 below, or by law, the rights and obligations of the parties hereunder shall constitute covenants, benefits, burdens, conditions, equitable servitudes, and restrictions which run with the land in perpetuity and which shall be binding upon, and inure to the benefit of, each Owner during its respective period of ownership of all or any part of the Property. No Owner shall be bound by, or entitled to the benefit of, said rights and obligations, upon transfer by the Owner of its entire interest in the Property, in fee, to a successor in interest to the Property.

5. <u>Termination of Agreement Upon Termination of WQMP</u>

This Agreement and the conditions, covenants, equitable servitudes, and restrictions set forth herein shall terminate upon termination of the WQMP applicable to the Property in accordance with its terms. Upon termination of the WQMP applicable to the Property, the Owner may request that the City execute a recordable document approved by the City approving and acknowledging termination of this agreement. A recorded document duly executed and acknowledged by the Public Works Director, or his or her Designee, approving termination of this Agreement shall be conclusive evidence of such termination.

6. Enforcement

The City may, but shall not be obligated to, enforce this Agreement by a proceeding at law or in equity against any person or persons violating or attempting to violate any condition, covenant, equitable servitude, or restriction provided for herein, either to restrain such violation or to recover damages.

7. Entire Agreement

This Agreement constitutes the entire agreement and understanding between the parties with respect of the subject matter of this Agreement and supersedes all prior or contemporaneous agreements and understandings with respect to the subject matter hereof, whether oral or written.

8. Severability

If any part of this Agreement is declared by a final decision of a court of competent jurisdiction to be invalid for any reason, such shall not affect the validity of the rest of the Agreement. The other parts of this Agreement shall remain in effect as if this agreement had been executed without the invalid party. The partied declare that they intend and desire that the remaining parts of tis Agreement continue to be effective without any part or parts that have been declared invalid.

9. Counterparts

This Agreement may be executed in counterparts, each of which so executed shall, irrespective of the date of tits execution and delivery, be deemed an original, and all such counterparts together shall constitute one and the same instrument.

10. Attorneys' Fees

If any party files an action or brings any proceeding against the other arising from this Agreement, the prevailing party shall be entitled to recover as an element of its costs of suit, and not as damages, reasonable attorneys' fees and costs to be fixed by the court. A party not entitled to recover its costs shall not recover attorneys' fees. No sum for attorneys' fees shall be included in calculating the amount of a judgment for purposes of deciding whether a part is entitled to its costs or attorneys' fees.

11. Amendment

No modification, amendment, addition to, alteration of the terms of this Agreement whether written or verbal, shall be valid unless made in writing, formally approved and executed by the City and the current Owner(s) of the Property, and duly recorded.

12. Authority of Signatories to Agreement

Each person executing this Agreement represents and warrants that he or she is duly authorized and has legal capacity to execute and deliver this Agreement on behalf of the parties for which execution is made. Each party represents and warrants to the other that the execution of this Agreement and the performance of such party's obligations hereunder have been duly authorized and that the agreement is valid and legal agreement binding on such party and enforceable in accordance with its terms.

[SIGNATURES OF FOLLOWING PAGE]

IN WITNESS WHEREOF, the parties hereto have executed this agreement as of the date set forth above.

"CITY"/"COVENANTEE"
CITY OF CYPRESS

Douglas C. Dancs, P.E.
Public Works Director

ATTEST:

Alisha Farnell
City Clerk

APPROVED AS TO FORM:

Anthony Taylor
City Attorney

"COVENANTER"

Name of Covenanter

Signature

Title

Signature

Title

[signatures must be notarized]

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Non-Structural Source Control BMPs			
Yes	**N1. Education for Property Owners, Tenants and Occupants** For developments with no Property Owners Association (POA) or with POAs of less than fifty (50) dwelling units, practical information materials will be provided to the first occupants/tenants on general housekeeping practices that contribute to the protection of stormwater quality. These materials will be initially developed and provided to first occupants/tenants by the developer. Thereafter such materials will be available through the Permittees' education program. Different materials for residential, office commercial, retail commercial, vehicle-related commercial and industrial uses will be developed..	Educational materials will be provided to tenants, including brochures and restrictions to reduce pollutants from reaching the storm drain system. Examples include tips for pet care, household tips, and proper household hazardous waste disposal. Tenants will be provided with these materials by the property management prior to occupancy, and periodically thereafter. Refer to Section VII for a list of materials available and attached to this WQMP. Additional materials are available through the County of Orange Stormwater Program website (http://ocwatersheds.com/PublicEd/) and the California Stormwater Quality Association's (CASQA) BMP Handbooks (http://www.casqa.org/resources/bmphandbooks).	GLC CYPRESS LLC
Yes	**N2. Activity Restrictions** If a POA is formed, conditions, covenants and restrictions (CCRs) must be prepared by the developer for the purpose of surface water quality protection. An example would be not allowing car washing outside of established community car wash areas in multi-unit complexes. Alternatively, use restrictions may be developed by a building operator through lease terms, etc. These restrictions must be included in the Project WQMP.	The Owner/HOA shall develop ongoing activity restrictions that include those that have the potential to create adverse impacts on water quality. Activities include, but are not limited to: handling and disposal of contaminants, fertilizer and pesticide application restrictions, litter control and pick-up, and vehicle or equipment repair and maintenance in non-designated areas, as well as any other activities that may potentially contribute to water pollution.	GLC CYPRESS LLC
Yes	**N3. Common Area Landscape Management** Identify on-going landscape maintenance requirements that are consistent with those in the County Water Conservation Resolution (or city equivalent) that include fertilizer and/or pesticide usage consistent with Management Guidelines for Use of Fertilizers (DAMP	Management programs will be designed and implemented by the Owner to maintain all the common areas within the project site. These programs will cover how to reduce the potential pollutant sources of fertilizer and pesticide uses, utilization of water-efficient landscaping practices and proper disposal of landscape wastes by the owner and/or contractors.	GLC CYPRESS LLC

	Section 5.5). Statements regarding the specific applicable guidelines must be included in the Project WQMP.		
Yes	**N4. BMP Maintenance** The Project WQMP shall identify responsibility for implementation of each non-structural BMP and scheduled cleaning and/or maintenance of all structural BMP facilities.	The Owner will be responsible for the implementation and maintenance of each applicable nonstructural BMP, as well as scheduling inspections and maintenance of all applicable structural BMP facilities through its staff, landscape contractor, and/or any other necessary maintenance contractors.	GLC CYPRESS LLC
No	**N5. Title 22 CCR Compliance**		
No	**N6. Local Water Quality Permit Compliance**		
No	**N7. Spill Contingency Plan**		
No	**N8. Underground Storage Tank Compliance**		
No	**N9. Hazardous Materials Disclosure Compliance**		
No	**N10. Uniform Fire Code Implementation**		
Yes	**N11. Common Area Litter Control** For industrial/commercial developments the owner should be required to implement trash management and litter control procedures in the common areas aimed at reducing pollution of drainage water. The owner may contract with their landscape maintenance firms to provide this service during regularly scheduled maintenance, which should consist of litter patrol, emptying of trash receptacles in common areas, and noting trash disposal violations by tenants or businesses and reporting the violations to the owner for investigation.	The Owner will be responsible for performing trash pickup and sweeping of littered common areas on a weekly basis or whenever necessary. Responsibilities will also include noting improper disposal materials by the public and reporting such violations for investigation.	GLC CYPRESS LLC

Yes	**N12. Employee Training** Education program (see N1) as it would apply to future employees of individual businesses. Developer either prepares manual(s) for initial purchasers of business site or for development that is constructed for an unspecified use makes commitment on behalf of POA or future business owner to prepare. An example would be raining on the proper storage and use of fertilizers and pesticides, or training on the implementation of hazardous spill contingency plans.	All employees and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not be limited to, spill cleanup procedures, proper waste disposal, housekeeping practices, etc.	GLC CYPRESS LLC

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N13. Housekeeping of Loading Docks** Loading docks typically found at large retail and warehouse-type commercial and industrial facilities should be kept in a clean and orderly condition through a regular program of sweeping and litter control and immediate cleanup of spills and broken containers. Cleanup procedures should minimize or eliminate the use of water if plumed to the storm sewer. If wash water is used, it must be disposed of in an approved manner and not discharged to the storm drain system. If there are no other alternatives, discharge of non-stormwater flow to the sanitary sewer must be at an acceptable discharge point such as a cleanout, oil/water separator, grease interceptor, or industrial sewer connection. All sewer discharges shall be in accordance with the Orange County Sanitation District's Wastewater Discharge Regulations and/or Washwater Disposal Guidelines.	Inspect loading dock for litter, spills, broken containers, and broken containers. Remove litter and debris and sweep docking area. Check that loading dock is covered and isolated with no run-on or run-off to other areas or the storm drain system. Repair, redesign, regrade, etc. to correct deficiencies. If spills of hazardous materials occur, clean up spill, but prevent wash water from entering storm drain system.	GLC CYPRESS LLC

Yes	**N14. Common Area Catch Basin Inspection** For industrial/commercial developments and for developments with privately maintained drainage systems, the owner is required to have at least 80 percent of drainage facilities inspected, cleaned and maintained on an annual basis with 100 percent of the facilities included in a two-year period. Cleaning should take place in the late summer/early fall prior to the start of the rainy season. Drainage facilities include catch basins (storm drain inlets) detention basins, retention basins, sediment basins, open drainage channels and lift stations. Records should be kept to document the annual maintenance.	All on-site catch basin inlets and drainage facilities shall be inspected and maintained by the Owner at least once a year, prior to the rainy season, no later than October 1st of each year.	GLC CYPRESS LLC
Yes	**N15. Street Sweeping Private Streets and Parking Lots** Streets and parking lots are required to be swept prior to the storm season, in late summer or early fall, prior to the start of the rainy season or equivalent as required by the governing jurisdiction.	The Owner shall be responsible for sweeping all on-site streets, drive aisles, and parking areas within the project on a quarterly basis.	GLC CYPRESS LLC
Structural Source Control BMPs			
Yes	**S1. Provide Storm Drain System Stenciling and Signage** Storm drain stencils are highly visible source control messages, typically placed directly adjacent to storm drain inlets. The stencils contain a brief statement that prohibits the dumping of improper materials into the municipal storm drain system. Graphical icons, either illustrating anti-dumping symbols or images of receiving water fauna, are effective supplements to the antidumping message. Stencils and signs alert the public to the destination of pollutants discharged into stormwater. The following requirements should be included in the project design and shown on the project plans: Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language (such as: “NO DUMPINGDRAINS	The phrase “NO DUMPING! DRAINS TO OCEAN”, or an equally effective phrase approved by the City, will be stenciled on all major storm drain inlets within the project site to alert the public to the destination of pollutants discharged into storm water. Stencils shall be in place prior to release of certificate of occupancy. Stencils shall be inspected for legibility on an annual basis and re-stenciled as necessary.	GLC CYPRESS LLC

	TO OCEAN") and/or graphical icons to discourage illegal dumping. 2. Post signs and prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area. 3. Maintain legibility of stencils and signs. See CASQA Stormwater Handbook BMP Fact Sheet SD-13 for additional information.		
No	**S2. Design Outdoor Hazardous Material Storage Areas to Reduce Pollutant Introduction**		
Yes	**S3. Design Trash Enclosures to Reduce Pollutant Introduction** Design trash storage areas to reduce pollutant introduction. All trash container areas shall meet the following requirements (limited exclusion: detached residential homes): 1. Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements diverted around the area, screened or walled to prevent off-site transport of trash; and 2. Provide solid roof or awning to prevent direct precipitation. Connection of trash area drains to the municipal storm drain system is prohibited. Potential conflicts with fire code and garbage hauling activities should be considered in implementing this source control. See CASQA Stormwater Handbook Section 3.2.9 and BMP Fact Sheet SD-32 for additional information.	All trash and waste shall be stored in containers that have lids or tarps to minimize direct precipitation into the containers. Number and location(s) of any trash enclosures will be identified in the Final WQMP. The trash storage areas will be designed to City standards, and will be walled, roofed, have gates and proper drainage per City standards.	GLC CYPRESS LLC
Yes	**S4. Use Efficient Irrigation Systems and Landscape Design** Projects shall design the timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the municipal storm drain system. (Limited exclusion:	The Owner will be responsible for the installation and maintenance of all common landscape areas utilizing similar planting materials with similar water requirements to reduce excess irrigation runoff. The Owner will be responsible for implementing all efficient irrigation systems for common area landscaping including, but not limited to, provisions for water	GLC CYPRESS LLC

	detached residential homes.) The following methods to reduce excessive irrigation runoff shall be considered, and incorporated on common areas of development and other areas where determined applicable and feasible by the Permittee: 1. Employing rain shutoff devices to prevent irrigation after precipitation. 2. Designing irrigation systems to each landscape area's specific water requirements. 3. Using flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines. 4. Implementing landscape plan consistent with County Water Conservation Resolution or city equivalent, which may include provision of water sensors, programmable irrigation times (for short cycles), etc. 5. The timing and application methods of irrigation water shall be designed to minimize the runoff of excess irrigation water into the municipal storm drain system. 6. Employing other comparable, equally effective, methods to reduce irrigation water runoff. 7. Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider other design features, such as: • Use mulches (such as wood chips or shredded wood products) in planter areas without ground cover to minimize sediment in runoff. • Install appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant material where possible and/or as recommended by the landscape architect.	sensors and programmable irrigation cycles. This includes smart timers, rain sensors, and moisture shut-off valves. The irrigation systems shall be in conformance with water efficiency guidelines. Systems shall be tested twice per year, and water used during testing/flushing shall not be discharged to the storm drain system.	

	• Leave a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible. • Choose plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth. Irrigation practices shall comply with local and statewide ordinances related to irrigation efficiency.		
No	**S5. Protect Slopes and Channels**		
Yes	**S6. Loading Dock Areas** Loading /unloading dock areas shall include the following: 1. Cover loading dock areas, or design drainage to preclude run-on and runoff, unless the material loaded and unloaded at the docks does not have potential to contribute to stormwater pollution, and this use is ensured for the life of the facility. 2. Direct connections to the municipal storm drain system from below grade loading docks (truck wells) or similar structures are prohibited. Stormwater can be discharged through a permitted connection to the storm drain system with a treatment control BMP applicable to the use. 3. Other comparable and equally effective features that prevent unpermitted discharges to the municipal storm drain system. 4. Housekeeping of loading docks shall be consistent with N13. See CASQA Stormwater Handbook Section 3.2.8 for additional information.	Inspect loading dock for litter, spills, broken containers, and broken containers. Remove litter and debris and sweep docking area. Check that loading dock is covered and isolated with no run-on or run-off to other areas or the storm drain system. Repair, redesign, regrade, etc. to correct deficiencies. If spills of hazardous materials occur, clean up spill, but prevent wash water from entering storm drain system.	GLC CYPRESS LLC
No	**S7. Maintenance Bays and Docks**		
No	**S8. Vehicle Wash Areas**		

Operations and Maintenance Plan

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
No	**S9. Outdoor Processing Areas**		
No	**S10. Equipment Wash Areas**		
No	**S11. Fueling Areas**		
Yes	**S12. Site Design and Landscape Planning** Hillside areas that are disturbed by project development shall be landscaped with deep-rooted, drought tolerant plant species selected for erosion control, satisfactory to the local permitting authority.	Management programs will be designed and implemented by the Owner to maintain all the common areas within the project site. These programs will cover how to reduce the potential pollutant sources of fertilizer and pesticide uses, utilization of water-efficient landscaping practices and proper disposal of landscape wastes by the owner and/or contractors.	GLC CYPRESS LLC
No	**S13. Wash Water Controls for Food Preparation Areas**		
No	**S14. Community Car Wash Racks**		

Operations and Maintenance Plan

BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Low Impact Development BMPs		
Hydrologic Source Control BMPs	N/A	
Infiltration BMPs	N/A	
Harvest and use BMPs	N/A	

BMP Name and BMP implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Biotreatment BMP - Modular Wetlands **Model MWS-L-8-24-V – 2 Ea**	See Modular Wetlands maintenance procedures in the Appendix. Inspect system via the maintenance port for infiltration of collected runoff after major rain events and at least semi-annually, once prior to the beginning of the rainy season (October 1 of each year) and once after the rainy season.	GLC CYPRESS LLC
Underground Storage System – StormTrap or Equal	Inspect system via the maintenance port for infiltration of collected runoff after major rain events and at least semi-annually, once prior to the beginning of the rainy season (October 1 of each year) and once after the rainy season. Ensure that facility drains within 48-72 hours. Should drawdown times get significantly reduced due to sediment buildup, flush system by injecting high pressure water via the maintenance port and remove sediment laden water via sump pump. 2x per year Inspections Cleanout Annually (min.)	GLC CYPRESS LLC

Operations and Maintenance Plan

Treatment Control BMPs		
Treatment Control BMP – Hydrodynamic separator **ADS Barracuda Max Model S4 – 2 Ea**	Typical maintenance includes inspecting the system at a minimum of once every six months and once prior to the beginning of the rainy season (October 1 of each year). The cleaning and debris removal maintenance from the settling chamber a minimum of once year and replacement of hydrocarbon booms once a year. The procedure is usually done with the use of any standard vacuum truck. Media shall be replaced when it has become 75% clogged, typically once per year at a minimum.	GLC CYPRESS LLC
Storm Drain Ejector Pump System – **Primary & Secondary** **Model PSI-PBL111422**	Inspection and operation of the pump and sump manhole shall be once prior to the beginning of the rainy season (October 1 of each year). Proper operation and inspection would include the following: 1) Automatic operation of the system by float activation. One pump starting at lead on levels, second pump starting at high level conditions; manual operation by use of the selector switches. 2) Inspect floats for proper elevation and for proper movement. Correct any obstructions. 3) Check incoming power for proper voltage. Check voltage at motor connections. 4) Check amperage of each motor. 5) Hose down lift station to clean the walls of the wet well, pumps and floats.	GLC CYPRESS LLC
Inlet Filters **AbTech Ultra-Urban Filter - Models CO & DI – 18 ea**	Typical maintenance includes inspecting the filter at a minimum of once every six months and once prior to the beginning of the rainy season (October 1 of each year). The filter cleaning and debris removal maintenance from the filter and basket should occur a minimum of once year and replacement of hydrocarbon booms once a year. The procedure is usually done with the use of any standard vacuum truck.	GLC CYPRESS LLC
Trench Drains – 2 ea **Zurn Products Model Z874-12-HDG (or equal)**	Typical maintenance includes inspecting the grates and trough at a minimum of once every six months and once prior to the beginning of the rainy season (October 1 of each year). The grates and trough should be cleaned of silt and debris to ensure a free flow condition. Any damaged grating or trough should be repaired or replaced as needed.	GLC CYPRESS LLC

Required Permits

This section must list any permits required for the implementation, operation, and maintenance of the BMPs. Possible examples are:

- Permits for connection to sanitary sewer
- Permits from California Department of Fish and Game
- Encroachment permits

If no permits are required, a statement to that effect should be made.

Forms to Record BMP Implementation, Maintenance, and Inspection

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

Recordkeeping

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

ATTACHMENT A - Record of BMP Implementation, Maintenance, and Inspection

Today's Date: ______________________

Name of Person Performing Activity (Printed): ______________________

Signature: ______________________

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed

ATTACHMENT B – Notice of Transfer of Responsibility

Exhibit D

Water Quality Management Plan
Notice of Transfer of Responsibility

Tracking No. Assigned by the City of Cypress: _ WQMP-23-1

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

I. Previous Owner/Previous Responsible Party Information

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

II. Information about Site Transferred

Name of Project (if applicable) GCC Cypress Building 3	
Title of WQMP Applicable to site: Final WQMP - GCC Cypress Building 3	
Street Address of Site (if applicable) 5665 Plaza Drive	
Planning Area (PA) and/or Tract Number(s) for Site	Lot Numbers (if Site is a portion of a tract)
Date WQMP Prepared (and revised if applicable)	

III. New Owner/New Responsible Party Information

Company/Individual Name GLC Cypress, LLC		Contact Person Blair Dahl	
Street Address 3333 Michelson Dr, #1050		Title VP	
City Irvine	State CA	ZIP 92620	Phone 949-407-0118

IV. Ownership Transfer Information

General Description of Site Transferred to New Owner	General Description of Portion of Project/Parcel Subject to WQMP Retained by Owner (if any)
Lot/Tract Numbers of SiteTransferred to New Owner	
Remaining Lot/Tract Numbers Subject to WQMP Still Held by Owner (if any)	
Date of Ownership Transfer	

Note: When the Previous Owner is transferring a Site that is a portion of a larger project/parcel addressed by the WQMP, as opposed to the entire project/parcel addressed by the WQMP, the General Description of the Site transferred and the remainder of the project/parcel not transferred shall be set forth as maps attached to this notice. These maps shall show those

portions of a project/parcel addressed by the WQMP that are transferred to the New Owner (the Transferred Site), those portions retained by the Previous Owner, and those portions previously transferred by Previous Owner. Those portions retained by Previous Owner shall be labeled "Previous Owner," and those portions previously transferred by Previous Owner shall be labeled as "Previously Transferred."

V. Purpose of Notice of Transfer

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

VI. Certifications

A. Previous Owner

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

Printed Name of Previous Owner Representative	Title
Signature of Previous Owner Representative	Date

B. New Owner

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

Printed Name of New Owner Representative	Title
Signature	Date

ATTACHMENT C – Owners Manuals

Attachment G . ... Worksheet "J" – Harvest and Reuse Feasibility

minimum incremental benefit required to mandate its use (See discussion of threshold incremental benefit in **Appendix XIII**). This level of performance is termed the "minimum partial capture." A harvest and use system would be considered to achieve less than "minimum partial capture" if:

- Based on a system sized for the full DCV from the tributary area, and
- Based on the combined project demand for harvested water,
- The system draws down in greater than 30 days (720 hours), therefore captures less than 40 percent of average annual runoff (See Figure III.2).

Harvest and use systems with demand lower than required to achieve minimum partial capture are not required to be considered to demonstrate retention of stormwater to the MEP. If this is the case, other LID BMPs must be evaluated for retention and/or biotreatment of the Project DCV.

X.3.2. Demand Thresholds for Minimum Partial Capture

Table X.6 provides the minimum combined project demand to meet the minimum partial capture for the range of precipitation zones found in Orange County. Projects with a total demand below this value not required to prepare a project specific evaluation of harvest and use feasibility.

Table X.6: Harvested Water Demand Thresholds for Minimum Partial Capture

Design Capture Storm Depth[1], inches	Wet Season Demand Required for Minimum Partial Capture[2], gpd per impervious acre
0.60	490
0.65	530
0.70	570
0.75	610
0.80	650
0.85	690
0.90	730
0.95	770
1.00	810

1 - Based on isopluvial map (See **XVI.1**)

2 –Minimum Partial Capture is a performance standard whereby system performance exceeds 40 percent capture (See **Appendix** XIII) , such that the system must be considered for use even if it cannot achieve the full DCV.

X.3.3. TUTIA Ratio Thresholds for Minimum Partial Capture

Table X.7 provides thresholds for TUTIA (Toilet Users to Impervious Area) ratio required to achieve minimum partial capture of the stormwater DCV (i.e. at least 40 percent average annual capture efficiency with a system sized for the DCV). Projects with TUTIA ratios below this value and without other significant demands for harvested water are not required to prepare a project specific evaluation of harvest and use feasibility. The values in Table X.7 reflect the minimum TUTIA ratio required to achieve at least 40 percent average annual capture efficiency with a system sized for the DCV.

Table X.7: Minimum TUTIA for Minimum Partial Capture

Project Type	**Residential**	**Retail and Office Commercial**	**Industrial**	**Schools[1]**
Basis of Toilet User Calculation	*Resident*	*Employee (non-visitor)*	*Employee (non-visitor)*	*Employee (non-student)*
Design Capture Storm Depth, inches	**Minimum TUTIA Ratio Required for Minimum Partial Capture (toilet users/impervious acre)**			
0.6	74	98	125	21
0.65	80	106	135	23
0.7	86	114	145	24
0.75	92	122	155	26
0.8	98	130	165	28
0.85	104	138	176	30
0.9	110	146	186	31
0.95	117	154	196	33
1	123	162	206	35

1 – based on employees only; assumes approximately 5 students per employee.

X.3.4. Irrigated Area Thresholds for Minimum Partial Capture

Table X.8 provides thresholds for irrigated area per impervious acre for minimum partial capture of the stormwater DCV. Projects with irrigation area below this value and without other sources of significant demand will generally not be required to prepare a project specific evaluation of harvest and use feasibility. The values in Table X.8 reflect the minimum irrigated area per impervious area required to achieve at least 40 percent average annual capture efficiency with a system sized for the DCV.

Table X.8: Minimum Irrigated Area for Potential Partial Capture Feasibility

General Landscape Type	Conservation Design: K_L = 0.35			Active Turf Areas: K_L = 0.7		
Closest ET Station	*Irvine*	*Santa Ana*	*Laguna*	*Irvine*	*Santa Ana*	*Laguna*
Design Capture Storm Depth, inches	**Minimum Required Irrigated Area per Tributary Impervious Acre for Potential Partial Capture, ac/ac**					
0.60	0.66	0.68	0.72	0.33	0.34	0.36
0.65	0.72	0.73	0.78	0.36	0.37	0.39
0.70	0.77	0.79	0.84	0.39	0.39	0.42
0.75	0.83	0.84	0.90	0.41	0.42	0.45
0.80	0.88	0.90	0.96	0.44	0.45	0.48
0.85	0.93	0.95	1.02	0.47	0.48	0.51
0.90	0.99	1.01	1.08	0.49	0.51	0.54
0.95	1.04	1.07	1.14	0.52	0.53	0.57
1.00	1.10	1.12	1.20	0.55	0.56	0.60

Worksheet J: Summary of Harvested Water Demand and Feasibility

1	What demands for harvested water exist in the tributary area (check all that apply):			
2	Toilet and urinal flushing		X	
3	Landscape irrigation		X	
4	Other:______________________________		☐	
5	What is the design capture storm depth? (**Figure III.1**)	d	0.82	inches
6	What is the project size?	A	8.45	ac
7	What is the acreage of impervious area?	IA	7.77	ac
	For projects with multiple types of demand (toilet flushing, indoor demand, and/or other demand)			
8	What is the minimum use required for partial capture? (**Table X.6**)	665		gpd
9	What is the project estimated wet season total daily use?	200		gpd
10	Is partial capture potentially feasible? (Line 9 > Line 8?)	No		
	For projects with only toilet flushing demand			
11	What is the minimum TUTIA for partial capture? (**Table X.7**)	169		
12	What is the project estimated TUTIA?	100		

Worksheet J: Summary of Harvested Water Demand and Feasibility

13	Is partial capture potentially feasible? (Line 12 > Line 11?)	No	
	For projects with only irrigation demand		
14	What is the minimum irrigation area required based on conservation landscape design? (**Table X.8**)	7.14	ac
15	What is the proposed project irrigated area? (multiply conservation landscaping by 1; multiply active turf by 2)	0.68	ac
16	Is partial capture potentially feasible? (Line 15 > Line 14?)	No	
Provide supporting assumptions and citations for controlling demand calculation: All landscaping will be drought tolerant no turf			

Attachment H . ... HCOC Exhibit & Calculations

HCOC MITIGATION

128-11 Goodman Commerce Center - Building 3 - Cypress, CA

2YR, 24HR DESIGN STORM

	Area	***Runoff Depth***	***Runoff Volume (V)***	***Time of Concentration (T_C)***
	(AC)	(IN)	(AC-FT)	(HOURS)
EXISTING	8.450	1.069	0.753	0.132
PROPOSED	8.450	1.069	0.753	0.100

is $\mathbf{V}_{PROP}$ / $\mathbf{V}_{EXIST} \leq$ 1.05 ?	TRUE
is $\mathbf{Tc}_{PROP}$ / $\mathbf{Tc}_{EXIST} \leq$ 1.05 ?	TRUE
Δ[2YR, 24HR] =	0

Area	***Runoff Depth***	***Design Capture Volume (DCV)***
(AC)	(IN)	(AC-FT)

WinTR-55 Current Data Description

--- Identification Data ---

User: PBLA Eng. Date: 8/29/2023
Project: Pr. Goodman Commerce Center Units: English
SubTitle: Existing Condition - GCC BLDG 3 - Cypress, CA
Areal Units: Acres
State: California
County: Orange
Filename: L:\128-11 Cypress Bldg 3\HYDRO\PRELIM\TR-55\128-11 - Existing.w55

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
A		Outlet	8.45	89	.132

Total area: 8.45 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
2.16	2.88	3.47	4.3	4.95	5.62	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type I
Dimensionless Unit Hydrograph: <standard>

Pr. Goodman Commerce Center
Existing Condition - GCC BLDG 3 - Cypress, CA
Orange County, California

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
2.16	2.88	3.47	4.3	4.95	5.62	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type I
Dimensionless Unit Hydrograph: <standard>

Pr. Goodman Commerce Center
Existing Condition - GCC BLDG 3 - Cypress, CA
Orange County, California

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 2-Yr (cfs)
SUBAREAS	
A	7.11
REACHES	
OUTLET	7.11

Pr. Goodman Commerce Center
Existing Condition - GCC BLDG 3 - Cypress, CA
Orange County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs) (hr)
SUBAREAS	
A	7.11 9.95
REACHES	
OUTLET	7.11

PBLA Eng. Pr. Goodman Commerce Center
Existing Condition - GCC BLDG 3 - Cypress, CA
Orange County, California

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
A	8.45	0.132	89	Outlet	

Total Area: 8.45 (ac)

Sub-Area Time of Concentration Details

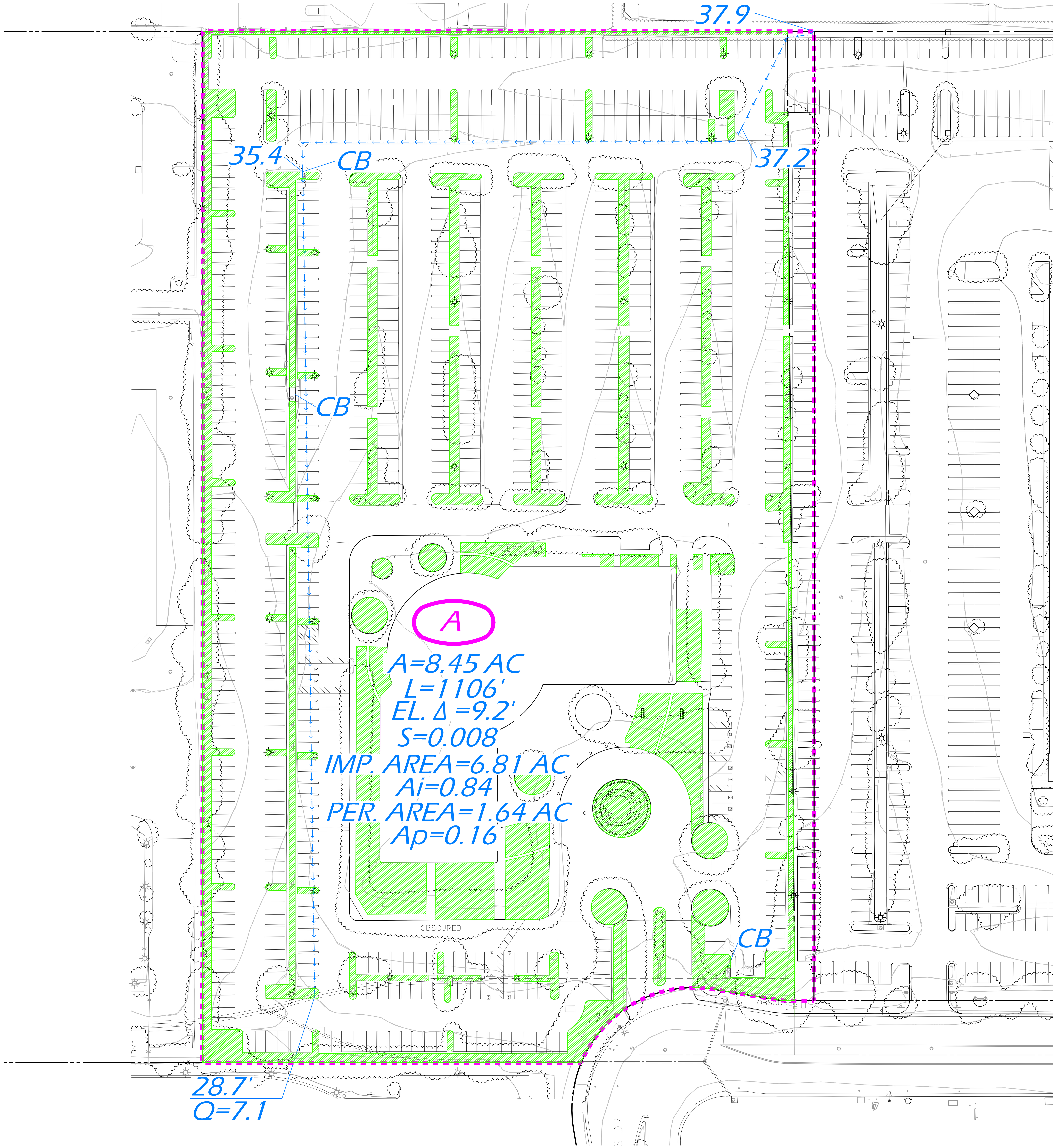
Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
A							
SHEET	100	0.0070	0.011				0.037
SHALLOW	369	0.0048	0.025				0.073
CHANNEL	637	0.0058	0.009	3.14	6.28	8.043	0.022
						Time of Concentration	.132

PBLA Eng.

Pr. Goodman Commerce Center
Existing Condition - GCC BLDG 3 - Cypress, CA
Orange County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
A	Commercial & business	A	8.45	89
	Total Area / Weighted Curve Number		8.45	89
			====	==



LEGEND

- (A) — SUBAREA DESIGNATION
- — SUBAREA BOUNDARY
- SD — SD — EXIST STORM DRAIN
- Q=7.1 — 24 HOUR, 2 YEAR DISCHARGE
- — EXISTING LANDSCAPING

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PREPARED BY:

PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

Aug 30 2023

TR-55 HYDROLOGY MAP
EXISTING CONDITION HYDROLOGY

GCC - CYPRESS-BLD 3
PLAZA DRIVE - CYPRESS, CA

SHT 1 of 1

WinTR-55 Current Data Description

--- Identification Data ---

User:	PBLA Eng.	Date:	8/29/2023
Project:	Pr. Goodman Commerce Center	Units:	English
SubTitle:	Proposed Condition - GCC BLDG 3 - Cypress, CA		
		Areal Units:	Acres
State:	California		
County:	Orange		
Filename:	L:\128-11 Cypress Bldg 3\HYDRO\PRELIM\TR-55\128-11 - Proposed.w55		

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
A		Outlet	8.45	89	0.100

Total area: 8.45 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
2.16	2.88	3.47	4.3	4.95	5.62	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type I
Dimensionless Unit Hydrograph: <standard>

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
2.16	2.88	3.47	4.3	4.95	5.62	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type I
Dimensionless Unit Hydrograph: <standard>

PBLA Eng.

Pr. Goodman Commerce Center
Proposed Condition - GCC BLDG 3 - Cypress, CA
Orange County, California

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 2-Yr (cfs)
SUBAREAS	
A	7.50
REACHES	
OUTLET	7.50

PBLA Eng. Pr. Goodman Commerce Center
Proposed Condition - GCC BLDG 3 - Cypress, CA
Orange County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs) (hr)
SUBAREAS	
A	7.50 9.93
REACHES	
OUTLET	7.50

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
A	8.45	0.100	89	Outlet	

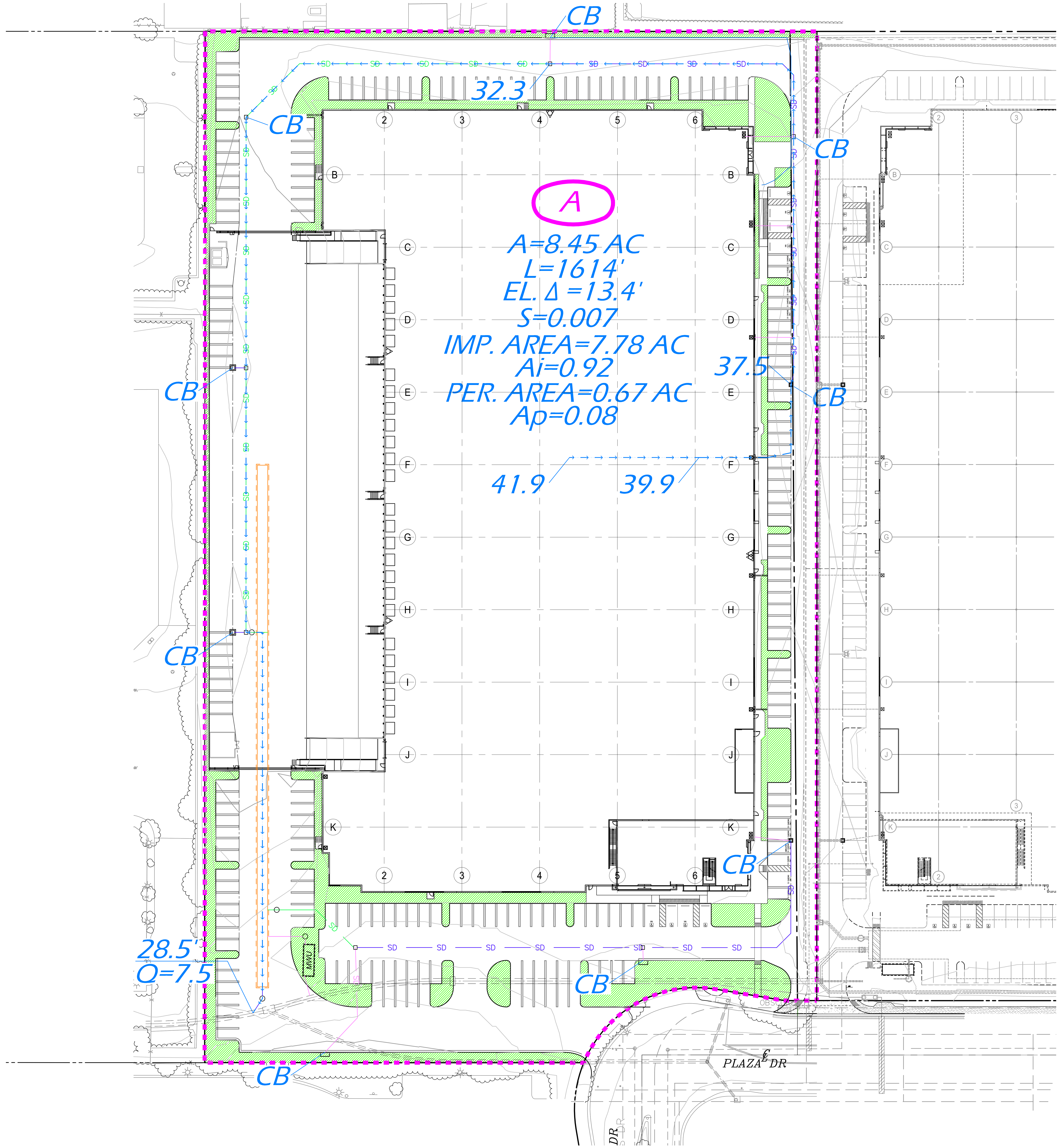
Total Area: 8.45 (ac)

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
A							
SHEET	100	0.0200	0.011				0.025
SHALLOW	124	0.0194	0.025				0.012
CHANNEL	431	0.0050	0.009	1.77	4.71	5.986	0.020
CHANNEL	959	0.0040	0.009	3.14	6.28	6.660	0.040
					Time of Concentration		0.100

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
A	Commercial & business	A	8.45	89
	Total Area / Weighted Curve Number		8.45	89
			====	==



LEGEND

- A — SUBAREA DESIGNATION
- SUBAREA BOUNDARY
- SD —— SD — EXIST STORM DRAIN
- Q=7.5 — 24 HOUR, 2 YEAR DISCHARGE
- EXISTING LANDSCAPING

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PREPARED BY:

PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

Aug 30 2023

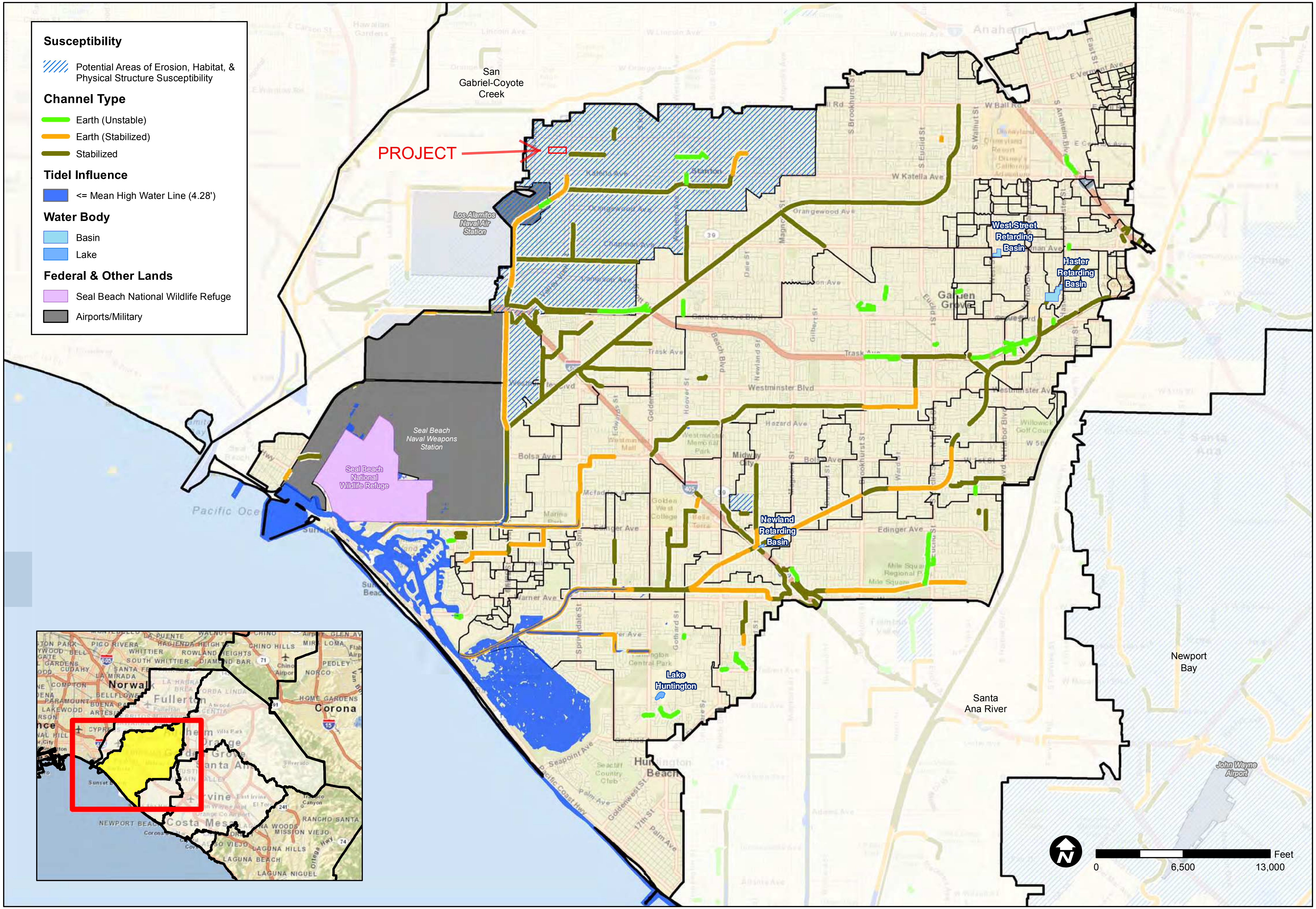
TR-55 HYDROLOGY MAP

PROPOSED CONDITION HYDROLOGY

GCC - CYPRESS-BLD 3

PLAZA DRIVE - CYPRESS, CA

SHT 1 of 1



TITLE
SUSCEPTIBILITY ANALYIS
ANAHEIM BAY-
HUNTINGTON HARBOR

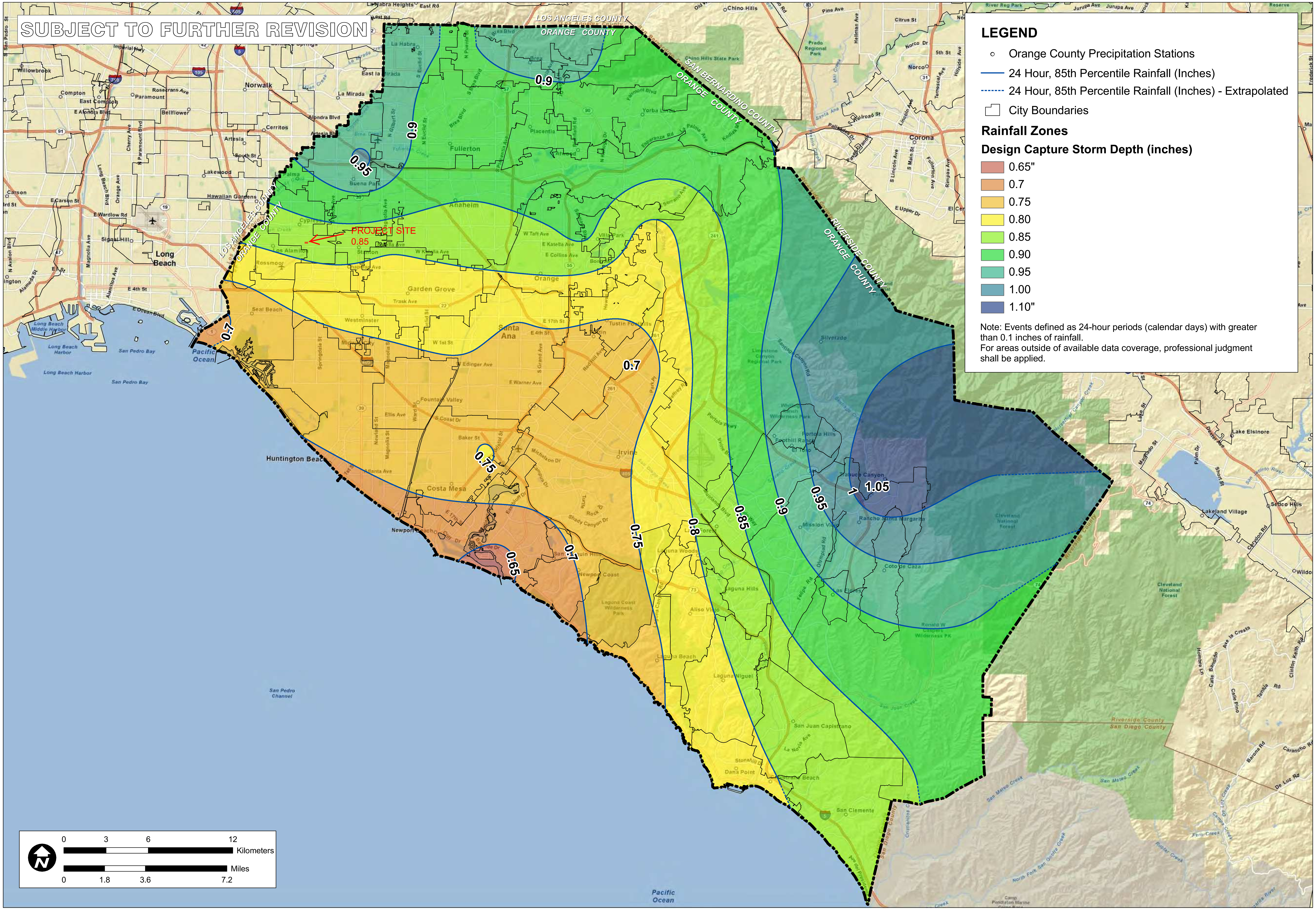
JOB
ORANGE COUNTY
WATERSHED
MASTER PLANNING
ORANGE CO. CA

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

PACE
Advanced Water Engineering

FIGURE
2

P:\9526E\6-GIS\Mxds\Workspace\Susceptible Analysis_20100422\9526E_AnaheimBay_20100331.mxd



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

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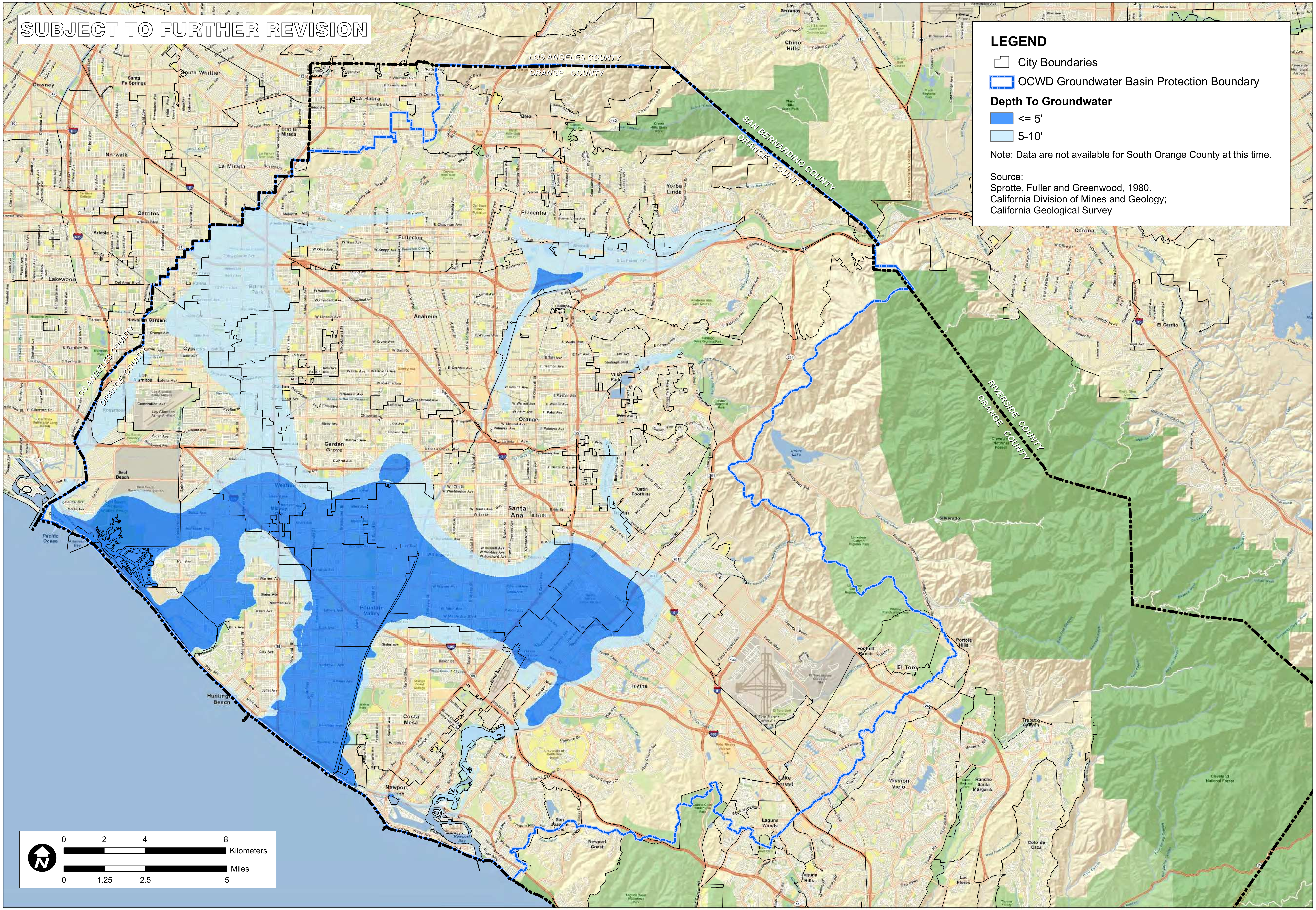

TITLE NORTH ORANGE COUNTY MAPPED SHALLOW GROUNDWATER

JOB ORANGE COUNTY INFILTRATION STUDY

ORANGE CO. CA

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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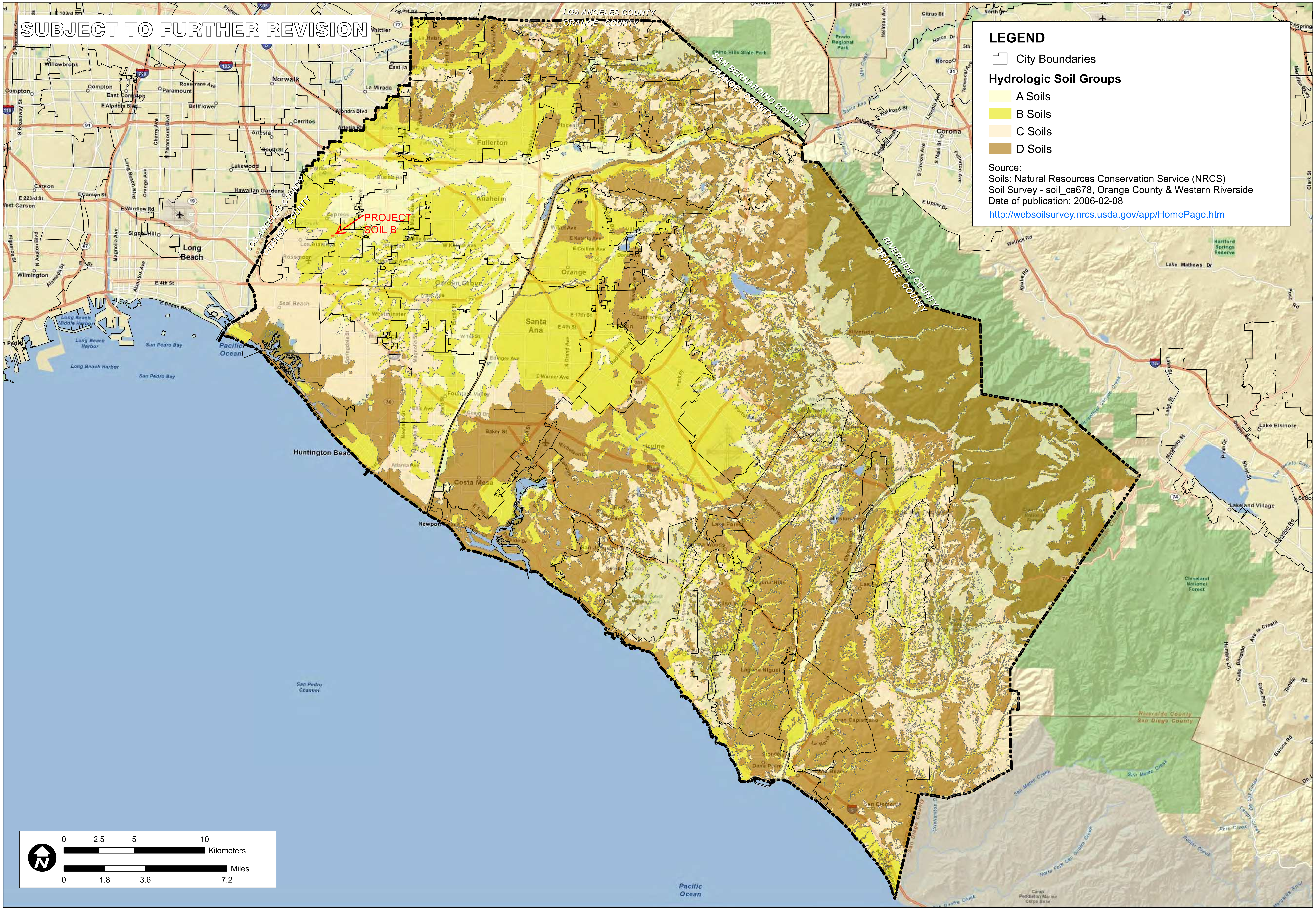

TITLE

NRCS HYDROLOGIC SOILS GROUPS

JOB

ORANGE COUNTY INFILTRATION STUDY

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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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**

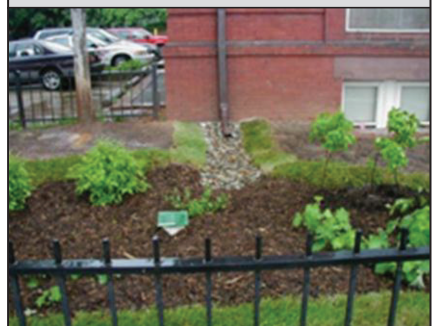
XIV.1. Hydrologic Source Control Fact Sheets (HSC)

HSC-1: Localized On-Lot Infiltration

'Localized on-lot infiltration' refers to the practice of collecting on-site runoff from small distributed areas within a catchment and diverting it to a dedicated on-site infiltration area. This technique can include disconnecting downspouts and draining sidewalks and patios into french drains, trenches, small rain gardens, or other surface depressions. For downspout disconnections and other impervious area disconnection involving dispersion over pervious surfaces, but without intentional ponding, see HSC-2: Impervious Area Dispersion.

Also known as:

- *Downspout infiltration*
- *Retention grading*
- *French drains*
- *On-lot rain gardens*



On-lot rain garden
Source: lowimpactdevelopment.org

Feasibility Screening Considerations

- 'Localized on-lot infiltration' shall meet infiltration infeasibility screening criteria to be considered for use.

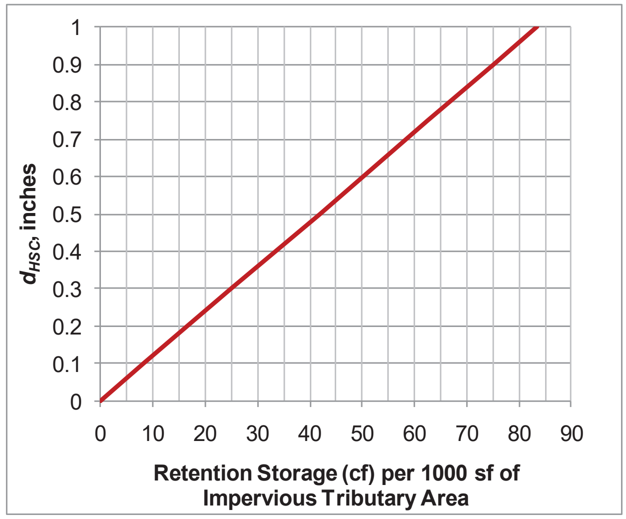
Opportunity Criteria

- Runoff can be directed to and temporarily pond in pervious area depressions, rock trenches, or similar.
- Soils are adequate for infiltration or can be amended to provide an adequate infiltration rate.
- Shallow utilities are not present below infiltration areas.

OC-Specific Design Criteria and Considerations

- ☐ A single on-lot infiltration area should not be sized to retain runoff from impervious areas greater than 4,000 sq. ft.; if the drainage area exceeds this criteria, sizing should be based on calculations for bioretention areas or infiltration trenches.
- ☐ Soils should be sufficiently permeable to eliminate ponded water within 24 hours following a 85th percentile, 24-hour storm event.
- ☐ Maximum ponding depth should be should be less than 3 inches and trench depth should be less than 1.5 feet.
- ☐ Infiltration should not be used when the depth to the mounded seasonally high table is within 5 feet of the bottom of infiltrating surface.
- ☐ Infiltration via depression storage, french drains, or rain gardens should be located greater than 8 feet from building foundations.
- ☐ Site slope should be less than 10%.
- ☐ Infiltration unit should not be located within 50 feet of slopes greater than 15 percent.
- ☐ Side slopes of rain garden or depression storage should not exceed 3H:1V.
- ☐ Effective energy dissipation and uniform flow spreading methods should be employed to prevent erosion resulting fromwater entering infiltration areas.

- ☐ Overflow should be located such that it does not cause erosion orand is conveyed away from structures toward the downstream conveyance and treatment system. .



Calculating HSC Retention Volume

- The retention volume provided by localized on-lot infiltration can be computed as the storage volume provided by surface ponding and the pore space within an amended soil layer or gravel trench.
- Estimate the average retention volume per 1000 square feet impervious tributary area provided by on-lot infiltration.
- Look up the storm retention depth, d_{HSC} from the chart to the right.
- The max d_{HSC} is equal to the design capture storm depth for the project site.

Configuration for Use in a Treatment Train

- Localized on-lot infiltration would typically serve as the first in a treatment train and should only be used where tributary areas do not generate significant sediment that would require pretreatment to mitigate clogging.
- The use of impervious area disconnection reduces the sizing requirement for downstream LID and/or conventional treatment control BMPs.

Additional References for Design Guidance

- LID Center – Rain Garden Design Template. http://www.lowimpactdevelopment.org/raingarden_design/
- University of Wisconsin Extension. Rain Gardens: A How-To Manual for Homeowners. http://learningstore.uwex.edu/assets/pdfs/GWQ037.pdf

XIV.4. Harvest and Use BMP Fact Sheets (HU)

HU-1: Above-Ground Cisterns

Cisterns are large rain barrels. While rain barrels are less than 100 gallons, cisterns range from 100 to more than 10,000 gallons in capacity. Cisterns collect and temporarily store runoff from rooftops for later use as irrigation and/or other non-potable uses. The following components are generally required for installing and utilizing a cistern: (1) pipes that divert rooftop runoff to the cistern, (2) an overflow for when the cistern is full, (3) a pump, and (4) a distribution system to supply the intended end uses.


Above-Ground Cisterns
Source: Sunset Publishing Corporation

Feasibility screening consideration, opportunity criteria, design criteria, etc. for this BMP are listed below under HU-2: Underground Detention.

HU-2: Underground Detention

Underground detention facilities are subsurface tanks, vaults, or oversized pipes that store stormwater runoff. Similar to cisterns, underground detention facilities can store water for later use as irrigation and/or other non-potable uses.


Underground detention tank
Source: www.webtecgeos.com

Feasibility Screening Considerations

- The primary feasibility considerations for harvest and use systems for stormwater management is the presence of consistent and reliable demand that is sufficient to drain the systems relatively quickly between storms. **Appendix X** provides guidance for calculating harvested water demand.
- Use of harvested water should not conflict with applicable plumbing and health codes at the time of project application.

Opportunity Criteria

- Cisterns may collect rooftop runoff, and if located underground, may collect ground-level runoff.
- Cisterns may be installed in any type of land use provided space is available and adequate water demand exists.
- Stored water may supply non-potable water use demands such as irrigation and toilet flushing.
- Cisterns and underground detention facilities may also be used for peak flow control if active storage volume and hydraulic controls are provided above the retained storage or systems are operated with advanced controllers.

OC-Specific Design Criteria and Considerations for Above-Ground Cisterns

☐ Cistern systems should include prescreening in the form of screens on gutters and downspouts to remove vegetative debris and sediment from the runoff prior to entering the cistern.

- ☐ Above-ground cisterns should be secured in place and comply with applicable building codes.
- ☐ Above-ground cisterns should not be located on uneven or sloped surfaces; if installed on a sloped surface, the base where the cistern will be installed should be leveled and designed for the weight of the filled cistern prior to installation.
- ☐ Child-resistant covers and mosquito screens should be placed on all water entry holes.
- ☐ A first flush diverter may be installed so that initial runoff bypasses the cistern.
- ☐ Above-ground cisterns should be installed in a location with easy access for maintenance or replacement.
- ☐ Plumbing systems should be installed in accordance with the current California Building and Plumbing Codes (CBC – part of California Code of Regulations, Title 24).
- ☐ When a potable water supply line is connected to a cistern system to provide dry-season make-up water, cross-contamination should be prevented by providing a backflow prevention system on the potable water supply line and/or an air gap.
- ☐ In cases where there is non-potable indoor use demand, proper pretreatment measures should be installed such as pre-filtration, cartridge filtration, and/or disinfection.

OC-Specific Design Criteria and Considerations for Underground Cisterns/Detention Systems

- ☐ Access entry covers (36" diameter minimum) should be locking and within 50 feet of all areas of the detention tank.
- ☐ In cases where the detention facility provides sediment containment, the facility should be laid flat and there should be at least ½ foot of dead storage within the tank or vault.
- ☐ Outlet structures should be designed using the 100-year storm as overflow and should be easily accessible for maintenance activities.
- ☐ For detention facilities beneath roads and parking areas, structural requirements should meet H-20 load requirements.
- ☐ In cases where shallow groundwater may cause flotation, buoyant forces should be counteracted with backfill, anchors, or other measures.
- ☐ Underground detention facilities should be installed on consolidated and stable native soil; if the facility is constructed in fill slopes, a geotechnical analysis should be performed to ensure stability.
- ☐ Plumbing systems should be installed in accordance with the current California Building and Plumbing Codes (CBC – part of California Code of Regulations, Title 24).
- ☐ When a potable water supply line is connected to a cistern system to provide dry-season make-up water, cross-contamination should be prevented by providing a backflow prevention system on the potable water supply line and/or an air gap.
- ☐ In cases where there is non-potable indoor reuse demand, proper pretreatment measures should be installed such as pre-filtration, cartridge filtration, and/or disinfection.

Types of Harvested Water Demands

Harvested rainwater can be used for irrigation and other non-potable uses (if local, State, and Federal ordinances allow). The use of captured stormwater allows a reduced demand on the potable water supply.

Irrigation Use

- Subsurface (or drip) irrigation should not require disinfection pretreatment prior to use; other irrigation types, such as spray irrigation, may require additional pretreatment prior to use
- Selecting native and/or drought tolerant plants for landscaped area will reduce irrigation demand, thereby reducing the needed size of the storage facility and the amount of tributary area that can be successfully managed with a harvest and use system.

Indoor Use

- Indoor uses generally require filtration and disinfection and should only be considered if permitted by local, State, or Federal codes and ordinances.
- Domestic uses (single-family uses) may include toilet flushing.
- Offices, commercial developments, and industrial facility indoor uses may use cisterns for toilet and urinal flushing. Demands for these specific land uses are include in Appendix X.
- Pretreatment requirements per local, State, or Federal codes and ordinances should be applied

Other Non-Potable Uses

- Other non-potable uses may include vehicle/equipment washing, evaporative cooling, industrial processes, and dilution water for recycled water systems (if local, State, and Federal ordinances allow)
- Pretreatment requirements per local, State, or Federal codes and ordinances should be applied

Harvested Water Demand Calculations and Feasibility Thresholds

Appendix X provides guidance for estimating harvesting water demand and determining whether demand is potentially sufficient to provide a significant benefit for stormwater management.

Simple Sizing Method for Cisterns

If the Simple Design Capture Volume Sizing Method described in **Appendix** III.3.1 is used to size harvest and use systems, the user calculates the DCV and determines whether demand is sufficient to drain the tank in 48 hours following the end of rainfall. The sizing steps are as follows:

Step 1: Determine Cistern DCV

Calculate the DCV using the Simple Design Capture Volume Sizing Method described in **Appendix** III.3.1. This is the required cistern size.

Step 2: Determine the 48-hour Required Demand

Calculate the daily demand needed to draw down the DCV in 48 hours using the following equation:

$$Demand_{48} = (DCV/2)*7.48$$

Where:

$Demand_{48}$ = daily demand required (gal/day)

DCV = design capture volume, cu-ft

Use the guidance in Appendix X determine the non-potable uses needed to generate the required demand.

Designing Cisterns to Achieve the Maximum Feasible Retention Volume

It is rare that cisterns can be sized to capture the full DCV and use this volume in 48 hours. However, if the demand exceeds minimum harvested water demand thresholds, cisterns should be sized to achieve at least 40 percent capture of average annual runoff volume.

Step 1: Determine if the Project Meets the Minimum Harvested Water Demand Thresholds

Determine the Project's design capture storm depth, then use the TUTIA thresholds table (Appendix X) for indoor uses, or the Irrigated Area thresholds table (Appendix X) for outdoor uses, to determine whether the project meets the minimum harvested water demand thresholds. If the project does not meet the minimum harvested water demand thresholds, harvest and use does not meet the minimum incremental benefit required to such that its use must be evaluated. .

If the project meets or exceeds the minimum harvested water demand thresholds, continue to Step 2 **or** Step 3 (equally-allowable pathways).

Step 2: Iteratively Determine the Cistern Volume for 80 percent capture of average annual stormwater runoff volume

Cisterns can be sized using the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix** III.3.2). This approach requires an iterative sizing process in which the user selects the initial cistern size and the project harvested water demand, then calculates the time required for the cistern to drain. Based on the drain time, the cistern size is increased or decreased and the calculations are done again until the initially assumed size and the required size are within 10 percent.

a. Calculate wet season harvested water demand using guidance contained in Appendix X.
b. Select cistern size in terms of the design rainfall depth.
c. Calculate the cistern volume using hydrologic method described in **Appendix** III.1.1.
d. Compute the drawdown time of the cistern as:

   Drawdown Time (hr) = [Volume (cu-ft) × 7.48 gal/cu-ft× 24hr/day]/[Demand (gpd)]
e. Based on design rainfall depth and drawdown time using guidance provided in **Appendix III** to calculate long term average capture efficiency.
f. If capture is between 75 and 85 percent, further iterations are not required.
g. If capture is less than 80 percent capture of average annual stormwater runoff volume, return to Step (b) and increase design rainfall depth.
h. If capture is greater than 80 percent, return to Step (b) and increase design rainfall depth.

Step 3: Determine Cistern Volume and Drawdown to Achieve Maximum Practicable Capture Efficiency

The applicant is not required to provide a cistern greater than the DCV to demonstrate that BMPs have been designed to achieve the maximum feasible retention. The following steps should be used to compute the maximum feasible fraction of stormwater than can be retained with harvest and use BMPs:

a. Calculate wet season harvested water demand using guiance contained in Appendix X, accounting for all applicable demands.
b. Calculate the DCV using hydrologic method described in **Appendix** III.1.1 and size the cistern for this volume.

c. Compute the drawdown time of the cistern as:

   Drawdown Time (hr) = [Volume (cu-ft) × 7.48 gal/cu-ft× 24hr/day]/[Demand (gpd)]

d. Based on 1.0 × design capture storm depth and the drawdown time computed in Step I, calculate the long term average capture efficiency using the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See **Appendix** III.3.2).

e. If capture efficiency is less than 40 percent, harvest and use is not required to be considered for use on the project.

f. If capture efficiency is greater than 40 percent, provide a cistern sized for the DCV and provide volume or flowate to treat the remaining volume up to 80 percent total average annual capture using biotreatment BMP.

Configuration for Use in a Treatment Train

- Cisterns can be combined into a treatment train to provide enhanced water quality treatment and reductions in the runoff volume and rate. For example, if a green roof is placed upgradient of a cistern, the rate and volume of water flowing to the cistern can be reduced and the water quality enhanced.
- Cisterns can be incorporated into the landscape design of a site and can be aesthetically pleasing as well as functional for irrigation purposes.
- Treatment of the captured rainwater (i.e. disinfection) may be required depending on the end use of the water.
- Cisterns can be designed to overflow to biotreatment BMPs.

Additional References for Design Guidance

Santa Barbara BMP Guidance Manual, Chapter 6: http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual_071008_Final.pdf

- County of Los Angeles Low Impact Development Standards Manual, Chapter 5: http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf
- SMC LID Manual (pp 114): http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCalLID_Manual_FINAL_040910.pdf

San Diego County LID Handbook Appendix 4 (Factsheet 26): http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf

XIV.7. Pretreatment/Gross Solids Removal BMP Fact Sheets (PRE)

Also known as:

- *Vortex Separators*
- *Swirl Concentrators*
- *Gross solids removal devices (GSRDs)*

Hydrodynamic Separation Device
Source: Contech Stormwater Solution, Inc.

PRE-1: Hydrodynamic Separation Device

Hydrodynamic separation devices are inline pretreatment units designed to remove trash, debris, and coarse sediment using screening, gravity settling, and centrifugal forces generated by forcing the influent into a circular motion. Several companies manufacture units with a variety of design components including separate chambers, baffles, sorbent media, screens, and flow control orifices. Therefore, additional constituents may be targeted depending on the design; however, the short residence time and potential for captured materials to be released during high flows limits the acceptable use of this BMP type as a standalone treatment control BMP.

Opportunity Criteria

- Hydrodynamic separation devices are effective for the removal of coarse sediment, trash, and debris, and are useful as pretreatment in combination with other BMP types that target smaller particle sizes. They are most effective in urban areas where coarse sediment, trash, and debris are pollutants of concern.
- Hydrodynamic devices represent a wide range of device types that have different unit processes and design elements (e.g., storage versus flow-through designs, inclusion of media filtration, etc.) that vary significantly within the category. These design features likely have significant effects on BMP performance; therefore, generalized performance data for hydrodynamic devices is not practical.

OC-Specific Design Criteria and Considerations

- ☐ Proprietary hydrodynamic device BMP vendors are constantly updating and expanding their product lines so refer to the latest design guidance from each of the vendors. General guidelines on the performance, operations and maintenance of proprietary devices are provided by the vendors.
- ☐ Operations and maintenance requirements include: clearing trash, debris, and sediment around insert grate and inside chamber, and repairing screens and media if damaged or severely clogged.

Computing Sizing Criteria for Hydrodynamic Devices

- Hydrodynamic separation devices should be adequately sized to pretreat the entire design volume or design flow rate of the downstream BMP.
- The required design flowrate should be calculated based on the Capture Efficiency Method for Flow-based BMPs (See **Appendix III**) to achieve 80 percent capture of the average annual stormwater runoff volume.

Proprietary Hydrodynamic Device Manufacturer Websites

- Table XIV.1 is a list of manufacturers that provide hydrodynamic separation devices. The inclusion of these manufacturers does not represent an endorse of their products. Other devices and manufacturers may be acceptable for pretreatment.

Table XIV.1: Proprietary Hydrodynamic Device Manufacturer Websites

Device	Manufacturer	Website
Rinker In-Line Stormceptor®	Rinker Materials™	www.rinkerstormceptor.com
FloGard® Dual-Vortex Hydrodynamic Separator	KriStar Enterprises Inc.	www.kristar.com
Contech® CDS[a]™	Contech® Construction Products Inc.	www.contech-cpi.com
Contech® Vortechs™	Contech® Construction Products Inc.	www.contech-cpi.com
Contech® Vorsentry™	Contech® Construction Products Inc.	www.contech-cpi.com
Contech® Vorsentry™ HS	Contech® Construction Products Inc.	www.contech-cpi.com
BaySaver BaySeparator	Baysaver Technologies Inc.	www.baysaver.com

Additional References for Design Guidance

- CASQA BMP Handbook for New and Redevelopment: http://www.cabmphandbooks.com/Documents/Development/MP-51.pdf
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 9: http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf