ATTACHMENT 3

STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☒ Included See Structural BMP Maintenance Information Checklist.
Attachment 3b	Draft Maintenance Agreement (when applicable)	☐ Included ☐ Not Applicable

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Preliminary Design / Planning / CEQA level submittal:

- Attachment 3a must identify:
  - ☐ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual
- Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

Final Design level submittal:

Attachment 3a must identify:

- ☐ Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ When applicable, frequency of bioretention soil media replacement
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For private entity operation and maintenance, Attachment 3b must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

- ☐ Vicinity map
- ☐ Site design BMPs for which DCV reduction is claimed for meeting the pollutant control obligations.
- ☐ BMP and HMP location and dimensions
- ☐ BMP and HMP specifications/cross section/model
- ☐ Maintenance recommendations and frequency
- ☐ LID features such as (permeable paver and LS location, dim, SF).

Attachment 3A: Structural BMP Maintenance Information Checklist

BMP Type: Biofiltration (Lined)

Inspection. Perform inspections monthly (or as needed) of the basins for sediment/trash accumulation, inlet and outlet structures, vegetation health, basin erosion and standing water in basins.

Inspection Items	Typical Maintenance Indicator(s)	Maintenance Actions
Mulch	Insufficient cover or patchy in appearance. Areas of bare earth are exposed, or mulch layer is less than 3 inches in depth.	Remove and replace with fresh mulch every 3 months, or as needed.
Trash and Debris	Trash and debris accumulated in area.	Remove and dispose of properly.
Sedimentation	Accumulation of sediment. (Overflow inlets should be at least 6 inches above bottom of basin).	Remove and properly dispose of accumulated materials, without damage to the vegetation. Maintain integrity of side slopes.
Vegetation	Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans. Maintain vegetation health.
	Overgrown vegetation	Mow or trim as appropriate.
	Presence of weeds	Remove weeds.
Erosion	Erosion due to concentrated irrigation flow or storm water flow	Inspect soil and repair/re-seed/re-plant eroded areas after big storm events or as needed
		Repair energy dissipation (riprap or splashblock).
Inlet and outlet structures	Check for clogging.	Clear obstructions.
Standing water (beyond 96 hours after a rain event)	Inspect perforated underdrain pipe using cleanout riser and inspect downstream connection	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, unclogging perforated underdrain, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.

Maintenance Procedures

Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.

Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

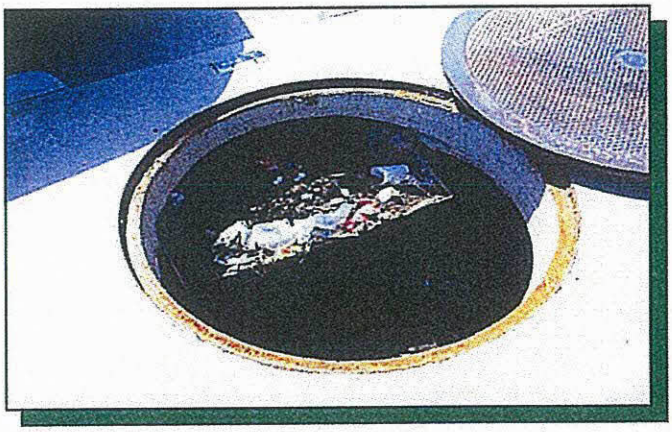
5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

Maintenance Procedure Illustration

Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.

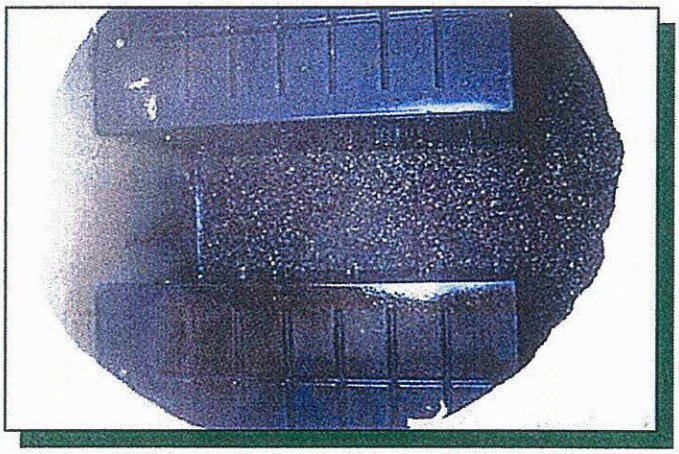


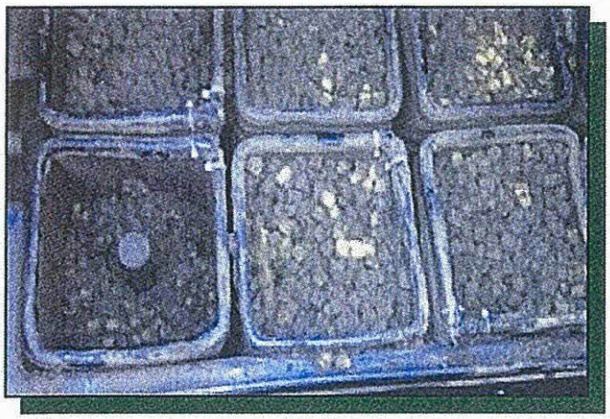
Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.

Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.



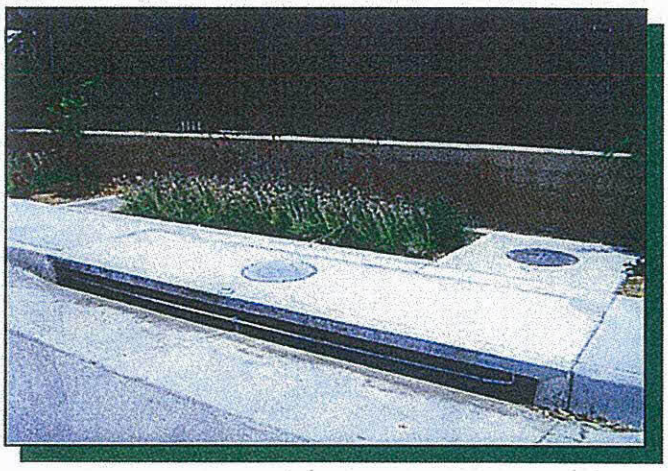


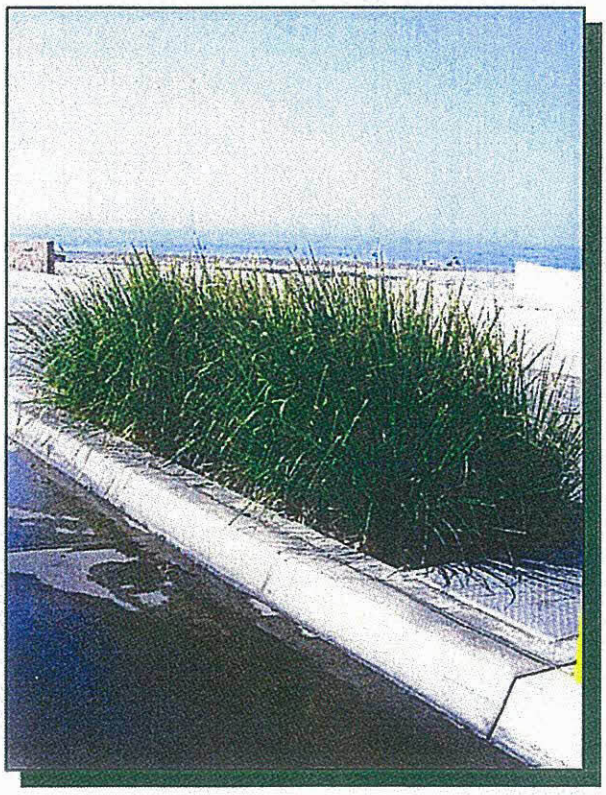
Drain Down Filter

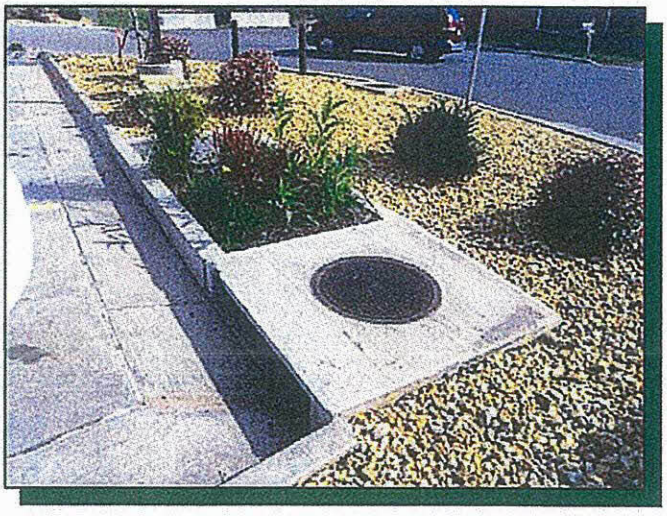
The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.

Trim Vegetation

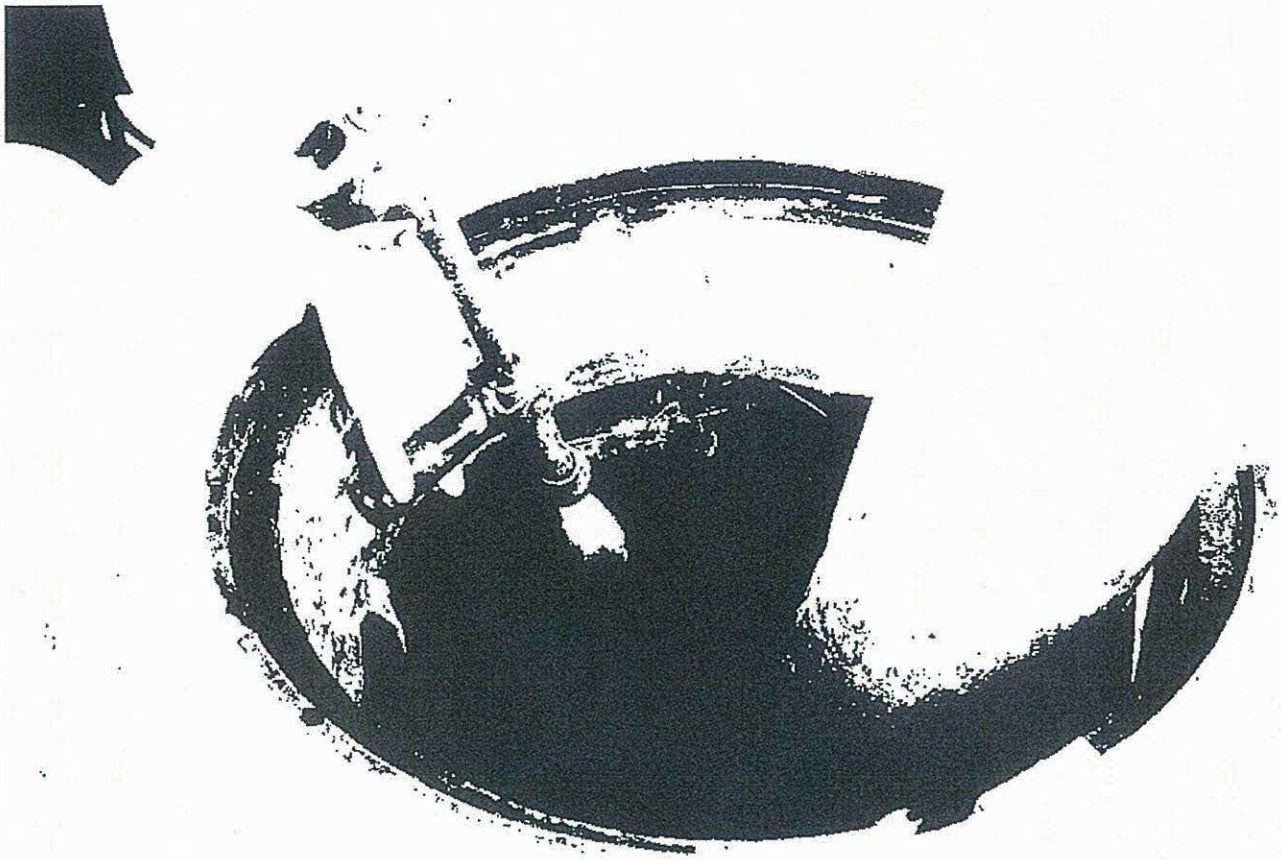
Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.







Inspection Form



Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

BIO CLEAN ENVIRONMENTAL SERVICES, INC.

Inspection Report
Modular Wetlands System

MODULAR WETLANDS

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

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

Weather Condition _____ Additional Notes _____

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

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	Yes	No	Comments
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	Yes	No
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: _____

2972 San Luis Rey Road, Oceanside, CA 92058 P (760) 433-7640 F (760) 433-3176

MODULAR WETLANDS

Maintenance Report

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

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

Weather Condition _____ Additional Notes _____

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

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

2972 San Luis Rey Road, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

THE CITY OF SAN DIEGO
RECORDING REQUESTED BY:
THE CITY OF SAN DIEGO
AND WHEN RECORDED MAIL TO:

Click or tap here to enter text.
Click or tap here to enter text.
Click or tap here to enter text.

(THIS SPACE IS FOR THE RECORDER'S USE ONLY)

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

APPROVAL NUMBER:	ASSESSOR'S PARCEL NUMBER:	PROJECT NUMBER:
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.

This agreement is made by and between the City of San Diego, a municipal corporation [City] and Click or tap here to enter text.

the owner or duly authorized representative of the owner [Property Owner] of property located at:
Click or tap here to enter text.

(PROPERTY ADDRESS)

and more particularly described as: Click or tap here to enter text.

(LEGAL DESCRIPTION OF PROPERTY)

in the City of San Diego, County of San Diego, State of California.

Property Owner is required pursuant to the City of San Diego Municipal Code, Chapter 4, Article 3, Division 3, Chapter 14, Article 2, Division 2, and the Land Development Manual, Storm Water Standards to enter into a Storm Water Management and Discharge Control Maintenance Agreement [Maintenance Agreement] for the installation and maintenance of Permanent Storm Water Best Management Practices [Permanent Storm Water BMP's] prior to the issuance of construction permits. The Maintenance Agreement is intended to ensure the establishment and maintenance of Permanent Storm Water BMP's onsite, as described in the attached exhibit(s), the project's Storm Water Quality Management Plan [SWQMP] and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s): Click or tap here to enter text.

Property Owner wishes to obtain a building or engineering permit according to the Grading and/or Improvement Plan Drawing No(s) or Building Plan Project No(s): Click or tap here to enter text.

Continued on Page 2

NOW, THEREFORE, the parties agree as follows:

1. Property Owner shall have prepared, or if qualified, shall prepare an Operation and Maintenance Procedure [OMP] for Permanent Storm Water BMP's, satisfactory to the City, according to the attached exhibit(s), consistent with the Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s):Click or tap here to enter text..

2. Property Owner shall install, maintain and repair or replace all Permanent Storm Water BMP's within their property, according to the OMP guidelines as described in the attached exhibit(s), the project's WQTR and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s)Click or tap here to enter text..

3. Property Owner shall maintain operation and maintenance records for at least five (5) years. These records shall be made available to the City for inspection upon request at any time.

This Maintenance Agreement shall commence upon execution of this document by all parties named hereon, and shall run with the land.

Executed by the City of San Diego and by Property Owner in San Diego, California.

See Attached Exhibits(s):Click or tap here to enter text.

(Owner Signature)

Click or tap here to enter text.

(Print Name and Title)

Click or tap here to enter text.

(Company/Organization Name)

Click or tap to enter a date.

(Date)

THE CITY OF SAN DIEGO

APPROVED:

(City Control engineer Signature

(Print Name)

(Date)

NOTE: ALL SIGNATURES MUST INCLUDE NOTARY ACKNOWLEDMENTS PER CIVIL CODE SEC. 1180 ET.SEQ

ATTACHMENT 4
COPY OF PLAN SHEETS SHOWING PERMANENT STORM WATER BMPS

This is the cover sheet for Attachment 4.

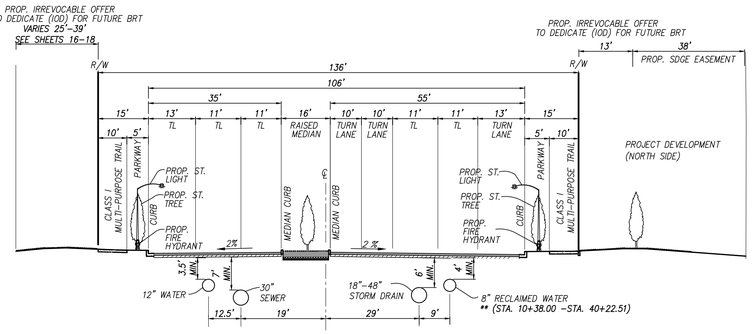
Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

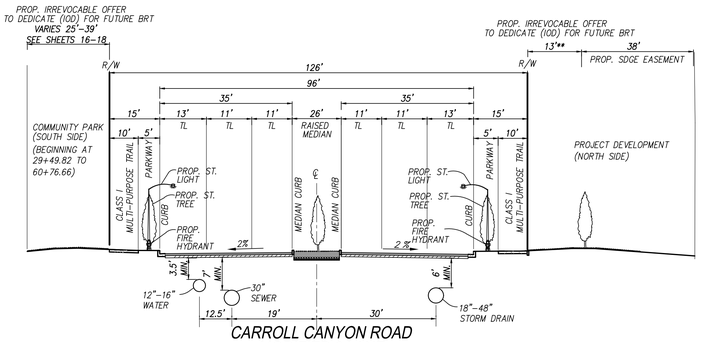
- ☐ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- ☐ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- ☐ Details and specifications for construction of structural BMP(s)
- ☐ Signage indicating the location and boundary of structural BMP(s) as required by the City Engineer
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- ☐ Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
- ☐ All BMPs must be fully dimensioned on the plans
- ☐ When propritery BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Broucher photocopies are not allowed.

3 ROOTS VTM EXHIBIT 'A'

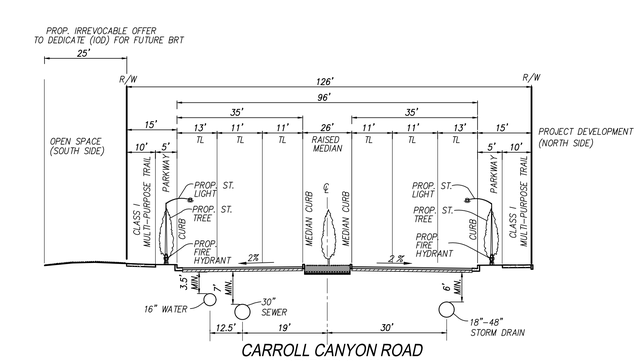
REZONE NO. 2069822/VESTING TENTATIVE MAP NO. 2069827/SITE DEVELOPMENT PERMIT NO. 2069825/ LAND USE PLAN NO. 2069831/PLANNED DEVELOPMENT PERMIT NO. 2068725/AMENDED CUP 87-2069822/PROJ. NO. 587128



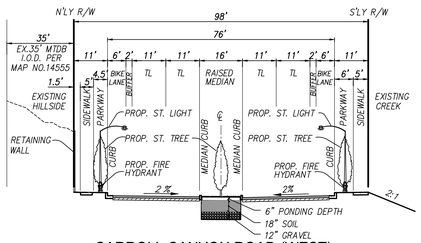
CARROLL CANYON ROAD
MODIFIED 6 LANE
PRIMARY ARTERIAL
(55 MPH) PUBLIC
(STA. 10+94.83 – STA. 15+79.15) NOT TO SCALE
*NOTE: NO PARKING WILL BE ALLOWED WITHIN ROADWAY



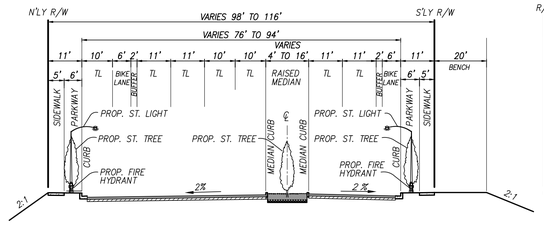
CARROLL CANYON ROAD
MODIFIED 6 LANE
PRIMARY ARTERIAL
(55 MPH) PUBLIC
(STA. 20+43.02 – STA. 60+76.66) NOT TO SCALE
*NOTE: NO PARKING WILL BE ALLOWED WITHIN ROADWAY
**PROPOSED 13FT BRT-IOD ENDS AT STATION 31+40



CARROLL CANYON ROAD
MODIFIED 6 LANE
PRIMARY ARTERIAL
(55 MPH) PUBLIC
(STA. 60+76.66 – STA. 73+07.22) NOT TO SCALE
*NOTE: NO PARKING WILL BE ALLOWED WITHIN ROADWAY



CARROLL CANYON ROAD (WEST)
FOUR LANE MAJOR
(55 MPH) PUBLIC
NOT TO SCALE
STA.45+82.67 TO 60+00.00
SECTION A-A, SEE SHEET 24



CARROLL CANYON ROAD (WEST)
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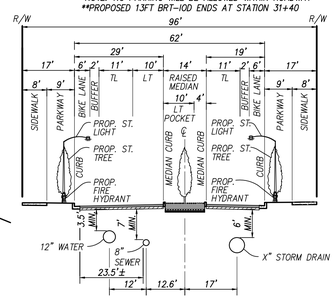
(55 MPH) PUBLIC
NOT TO SCALE
STA. 60+00 TO 65+99.20
SECTION B-B, SEE SHEET 24



VILLAGE ENTRY
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WITH 2 WAY LEFT TURN
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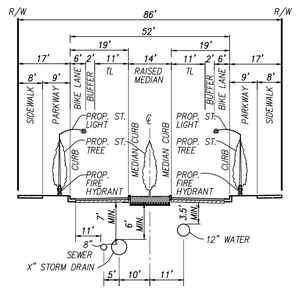

VILLAGE ENTRY
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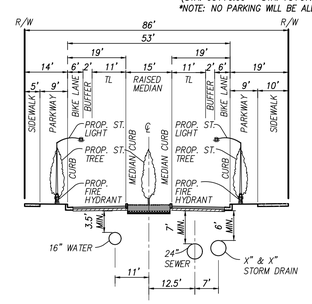
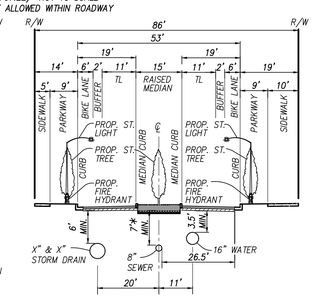
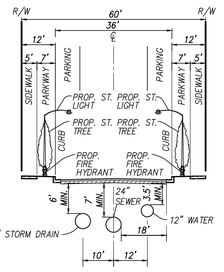
WITH 2 WAY LEFT TURN
(35 MPH) PUBLIC
(STA. 15+24.71 – STA. 19+93.34) NOT TO SCALE



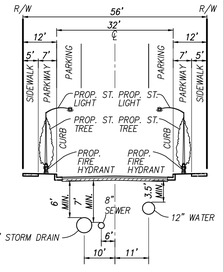
SPINE ROAD
MODIFIED 2 LANE COLLECTOR
WITH 2 WAY LEFT TURN
(35 MPH) PUBLIC
(STA. 30+04.72 – STA. 49+60.67) NOT TO SCALE



SPINE ROAD
MODIFIED 2 LANE COLLECTOR
WITH 2 WAY LEFT TURN
(35 MPH) PUBLIC
(STA. 10+00.00 – STA. 30+04.72) NOT TO SCALE
* 5' MIN ENTERING FROM CARROLL CANYON ROAD



STREET A
RESIDENTIAL LOCAL
COLLECTOR ENTRY STREET
(30 MPH) PUBLIC
(STA. 12+92.35 – STA. 23+28.33) NOT TO SCALE



STREET A
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COLLECTOR ENTRY STREET
(30 MPH) PUBLIC
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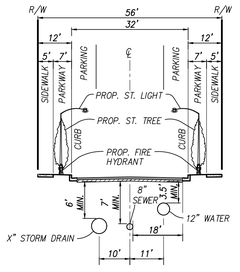
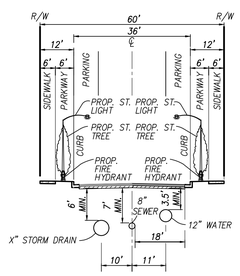
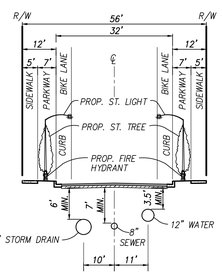


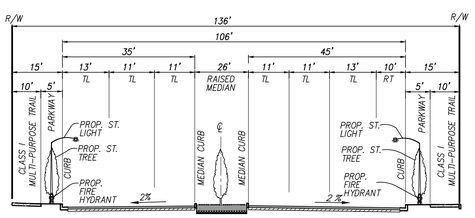
RESIDENTIAL LOCAL STREET
STREETS B THROUGH J
(25 MPH) PUBLIC
NOT TO SCALE



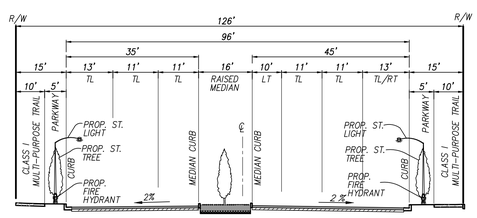
URBAN CORRIDOR STREET
MODIFIED 2 LANE COLLECTOR
(25 MPH) PUBLIC
NOT TO SCALE



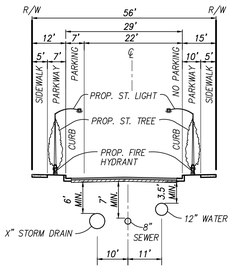
RESIDENTIAL LOCAL
ENTRY STREET
(25 MPH) PUBLIC
NOT TO SCALE



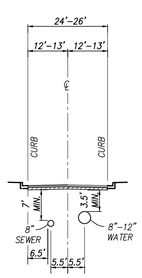
CARROLL CANYON ROAD
AT SPINE ROAD
NOT TO SCALE



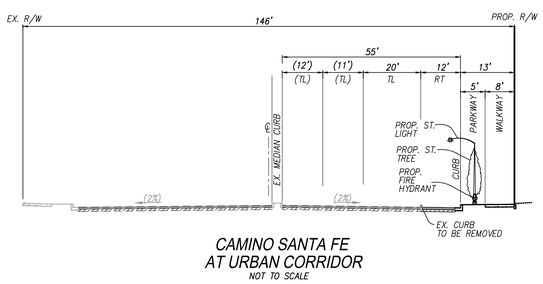
CARROLL CANYON ROAD
AT STREETS F, G, AND H
NOT TO SCALE



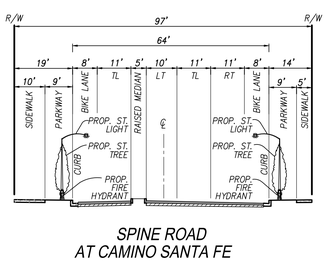
RESIDENTIAL LOCAL
GREEN STREET
(25 MPH) PUBLIC
NOT TO SCALE



PRIVATE DRIVE
(15 MPH)
NOT TO SCALE



CAMINO SANTA FE
AT URBAN CORRIDOR
NOT TO SCALE



SPINE ROAD
AT CAMINO SANTA FE

3 ROOTS by Mesa Canyon Community Partners

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
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PREPARED BY:
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ADDRESS: 701 'B' STREET, SUITE 800
SAN DIEGO, CALIFORNIA 92101
PHONE #: (619) 235-6471

PROJECT ADDRESS:
SAN DIEGO, CALIFORNIA

PROJECT NAME:
3 ROOTS

SHEET TITLE:
DETAILS AND STREET CROSS SECTIONS

REVISION 14:
REVISION 13:
REVISION 12:
REVISION 11:
REVISION 10:
REVISION 09:
REVISION 08:
REVISION 07:
REVISION 06:
REVISION 05:
REVISION 04: 02/08/2019
REVISION 03: 10/08/2018
REVISION 02: 07/10/2018
REVISION 01: 03/26/2018
ORIGINAL DATE: 11/28/2017

SHEET 2 OF 327

DEP #

P:\4182.20\ENGR\DWG_PLANS\TENTATIVE MAP\4182.20_TM 02.DWG 2/8/2019 12:39 PM

3 ROOTS VTM EXHIBIT 'A'

REZONE NO. 2069822/VESTING TENTATIVE MAP NO. 2069827/SITE DEVELOPMENT PERMIT NO. 2069825/ LAND USE PLAN NO. 2069831/PLANNED DEVELOPMENT PERMIT NO. 2068725/AMENDED CUP 87-2069822/PROJ. NO. 587128

Deviations for RX-1-2 Zone

- *Front Setback: Changed from 15 feet to 6 feet.*
- *Side Setback for detached: Changed from 3 feet to 4 feet. Minimum side setback may be 0 feet when adjacent to common open space, park, or landscaped HOA lot.*
- *Rear Setback: Rear setbacks of 5 feet are allowed for up to 50% of the width of the building envelope on the ground floor, the remaining portion of the building envelope on the first floor shall have a minimum rear setback of 10 feet. Upper stories shall observe the standard minimum rear setback of 10 feet.*
- *Max Structure Height - §131.0444(c): Does not apply; no angled building envelope plane is required.*
- *Architectural Projections and Encroachments - §142.0520(a): Architectural projections and encroachments, including eaves and canopies, may extend to the property line for up to 60% of the length of the street frontage. Architectural projections many not conflict with the height of mature trees.*

Deviations for RM-2-6 Zone

- *Minimum Front Setback: Changed from 15 feet to 5 feet.*
- *Standard Front Setback: Changed from 20 feet to 5 feet.*

Side Setback: Minimum side setback may be 0 feet when adjacent to common open ***Deviations for RX-1-2 Zone***

- *Front Setback: Changed from 15 feet to 6 feet.*
- *Side Setback for detached: Changed from 3 feet to 4 feet. Minimum side setback may be 0 feet when adjacent to common open space, park, or landscaped HOA lot.*
- *Rear Setback: Rear setbacks of 5 feet are allowed for up to 50% of the width of the building envelope on the ground floor, the remaining portion of the building envelope on the first floor shall have a minimum rear setback of 10 feet. Upper stories shall observe the standard minimum rear setback of 10 feet.*
- *Max Structure Height - §131.0444(c): Does not apply; no angled building envelope plane is required.*
- *Architectural Projections and Encroachments - §142.0520(a): Architectural projections and encroachments, including eaves and canopies, may extend to the property line for up to 60% of the length of the street frontage. Architectural projections many not conflict with the height of mature trees.*

Deviations for RM-2-6 Zone

- *Minimum Front Setback: Changed from 15 feet to 5 feet.*
- *Standard Front Setback: Changed from 20 feet to 5 feet.*
- *Side Setback: Minimum side setback may be 0 feet when adjacent to common open space, park, or landscaped HOA lot. In this condition, plaza and paseo areas may be calculated towards remaining yard landscape area and point requirements.*
- *Minimum Street Side Setback: Changed from 10 feet to 5 feet.*
- *Minimum Rear Setback: Changed from 15 feet to 5 feet.*
- *Maximum Structure Height: 3-story structures may be up to 45 feet tall. 2-story structures have a maximum structure height of 40 feet.*
- *Max Structure Height - §131.0444(f): At the side setback lines, the maximum height of the building envelope above 40 feet in height is established by a 60-degree angled building envelope plane sloping inward from the side setback lines to the maximum permitted 45-foot structure height.*
- *Architectural Projections and Encroachments - §131.0461(c): Architectural projections and encroachments, including eaves and canopies, may extend to the property line for up to 60% of the length of the street frontage. Architectural projections may not conflict with the height of mature trees.*
- *Private Exterior Open Space - §131.0455(b): At least 75 percent of the dwelling units shall be provided with at least 60 square feet of usable, private, exterior open space abutting the unit with a minimum dimension of 5 feet, including a porch or patio at ground level or balcony or roof deck on upper floors of the building. The open space may be located in required front and rear yards, but shall be no closer than 6 feet to the front property line.*
- *Vehicle Use Area - §142.0407(b): For multifamily with internal streets that are calculated as vehicular use areas, all areas within 10 feet of the curb are included in the planting area and plant point calculations in order to mitigate the minimal amount of parking stalls and associated eligible compliant landscape area.*

Deviations for RM-3-9 Zone

- *Minimum Front Setback: Changed from 10 feet to 5 feet.*
- *Standard Front Setback: Changed from 20 feet to 5 feet.*
- *Side Setback: Minimum side setback may be 0 feet when adjacent to common open space, park, or landscaped HOA lot. In this condition, plaza and paseo areas may be calculated towards remaining yard landscape area and point requirements.*
- *Minimum Street Side Setback: Changed from 10 feet to 5 feet.*
- *Maximum Structure Height: Changed from 60 feet to 65 feet.*
- *Architectural Projections and Encroachments - §131.0461(c): Architectural projections and encroachments, including eaves and canopies, may extend to the property line for up to 60% of the length of the street frontage. Architectural projections may not conflict with the height of mature trees.*
- *Street Yard and Remaining Yard Planting Area and Point Requirements - §142.0404: The required street yard planting area for PA-12 is 40%.*
- *Storage Requirements - §131.0454: Each dwelling unit shall have a fully enclosed, personal storage area outside the unit that is at least 100 cubic feet; no minimum horizontal dimension is required.*
- *Exterior Open Space - §131.0455(c): At least 75 percent of the dwelling units shall be provided with at least 60 square feet of usable, private, exterior open space abutting the unit with a minimum dimension of 5 feet, including a porch or patio at ground level or balcony or roof deck on upper floors of the building. The open space may be located in required front and rear yards, but shall be no closer than 6 feet to the front property line.*

Deviations for CC-2-4 Zone

- *Minimum Side Setback: Changed from 10 feet to 0 feet.*
- *Maximum Street Side Setback: Changed from 10 feet to 0 feet.*
- *Minimum Rear Setback: Changed from 10 feet to 0 feet.*
- *Architectural Projections and Encroachments - §142.0520(a): Architectural projections and encroachments, including eaves and canopies, may extend to the property line.*
- *Setback Requirements for Commercial Zones - §131.0543(a)(2) - The maximum setback requirement in Municipal Code Table 131-05B shall not apply. A maximum setback of 40 feet from the property line abutting Urban Corridor and Spine Road shall be allowed. Maximum setback intended to accommodate lettered lots. Street frontage shall substantially conform to the site plan shown in Figure 8-13 which illustrates an approximate street frontage of 64% along the Spine Road and the Urban Corridor streets.*
- *Parking structures shall have a maximum structure height of 65 feet to accommodate 4 levels with roof parking and solar panels overhead.*
- *Per §143.0460(c), at least 50% of the gross ground floor area of commercial development shall be used for retail sales and commercial services.*
- *A minimum lot coverage of less than 35% is acceptable on PA-20 (Mobility Hub) to the primary function of that parcel.*

space, park, or landscaped HOA lot. In this condition, plaza and paseo areas may be calculated towards remaining yard landscape area and point requirements.

- *Minimum Street Side Setback: Changed from 10 feet to 5 feet.*
- *Minimum Rear Setback: Changed from 15 feet to 5 feet.*
- *Maximum Structure Height: 3-story structures may be up to 45 feet tall. 2-story structures have a maximum structure height of 40 feet.*
- *Max Structure Height - §131.0444(f): At the side setback lines, the maximum height of the building envelope above 40 feet in height is established by a 60-degree angled building envelope plane sloping inward from the side setback lines to the maximum permitted 45-foot structure height.*
- *Architectural Projections and Encroachments - §131.0461(c): Architectural projections and encroachments, including eaves and canopies, may extend to the property line for up to 60% of the length of the street frontage. Architectural projections may not conflict with the height of mature trees.*
- *Private Exterior Open Space - §131.0455(b): At least 75 percent of the dwelling units shall be provided with at least 60 square feet of usable, private, exterior open space abutting the unit with a minimum dimension of 5 feet, including a porch or patio at ground level or balcony or roof deck on upper floors of the building. The open space may be located in required front and rear yards, but shall be no closer than 6 feet to the front property line.*
- *Vehicle Use Area - §142.0407(b): For multifamily with internal streets that are calculated as vehicular use areas, all areas within 10 feet of the curb are included in the planting area and plant point calculations in order to mitigate the minimal amount of parking stalls and associated eligible compliant landscape area.*

Deviations for RM-3-9 Zone

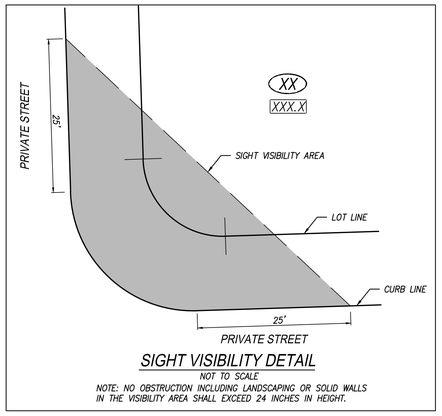
- *Minimum Front Setback: Changed from 10 feet to 5 feet.*
- *Standard Front Setback: Changed from 20 feet to 5 feet.*
- *Side Setback: Minimum side setback may be 0 feet when adjacent to common open space, park, or landscaped HOA lot. In this condition, plaza and paseo areas may be calculated towards remaining yard landscape area and point requirements.*
- *Minimum Street Side Setback: Changed from 10 feet to 5 feet.*
- *Maximum Structure Height: Changed from 60 feet to 65 feet.*
- *Architectural Projections and Encroachments - §131.0461(c): Architectural projections and encroachments, including eaves and canopies, may extend to the property line for up to 60% of the length of the street frontage. Architectural projections may not conflict with the height of mature trees.*
- *Street Yard and Remaining Yard Planting Area and Point Requirements - §142.0404: The required street yard planting area for PA-12 is 40%.*
- *Storage Requirements - §131.0454: Each dwelling unit shall have a fully enclosed, personal storage area outside the unit that is at least 100 cubic feet; no minimum horizontal dimension is required.*
- *Exterior Open Space - §131.0455(c): At least 75 percent of the dwelling units shall be provided with at least 60 square feet of usable, private, exterior open space abutting the unit with a minimum dimension of 5 feet, including a porch or patio at ground level or balcony or roof deck on upper floors of the building. The open space may be located in required front and rear yards, but shall be no closer than 6 feet to the front property line.*

Deviations for CC-2-4 Zone

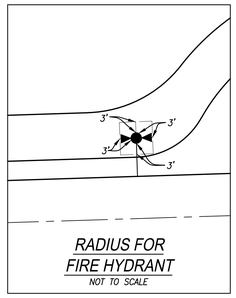
- *Minimum Side Setback: Changed from 10 feet to 0 feet.*
- *Maximum Street Side Setback: Changed from 10 feet to 0 feet.*
- *Minimum Rear Setback: Changed from 10 feet to 0 feet.*
- *Architectural Projections and Encroachments - §142.0520(a): Architectural projections and encroachments, including eaves and canopies, may extend to the property line.*
- *Setback Requirements for Commercial Zones - §131.0543(a)(2) - The maximum setback requirement in Municipal Code Table 131-05B shall not apply. A maximum setback of 40 feet from the property line abutting Urban Corridor and Spine Road shall be allowed. Maximum setback intended to accommodate lettered lots. Street frontage shall substantially conform to the site plan shown in Figure 8-13 which illustrates an approximate street frontage of 64% along the Spine Road and the Urban Corridor streets.*
- *Parking structures shall have a maximum structure height of 65 feet to accommodate 4 levels with roof parking and solar panels overhead.*
- *Per §143.0460(c), at least 50% of the gross ground floor area of commercial development shall be used for retail sales and commercial services.*
- *A minimum lot coverage of less than 35% is acceptable on PA-20 (Mobility Hub) to the primary function of that parcel.*

PLANNING AREA YIELD ANALYSIS

PLANNING AREA	LOT NO.	AREA (AC)	UNIT COUNT (DU)	PROP.ZONING	LAND USE
1	1	3.5	56	RM-2-6	
2	2	6.4	78	RM-2-6	
3	3-80, PPP	13.7	78	RX-1-2	
4	81-134, OO	8.1	54	RX-1-2	
5	135-141	12.1	141	RM-2-6	
6	142-194, QQQ	6.3	53	RX-1-2	
7	195	4.1	66	RM-2-6	
8	196, II-3	5.1	118	RM-2-6	
9	197, II, II-1, II-2	4.6	68	RM-2-6	
10	198	4.5	61	RM-2-6	
11	199	4.0	85	RM-2-6	
12	200, JJ, JJ-1, KK-4	4.2	180	RM-3-9	
13	201, JJ-2, JJ-3	4.1	243	RM-3-9	
14	202	4.5	186	RM-3-9	
15	203, XX-1, XX-2, XX-3	4.5	76	RM-2-6	
16	204, WW-1, WW-2	6.1	80	RM-2-6	
17	205, 206	4.8	94	RM-2-6	
18	207, 208	6.5	83	RM-2-6	
19	209, KK-1, KK-2, KK-3,,LL	10.9	–	CC-2-4	
20	210, NN	1.7	–	CC-2-4	
		TOTAL 119.7	TOTAL 1800		



SIGHT VISIBILITY DETAIL
NOT TO SCALE
NOTE: NO OBSTRUCTION INCLUDING LANDSCAPING OR SOLID WALLS IN THE VISIBILITY AREA SHALL EXCEED 24 INCHES IN HEIGHT.



RADIUS FOR FIRE HYDRANT
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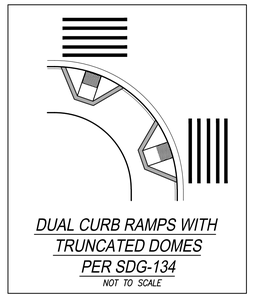
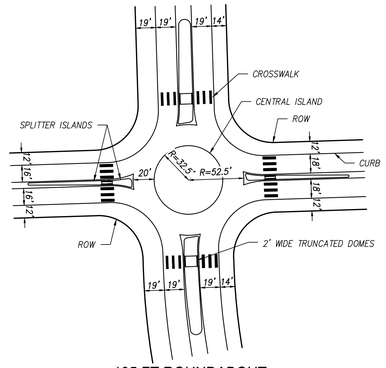


DUAL CURB RAMPS WITH TRUNCATED DOMES PER SDG-134
NOT TO SCALE



105 FT ROUNDABOUT
SOURCE: NCHRP REPORT 672

PARK TABLE

Lot	Description	Area(sf)	Area(ac)
A	PARK	5,613	0.13
B	PARK	7,760	0.18
C	PARK	3,871	0.09
D	PARK	5,059	0.12
E	PARK	39,882	0.92
F	PARK	3,471	0.08
G	PARK	1,791	0.04
H	PARK	49,865	1.15
I	PARK	14,487	0.33
J	PARK	20,284	0.47
K	PARK	49,576	1.14
K-1	PARK	75,290	1.73
L	PARK	17,489	0.40
M	PARK	144,909	3.33
M-1	PARK	14,069	0.32
N	PARK	21,012	0.48
O	PARK	36,295	0.83
P	PARK	25,530	0.59
Q	PARK	5,316	0.12
R	PARK	491,234	11.28
S	PARK	571,956	13.13
T	PARK	46,021	1.02
U	PARK	29,642	0.68
V	PARK	2,564	0.06
SUBTOTAL			38.62

HOA TABLE

Lot	Description	Area(sf)	Area(ac)
AA	HOA	235,218	5.40
BB	HOA	50,919	1.17
BB-1	HOA	6,912	0.16
CC	HOA	97,317	2.23
DD	HOA	45,045	1.03
EE	HOA	80,956	1.86
FF	HOA	124,341	2.85
GG	HOA	35,146	0.81
HH	HOA	2,442	0.06
II	HOA	2,212	0.05
II-1	HOA	370	0.01
II-2	HOA	578	0.01
II-3	HOA	7,341	0.17
JJ	HOA	2,855	0.07
JJ-1	HOA	4,610	0.11
JJ-2	HOA	1,784	0.04
JJ-3	HOA	2,366	0.05
KK	HOA	1,552	0.04
KK-1	HOA	10,018	0.23
KK-2	HOA	11,611	0.27
KK-3	HOA	5,794	0.13
KK-4	HOA	593	0.01
LL	HOA	35,820	0.82
MM	HOA	30,056	0.69
NN	HOA	14,739	0.34
OO	HOA	26,161	0.60
PP	HOA	34,782	0.80
QQ	HOA	156,762	3.60
SS	HOA	13,238	0.30
TT	HOA	131,358	3.01
UU	HOA	28,861	0.66
VV	HOA	14,390	0.33
WW	HOA	45,153	1.04
WW-1	HOA	6,948	0.16
WW-2	HOA	1,982	0.05
WW-3	HOA	2,550	0.06
XX	HOA	61,025	1.41
XX-1	HOA	3,525	0.08
XX-2	HOA	3,232	0.07
XX-3	HOA	3,852	0.09
YY	HOA	7,646	0.18
SUBTOTAL			31.05

BMP BASIN TABLE

Lot	Description	Area(sf)	Area(ac)
AAA	BASIN	27,061	0.62
BBB	BASIN	25,469	0.58
CCC	BASIN	36,993	0.85
DDD	BASIN	74,761	1.72
EEE	BASIN	106,535	2.45
FFF	BASIN	30,946	0.71
GGG	BASIN	93,746	2.15
SUBTOTAL			9.08

OPEN SPACE TABLE

Lot	Description	Area(sf)	Area(ac)
HHH	OS	4,254,583	97.67
III	OS	628,627	14.43
JJJ	OS	515,787	11.84
KKK	OS	1,258,606	28.89
LLL	OS	334,887	7.69
MMM	OS	225,442	5.18
NNN	OS	43,497	1.00
ZZ	OS W/BMZ	242,490	5.57
ZZ-1	OS W/BMZ	19,915	0.46
ZZ-2	OS W/BMZ	309,388	7.10
ZZ-3	OS W/BMZ	6,698	0.15
ZZ-4	OS W/BMZ	12,226	0.28
SUBTOTAL			180.26

PRIVATE DRIVE TABLE

Lot	Description	Area(sf)	Area(ac)
OOO	PVT DRIVE	20,432	0.47
PPP	PVT DRIVE	2,385	0.05
QQQ	PVT DRIVE	60,414	1.39
SUBTOTAL		83,231	1.91

COMMERCIAL TABLE

Lot	Description	Area(sf)	Area(ac)
209	COMMERCIAL	408,794	9.39
SUBTOTAL		408,794	9.39

MULTIMODAL TABLE

Lot	Description	Area(sf)	Area(ac)
210	MULTIMODAL	58,842	1.35
SUBTOTAL		58,842	1.35

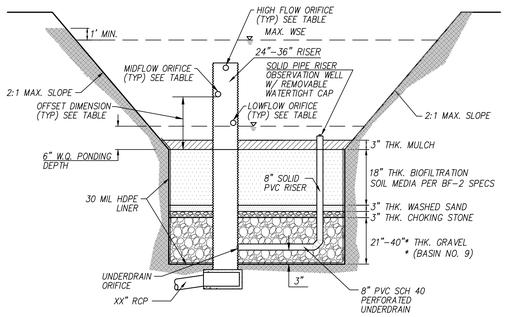
PUBLIC ROADS

	Description	Area(sf)	Area(ac)
ONSITE	PUBLIC ROW		54.96
COR-WEST	PUBLIC ROW		4.62
SUBTOTAL			59.58

Biofiltraion Orifice Design

Biofiltraion BMP#	Underdrain Orifice (in)	Low Flow Orifice		Mid Flow Orifice		High Flow Orifice		Overflow Weir/Riser	
		Dia. (in)	Offset (ft)*	Dia. (in)	Offset (ft)*	Dia. (in)	Offset (ft)*	Dia. (in)	Offset (ft)*
1	4	2	0.5	–	–	–	–	2	5
2	3	4	0.5	–	–	–	–	2	3
3	4	4	0.5	6	2	–	–	2	3
5	4	2-2in	0.5	2	2.5	4	3	2	3.5
6	4	2-2in	0.5	2-4in	2.1	2-4.8in	2.5	3	3.1
7	4	2-2in	0.5	3-4in	2	2-4.8in	2.5	3	2.8
8	4	2-4in	0.5	2-4in	1.5	–	–	2	2.5
9	4	4	0.5	4 & 2	1.5 & 2.5	3-4in	3.5	2	4.9

*OFFSET DIMENSIONS ARE DISTANCE FROM ORIFICE IE/WEIR TOP TO THE BOTTOM OF BASIN SURFACE LAYER (MULCH BOTTOM)



BIOFILTRATION BF-1
POLLUTANT CONTROL/
HYDROMODIFICATION/DETENTION BASIN (TYP.)
NOT TO SCALE

Stormwater Structural Pollutant Control & Hydromodification Control BMPs* (List all from SWQMP)

Description/Type of Structural BMP	Plan Sheet #	Structural BMP ID#	Bottom Area (S.F.)
BIOFILTRATION BF-1 POLLUTANT CONTROL/ HYDROMOD BASIN	4	BASIN 1	7,790
BIOFILTRATION BF-1 POLLUTANT CONTROL/ HYDROMOD BASIN	4	BASIN 2	7,670
BIOFILTRATION BF-1 POLLUTANT CONTROL/ HYDROMOD BASIN	4	BASIN 3	9,430
BIOFILTRATION BF-1 POLLUTANT CONTROL/ HYDROMOD DETENTION BASIN	4	BASIN 5	13,015
BIOFILTRATION BF-1 POLLUTANT CONTROL/ HYDROMOD DETENTION BASIN	5	BASIN 6	57,750
BIOFILTRATION BF-1 POLLUTANT CONTROL/ HYDROMOD DETENTION BASIN	5	BASIN 7	18,210
BIOFILTRATION BF-1 POLLUTANT CONTROL/ HYDROMOD DETENTION BASIN	5	BASIN 8	56,700
BIOFILTRATION BF-1 POLLUTANT CONTROL/ HYDROMOD DETENTION BASIN	5	BASIN 9	28,525

Stormwater Structural Pollutant Control & Hydromodification Control BMPs* (List all from SWQMP)

Description/Type of Structural BMP	Plan Sheet #	Structural BMP ID#
PROPRIETARY BMP MODULAR WTLAND SYSTEM	24	MWS 10-1
PROPRIETARY BMP MODULAR WTLAND SYSTEM	24	MWS 10-2
BIOFILTRATION MEDIAN	2, 24	BMP 11
HYDROMOD VAULT	24	BMP 12

3 ROOTS by Mesa Canyon Community Partners

PROJECT DESIGN CONSULTANTS
Planning I Landscape Architecture I Engineering I Survey

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PHONE #: (619) 235-6471

PROJECT ADDRESS:
SAN DIEGO, CALIFORNIA

PROJECT NAME:
3 ROOTS

SHEET TITLE:
PARCEL SUMMARY

REVISION 14:
REVISION 13:
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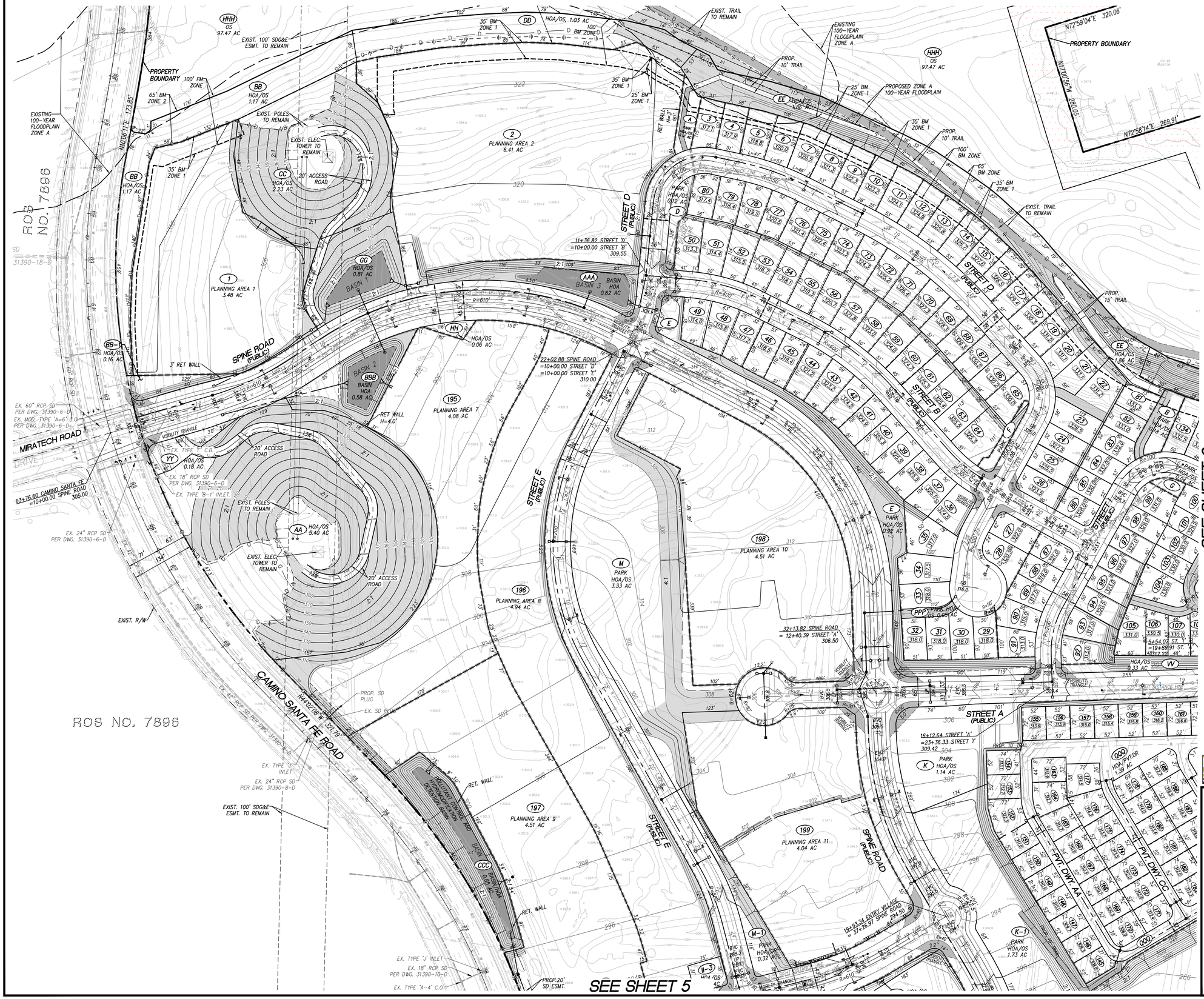
3 ROOTS VTM EXHIBIT 'A'

REZONE NO. 2069822/VESTING TENTATIVE MAP NO. 2069827/SITE DEVELOPMENT PERMIT NO. 2069825/ LAND USE PLAN NO. 2069831/PLANNED DEVELOPMENT PERMIT NO. 2068725/AMENDED CUP 87-2069822/PROJ. NO. 587128

NOTE: FOR WATER AND SEWER, SEE SHEETS 11-15.



3 ROOTS by Mesa Canyon Community Partners

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PROJECT NAME:
3 ROOTS

SHEET TITLE:
SITE GRADING AND STORM DRAIN PLANS

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3 ROOTS VTM EXHIBIT 'A'

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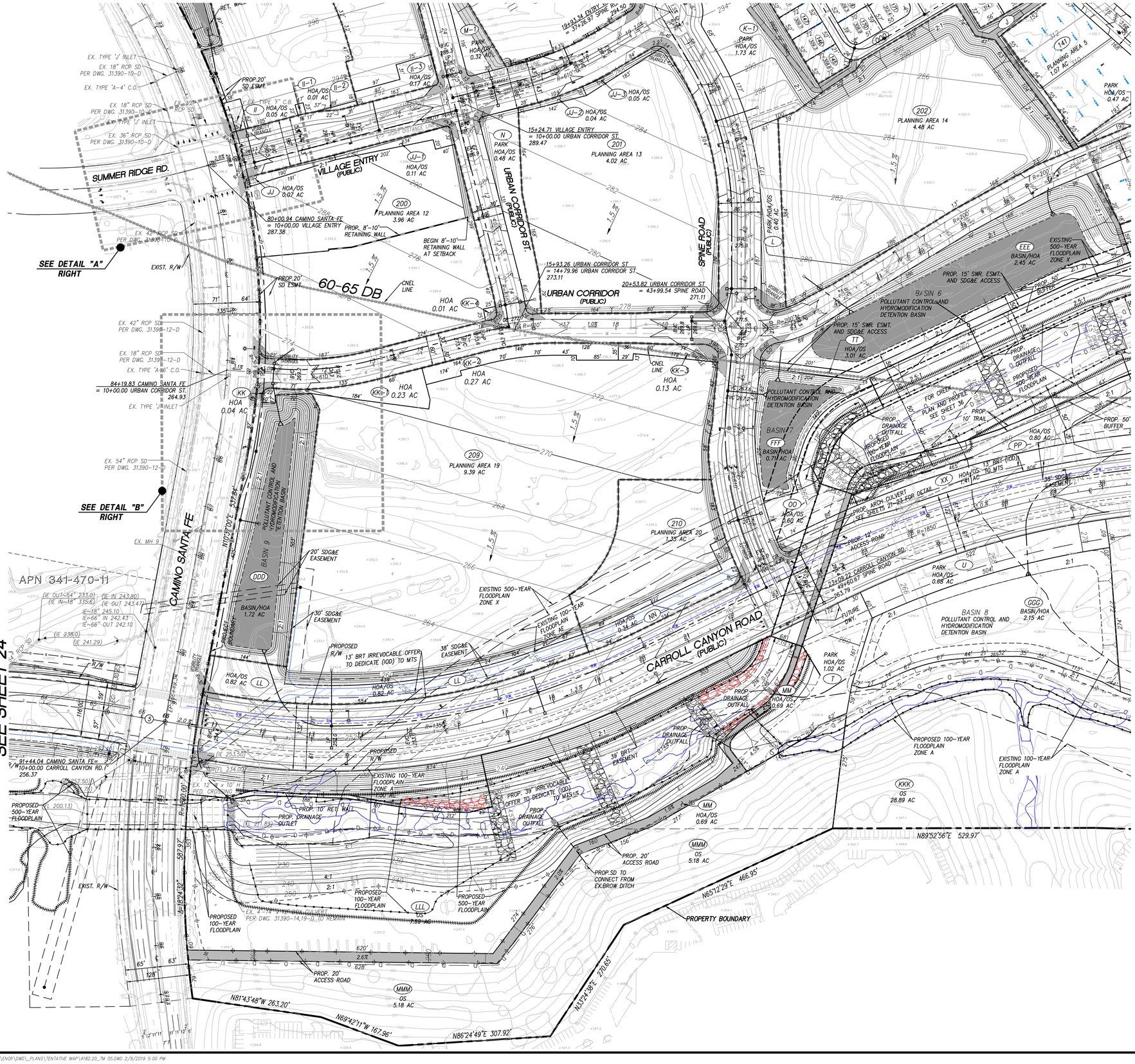
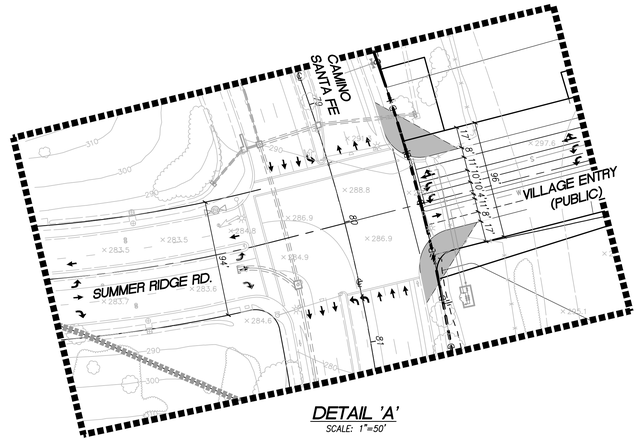
SEE SHEET 4





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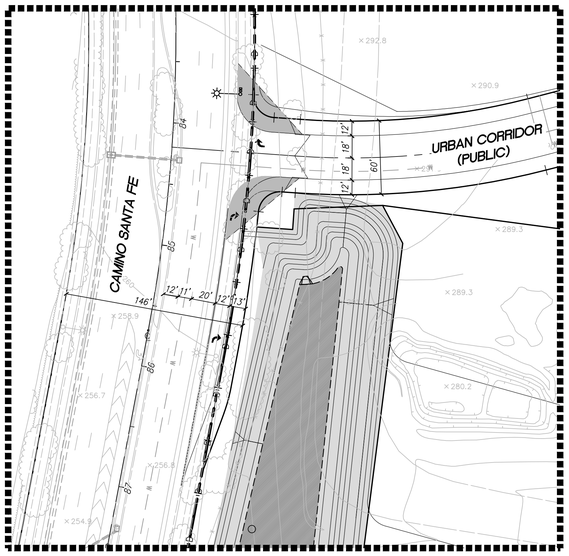

DETAIL 'B'
SCALE: 1"=50'

N

0 40 80 160 240

GRAPHICAL SCALE
SCALE: 1" = 80'

NOTE: FOR WATER AND SEWER, SEE SHEETS 11-15.

3 ROOTS by Mesa Canyon Community Partners

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PROJECT ADDRESS:
SAN DIEGO, CALIFORNIA

PROJECT NAME:
3 ROOTS

SHEET TITLE:
SITE GRADING AND STORM DRAIN PLANS

REVISION 14:
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REVISION 03: 10/08/2018
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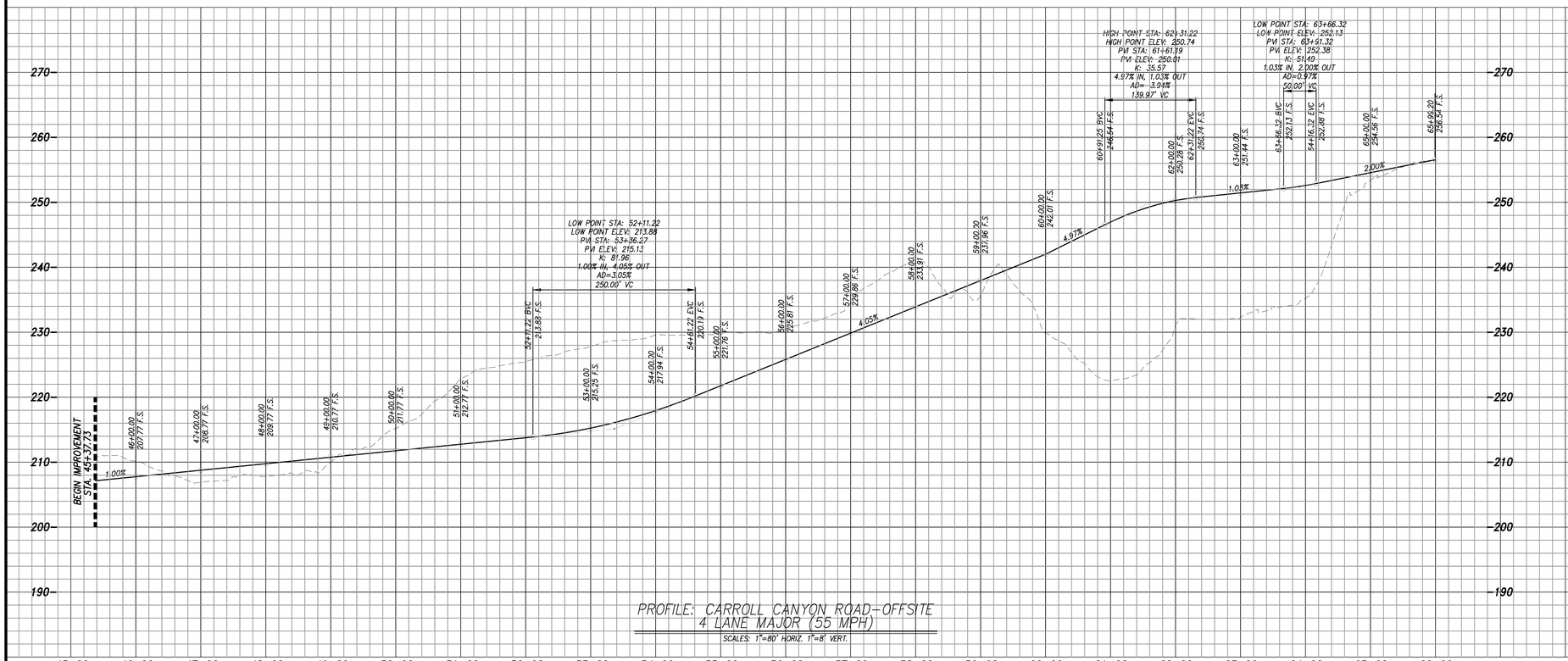
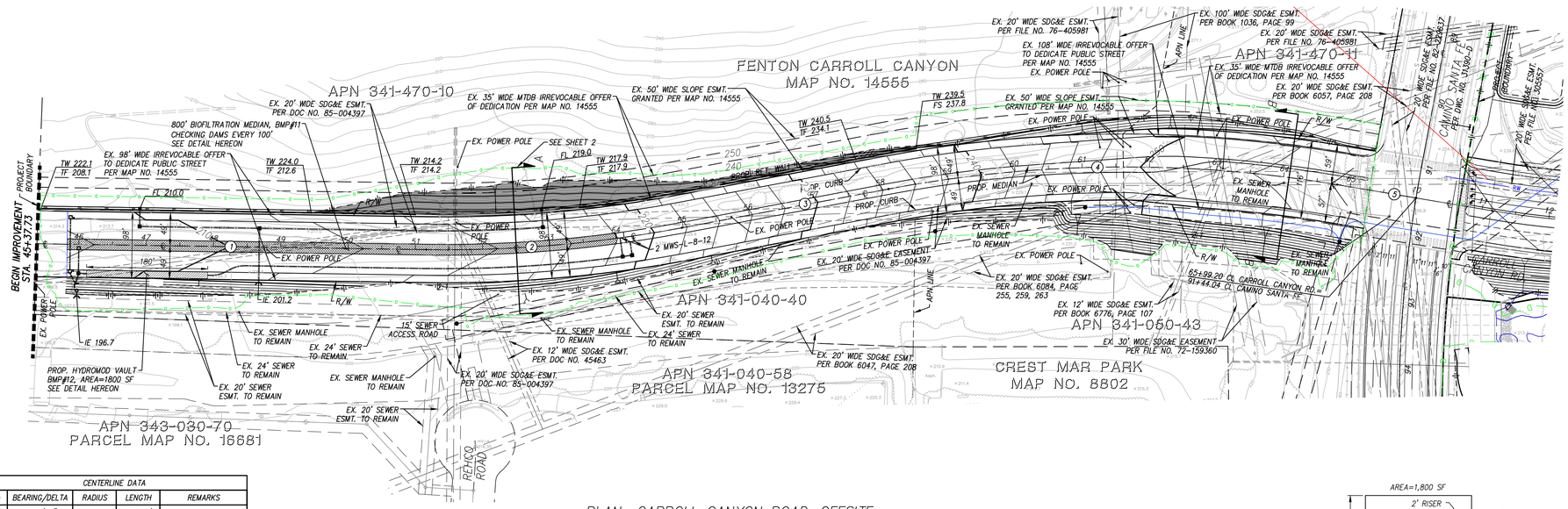
3 ROOTS VTM EXHIBIT 'A'

REZONE NO. 2069822/VESTING TENTATIVE MAP NO. 2069827/SITE DEVELOPMENT PERMIT NO. 2069825/ LAND USE PLAN NO. 2069831/PLANNED DEVELOPMENT PERMIT NO. 2068725/AMENDED CUP 87-2069822/PROJ. NO. 587128



PROFILE: CARROLL CANYON ROAD-OFFSITE
4 LANE MAJOR (55 MPH)

SCALES: 1"=80' HORIZ. 1"=8' VERT.



CENTERLINE DATA				
NO	BEARING/DELTA	RADIUS	LENGTH	REMARKS
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2	Δ=11°30'13"	1900.00'	381.47'	-
3	N 79°21'01" E	--	312.16'	-
4	Δ=20°12'37"	1900.00'	670.20'	-
5	N 80°26'22" W	--	118.70'	-

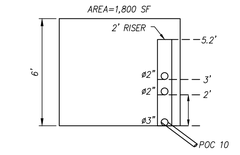
PLAN: CARROLL CANYON ROAD-OFFSITE
4 LANE MAJOR (55 MPH)

SCALE: 1"=80'

N

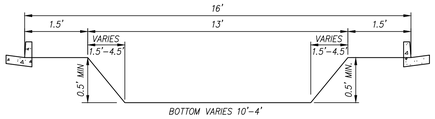
0 40 80 160 240

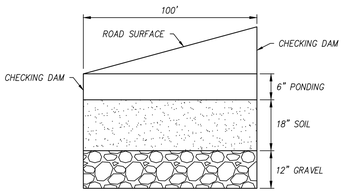
GRAPHICAL SCALE
SCALE: 1" = 80'



HYDROMOD VAULT DETAIL

SCALE: NTS





BIOFILTRATION MEDIAN DETAIL

SCALE: NTS

3ROOTS by Mesa Canyon Community Partners

PROJECT DESIGN CONSULTANTS

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PROJECT ADDRESS:
SAN DIEGO, CALIFORNIA

PROJECT NAME:
3 ROOTS

SHEET TITLE:
CARROLL CANYON ROAD (OFFSITE)
PLAN AND PROFILE

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ORIGINAL DATE: 11/28/2017

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ATTACHMENT 5
DRAINAGE REPORT

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

ATTACHMENT 6
GEOTECHNICAL AND GROUNDWATER INVESTIGATION REPORT

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.

PRELIMINARY GEOTECHNICAL INVESTIGATION FOR VESTING TENTATIVE MAP

3ROOTS
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

LEHIGH HANSON
WEST REGION
SAN DIEGO, CALIFORNIA

AUGUST 31, 2017
PROJECT NO. G2070-42-01

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G2070-42-01
August 31, 2017

Lehigh Hanson
West Region
Post Office Box 639069
San Diego, California 92163

Attention: Mr. Marvin Howell

Subject: PRELIMINARY GEOTECHNICAL INVESTIGATION
FOR VESTING TENTATIVE MAP
3ROOTS
SAN DIEGO, CALIFORNIA

Dear Mr. Howell:

In accordance with your authorization, we have prepared this preliminary geotechnical investigation for the Vesting Tentative Map submittal for the subject project. The property is underlain by undocumented and compacted fills, alluvium/colluvium, and the Stadium Conglomerate Formation. The accompanying report presents the results of our limited study and our conclusions and recommendations regarding geotechnical aspects of site development. It is our opinion, based on the results of this study, that the site is suitable for the planned improvements.

Should you have questions regarding this investigation, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Rodney C. Mikesell
GE 2533

REGISTERED PROFESSIONAL ENGINEER
RODNEY C. MIKESELL
No.2533
GEOTECHNICAL
STATE OF CALIFORNIA

Troy K. Reist
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PROFESSIONAL GEOLOGIST
TROY K. REIST
No. 2408
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

RCM:TKR:dmc

(1) Addressee
(3/del) Project Design Consultants
Attention: Ms. Marina Wurst
(1) Nuquest Ventures
Attention: Ms. Allegra Parisi

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TABLE OF CONTENTS (Concluded)

PRELIMINARY GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation for the Tentative Map submittal for the 3Roots project within the Lehigh Hanson Carroll Canyon aggregate mine. The project site is generally located northeast of the intersection of Camino Santa Fe and Carroll Canyon Road in the Mira Mesa area of San Diego, California (see *Vicinity Map*, Figure 1). The purpose of the geotechnical investigation was to evaluate the surface and subsurface soil and geologic conditions and provide recommendations regarding the geotechnical aspects of developing the property for residential and commercial uses, including parks and infrastructure.

The scope of this study consisted of a review of readily available published and unpublished geologic literature (see List of References), drilling 10 large-diameter borings and 4 small-diameter borings, 48 backhoe trenches, soil sampling, laboratory testing, engineering analyses, and preparation of this report. The approximate locations of the borings and trenches are shown on the *Geologic Map*, Figure 2. Our scope also included a review of our summary compaction report documenting the placement of compacted fill that has occurred during reclamation grading (Reference No. 7).

Site geologic conditions depicted on the *Geologic Map* were plotted on an AutoCAD base map provided by Project Design Consultants. The plan depicts the proposed grading, existing topography, mapped geologic contacts, base of compacted fill elevations and the approximate locations of the exploratory excavations. *Geologic Cross-Sections* A-A' through K-K' (Figures 3 through 7) represent our interpretation of the geologic conditions across the site.

The conclusions and recommendations presented herein are based on our analysis of the data obtained from the exploratory field investigation, laboratory test results, review of compaction reports associated with reclamation grading which has occurred on the property, and our experience with similar soil and geologic conditions on this and adjacent properties.

2. SITE DESCRIPTION AND PREVIOUS GRADING

The project site consists of approximately 427 acres of partially graded and ungraded land located within the Lehigh Hanson aggregate mine area located in San Diego, California. The property has been utilized to mine aggregate (predominately the cobble from the Stadium Conglomerate formation) to produce sand and aggregate products since the early 1980's. Recently, active mining has ceased; however, a concrete batch plant and other tenants occupy portions of the property. Many of the conveyor belts and equipment along with numerous stockpiles of soil, aggregate, and recycled products are still present on the property.

Mining resulted in removal of rock and soil deposits resulting in deep excavations (over 100 feet), as well as relatively steep cut slopes (0.4:1 horizontal to vertical) within the northern portion of the property. The excavations were backfilled with waste materials generated during mining activities that have created relatively sharp differential fill thicknesses with abrupt near-vertical formational sidewall contacts.

Compaction testing has been performed by Geocon Incorporated on a periodic basis on the waste materials placed throughout the site from the early 1980's through March 2016. Compaction reports were prepared on an approximate quarterly to annual basis during fill placement. These reports were recently summarized into our report titled *Compaction Test Summary Report, Hanson Carroll Canyon Materials Plant, San Diego, California*, dated April 14, 2017. The summary report includes the previously submitted compaction test reports and approximate locations of the density tests taken.

Currently, minor grading is occurring in Area 5 (shown as light blue shaded area on Figure 2), located within the central portion of the site. The grading consists of removal of saturated fill to expose the native formational bedrock contact (Stadium Conglomerate) and placement of compacted fill. Compaction tests in this area will be summarized in a future report.

Fill depths are estimated to range from approximately 50 feet to 150 feet within the northwest portion of the property. Some of the fill is comprised of stockpiles (shown as green shaded areas on Figure 2) and a large undocumented fill berm (also shaded green) constructed along the northern property boundary. The stockpiles and most of the undocumented fill berm will be removed to reach proposed pad grades resulting in fill depths between 50 to 100.

Compacted fill was also placed during the reclamation grading operations along the southern portion of the site. The compacted fill is expected to range from between 20 and 80 feet thick, however, it is overlain by stockpiles approximately 5 to 10 feet thick. At the east end of the property approximately 20 to 30 feet of compacted fill was also placed, which is overlain by up to 70 feet of undocumented fill.

In the southeast portion of the site, previous waste ponds were infilled with undocumented fill (shown as light brown shaded areas on Figure 2). The undocumented fill was placed directly on compressible deposits that had accumulated in the pond area. The areas should be designated for non-structural areas until remedial measures are performed.

Areas located outside where reclamation grading operations where performed consist of compressible surficial deposits (i.e. undocumented fill, alluvium, colluvium) that will require remedial grading. The perimeter slopes to the north and south beyond the mined pit areas consist of native slopes.

A trunk sewer main currently crosses the northwest portion of the site. We expect portions of the sewer main will be left in-place and will need to be protected during grading. Other utility lines (gas, electric, water) that serve the existing tenants on the property and former mining activities exist across the property. We expect many of these utilities will be abandoned and relocated.

3. PROJECT DESCRIPTION

Based on planned finish grades, grading will consist of excavations up to 70 feet with fills up to approximately 80 feet to achieve the current desired grades, which will support approximately 1,800 residential units, mixed-use areas, parks, and infrastructure.

Based on preliminary information, the residential portion of the project will be comprised of both single-family attached and detached products. Some of the product will be multi-story apartments wrapped around parking structures. Affordable housing units are also planned. The mixed-use component is expected to consist of retail and office space. A transit station is also proposed.

Across the southern portion of the site a 25-acre community park is planned. In addition, several passive parks will be constructed within the property. Carroll Canyon Road (a 6-lane prime arterial roadway) will be extended from the current terminus west of Camino Ruiz to Camino Santa Fe. The project will also restore Carroll Canyon Creek by constructing drainage features that include a drainage channel, drop structures, and an arch undercrossing below Carroll Canyon Road. A pedestrian bridge across the creek drainage is also planned. Storm water management will be handled with basins planned at various locations on the property.

The locations and descriptions provided herein are based on a review of available information and preliminary plans prepared by Project Design Consultants. If project details change significantly from those described herein, Geocon Incorporated should be contacted to evaluate potential impacts with respect to the site soil and geologic conditions and to determine if the proposed changes will require revision of this report.

4. SOIL AND GEOLOGIC CONDITIONS

The site is underlain by undocumented fill, stockpiles of soil and aggregate products, compacted fill, alluvium, colluvium, and the Stadium Conglomerate Formation. The soil and geologic units are described below. The approximate lateral extent of surficial soils and geologic formational units are shown on the *Geologic Map*. *Geologic Cross-Sections* A-A′ through K-K′ (Figures 3 through 7) represent our interpretation of the geologic conditions across the site.

4.1 Undocumented Fill (Qudf)

Undocumented fill associated with previous mining and grading activities is present across the majority of the site. The undocumented fill thickness is expected to range from a few feet to 80 feet thick. The thicker undocumented fills exist in the northwest and east corners of the property; however, the majority of these deposits will be removed based on the current proposed pad grades. In some areas, we expect up to 5 to 10 feet of undocumented fill may exist below finish pad grade, which will require removal and recompaction.

Along the south portion of the site, finish grades are currently planned above current grades. Prior to placing fill, the undocumented fill will need to be removed and replaced within building pads roadway areas. Undocumented fill underlying the community park may be left in-place provided the area is designated as non-structural. However, any park improvements such as buildings and parking lots will require remedial measures. Additionally, the infilled pond areas, (shown as light brown shaded areas on Figure 2), will require remedial measures due to the presence of compressible deposits.

4.2 Compacted Fill (Qcf)

Compacted fill placed during reclamation grading is present within the northwest, southern, and eastern potions of the site. The compacted fill was tested during placement periodically by Geocon Incorporated (see Reference No. 7). Based on exploratory borings and laboratory testing performed for this study, the compacted fill has a low potential for loading-induced compression, and has good moisture content and density. The compacted fill is considered suitable for support of planned improvements in its existing condition. Prior to placing fill, the upper 12 inches of compacted fill should be reprocessed by scarifying, moisture conditioning and recompacting prior to placing additional fill or structural improvements.

4.3 Alluvium

Alluvium is present within the drainage area along the northern project perimeter and within the Carroll Canyon Creek drainage area. The alluvium where observed, consists of sand, silts and clays with varying amounts of cobble. The alluvium is considered compressible and should be removed and replaced as compacted fill within structural improvement areas.

4.4 Colluvium

Colluvium was encountered at the base and along the natural hillside at the east end of the property. The colluvium consists of loose, sandy clay with gravel and cobbles. The thickness of the colluvium was undetermined due to caving. The colluvium is compressible and will require removal within structural improvement areas.

4.5 Stadium Conglomerate (Tst)

The Eocene-age Stadium Conglomerate is the predominant formational unit on the site. This unit was the primary material mined to generate aggregate. In general, the Stadium Conglomerate consists of a dense to very dense, yellow to light brown, cobble conglomerate. The deposit contains a relatively high percentage of rounded cobble (up to approximately 60 percent by weight) embedded in a silty to clayey, fine to medium sand soil matrix. The cobble typically ranges in size from approximately 3 inches to 12 inches. The Stadium Conglomerate underlies the surficial soils on the property and is exposed on the north and south perimeter slopes. When excavated, the Stadium Conglomerate typically consists of *low* to *very low* expansive silty/clayey sands that possess good shear strength characteristics in either a natural or properly compacted condition. Cuts slopes within the Stadium Conglomerate typically possess adequate factors of safety. The Stadium Conglomerate is suitable for support of additional fill and structural loading.

5. GROUNDWATER

Groundwater was encountered in several borings within the southern portion of the property, which appears to be perched on the underlying Stadium Conglomerate. It is expected that groundwater will be encountered during remedial grading operations within the southern portion of the property, which may require temporary dewatering techniques. It is not uncommon for groundwater or seepage conditions to develop where none previously existed. Groundwater elevations are dependent on seasonal precipitation, irrigation, land use, among other factors, and vary as a result. Proper surface drainage will be important to future performance of the project.

6. GEOLOGIC HAZARDS

6.1 Faulting and Seismicity

Based on a review of geologic literature and experience with the soil and geologic conditions in the general area, it is our opinion that no known active or potentially active faults are located at the site.

Minor fault traces have been mapped with the northern portion of the site that traverse generally from east to west. The faults were observed during grading of the adjacent Fenton Technology Park project and during the recent mining operations. Undisturbed ferruginous mineral layers caused by long periods of weathering along the fault trace were observed along the faults. These layers are suggestive of ancient (pre-Holocene) pervasive groundwater conditions. The undisturbed character of these layers suggests the faults are inactive.

According to the computer program *EZ-FRISK (Version 7.65)*, six known active faults are located within a search radius of 50 miles from the property. The nearest known active fault is the Newport-Inglewood/Rose Canyon Fault Zone, located approximately 6 miles west of the site. The Newport-

Inglewood/Rose Canyon Fault Zone is the dominant source of potential ground motion. Earthquakes that might occur on the Newport-Inglewood/Rose Canyon Fault Zone or other faults within the southern California and northern Baja California area are potential generators of significant ground motion at the site. The estimated deterministic maximum earthquake magnitude and peak ground acceleration for the Newport-Inglewood/Rose Canyon Fault Zone are 7.5 and 0.36g, respectively. Table 6.1.1 lists the estimated maximum earthquake magnitude and peak ground acceleration for the most dominant faults in relationship to the site location. We calculated peak ground acceleration (PGA) using Boore-Atkinson (2008) NGA USGS 2008, Campbell-Bozorgnia (2008) NGA USGS 2008, and Chiou-Youngs (2007) NGA USGS 2008 acceleration-attenuation relationships.

TABLE 6.1.1
DETERMINISTIC SPECTRA SITE PARAMETERS

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Peak Ground Acceleration		
			Boore-Atkinson 2008 (g)	Campbell-Bozorgnia 2008 (g)	Chiou-Youngs 2007 (g)
Newport-Inglewood/Rose Canyon	6	7.5	0.31	0.28	0.36
Rose Canyon	6	6.9	0.27	0.26	0.30
Coronado Bank	20	7.4	0.19	0.13	0.16
Palos Verdes Connected	20	7.7	0.21	0.14	0.19
Elsinore	32	7.85	0.17	0.11	0.14
Earthquake Valley	39	6.8	0.10	0.06	0.06

We used the computer program *EZ-FRISK* to perform a probablilistic seismic hazard analysis. The computer program *EZ-FRISK* operates under the assumption that the occurrence rate of earthquakes on each mapped Quaternary fault is proportional to the fault slip rate. The program accounts for earthquake magnitude as a function of fault rupture length. Site acceleration estimates are made using the earthquake magnitude and distance from the site to the rupture zone. The program also accounts for uncertainty in each of following: (1) earthquake magnitude, (2) rupture length for a given magnitude, (3) location of the rupture zone, (4) maximum possible magnitude of a given earthquake, and (5) acceleration at the site from a given earthquake along each fault. By calculating the expected accelerations from considered earthquake sources, the program calculates the total average annual expected number of occurrences of site acceleration greater than a specified value. We utilized acceleration-attenuation relationships suggested by Boore-Atkinson (2008), Campbell-Bozorgnia (2008), and Chiou-Youngs (2007) in the analysis. Table 6.1.2 presents the site-specific probabilistic seismic hazard parameters including acceleration-attenuation relationships and the probability of exceedence.

TABLE 6.1.2
PROBABILISTIC SEISMIC HAZARD PARAMETERS

Probability of Exceedence	Peak Ground Acceleration		
	Boore-Atkinson, 2008 (g)	Campbell-Bozorgnia, 2008 (g)	Chiou-Youngs, 2008 (g)
2% in a 50 Year Period	0.47	0.40	0.46
5% in a 50 Year Period	0.34	0.29	0.33
10% in a 50 Year Period	0.26	0.22	0.24

While listing peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including frequency and duration of motion and soil conditions underlying the site. Seismic design of the structures should be evaluated in accordance with the California Building Code (CBC) guidelines.

6.2 Ground Rupture

The risk associated with ground rupture hazard is very low due to the absence of active faults at the subject site.

6.3 Tsunamis and Seiches

The site is not located near the ocean or downstream of any large bodies of water. Therefore, the risk of tsunamis or seiches associated with the site is low.

6.4 Liquefaction and Seismically Induced Settlement

Provided removal and recompaction of undocumented fill and alluvium is performed as recommended in this report, the risk associated with soil liquefaction hazard at the site is low.

6.5 Landslides

Based on our review of published geologic maps for the site vicinity, it is our opinion landslides are not present at the property or at a location that could impact the site.

6.6 Geologic Hazard Category

Review of the 2008 *City of San Diego Seismic Safety Study, Geologic Hazards and Faults, Sheet 35*, indicates the site is mapped as Geologic Hazard Categories 51, 53, and 32. Category 51 is described as- *level mesas – underlain by terrace deposits and bedrock, nominal risk.* Category 53 is described

as-*level or sloping terrain, unfavorable geologic structure, low to moderate risk.* Category 32 listed under liquefaction is described as- *low potential – fluctuating groundwater, minor drainages.*

At the completion of grading, the site will be underlain by compacted fill overlying the Stadium Conglomerate Formation in structural improvement areas. The natural hillsides and cut slopes to the north and south consist of Stadium Conglomerate and are considered grossly stable.

7. EARTHWORK GRADING FACTORS

Estimates of embankment shrink or swell (bulk/shrink) factors are presented in Table 7 below. A discussion of these factors, and the level of accuracy associated with these estimates, is warranted. Bulk/shrink factors are based on comparing existing soil or rock conditions with expected final fill conditions. Numerous uncertainties are inherent with the analysis and its potential effect on site development costs should be considered when preparing budgets. Variations in natural soil density, as well as in compacted fill, render shrinkage and bulking value estimates very approximate.

For the existing conditions, the density (and moisture content) can vary by 10 to 20 percent. The geometry of differing soil deposits can vary significantly over relatively short distances. The depth and variability of the gravel, cobble, and boulder content can also vary abruptly over short distances. Due to these inherit inaccuracies in estimating bulk/shrink volumes, it is recommended that a site balance area be provided where grades can be adjusted to accommodate these uncertainties.

For fill areas, the degree of compaction that is achieved by the grading contractor may be significantly greater than the minimum required. As an example, the contractor can compact fills to any relative compaction of 90 percent or higher of the laboratory maximum dry density. Thus, the contractor has at least a 10 percent range of control over the fill volume. Overexcavation of the gravel-sand soils to generate capping material often occurs to facilitate the grading contractor's operation. The grading contractor can also undercut/overexcavate areas for *convenience yardage.*

Estimated ranges for percentage of shrinkage or bulking are presented in Table 7. For use in earthwork balancing, the midpoint (average) of these ranges is typically used in determining shrinkage and bulking amounts, and in balancing cut and fill volumes on the site. However, in addition to the use of the average shrinkage/bulking for balancing purposes, it is recommended that the upper and lower bounds of the earthwork factor ranges be used to *bracket* the range of estimated earthwork shrinkage and bulking. By using the upper and lower bounds, an estimate of the maximum deviation of earthwork quantities may be established. The resulting maximum deviation is for inherent errors relating to the variability in earthwork factors and does not include an allowance for variables that occur during construction such as site grading errors, or the other factors discussed above. In this regard, it is suggested that maximum and minimum values also be assigned to other

quantity estimates to permit a *worst-case* and *best-case* evaluation of balance site development costs. In addition, a *balance area* should be implemented as part of the grading plan to adjust final grades based on the final shrinkage/bulking factors.

TABLE 7
BULKING AND SHRINKAGE FACTORS

Soil Unit	Shrink/Bulk Factor
Alluvium and Colluvium	8 to 12 percent shrink
Undocumented fill	10 to 15 percent shrink
Compacted fill	2 percent shrink to 2 percent bulk
Stadium Conglomerate Formation	3 to 5 percent bulk

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 General

8.1.1 No soil or geologic conditions were observed that would preclude the development of the property as presently proposed provided that the recommendations of this report are followed.

8.1.2 The site is underlain by undocumented fill, stockpiles, compacted fill, alluvium and the Stadium Conglomerate formation. The undocumented fill and compacted fill ranges in depths of a few feet to 150 feet. Undocumented fill, stockpile fill, alluvium and colluvium is unsuitable for support of structural improvements and should be removed and replaced as compacted fill. Areas where undocumented fill, stockpile fill, alluvium or colluvium is left in-place should be designated as non-structural.

8.1.3 Based on exploratory borings, trenches, and laboratory testing, the compacted fill was observed to have relatively good moisture content and density. Consolidation curves indicate the fill has a low potential for loading induced compression. The compacted fill appears to be suitable in its present condition for support of new fill and/or structural loading. Additional borings should be performed once grading plans are prepared to further evaluate the suitability of the fill for support of the planned improvements.

8.1.4 Based on our experience and laboratory testing, we expect the majority of on-site soils to possess a very low to medium expansion potential. We also expect the soils to have a negligible sulfate exposure to concrete structures.

8.1.5 The soils are expected to be corrosive to buried metal. The corrosive nature of the soils should be considered in the design of buried metal pipes and underground structures.

8.1.6 We encountered groundwater in several of the borings. We expect removal excavations along the southern portion of the property will encounter groundwater perched on the Stadium Conglomerate. Dewatering methods and possible top-loading techniques may be needed to achieve removals.

8.1.7 With the exception of possible strong seismic shaking, no significant geologic hazards were observed or are known to exist on the site that would adversely affect the site. No special seismic design considerations, other than those recommended herein, are required.

8.1.8 Subsurface conditions observed may be extrapolated to reflect general soil/geologic conditions; however, some variations in subsurface conditions between trench and boring locations should be anticipated.

8.2 Soil and Excavation Characteristics

8.2.1 Excavation of the surficial soils should be possible with moderate to heavy effort using conventional heavy-duty equipment. Excavation of the Stadium Conglomerate may require very heavy effort with conventional heavy-duty grading equipment to excavate and may generate oversized material. Oversized rock (rocks greater than 12 inches in dimension) can be incorporated into deep fill areas.

8.2.2 Temporary slopes should be made in conformance with OSHA requirements. The Stadium Conglomerate can be considered Type A Soil (Type B where groundwater or seepage is encountered) in accordance with OSHA requirements. Compacted fill can be considered Type B soil (Type C were seepage is encountered). Undocumented fill, alluvium, and colluvium should be considered Type C soil.

8.2.3 It is the responsibility of the contractor to provide a safe excavation during the construction of the proposed project. In general, no special shoring requirement will be necessary if temporary excavations will be less than 4 feet high. Temporary excavations greater than 4 feet high should be laid back at an appropriate inclination. Surcharge loads should not be permitted within a distance equal to the height of the excavation from the top of the excavation. The top of the excavation should be at least 15 feet from the edge of existing improvements. Excavations steeper than those recommended or closer than 15 feet from an existing surface improvement should be shored in accordance with applicable OSHA codes and regulations.

8.2.4 Table 8.2.1 presents the allowable slope inclination for different soil types based on information presented by OSHA assuming seepage is not encountered.

TABLE 8.2.1
ALLOWABLE SLOPE INCLINATIONS FOR EXCAVATIONS LESS THAN 20 FEET FOR UNDERGROUND CONTRACTORS

Soil or Rock Type	On-Site Geologic Unit	Maximum Inclination (horizontal: vertical)	Maximum Slope Angle from Horizontal (degrees)
Type A	Stadium Conglomerate	¾:1	53
Type B	Properly Compacted Fill	1:1	45
Type C	Undocumented Fill and Surficial Soil	1½:1	34

8.2.5 The soil encountered in the field investigation is considered to be both "non-expansive" (expansion index [EI] of 20 or less) and "expansive" (EI greater than 20) as defined by 2016 California Building Code (CBC) Section 1803.5.3. Table 8.2.2 presents soil classifications based on the expansion index. Based on the laboratory test results, a majority of the soil encountered is expected to possess a "very low" to "medium" expansion potential.

TABLE 8.2.2
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	Expansion Classification	2016 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

8.2.6 We performed laboratory tests on samples of the site materials to evaluate the percentage of water-soluble sulfate content. Results from laboratory testing indicate the on-site soils possess "Not Applicable" ("S0") sulfate exposure to concrete structures as defined by 2016 CBC Section 1904 and ACI 318-08 Sections 4.2 and 4.3. Table 8.2.3 presents a summary of concrete requirements set forth by 2016 CBC Section 1904 and ACI 318. Samples of near pad grade soils should be performed after the completion of grading. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

TABLE 8.2.3
REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Sulfate Exposure	Exposure Class	Water-Soluble Sulfate Percent by Weight	Cement Type	Maximum Water to Cement Ratio by Weight	Minimum Compressive Strength (psi)
Not Applicable	S0	0.00-0.10	--	--	2,500
Moderate	S1	0.10-0.20	II	0.50	4,000
Severe	S2	0.20-2.00	V	0.45	4,500
Very Severe	S3	> 2.00	V+Pozzolan or Slag	0.45	4,500

8.2.7 Based on our experience with the on-site soils, we expect the soils to be corrosive to buried metal. The corrosive nature of the soils should be considered in the design of buried metal pipes and underground structures. We performed laboratory tests on samples of selected samples to check the corrosion potential. A site is considered corrosive if the chloride concentration is 500 parts per million (ppm) or greater, sulfate concentration is 2,000 ppm (0.2%) or greater, or the pH is 5.5 or less according to Caltrans *Corrosion Guidelines,* dated September 2003. The laboratory test results are presented in Appendix B. Based on the laboratory test results and guidelines listed above, it is our opinion the site is considered corrosive with respect to buried metals.

8.2.8 Geocon Incorporated does not practice in the field of corrosion engineering; therefore, further evaluation by a corrosion engineer may be needed to incorporate the necessary precautions to avoid premature corrosion of underground pipes and buried metal in direct contact with soil.

8.3 Settlement Monitoring

8.3.1 Based on the proposed grading, the majority of the northwest portion of the site will require cuts to achieve pad grade. In the central portion of the site, fills between approximately 50 to 80 feet are planned. Along the southern portion of the property, proposed grading will result in additional fill thicknesses of approximately 10 to 20 feet above existing grades. We recommend settlement monuments be placed in areas where new fill thickness (fill plus remedial removals) exceeds 50 feet. The locations of monuments will be determined once the grading plans are available.

8.3.2 Remedial grading recommendations provided herein specify removal and compaction of undocumented fill, alluvium, and colluvium. As such, adverse settlement associated with compressible deposits will be mitigated where these soils are completely removed. Where groundwater is present, removal of the surficial soils may be limited. Where complete removals cannot be performed, settlement monitoring as discussed herein should be performed.

8.3.3 Figure 8 shows a typical settlement monument. We recommend surface settlement monuments be installed and monitored until the readings indicate settlement, as a result of fill placement, is essentially complete. The recommended locations of settlement monuments will be provided once finalized grading plans are available.

8.3.4 Settlement monuments should be surveyed on a weekly basis. We estimate a settlement period of 3 to 6 months. The surveyed results should be provided to Geocon Incorporated to evaluate when settlement has essentially ceased.

8.4 Subdrains

8.4.1 Canyon subdrains are not required for the project.

8.5 Grading Recommendations

8.5.1 All grading should be performed in accordance with the *Recommended Grading Specifications* contained in Appendix D. Where the recommendations of this section conflict with those of Appendix D, **the recommendations of this section take precedence**. All earthwork should be observed and all fill tested for proper compaction by Geocon Incorporated.

8.5.2 Prior to commencing grading, a preconstruction conference should be held at the site with the owner or developer, grading contractor, civil engineer, City of San Diego representatives, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

8.5.3 Site preparation should begin with the removal of all deleterious material and vegetation. The depth of removal should be such that material exposed in cut and fill areas, or soils to be used as fill are relatively free of organic matter. Material generated during stripping should be exported from the site.

8.5.4 All compressible soil deposits, including undocumented fill, stockpiles, alluvium and colluvium within areas where structural improvements and/or structural fill are planned should be removed to expose the underlying Stadium Conglomerate or compacted fill prior to placing additional fill and/or structural loads. The actual extent of unsuitable soil removals will be determined in the field during grading by the geotechnical engineer and/or engineering geologist. Areas where undocumented fill, alluvium, or colluvium will be left in-place should be identified as non-structural areas.

8.5.5 The upper surface elevation of documented compacted fill was not surveyed during reclamation grading. As such, the elevation at the top of documented fill is unknown. However, the estimated contact between documented and undocumented fill based on information from borings and trenches, and elevations from previous compaction testing is shown on the *Geologic Cross Sections*. For preliminary estimates, within areas of

documented compacted fill, the upper 5 feet of fill below proposed finish grade in cut and fill areas should be removed and recompacted in all structural improvement areas.

8.5.6 In areas outside of the limits of documented compacted fill where structural improvements will be constructed, all compressible surficial deposits should be removed to expose the underlying native Stadium Conglomerate bedrock and replaced as compacted fill. The approximate elevation of the bedrock contact and approximate thickness of remedial grading is shown on Figure 2. The estimated contact is shown on the *Geologic Cross Sections* based on interpolation between borings.

8.5.7 For the community park site along the south side of the project, we recommend the upper 2 feet of soil below proposed pad grade in cut areas and the upper 2 feet of existing soil in fill areas be removed and replaced as compacted fill. The park should be designated as nonstructural. Modified grading recommendations to provide engineered fill for support of structural improvements in the park can be provided in update reports once the location and type of structural improvement for the park is known.

8.5.8 In the pond area where uncompacted fill was placed over compressible pond deposits (shown as light brown shaded area on Figure 2), we expect significant settlement will occur. We recommend the compressible deposits either be completely removed and recompacted or the area surcharged with 10 feet of fill. If surcharging is planned, we recommend the upper 5 feet of soil below proposed finish grade be removed and replaced as compacted fill prior to surcharging. The upper 2 feet of the surcharge fill should also be compacted to 90 percent relative compaction to ensure compacted fill exists at the finish grade surface after settlement and removal of the stockpile. We expect several years of surcharging will be required to adequately compress the soil. Settlement monitoring as recommended in Section 8.3 of this report should be performed.

8.5.9 Removals within drainage areas and near toes of proposed fill slopes should extend horizontally beyond the edge of improvements a distance equal to the depth of removal. A typical detail of remedial grading beyond proposed grading is presented in Figure 9. The anticipated removal limits are shown in green on the *Geologic Map* and *Geologic Cross Sections*. Structural setbacks or modified recommendations may be required if remedial removals cannot extend laterally as recommended due to environmental constraints, especially along Carroll Canyon Creek.

8.5.10 Cut to fill transitions may occur as a result of grading within portions of the property. Additionally, lots with very large differential fill thicknesses will exists near the previous mined cut slope sidewall in the northwest portion of the property. To reduce the amount of

differential settlement, building pads and lots should be undercut at least 3 feet and sloped 1 percent to the adjacent street or deepest fill. Where the thickness of the fill below the building pad or lot exceeds 15 feet, the depth of the undercut should be increased to one-fifth of the maximum fill thickness. Lots requiring undercuts can be determined once grading plans have been prepared.

8.5.11 Prior to placing fill, the base of excavations and surface of compacted fill should be scarified; moisture conditioned as necessary and compacted. Fill soils may then be placed and compacted in layers to the design finish grade elevations. In general, on-site soils are suitable for re-use as fill if free from vegetation, debris and other deleterious material. Layers of fill should be no thicker than will allow for adequate bonding and compaction. All fill, including scarified ground surfaces and backfill, should be compacted to at least 90 percent of laboratory maximum dry density as determined by ASTM Test Procedure D 1557 at or slightly above optimum moisture content. Overly wet materials will require drying and/or mixing with drier soils to facilitate proper compaction.

8.5.12 The upper 3 feet of fill on all lots and streets should be composed of properly compacted *very low* to *low* expansive soils. Highly expansive soils, if encountered, should be placed in deeper fill areas and properly compacted. *Very low* to *low* expansive soils are defined as those soils that have an Expansion Index of 50 or less. Boulders, concretions, concrete chunks greater than 12 inches in maximum dimension should not be placed within 5 feet of finish grade or 3 feet from the deepest utility within streets. Specific recommendations for the placement of oversize rock is contained in the *Grading Specifications* contained in Appendix D.

8.5.13 Import fill (if necessary) should consist of granular materials with a *very low* to *low* expansion potential (EI of 50 or less), be free of deleterious material or stones larger than 3 inches, and should be compacted as recommended herein. Geocon Incorporated should be notified of the import soil source and should be authorized to perform laboratory testing of import soil prior to its arrival at the site to evaluate its suitability as fill material.

8.6 Slopes

8.6.1 Slope stability analyses were performed for proposed and existing cut and fill slopes for slope heights up to 100 feet (cut) and 60 feet (fill). The stability analyses were performed using simplified Janbu analysis. Our analyses utilized average drained direct shear strength parameters based on laboratory tests performed for this project and our experience with similar soils. The analyses indicate existing native perimeter slopes and proposed new cut and fill slopes will have calculated factors of safety in excess of 1.5 under static conditions

for both deep-seated failure and shallow sloughing conditions. A summary of slope stability analyses is presented on Figures 10 through 13.

8.6.2 All cut slope excavations should be observed during grading by an engineering geologist to verify that soil and geologic conditions do not differ significantly from those anticipated.

8.6.3 The outer 15 feet (or a distance equal to the height of the slope, whichever is less) of fill slopes should be composed of properly compacted granular *soil* fill to reduce the potential for surficial sloughing. All slopes should be compacted by backrolling with a loaded sheepsfoot roller at vertical intervals not to exceed 4 feet and should be track-walked at the completion of each slope such that the fill soils are uniformly compacted to at least 90 percent relative compaction to the face of the finished sloped.

8.6.4 All slopes should be landscaped with drought-tolerant vegetation, having variable root depths and requiring minimal landscape irrigation. In addition, all slopes should be drained and properly maintained to reduce erosion.

8.7 Settlement of Existing and Proposed Fills

8.7.1 Engineered fill was placed on the property between 1980 and 2016. The deepest fills are located in the northwest portion of the site in areas that will require cuts to achieve pad grade. Planned grading will result in the placement of up to approximately 80 feet of new fill in the central portion of the site with fills of approximately 10 to 30 feet in other areas. We expect post-grading settlement (hydro-compression) of properly compacted new fill with a thickness of approximately 80 feet to be between 3 to 4 inches. For fills that are approximately 10 to 30 feet thick, we expect post-grading settlement of about 1 to 2 inches. We expect the settlement will occur over 20+ years depending on the influx of rain and irrigation water into the fill mass. This settlement will likely be linear from the time the fill is placed to the end of the settlement period. We do not expect the settlement will impact proposed utilities with proposed gradients of 1 percent or greater. Foundations will need to be designed to accommodate post-construction settlement.

8.7.2 At the completion of grading, we expect some portions of the site will be underlain by approximately 100 feet of compacted fill that was placed during reclamation grading that has occurred over the past 15 years. With respect to post-construction settlement in areas where existing fills have been present for more than 5 years, we expect post-construction settlements as a result of hydro-compression to be on the order of 2.5 inches for fill thicknesses of approximately 100 feet.

8.7.3 Post-construction settlements for specific building pads and lots will be provided in update reports once grading plans have been prepared.

8.8 Seismic Design Criteria

8.8.1 We used the computer program *U.S. Seismic Design Maps*, provided by the USGS. Table 8.8.1 summarizes site-specific design criteria obtained from the 2016 California Building Code (CBC; Based on the 2015 International Building Code [IBC] and ASCE 7-10), Chapter 16 Structural Design, Section 1613 Earthquake Loads. The short spectral response uses a period of 0.2 second. The building structure and improvements should be designed using a Site Class D. We evaluated the Site Class based on the discussion in Section 1613.3.2 of the 2016 CBC and Table 20.3-1 of ASCE 7-10. The values presented in Table 8.8.1 are for the risk-targeted maximum considered earthquake (MCE_R).

TABLE 8.8.1
2016 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2016 CBC Reference
Site Class	D	Table 1613.5.2
Spectral Response – Class B (0.2 sec), S_S	0.971 g	Figure 1613.5(3)
Spectral Response – Class B (1 sec), S_1	0.375 g	Figure 1613.5(4)
Site Coefficient, F_a	1.111	Table 1613.5.3(1)
Site Coefficient, F_v	1.651	Table 1613.5.3(2)
Maximum Considered Earthquake Spectral Response Acceleration (0.2 sec), S_{MS}	1.080 g	Section 1613.5.3 (Eqn 16-36)
Maximum Considered Earthquake Spectral Response Acceleration – (1 sec), S_{M1}	0.618 g	Section 1613.5.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (0.2 sec), S_{DS}	0.720 g	Section 1613.5.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.412 g	Section 1613.5.4 (Eqn 16-39)

8.8.2 Table 8.8.2 presents additional seismic design parameters for projects located in Seismic Design Categories D through F in accordance with ASCE 7-10 for the mapped maximum considered geometric mean (MCE_G).

TABLE 8.8.2
2016 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	ASCE 7-10 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.387 g	Figure 22-7
Site Coefficient, F_{PGA}	1.113	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.431g	Section 11.8.3 (Eqn 11.8-1)

8.8.3 Conformance to the criteria in Tables 8.8.1 and 8.8.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a maximum level earthquake occurs. The primary goal of seismic design is to protect life and not to avoid all damage, since such design may be economically prohibitive.

8.9 Foundations

8.9.1 We expect the site, at the completion of grading, will be suitable for the use of shallow post-tensioned or mat slab foundations. Foundation recommendations will be provided in update reports based on proposed structures and final grading plans.

8.9.2 We expect footings may be designed for an allowable soil bearing pressure of 2,000 psf (dead plus live loads). The soil bearing pressure may be increased by 300 psf and 500 psf for each additional foot of foundation width and depth, respectively, up to a maximum allowable soil bearing pressure of 4,000 psf. The allowable bearing pressure may be increased by up to one-third when considering transient loading such as those due to wind or seismic forces.

8.9.3 Foundations will need to be designed to accommodate both static settlement as a result of building loading and hydro-compression. Estimated total and differential fill settlements for specific building pads and project areas will be provided in update reports once grading plans have been prepared.

8.10 Slope Maintenance

8.10.1 Slopes that are steeper than 3:1 (horizontal:vertical) may, under conditions which are both difficult to prevent and predict, be susceptible to near surface (surficial) slope instability. The instability is typically limited to the outer three feet of a portion of the slope and usually does not directly impact the improvements on the pad areas above or below the slope. The occurrence of surficial instability is more prevalent on fill slopes and is

generally preceded by a period of heavy rainfall, excessive irrigation, or the migration of subsurface seepage. The disturbance and/or loosening of the surficial soils, as might result from root growth, soil expansion, or excavation for irrigation lines and slope planting, may also be a significant contributing factor to surficial instability. It is, therefore, recommended that, to the maximum extent practical: (a) disturbed/loosened surficial soils be either removed or properly recompacted, (b) irrigation systems be periodically inspected and maintained to eliminate leaks and excessive irrigation, and (c) surface drains on and adjacent to slopes be periodically maintained to preclude ponding or erosion. It should be noted that although the incorporation of the above recommendations should reduce the potential for surficial slope instability, it will not eliminate the possibility, and, therefore, it may be necessary to rebuild or repair a portion of the project's slopes in the future.

8.11 Storm Water Management

8.11.1 If storm water management devices are not properly designed and constructed, there is a risk for distress to improvements and property located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water being detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeological study at the site. If infiltration of storm water runoff into the subsurface occurs, downstream improvements may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of water infiltration.

8.11.2 We performed an infiltration study on the property. A summary of our study and storm water management recommendations are provided in Appendix C. Based on the results of our study, full and partial infiltration is considered infeasible due to the presence of deep fills and the dense nature of the Stadium Conglomerate Formation. Basins should utilize a liner to prevent infiltration from causing adverse settlement, migrating to adjacent slopes, utilities, and foundations.

8.12 Site Drainage and Moisture Protection

8.12.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2016 CBC 1803.3 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into

swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

8.12.2 In the case of basement walls or building walls retaining landscaping areas, a water-proofing system should be used on the wall and joints, and a Miradrain drainage panel (or similar) should be placed over the waterproofing. The project architect or civil engineer should provide detailed specifications on the plans for all waterproofing and drainage.

8.12.3 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

8.12.4 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. We recommend that subdrains to collect excess irrigation water and transmit it to drainage structures, or impervious above-grade planter boxes be used. In addition, where landscaping is planned adjacent to the pavement, we recommend construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material.

8.13 Grading and Foundation Plan Review

8.13.1 Geocon Incorporated should review the grading plans and foundation plans for the project prior to final design submittal to evaluate whether additional analyses and/or recommendations are required.

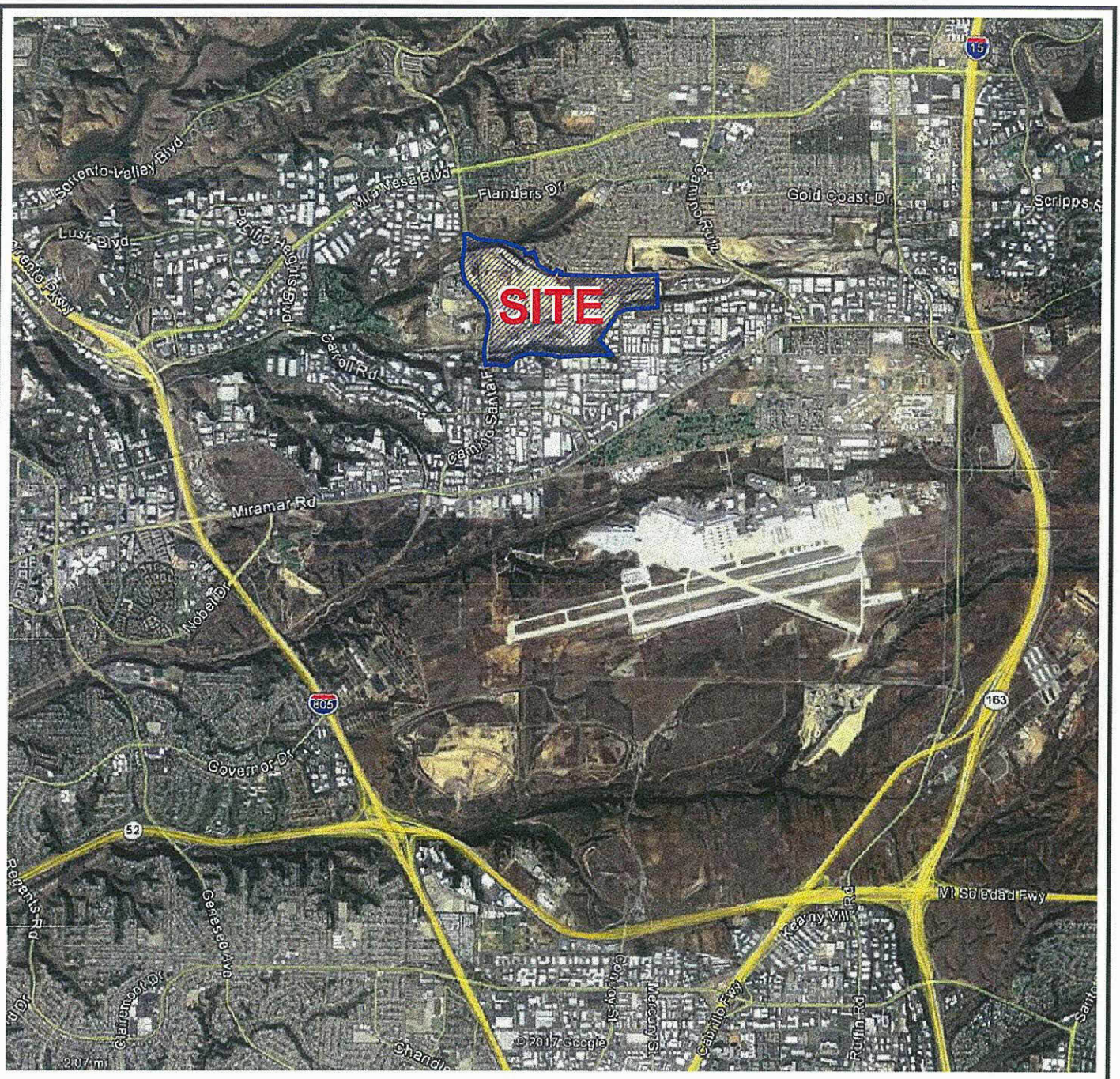
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.



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NO SCALE

VICINITY MAP

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

CARROLL CANYON MATERIALS PLANT
SAN DIEGO, CALIFORNIA

RM / AML		DSK/GTYPD

DATE 08 - 31 - 2017	PROJECT NO. G2070 - 42 - 01	FIG. 1

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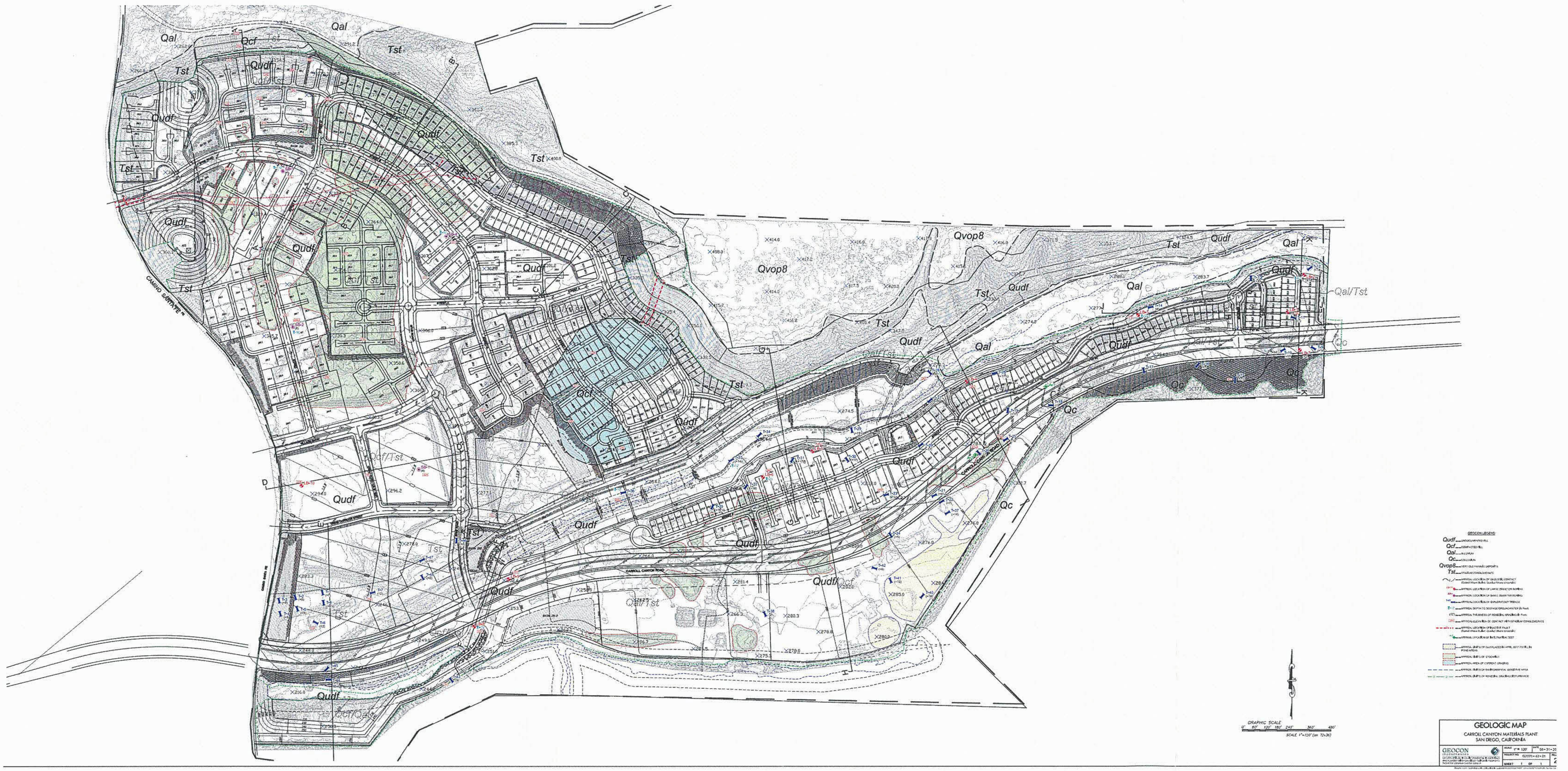
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Qudf
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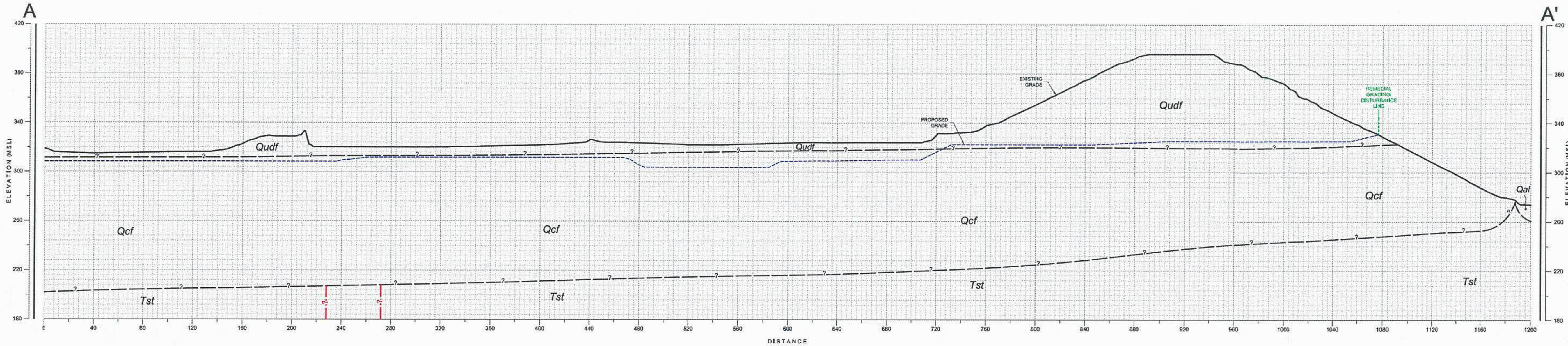
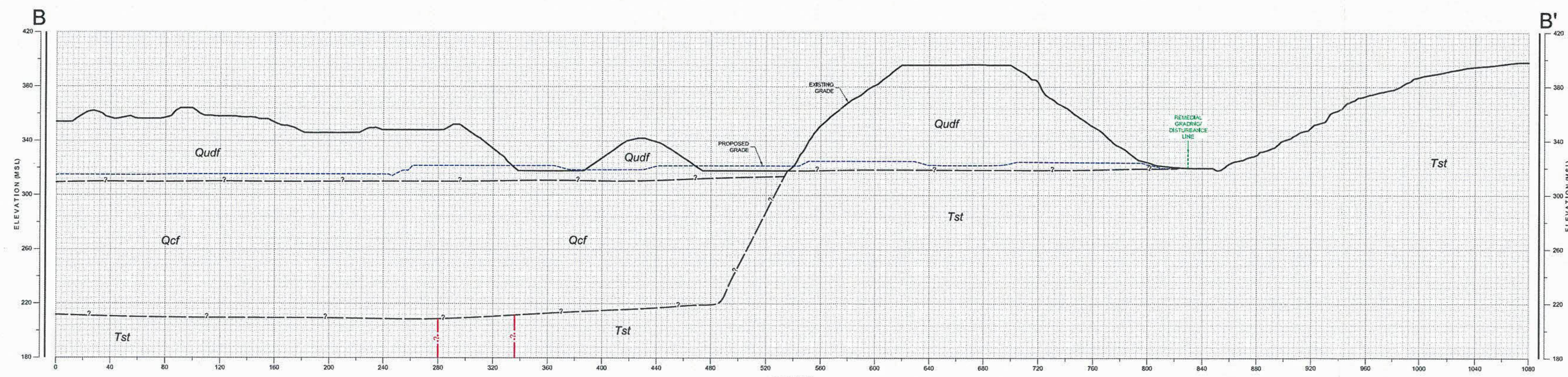
Qvop8
Qal/Tst
Qc
Qudf/Qcf
Qcf/Qal
CAMINO SANTA FE
CARROLL CANYON ROAD
GEOCON LEGEND
Qudf — UNDOCUMENTED FILL
Qcf — COMPACTED FILL
Qal — ALLUVIUM
Qc — COLLUVIUM
Qvop8 — VERY OLD PARALIC DEPOSITS
Tst — STADIUM CONGLOMERATE
GRAPHIC SCALE
SCALE 1"=120' (on 72x36)
GEOLOGIC MAP
CARROLL CANYON MATERIALS PLANT
SAN DIEGO, CALIFORNIA
GEOCON INCORPORATED
SCALE 1" = 120'
PROJECT NO. G2070-42-01
SHEET 1 OF 1



GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 40' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION B-B'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON LEGEND

- *Qudf* ...... UNDOCUMENTED FILL
- *Qcf* ...... COMPACTED FILL
- *Qal* ...... ALLUVIUM
- *Qc* ...... COLLUVIUM
- *Tst* ...... STADIUM CONGLOMERATE
- ...... APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- LB-10 ...... APPROX. LOCATION OF LARGE DIAMETER BORING
- SB-1 ...... APPROX. LOCATION OF SMALL DIAMETER BORING
- T-34 ...... APPROX. LOCATION OF EXPLORATORY TRENCH
- — ?- — ...... APPROX. LOCATION OF INACTIVE FAULT

GEOLOGIC CROSS SECTION

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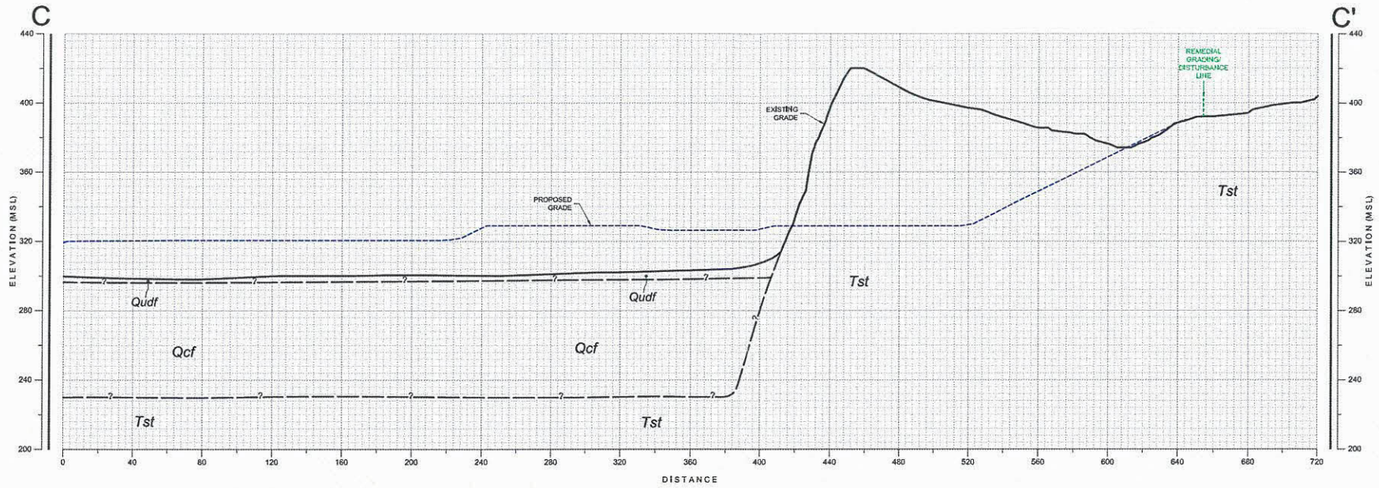
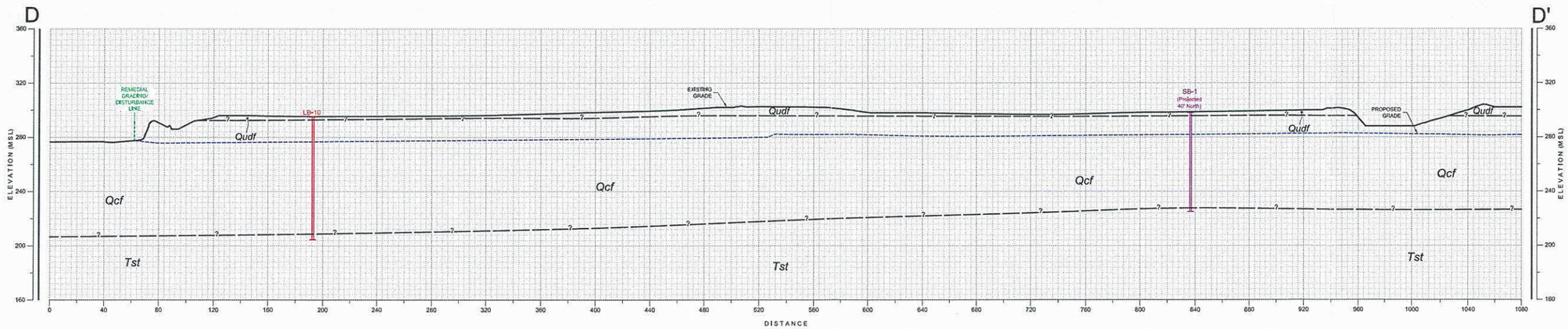
SCALE 1" = 40'	DATE 08 - 31 - 2017	
PROJECT NO. G2070 - 42 - 01		FIGURE 3
SHEET 1 OF 5		



GEOLOGIC CROSS-SECTION C-C'

SCALE: 1" = 40' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION D-D'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON LEGEND

- Qudf ..... UNDOCUMENTED FILL
- Qcf ..... COMPACTED FILL
- Qal ..... ALLUVIUM
- Qc ..... COLLUVIUM
- Tst ..... STADIUM CONGLOMERATE
- ..... APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- LB-10 ..... APPROX. LOCATION OF LARGE DIAMETER BORING
- SB-1 ..... APPROX. LOCATION OF SMALL DIAMETER BORING
- T-34 ..... APPROX. LOCATION OF EXPLORATORY TRENCH
- ..... APPROX. LOCATION OF INACTIVE FAULT

GEOLOGIC CROSS SECTION

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SCALE	1" = 40'	DATE	08 - 31 - 2017
PROJECT NO.	G2070 - 42 - 01	FIGURE	4
SHEET	2 OF 5		

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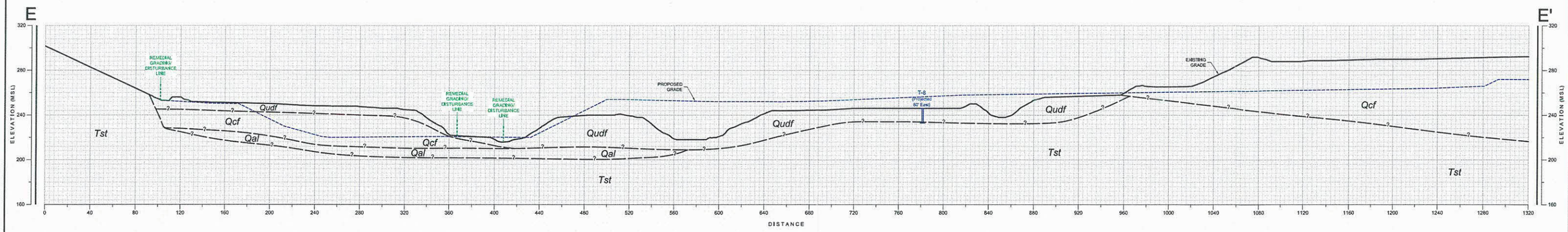
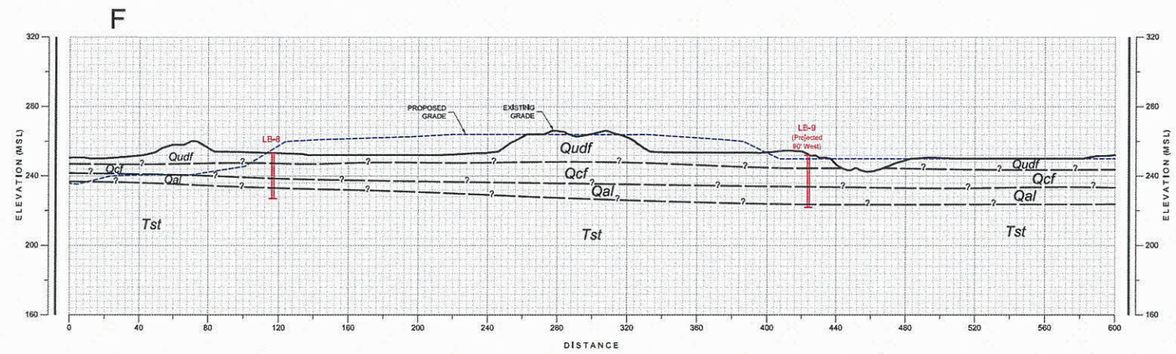


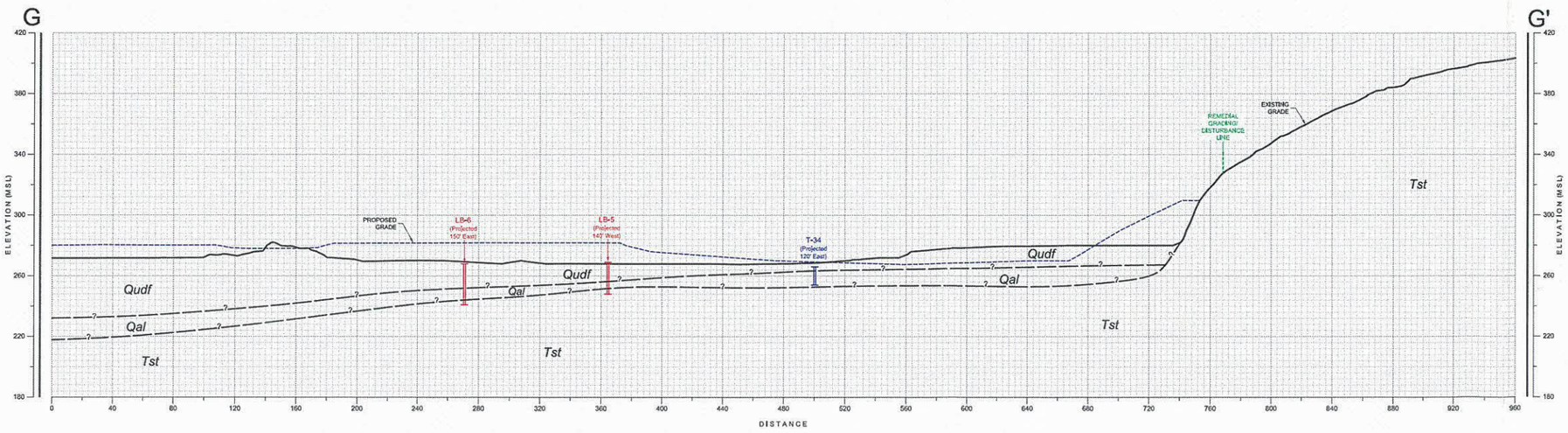
GEOLOGIC CROSS-SECTION E-E'

SCALE: 1" = 40' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION F-F'

SCALE: 1" = 40' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION G-G'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON LEGEND

- Qudf ..... UNDOCUMENTED FILL
- Qcf ..... COMPACTED FILL
- Qal ..... ALLUVIUM
- Qc ..... COLLUVIUM
- Tst ..... STADIUM CONGLOMERATE
- ~?~ ..... APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- LB-10 ..... APPROX. LOCATION OF LARGE DIAMETER BORING
- SB-1 ..... APPROX. LOCATION OF SMALL DIAMETER BORING
- T-34 ..... APPROX. LOCATION OF EXPLORATORY TRENCH
- -?- ..... APPROX. LOCATION OF INACTIVE FAULT

GEOLOGIC CROSS SECTION

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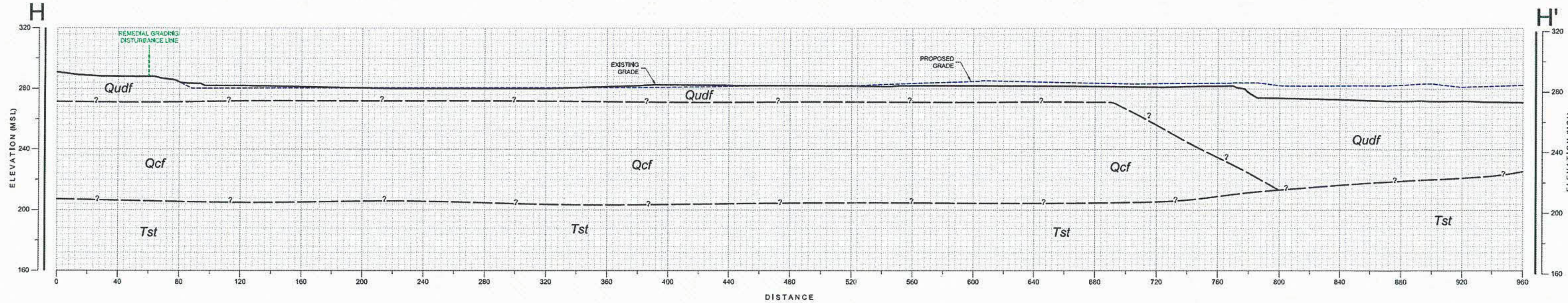
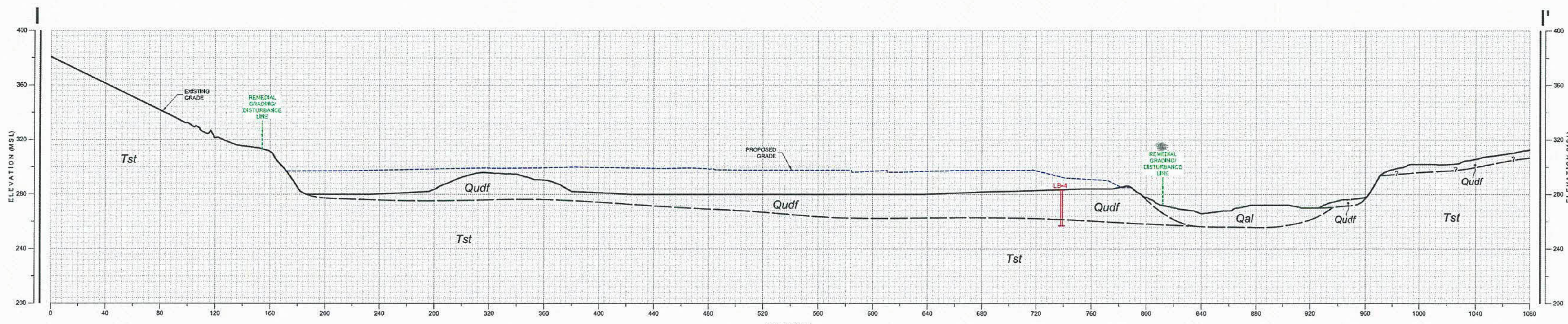
SCALE	1" = 40'	DATE	08 - 31 - 2017
PROJECT NO.	G2070 - 42 - 01	FIGURE	5
SHEET	3 OF 5		



GEOLOGIC CROSS-SECTION H-H'

SCALE: 1" = 40' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION I-I'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON LEGEND

Qudf......UNDOCUMENTED FILL

Qcf......COMPACTED FILL

Qal......ALLUVIUM

Qc......COLLUVIUM

Tst......STADIUM CONGLOMERATE

......APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

LB-10 ......APPROX. LOCATION OF LARGE DIAMETER BORING

SB-1 ......APPROX. LOCATION OF SMALL DIAMETER BORING

T-34 ......APPROX. LOCATION OF EXPLORATORY TRENCH

—?—......APPROX. LOCATION OF INACTIVE FAULT

GEOLOGIC CROSS SECTION

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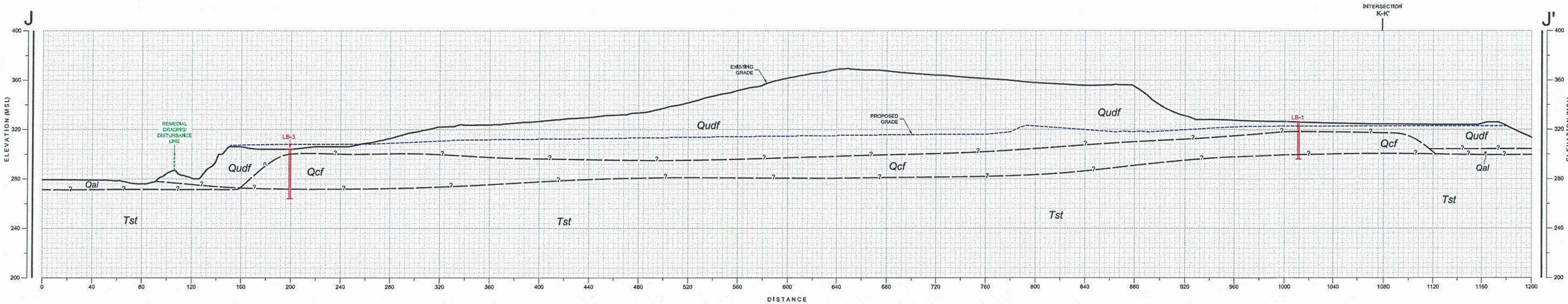
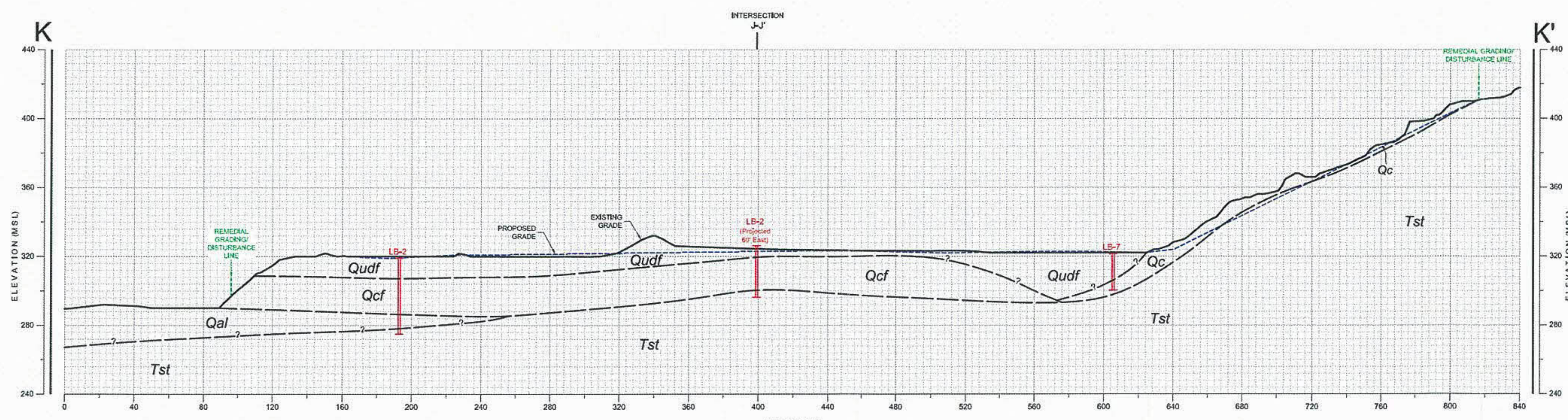
SCALE 1" = 40'	DATE 08 - 31 - 2017	
PROJECT NO. G2070 - 42 - 01		FIGURE 6
SHEET 4 OF 5		



GEOLOGIC CROSS-SECTION J-J'

SCALE: 1" = 40' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION K-K'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON LEGEND

- *Qudf*.......UNDOCUMENTED FILL
- *Qcf*.......COMPACTED FILL
- *Qal*.......ALLUVIUM
- *Qc*.......COLLUVIUM
- *Tst*.......STADIUM CONGLOMERATE
- ....APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- LB-10 ....APPROX. LOCATION OF LARGE DIAMETER BORING
- SB-1 ....APPROX. LOCATION OF SMALL DIAMETER BORING
- T-34 ....APPROX. LOCATION OF EXPLORATORY TRENCH
- ....APPROX. LOCATION OF INACTIVE FAULT

GEOLOGIC CROSS SECTION

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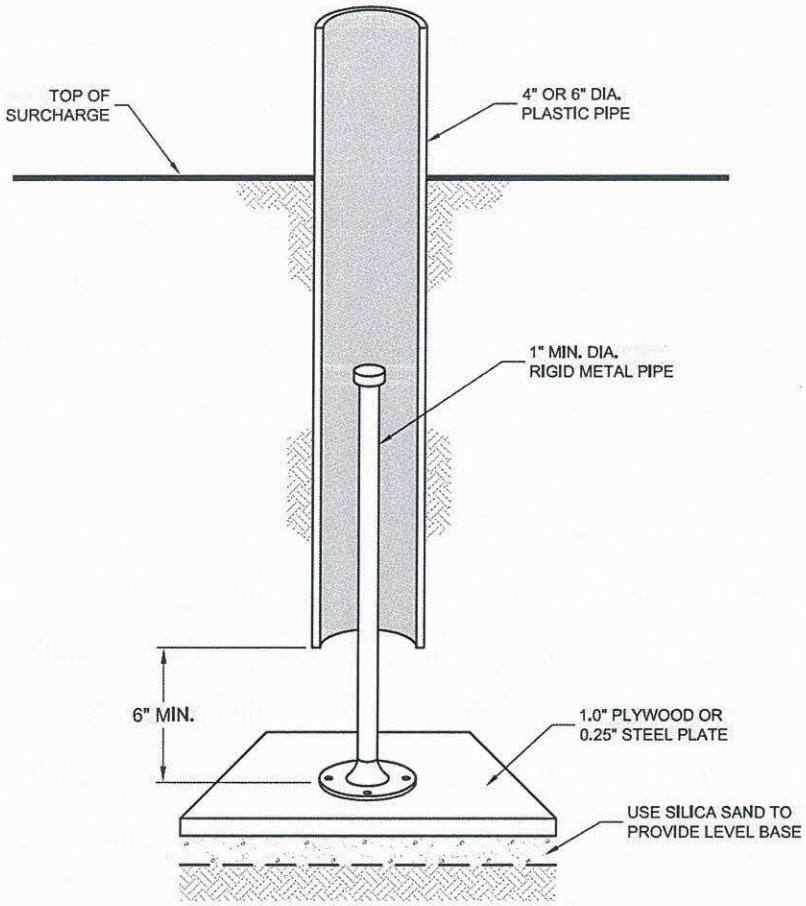
SCALE 1" = 40'	DATE 08 - 31 - 2017	
PROJECT NO. G2070 - 42 - 01		FIGURE 7
SHEET 5 OF 5		



NOTES:

1.....LOCATION OF SETTLEMENT PLATES SHALL BE CLEARLY MARKED AND READILY VISIBLE (RED FLAG) TO EQUIPMENT OPERATORS.

2.....CONTRACTOR SHALL MAINTAIN 10-FOOT HORIZONTAL CLEARANCE FOR HEAVY EQUIPMENT WITHIN 5 FEET (VERTICAL) OF PLATE BASE. FILL WITHIN CLEARANCE AREA SHALL BE HAND COMPACTED TO PROJECT SPECIFICATIONS OR COMPACTED BY ALTERNATIVE APPROVED SOILS ENGINEER.

3.....AFTER 5 FEET (VERTICAL) OF FILL IS IN PLACE, THE CONTRACTOR SHALL MAINTAIN 5 FEET HORIZONTAL EQUIPMENT CLEARANCE. FILL IN CLEARANCE AREA SHALL BE HAND COMPACTED (OR APPROVED ALTERNATIVE) IN VERTICAL INCREMENTS NOT TO EXCEED 2 FEET.

4.....IN THE EVENT OF DAMAGE TO SETTLEMENT PLATE OR EXTENSION RESULTING FROM EQUIPMENT OPERATING WITHIN PRESCRIBED CLEARANCE AREA, CONTRACTORS SHALL IMMEDIATELY NOTIFY SOILS ENGINEER AND SHALL BE RESPONSIBLE FOR RESTORING THE SETTLEMENT PLATES TO WORKING ORDER.

NO SCALE

NO SCALE

SETTLEMENT MONUMENT DETAIL

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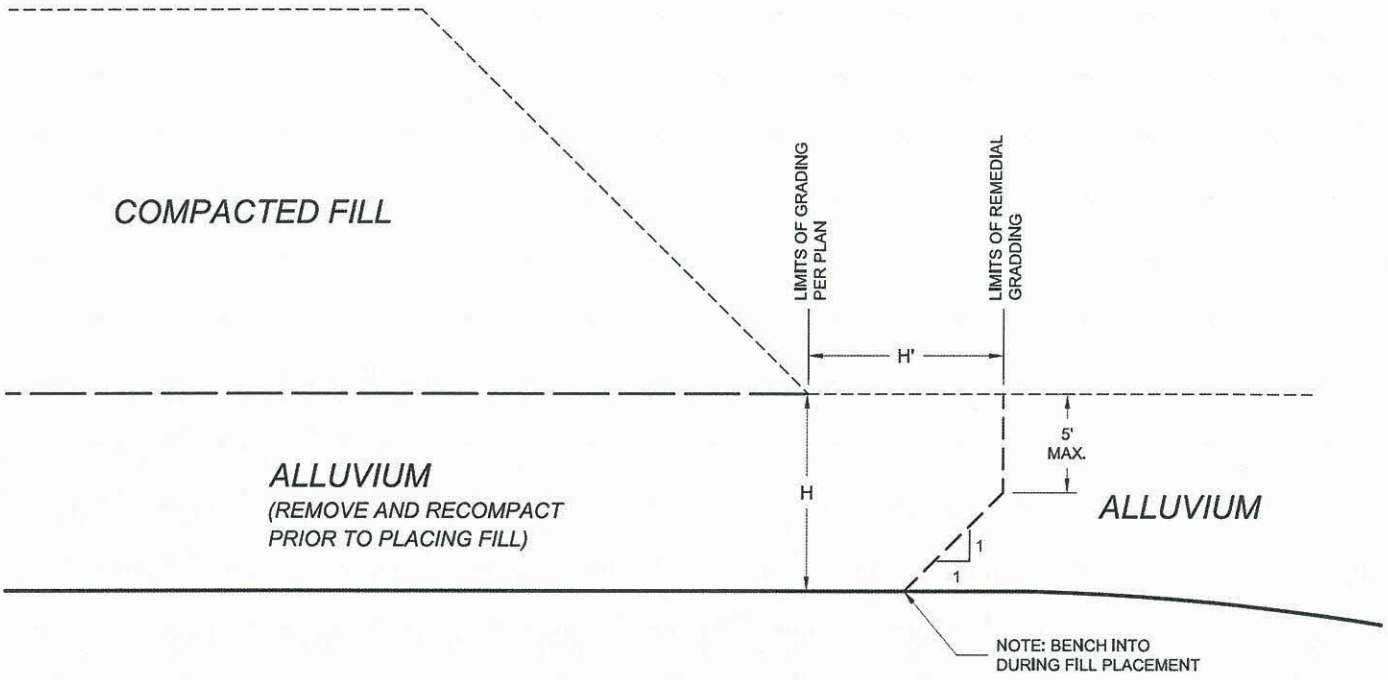
CARROLL CANYON MATERIALS PLANT
SAN DIEGO, CALIFORNIA

RM / AML		DSK/GTYPD

DATE 08 - 31 - 2017	PROJECT NO. G2070 - 42 - 01	FIG. 8

Plotted:08/30/2017 4:44PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2070-42-01 (Cantera)\DETAILS\Settlement Monument Detail.dwg



H = THICHNESS OF REMOVAL

H' = HORIZONTAL DISTANCE BEYOND GRADING PER PLAN FOR REMEDIAL GRADING
H = H'

NOTE: WHERE H' IS LIMITED BY PROPERTY BOUNDARIES OR OTHER RESTRICTIONS A SETBACK EQUAL TO THE DISTANCE OF THE RESTRICTIONS TO H' MAY BE REQUIRED.

TYPICAL DETAIL FOR LIMITS OF REMOVAL GRADING

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CARROLL CANYON MATERIALS PLANT
SAN DIEGO, CALIFORNIA

DATE 08 - 31 - 2017	PROJECT NO. G2070 - 42 - 01	FIG. 9

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ASSUMED CONDITIONS :

SLOPE HEIGHT	H	=	100 feet
SLOPE INCLINATION	2 : 1	(Horizontal : Vertical)	
TOTAL UNIT WEIGHT OF SOIL	γ_t	=	135 pounds per cubic foot
ANGLE OF INTERNAL FRICTION	ϕ	=	42 degrees
APPARENT COHESION	C	=	100 pounds per square foot
NO SEEPAGE FORCES			

ANALYSIS :

$\gamma_{c\phi}$	=	$\frac{\gamma_t H \tan\phi}{C}$	EQUATION (3-3), REFERENCE 1
FS	=	$\frac{NcfC}{\gamma_t H}$	EQUATION (3-2), REFERENCE 1
$\gamma_{c\phi}$	=	122	CALCULATED USING EQ. (3-3)
Ncf	=	250	DETERMINED USING FIGURE 10, REFERENCE 2
FS	=	1.85	FACTOR OF SAFETY CALCULATED USING EQ. (3-2)

REFERENCES :

1.....Janbu, N., Stability Analysis of Slopes with Dimensionless Parameters, Harvard Soil Mechanics, Series No. 46, 1954

2.....Janbu, N., Discussion of J.M. Bell, Dimensionless Parameters for Homogeneous Earth Slopes, Journal of Soil Mechanics and Foundation Design, No. SM6, November 1967.

SLOPE STABILITY ANALYSIS - CUT SLOPES

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CARROLL CANYON MATERIALS PLANT
SAN DIEGO, CALIFORNIA

RM / AML		DSK/GTYPD	DATE 08 - 31 - 2017	PROJECT NO. G2070 - 42 - 01	FIG. 10

Plotted:08/30/2017 4:37PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2070-42-01 (Cantera)\DETAILS\Slope Stability Analyses-Cut (SSA-C).dwg

ASSUMED CONDITIONS :

SLOPE HEIGHT	H	=	60 feet
SLOPE INCLINATION	2 : 1	(Horizontal : Vertical)	
TOTAL UNIT WEIGHT OF SOIL	γ_t	=	130 pounds per cubic foot
ANGLE OF INTERNAL FRICTION	ϕ	=	30 degrees
APPARENT COHESION	C	=	300 pounds per square foot
NO SEEPAGE FORCES			

ANALYSIS :

$\gamma_{c\phi}$	=	$\frac{\gamma_t H \tan\phi}{C}$	EQUATION (3-3), REFERENCE 1
FS	=	$\frac{NcfC}{\gamma_t H}$	EQUATION (3-2), REFERENCE 1
$\gamma_{c\phi}$	=	15	CALCULATED USING EQ. (3-3)
Ncf	=	43	DETERMINED USING FIGURE 10, REFERENCE 2
FS	=	1.65	FACTOR OF SAFETY CALCULATED USING EQ. (3-2)

REFERENCES :

1.....Janbu, N., Stability Analysis of Slopes with Dimensionless Parameters, Harvard Soil Mechanics, Series No. 46, 1954

2.....Janbu, N., Discussion of J.M. Bell, Dimensionless Parameters for Homogeneous Earth Slopes, Journal of Soil Mechanics and Foundation Design, No. SM6, November 1967.

SLOPE STABILITY ANALYSIS - FILL SLOPES

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RM / AML		DSK/GTYPD

CARROLL CANYON MATERIALS PLANT
SAN DIEGO, CALIFORNIA

DATE 08 - 31 - 2017	PROJECT NO. G2070 - 42 - 01	FIG. 11

Plotted:08/30/2017 4:36PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2070-42-01 (Cantera)\DETAILS\Slope Stability Analyses-Fill (SSA-F).dwg

ASSUMED CONDITIONS :

SLOPE HEIGHT	H	=	Infinite
DEPTH OF SATURATION	Z	=	3 feet
SLOPE INCLINATION	2 : 1		(Horizontal : Vertical)
SLOPE ANGLE	i	=	26.6 degrees
UNIT WEIGHT OF WATER	γ_w	=	62.4 pounds per cubic foot
TOTAL UNIT WEIGHT OF SOIL	γ_t	=	130 pounds per cubic foot
ANGLE OF INTERNAL FRICTION	ϕ	=	30 degrees
APPARENT COHESION	C	=	300 pounds per square foot

SLOPE SATURATED TO VERTICAL DEPTH Z BELOW SLOPE FACE

SEEPAGE FORCES PARALLEL TO SLOPE FACE

ANALYSIS :

$$FS = \frac{C + (\gamma_t - \gamma_w)\ Z\ cos^2\ i\ tan\ \phi}{\gamma_t\ Z\ sin\ i\ cos\ i} = 2.5$$

REFERENCES :

1.....Haefeli, R. *The Stability of Slopes Acted Upon by Parallel Seepage*, Proc. Second International Conference, SMFE, Rotterdam, 1948, 1, 57-62

2.....Skempton, A. W., and F.A. Delory, *Stability of Natural Slopes in London Clay*, Proc. Fourth International Conference, SMFE, London, 1957, 2, 378-81

SURFICIAL SLOPE STABILITY ANALYSIS

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CARROLL CANYON MATERIALS PLANT
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RM / AML		DSK/GTYPD	DATE 08 - 31 - 2017	PROJECT NO. G2070 - 42 - 01	FIG. 12

Plotted:08/30/2017 4:35PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2070-42-01 (Cantera)\DETAILS\Slope Stability Analyses-Surficial (SSSA).dwg

APPENDIX A

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 1 ELEV. (MSL.) 257' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry to damp, light brown to yellowish brown, Silty, fine to medium SAND; trace cobble			
2				SC	Loose to medium dense, damp to moist, brown to dark brown, Clayey SAND with 15-20% cobble up to 8-inches			
4								
6								
					TRENCH TERMINATED AT 7 FEET			

Figure A-1,
Log of Trench T 1, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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APPENDIX A

FIELD INVESTIGATION

Fieldwork for our investigation included subsurface exploration and soil sampling. The approximate locations of the exploratory borings and trenches are shown on the *Geologic Map,* Figure 2. We located the borings and trenches in the field based using existing site reference points. Therefore, actual boring and trench locations may deviate slightly.

We performed the field investigation between June 13 and July19, 2017. The exploration consisted of excavating 48 exploratory backhoe test pits, drilling and downhole logging of 10 large-diameter bucket auger borings, and drilling 4 small-diameter borings. The borings were drilled to depths up to 115 feet below the ground surface using a CME 95 drill rig with 8-inch, hollow-stem augers for the small-diameter borings and an EZ Bore bucket auger drill rig equipped with a 30-inch-diameter bucket for the large-diameter borings. The trenches were excavated using a John Deere 410 rubber-tire backhoe equipped with a 2-foot-wide bucket. We obtained bulk and ring samples from the exploratory borings and trenches for laboratory testing.

We obtained relatively undisturbed soil samples from the borings using a California Modified split-spoon sampler. The sampler has an inside diameter of 2.5 inches and an outside diameter of 2.875 inches. Up to 18 rings that are 2.4 inches in diameter and 1.0 inch in height are placed inside the sampler. Soil samples were collected by driving the sampler 12 to 18 inches into the bottom of the excavation using a 140 pound hammer on the small-diameter drill rig and with the weight of the drill rig Kelly bar (1,300 to 3,500 pounds) on the large-diameter drill rig. The number of blows required to drive the sampler 12 inches was recorded. The penetration resistances shown on the boring logs are shown in terms of blows per foot. These values are not to be taken as N-values. Ring samples were retained in moisture-tight containers and transported to our laboratory for testing. Bulk samples were also collected from the borings and trenches for laboratory testing. The type of sample is noted on the exploratory boring and trench logs.

We visually examined, classified and logged the soil conditions encountered in the borings in general accordance with American Society for Testing and Materials (ASTM) practice for Description and Identification of Soils (Visual-Manual Procedure D 2488). Logs of the exploratory borings and trenches are presented on Figures A-1 through A-62. The logs depict the soil and geologic conditions encountered and the depth at which samples were obtained. Elevations shown on the logs were based on existing elevations shown on topographic maps provided for our use.

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 2 ELEV. (MSL.) 254' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T2-1			SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, pale yellowish brown, Silty, fine to medium SAND; trace cobble, few small rootlets			
2				SC	Loose to medium dense, damp to moist, brown to dark brown, Clayey SAND with ±20% cobble up to 10-inches, and some organic debris			
4								
6								
8					TRENCH TERMINATED AT 8 FEET			

Figure A-2,
Log of Trench T 2, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 3 ELEV. (MSL.) 252' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T3-1			SM	**UNDOCUMENTED FILL (Qudf)** Loose, damp, pale yellowish brown to orange brown, Silty, fine to coarse SAND with abundant gravel and cobble up to 10-inches in diameter; trace organic debris and minor caving			
2								
4								
6								
8								
					TRENCH TERMINATED AT 9 FEET			

Figure A-3,
Log of Trench T 3, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 4 ELEV. (MSL.) 251' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry and damp, pale yellowish brown, Silty, fine to medium SAND with 15-20% cobble up to 8-inch in diameter; rootlets throughout			
2								
4				SM	Loose to medium dense, damp to moist, brown to dark brown, Silty, fine to medium SAND with clay; 5-10% cobble up to 6-inch in diameter			
6								
8								
				CL&SC	Stiff/loose to medium dense, moist, very dark brown and black, fine, Sandy CLAY and Clayey SAND; trace cobble			
					TRENCH TERMINATED AT 9 FEET			

Figure A-4,
Log of Trench T 4, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 5 ELEV. (MSL.) 253' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SC	**UNDOCUMENTED FILL (Qudf)** Loose, dry to damp, brown to yellowish brown, Clayey SAND with silt and <10% cobble up to 8-inches in diameter			
2								
4				CL	Stiff, moist, dark brown, fine, Sandy CLAY with cobble up to 8-inches in diameter			
6	T5-1							
8								
					TRENCH TERMINATED AT 9 FEET			

Figure A-5,
Log of Trench T 5, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 6 ELEV. (MSL.) 254' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose to very loose, dry, pale brown, Silty, fine to medium SAND with 20% cobble up to 10-inches in diameter; abundant rootlets			
2								
4				SM	Medium dense, damp, brown, Silty, fine to medium SAND; 10-15% cobble up to 6-inches in diameter			
6								
8				CL	Stiff, damp to moist, dark brown, Sandy CLAY; trace cobble up to 6-inches			
					TRENCH TERMINATED AT 8.5 FEET			

Figure A-6,
Log of Trench T 6, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL | ... STANDARD PENETRATION TEST | ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE | ... CHUNK SAMPLE | ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 7 ELEV. (MSL.) 252' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, light brown, Silty, fine SAND; 2-5% gravel up to 2-inches; abundant rootlets			
2								
4				SP	Loose to medium dense, damp, orange brown to reddish brown, fine to medium SAND with 10-20% cobble up to 12-inches in diameter			
6								
8					-Cobble content increases to 20-30% below 8 feet			
10								
12				SW	**STADIUM CONGLOMERATE (Tst)** Dense to very dense, damp, yellowish/orangish to orange brown, fine to medium SAND with cobble up to 10-inches; difficult trenching due to caving			
14					TRENCH TERMINATED AT 14 FEET			

Figure A-7,
Log of Trench T 7, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 8 ELEV. (MSL.) 246' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry to damp, light brown to grayish brown, Silty, fine to medium SAND with abundant cobble and boulders up to 38-inches; concrete debris also present			
2								
4								
6								
8								
10			▽		-Becomes moist to wet below 9 feet -Heavy seepage at 11 feet			
12				SW	**STADIUM CONGLOMERATE (Tst)** Dense, wet, orange brown to yellow/brown, medium SAND with cobble up to 10-inches			
					TRENCH TERMINATED AT 13 FEET			

Figure A-8,
Log of Trench T 8, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 9 ELEV. (MSL.) 321' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T9-1			SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry, pale yellowish brown, Silty, fine to medium SAND with <10% cobble up to 8-inches			
2								
4								
6	T9-2			SC	**COLLUVIUM (Qc)** Loose, moist to wet, black to dark brown, Clayey, fine to coarse SAND with cobble; caving on both sides			
8								
10								
12					-Becomes medium dense, damp to moist and brown to yellowish brown with cobble up to 10-inches in diameter below 12.5 feet			
14					TRENCH TERMINATED AT 14 FEET			

Figure A-9,
Log of Trench T 9, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 10 ELEV. (MSL.) 323' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				ML	**UNDOCUMENTED FILL (Qudf)** Loose, dry, pale grayish brown, Sandy SILT; trace gravel			
2				SC	Medium dense, damp, yellowish brown, Clayey SAND with cobble and some rootlets			
4								
6				SW/SP	**COLLUVIUM (Qc)** Loose, moist, black to dark brown, medium to coarse SAND with ±10% gravel and cobble up to 8-inches in diameter; some caving			
8								
10								
12								
14			▽		-Becomes wet with moderate seepage at 14 feet			
16								
					TRENCH TERMINATED AT 17 FEET			

Figure A-10,
Log of Trench T 10, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 11 ELEV. (MSL.) 325' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, pale brown, Silty SAND with gravel			
2	T-11			SM	**COMPACTED FILL (Qcf)** Medium dense, damp to moist, pale yellowish brown, Silty, fine SAND; trace cobble			
4				SM	Medium dense, damp to moist, yellowish brown to orange brown, Silty, fine to medium SAND with ±10-15% cobble up to 8-inches in diameter			
6								
8					-Concrete chunks at 7 feet			
10								
12								
14								
					TRENCH TERMINATED AT 15 FEET			

Figure A-11,
Log of Trench T 11, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 12 ELEV. (MSL.) 320' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry to damp, Silty, fine SAND with some cobble; several 24-36-inch boulders encountered; abundant roots			
4				SM	Medium dense, damp, brown to pale yellowish brown, Silty, fine to medium SAND with ±10% cobble up to 8-inches -Becomes moist at 11 feet			
14				SC	Medium dense, moist to wet, yellowish brown to orange brown, Clayey fine to medium SAND with ±15-20% cobble up to 10-inch in diameter			
16					TRENCH TERMINATED AT 16 FEET			

Figure A-12,
Log of Trench T 12, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

TRENCH T 13

ELEV. (MSL.) 316' DATE COMPLETED 06-13-2017

EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
				SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry, Silty, fine SAND; trace gravel up to 1-inch in diameter; shallow rootlets			
2								
				SC	**COMPACTED FILL (Qcf)** Medium dense to dense, damp to moist, yellowish brown to orange brown, Clayey, fine to coarse SAND with <10% gravel and cobble up to 4-inches			
4								
6	T13-1							
8								
10								
12								
14					TRENCH TERMINATED AT 14 FEET			

Figure A-13,
Log of Trench T 13, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 14 ELEV. (MSL.) 306' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry, pale grayish brown to brown, Silty, fine SAND; trace gravel			
2								
4				SC	**COMPACTED FILL (Qcf)** Medium dense to dense, damp to moist, orange brown, Clayey, fine to medium SAND with ±10% cobble up to 6-inches in diameter but mostly <1-inch in diameter			
6								
8								
10								
12					TRENCH TERMINATED AT 12 FEET			

Figure A-14,
Log of Trench T 14, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 15 ELEV. (MSL.) 375' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**COLLUVIUM (Qc)** Loose, dry, pale brown, Silty, fine SAND; some gravel and cobble			
2								
				SC	Medium dense, damp to moist, brown to dark brown and grayish brown, Clayey SAND with cobble up to 10-inches in diameter			
4								
6								
8				SW	**STADIUM CONGLOMERATE (Tst)** Very dense, damp, mottled grayish brown to orange brown, medium to coarse SANDSTONE with cobble up to 8-inches; moderately cemented			
					TRENCH TERMINATED AT 8 FEET			

Figure A-15,
Log of Trench T 15, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 16 ELEV. (MSL.) 384' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T16-1			SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, dry to damp, yellowish brown, Clayey, medium SAND; trace cobble up to 2-inches in diameter			
2								
4								
6								
					TRENCH TERMINATED AT 7 FEET			

Figure A-16,
Log of Trench T 16, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 17 ELEV. (MSL.) 386' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, damp, yellowish brown, Clayey SAND; trace cobble			
2								
4								
6					TRENCH TERMINATED AT 6 FEET			

Figure A-17,
Log of Trench T 17, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 18 ELEV. (MSL.) 288' DATE COMPLETED 06-13-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				GW	**STADIUM CONGLOMERATE (Tst)** Very dense, damp, fine to coarse, Sandy CONGLOMERATE; well cemented			
2					TRENCH TERMINATED AT 3 FEET			

Figure A-18,
Log of Trench T 18, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 19 ELEV. (MSL.) 282' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, pale yellow-brown, Silty, fine SAND; trace gavel			
2	T19-1			GP	Loose, damp to moist, brown to yellow brown, Sandy GRAVEL; 3/4-inch size			
4				SM	Medium dense, damp, orange-brown to whitish brown, Silty, fine to coarse SAND with 8-12% cobble up to 12-inches in diameter			
6								
8								
10				SW	Medium dense, damp, dark brown to gray to black, medium SAND with 10-15% cobble up to 12-inches			
12	T19-2							
14				SW	Medium dense, damp, to moist, dark brown to orange, medium to coarse SAND with ±15% cobble and boulders up to 18-inches in diameter			
16								
					TRENCH TERMINATED AT 17 FEET			

Figure A-19,
Log of Trench T 19, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 20 ELEV. (MSL.) 279' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Medium dense, damp, yellowish brown to orange brown, Silty, fine to coarse SAND; some clay and trace angular gravel			
2				GM	**STADIUM CONGLOMERATE (Tst)** Very dense, dry to damp, medium, Sandy CONGLOMERATE; well cemented; difficult excavation			
4					TRENCH TERMINATED AT 4 FEET			

Figure A-20,
Log of Trench T 20, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 21 ELEV. (MSL.) 273' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				GW	**UNDOCUMENTED FILL (Qudf)** Medium dense, dry, pale brown, Silty GRAVEL; 3/4-inch			
2				SP	Medium dense, damp to moist, orange brown, fine to medium SAND; trace angular gravel, concrete slag and scrap metal present			
4					REFUSAL AT 4.75 FEET ON CONCRETE			

Figure A-21,
Log of Trench T 21, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 22 ELEV. (MSL.) 274' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, dry to damp, orange brown, Clayey SAND with ±15% 3/4-inch gravel			
2				SC&SM	Medium dense, damp to moist, orange brown, Clayey, medium to coarse SAND to Silty SAND			
4	T22-1				-Concrete chunks at 5 feet			
6					REFUSAL AT 7 FEET ON CONCRETE			

Figure A-22,
Log of Trench T 22, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 23 ELEV. (MSL.) 273' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry to damp, Silty, fine to medium SAND with some gravel and cobble			
2				GM	**STADIUM CONGLOMERATE (Tst)** Very dense, damp, pale yellowish brown to gray brown, fine to medium, Sandy CONGLOMERATE; highly cemented			
4					TRENCH TERMINATED AT 5 FEET			

Figure A-23,
Log of Trench T 23, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 24 ELEV. (MSL.) 275' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SP	**UNDOCUMENTED FILL (Qudf)** Medium dense, dry to damp, gray to whitish gray, fine to medium SAND; trace silt and gravel			
2	T-24							
4								
					PRACTICAL REFUSAL AT 5 FEET			

Figure A-24,
Log of Trench T 24, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 25 ELEV. (MSL.) 283' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, damp to moist, orange brown, Clayey SAND with gravel and trace cobble <2-inches in diameter			
2								
4				SM&SC	Medium dense, moist, orange brown to whitish brown, Silty to Clayey, fine to medium SAND with 10% cobble up to 8-inches			
6								
8				GW	**STADIUM CONGLOMERATE (Tst)** Very dense, damp, whitish to yellowish brown, fine, Sandy CONGLOMERATE; highly cemented			
					TRENCH TERMINATED AT 8.5 FEET			

Figure A-25,
Log of Trench T 25, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

TRENCH T 26

ELEV. (MSL.) 286' DATE COMPLETED 06-14-2017

EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, yellowish-white, Silty, fine SAND with gravel			
2				SC	Loose to medium dense, damp to moist, orange brown, Clayey, fine to coarse SAND with <15% cobble and boulders up to 14-inches in diameter			
4								
6								
8				CL	Medium dense, moist, black, Sandy CLAY with cobble			
10				SC	Medium dense, moist, orange brown to grayish brown, Clayey SAND with <12% cobble up to 8-inches			
12				SM	Medium dense, moist, orange brown, Silty, fine to coarse SAND with <10% cobble <6-inches			
14								
16	T26-1							
					TRENCH TERMINATED AT 17.5 FEET			

Figure A-26,
Log of Trench T 26, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 27 ELEV. (MSL.) 283' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				GM	**UNDOCUMENTED FILL (Qudf)** Loose, dry to damp, grayish brown to brown, fine to medium, Sandy GRAVEL with 40-50% cobble and boulders up to 15-inches in diameter			
2					-Caving below 3 feet; voids observed between cobbles			
4								
6								
8				SM	Medium dense, damp, orange brown to grayish brown, Silty, medium SAND with 15% cobble <12-inches			
					TRENCH TERMINATED AT 9 FEET			

Figure A-27,
Log of Trench T 27, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 28 ELEV. (MSL.) 273' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, damp to moist, orange brown, Silty, fine to coarse SAND with 15% cobble and boulders up to <18-inches diameter and angular pointed tile fragments present			
2								
4								
6				GM	**STADIUM CONGLOMERATE (Tst)** Very dense, damp, orange brown, fine to coarse, Sandy CONGLOMERATE; moderately cemented			
					TRENCH TERMINATED AT 7 FEET			

Figure A-28,
Log of Trench T 28, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

TRENCH T 29

ELEV. (MSL.) 271' DATE COMPLETED 06-14-2017

EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, damp, orange brown, Clayey, medium to coarse SAND with 8% cobble, abundant trash, wood, plastic, rubber, metal and strong odor			
2								
4				SC	Medium dense, damp, dark gray to grayish black, Clayey SAND with ±5% cobble up to <6-inches in diameter; moderate to strong odor; large stump/pole at 5.5 feet			
6								
8				CL	Stiff, moist, grayish brown to orange brown, Sandy CLAY with cobble			
10								
12	T29-1			SC	Medium dense, moist to wet dark reddish brown, Clayey SAND with 10% cobble up to <10-inches in diameter; slight odor -At 13 feet becomes brown to grayish brown			
14				SC	Medium dense, damp to moist, orange brown, Clayey SAND with ±10-12% cobble <10-inches in diameter			
					TRENCH TERMINATED AT 15.5 FEET			

Figure A-29,
Log of Trench T 29, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 30 ELEV. (MSL.) 270' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, gray to pale brown, Silty SAND with gravel			
2				SC	Medium dense, damp to moist, grayish brown to orange brown and black brown, Clayey, medium to coarse SAND with <12% cobble and boulders up to 14-inches in diameter			
4								
6								
8								
10								
12								
14				CL	Stiff, moist, dark brown to black, Sandy CLAY; with cobble and slight odor			
16								
					TRENCH TERMINATED AT 17 FEET			

Figure A-30,
Log of Trench T 30, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 31 ELEV. (MSL.) 269' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				GM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry, gray, Silty GRAVEL; 3/4" rock			
2				SC	Medium dense, damp, orange brown to grayish brown, Clayey, fine to medium SAND with 12% cobble up to 10-inches in diameter			
4								
6								
8					-Becomes black to very dark gray with organic debris; strong odor			
10								
12					-At 11 feet becomes moist to wet with 4-6-inch wood fragments			
14					-At 13 feet 3/4-inch gravel observed			
16			▽		-At 15 feet becomes wet with light seepage in sidewall			
				CL	Medium dense, wet, greenish gray, Sandy CLAY with cobble; slight odor			
					TRENCH TERMINATED AT 17 FEET			

Figure A-31,
Log of Trench T 31, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 32 ELEV. (MSL.) 268' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, whitish gray, Silty, fine SAND with gravel; 3/4" rock			
2				SC	Medium dense, damp, orange brown to brown, Clayey, fine to coarse SAND with <10% cobble up to 8-inches in diameter			
4				SC	Medium dense, damp, black to dark brown, Clayey SAND with cobble up to 6-inches in diameter			
6					-At 7 feet 1-inch electrical conduit observed			
8				SC	Medium dense, damp to moist, brown to orange brown, Clayey, fine to coarse SAND with <10% cobble up to 6-inches in diameter			
10								
12								
14					-At 13 feet, 20-inch concrete chunk present -At 14 feet, asphalt and concrete chunks present			
16					TRENCH TERMINATED AT 16 FEET			

Figure A-32,
Log of Trench T 32, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 33 ELEV. (MSL.) 263' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, grayish white, Silty, fine SAND with 3/4" gravel			
2				SC	Loose to medium dense, damp to moist, orange brown, Clayey, medium to coarse SAND; with some 3/4" gravel and trace cobble			
4								
6	T33-1							
8								
10				CL	**ALLUVIUM (Qal)** Soft, moist to wet, dark brown, Sandy, CLAY; with <8% cobble up to 6-inches in diameter			
12			▽		-At 12 feet light to moderate seepage			
			▼		-At 13 feet heavy seepage and standing water			
14					TRENCH TERMINATED AT 14 FEET			

Figure A-33,
Log of Trench T 33, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 34 ELEV. (MSL.) 266' DATE COMPLETED 06-14-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, light gray, Silty, fine SAND with gravel			
2								
4	T34-1			ML	**ALLUVIUM (Qal)** Stiff, dry to damp, brown to reddish brown, Sandy SILT; few cobble <8-inches in diameter and concrete chunks			
6								
8					-Becomes soft with 10-25% cobble at 8 feet			
10				SM	Loose, dry, brown to grayish brown, Silty, fine SAND with some cobble up to 12-inches; trench collapsed during excavation			
12					TRENCH TERMINATED AT 12 FEET DUE TO CAVING			

Figure A-34,
Log of Trench T 34, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL | ... STANDARD PENETRATION TEST | ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE | ... CHUNK SAMPLE | ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 35 ELEV. (MSL.) 269' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry, grayish white, Silty, fine SAND with gravel			
2				SC	Medium dense, dry to damp, brown to grayish brown, Clayey, fine to coarse SAND with <10% cobble up to 10-inches in diameter			
4								
6								
8								
10				SM	Medium dense, moist to wet, brown, Silty, medium to coarse SAND with <15% cobble up to 12-inches and trace clay			
12								
14								
16					TRENCH TERMINATED AT 16.5 FEET			

Figure A-35,
Log of Trench T 35, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 36 ELEV. (MSL.) 253' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry to moist, brown to pale yellowish brown, Silty, fine to medium SAND with few cobble up to 8-inches in diameter; asphalt and concrete debris present			
2								
4								
6				SM	**ALLUVIUM (Qal)** Loose, damp to wet, pale yellowish brown, Silty, fine to medium SAND with some cobble up to 14-inches in diameter; minor caving			
8								
10			▽		-Seepage at 10 feet			
				GM	**STADIUM CONGLOMERATE (Tst)** Dense, moist to wet, whitish brown to yellow brown, mottled, fine to coarse, Sandy CONGLOMERATE; trace silt; well cemented			
12			▼					
					TRENCH TERMINATED AT 13 FEET			

Figure A-36,
Log of Trench T 36, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 37 ELEV. (MSL.) 274' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Medium dense, damp, brown Silty, fine to medium SAND; trace clay and cobble <4-inches and 3/4" gravel			
2				SP	Medium dense, damp to moist, orange brown, medium to coarse SAND; trace clay and angular rock fragments with abundant concrete fragments; possible washout			
4								
6								
8					-1 foot lens of concrete debris at 8 feet			
10								
12					-At 12 feet becomes difficult to excavate			
14					PRACTICAL REFUSAL AT 14 FEET			

Figure A-37,
Log of Trench T 37, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 38 ELEV. (MSL.) 281' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, grayish white, Silty, fine SAND with gravel			
2				SC	**COMPACTED FILL (Qcf)** Medium dense, moist, orange-brown, Clayey, fine to coarse SAND; trace rock fragments			
4								
6								
8								
10								
12								
14								
16								
					TRENCH TERMINATED AT 17 FEET			

Figure A-38,
Log of Trench T 38, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

TRENCH T 39

ELEV. (MSL.) 275' DATE COMPLETED 06-15-2017

EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				ML	**UNDOCUMENTED FILL (Qudf)** Loose, dry, grayish white, Sandy SILT; few cobble up to 6-inches in diameter			
2				SC	Loose to medium dense, damp, brown to reddish brown, Clayey, medium to coarse SAND with 10-15% cobble up to 10-inches in diameter			
4								
6								
8				SC	Medium dense, damp to moist, grayish brown to brown, Clayey, fine to coarse SAND with some cobble up to 12-inches in diameter and trace boulders			
10								
12								
14								
16				SC	**ALLUVIUM (Qal)** Medium dense, damp to moist, orange brown, Clayey, medium to coarse SAND with some cobble up to 8-inches in diameter			
					TRENCH TERMINATED AT 17 FEET			

Figure A-39,
Log of Trench T 39, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 40 ELEV. (MSL.) 285' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, damp, grayish brown, Clayey, fine to medium SAND; trace gravel			
2				ML	Medium dense, moist, pale yellowish brown to yellow brown, fine, Sandy SILT; trace wood debris and roots			
4								
6								
8				SC	Medium dense, damp to moist, grayish brown, Clayey, fine to medium SAND; trace cobble and some roots			
10					-Becomes gray and moist at 10 feet			
12								
14				CH	Very soft, moist, blackish-gray, Silty, CLAY; abundant organic debris including buried palm tree			
16					-At 16 feet becomes wet			
18					TRENCH TERMINATED AT 18 FEET			

Figure A-40,
Log of Trench T 40, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 41 ELEV. (MSL.) 285' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, moist, orange brown, Clayey, fine to medium SAND; trace 1/2" gravel; some asphalt chunks and concrete chunks			
2								
4								
6					-At 5 feet extensive caving in bench sidewalls -At 6 feet roots and plant debris noted			
8					-At 7 feet moist to wet			
10				CH	Very soft, wet, brownish gray, plastic CLAY; abundant organics			
12					TRENCH TERMINATED AT 12 FEET DUE TO CAVING			

Figure A-41,
Log of Trench T 41, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 42 ELEV. (MSL.) 281' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, pale brown, Silty, fine to medium SAND; trace gravel and cobble up to 8-inches			
2				SC	Medium dense, damp to moist, Clayey SAND; few cobble up to 8-inches in diameter			
4								
6					-Concrete slab at 6 feet REFUSAL AT 6 FEET ON CONCRETE SLAB			

Figure A-42,
Log of Trench T 42, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 43 ELEV. (MSL.) 247' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, yellowish brown, Silty, fine SAND with wood and metal debris and trace cobble			
2				SC	**ALLUVIUM (Qal)** Medium dense, dry to damp, Clayey, fine to medium SAND; trace clay and few cobble up to 8-inches in diameter			
4					-At 5 feet becomes reddish brown and moist			
6								
8								
10				GM	**STADIUM CONGLOMERATE (Tst)** Dense, moist, whitish brown to yellow orange, fine to medium, Sandy CONGLOMERATE; moderately to well cemented with cobble and boulders up to 18-inches in diameter			
					TRENCH TERMINATED AT 10.5 FEET			

Figure A-43,
Log of Trench T 43, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 44 ELEV. (MSL.) 238' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry to damp, orange brown, Silty, fine to medium SAND; few cobble up to 14-inches with roots present in upper 2 feet			
2								
4								
6					-Becomes slightly clayey at 6 feet			
8								
10								
					TRENCH TERMINATE AT 11 FEET			

Figure A-44,
Log of Trench T 44, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 45 ELEV. (MSL.) 230' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SC	**UNDOCUMENTED FILL (Qudf)** Loose, moist, orange brown, Clayey, fine to medium SAND; trace gravel and cobble			
2								
4								
6								
					TRENCH TERMINATED AT 7 FEET			

Figure A-45,
Log of Trench T 45, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 48 ELEV. (MSL.) 259' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SC	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry to damp, Clayey, fine to medium SAND with trace cobble up to 6-inches			
2								
4								
6					TRENCH TERMINATED AT 6 FEET			

Figure A-48,
Log of Trench T 48, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING LB 1

ELEV. (MSL.) 326' DATE COMPLETED 06-26-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		ML	**UNDOCUMENTED FILL (Qudf)** Firm to stiff, damp, olive brown to light brown, Sandy SILT; ~10% gravel and cobble			
2						
4						
6	LB1-1		-Becomes very stiff and moist below 5 ft.	1		
8		SM	**COMPACTED FILL (Qcf)** Medium dense, moist, light brown, Silty, fine to medium SAND; 10-20% gravel and cobble; majority of rock 3"-6" diameter with trace boulders -24" concretion observed at 7 ft.			
10	LB1-2		-Gravel and cobble content increase to ~20% below 10 ft.	3		
12						
14			-Increases in moisture content; excavates with some 3/4" gravel and trace cobble			
16	LB1-3			4		
18		SM&SC	Medium dense, moist, brown to olive brown, Silty to Clayey, fine to medium SAND; some gravel 3/4" size; few ±6" cobble			
20	LB1-4			3	124.9	9.5
22			-Observed 6" thick dark brown, Clayey SAND lens at 21 feet			
24			-Becomes saturated below 24.5 ft.; constant seepage			
26	LB1-5		**STADIUM CONGLOMERATE (Tst)** Very dense, moist, mottled brown, olive brown and reddish brown, fine to medium, Sandy CONGLOMERATE	4		
28			-Standing water at 27.5 ft.			
30			BORING TERMINATED AT 30 FEET			

Figure A-49,
Log of Boring LB 1, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING LB 2

ELEV. (MSL.) 319' DATE COMPLETED 06-26-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				GM	**UNDOCUMENTED FILL (Qudf)** Medium dense, dry to damp, olive brown, Sandy GRAVEL; majority of rock 3/4"-1"			
2				SM	Medium dense, moist, olive brown, Silty, fine to medium SAND; 10-20% grave and cobble			
4								
6	LB2-1				-Becomes loose with ~20%-30% gravel ± 1" size and 10-15% cobble 8" to 10" size from 6 to 8 feet	4		
8					-Geotechnically logged to 8 ft. due to loose caving conditions			
10	LB2-2					4		
12				SM	**COMPACTED FILL (Qcf)** Medium dense, moist, brown to light brown, Silty, fine to medium SAND; ~20%-30% gravel and cobble			
14								
16	LB2-3					5	91.2	9.2
18								
20	LB2-4					5	108.1	14.7
22					-Increase in cobble content; ±12" size			
24								
26	LB2-5					3		8.9
28					-Becomes dark brown			
30	LB2-6					3	112.4	10.6
32								
34				SM&SC	**ALLUVIUM (Qal)** Medium dense, moist, to wet, mottled brown and grayish brown, Silty to			

Figure A-50,
Log of Boring LB 2, Page 1 of 2

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING LB 2** ELEV. (MSL.) **319'** DATE COMPLETED **06-26-2017** EQUIPMENT **BUCKET RIG** BY: **BORJA/REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
36					Clayey, fine to coarse SAND; ~20%-30% gravel and cobble; ±6"-10" size			
38								
40								
42			▼	GM	**STADIUM CONGLOMERATE (Tst)** Very dense, wet to saturated, yellowish brown to brown, fine to coarse, Sandy CONGLOMERATE			
	LB2-7				-Seepage at 42 feet	10/10"		
44					BORING TERMINATED AT 44 FEET			

Figure A-50,
Log of Boring LB 2, Page 2 of 2

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ■ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 46 ELEV. (MSL.) 297' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, pale yellowish brown, Silty, fine to coarse SAND; trace clay, cobble and gravel			
2				SC	Medium dense, damp to moist, orange brown, Clayey, medium to coarse SAND; trace gravel and cobble up to 6-inches			
4								
6					-At 7 feet becomes moist to wet			
8								
10								
12								
14				GW	**STADIUM CONGLOMERATE (Tst)** Dense, moist, grayish-white to orangish-white, Sandy CONGLOMERATE; weakly cemented			
					TRENCH TERMINATED AT 15 FEET			

Figure A-46,
Log of Trench T 46, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 47 ELEV. (MSL.) 270' DATE COMPLETED 06-15-2017 EQUIPMENT RUBBER TIRE BACKHOE BY: R. ADAMS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				GM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, brown to dark brown, Sandy GRAVEL with 40% gravel, cobble and boulders up to 18-inches in diameter			
2								
4								
6								
8								
10					-Caving at 10 feet limiting excavation progress			
12								
					TRENCH TERMINATED AT 13 FEET			

Figure A-47,
Log of Trench T 47, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING LB 3

ELEV. (MSL.) 304' DATE COMPLETED 06-26-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				GM	**UNDOCUMENTED FILL (Qudf)** Medium dense, dry to damp, light brown to brown, Sandy GRAVEL; ~±2" size gravel -Becomes moist and tan to brown with few cobble below 2 feet			
4				CL	**COMPACTED FILL (Qcf)** Medium dense, moist to very moist, Gravelly CLAY with 20%-30% gravel up to 1"			
8				SC	Medium dense, moist to very moist, Clayey, fine to coarse SAND; ~10%-15% gravel -Excavates with ~20% cobble ±6" size below 11 feet -Excavates with 5% cobble ±10" size below 12 feet			
14				SM	Medium dense, moist, brown, Silty, fine to medium SAND; ~10%-20% gravel and cobble; ±8" size -Increase in moisture contact; decrease in cobble and boulder content with low cohesion between 16-19 ft.			
30			▽	SC	Medium dense, moist to very moist, gray to grayish brown, Clayey, fine to coarse SAND; ~20% gravel and cobble; ±6" size			
32				SM	-Slight seepage at 30.5 ft.			
34				GM	**STADIUM CONGLOMERATE (Tst)** Dense, moist, mottled light brown and light green, Silty, fine to medium-grained SANDSTONE			

Figure A-51,
Log of Boring LB 3, Page 1 of 2

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING LB 3** ELEV. (MSL.) **304'** DATE COMPLETED **06-26-2017** EQUIPMENT **BUCKET RIG** BY: **BORJA/REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
36				GM	Very dense, wet, yellowish brown to brown, fine to coarse, Sandy CONGLOMERATE			
38								
40					BORING TERMINATED AT 40 FEET			

Figure A-51,
Log of Boring LB 3, Page 2 of 2

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING LB 4

ELEV. (MSL.) 283' DATE COMPLETED 06-28-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Medium dense, damp to moist, brown, Silty, fine to medium SAND; ~10%-15% gravel and cobble, ±4" size rock			
2								
4					-Becomes moist with a few cobbles ±6" size below 3 feet			
6				SC	Medium dense, moist, brown, Clayey, fine to medium SAND; ~20%-30% gravel and cobble ±6" size			
8					-Becomes fine to coarse and dark brown at 8 ft.			
10				SP	Medium dense, moist, light grayish brown, fine to coarse SAND; some silt; 10% gravel and cobble; trace asphalt chunks			
12				SM	Medium dense, moist, dark brown, Silty, fine to coarse SAND; few gravel and cobble; ±6"; trace asphalt chunks			
14				SC	Medium dense, moist, light brown, Clayey, fine to coarse SAND; ~10%-20% gravel and cobble; ±8" size			
16								
18				CL	Firm to stiff, moist, light gray to grayish brown and dark gray, Sandy CLAY; ~10%-20% gravel and cobble; ±6" in size			
20	LB4-1					3		
22				GM	**STADIUM CONGLOMERATE (Tst)** Dense to very dense, damp, brown to yellowish brown, fine to coarse, Sandy CONGLOMERATE			
24								
26	LB4-2					8/5"		
					BORING TERMINATED AT 26 FEET			

Figure A-52,
Log of Boring LB 4, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING LB 5

ELEV. (MSL.) 269' DATE COMPLETED 06-27-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				GM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry, light gray to light brown, Sandy GRAVEL; ~70%-80% ±2" gravel; clast supported			
2								
4					-Geotechnically logged to 4 feet due to unsafe conditions			
6								
8				CL	Stiff, moist to wet, dark brown to dark brown, Sandy CLAY; ~10%-20% gravel and cobble ±6" in size			
10					-Trace asphalt concrete present at 10 feet			
12				SM&SC	Medium dense, moist, brown, Silty to Clayey, fine to medium SAND; 10%-20% gravel and cobble ±6" size			
14				SM	Medium dense, moist, grayish brown to gray, Silty, fine to coarse SAND; ~10%-20% gravel and cobble ±6" size			
16	LB5-1			CL	**ALLUVIUM (Qal)** Stiff, moist, dark gray, Sandy CLAY; ~10% gravel and cobble ±6" size	5		
18				GM	**STADIUM CONGLOMERATE (Tst)** Dense, moist, brown to grayish brown, fine to coarse, Sandy CONGLOMERATE			
20	LB5-2					8		
					BORING TERMINATED AT 21 FEET			

Figure A-53,
Log of Boring LB 5, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING LB 6** ELEV. (MSL.) **268'** DATE COMPLETED **06-28-2017** EQUIPMENT **BUCKET RIG** BY: **BORJA/REIST**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, dry to damp, light brown, Silty, fine to medium SAND; 20% gravel and cobble ±6" size rock			
2								
4					-Becomes damp to moist below 3 feet -Becomes dark gray to grayish brown and black below 4 feet			
6								
8								
10					-Trace organics present at 10 feet			
12					-Slight odor at 12 feet with increase in organic content			
14								
16				SC	**ALLUVIUM (Qal)** Medium dense, moist, dark greenish gray to black, Clayey, fine to coarse SAND; 10%-20% gravel and cobble ±4" size rock			
18				CL	Medium dense, moist, dark gray to black, Sandy CLAY; 10% gravel and cobble			
20								
22			▼	SP	Medium dense, moist, dark gray to black, fine to coarse SAND; little silt; some gravel; trace cobble			
24				ML GM	Firm, wet to saturated, mottled yellowish brown, greenish gray and tan, Sandy to Clayey SILT; seepage at 23 feet **STADIUM CONGLOMERATE (Tst)** Dense, moist, brown, fine to coarse, Sandy CONGLOMERATE			
26					BORING TERMINATED AT 27 FEET			

Figure A-54,
Log of Boring LB 6, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ■ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING LB 7

ELEV. (MSL.) 321' DATE COMPLETED 06-27-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
				ML	**UNDOCUMENTED FILL (Qudf)** Firm to stiff, dry to damp, light brown, Sandy SILT; ~10%-20% gravel			
2				SM	Medium dense, moist, brown, Silty, fine to medium SAND; ~10%-20% gravel and cobble ±6" size			
4								
6	LB7-1					5		
8					-Trace asphalt concrete present at 8 feet			
10	LB7-2					2		
12								
14					-Geotechnically logged to 14 feet			
				SC	**COLLUVIUM (Qc)**			
16	LB7-3		▼		Loose to medium dense, saturated, dark gray to black, Clayey, fine to medium SAND; ~10%-20% gravel and cobble; hole belled to ~8' below contact	PUSH		
			▼		-Seepage at 15 feet			
18					-Standing water and caving at 17 feet			
20								
					BORING TERMINATED AT 21 FEET DUE TO CAVING CONDITIONS			

Figure A-55,
Log of Boring LB 7, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING LB 8

ELEV. (MSL.) 253' DATE COMPLETED 06-28-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		SM	**COMPACTED FILL (Qcf)** Medium dense, moist, tan to brown, Silty, fine to medium SAND; 10% gravel and cobble; little clay			
4		SC	Medium dense, moist, light brown, Clayey, fine to medium SAND; 10% gravel and cobble			
6	LB8-1		-Increase in moisture content below 7 feet	1		
8		SM	Medium dense, moist, light brown, Silty, fine to medium SAND; 10% cobble and gravel			
10	LB8-2			2		
12			-Becomes moist to wet below 12 feet			
14		CL	Firm to stiff, moist, tan brown, Sandy CLAY; 10% cobble and gravel; ±6" size; slight seepage at contact at 16 feet			
16	LB8-3			4		
18		CL	**ALLUVIUM (Qal)** Firm to stiff, moist, wet, black to dark gray, Sandy CLAY; 10%-20% gravel and cobble ±6" size; hole slightly belled between 17-20 feet			
20	LB8-4	GM	**STADIUM CONGLOMERATE (Tst)** Dense, moist, brown to grayish brown, fine to coarse, Sandy CONGLOMERATE	8		
22						
24	LB8-5		-Standing water at 25 feet	8		
26			BORING TERMINATED AT 26 FEET			

Figure A-56,
Log of Boring LB 8, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING LB 9

ELEV. (MSL.) 252' DATE COMPLETED 06-30-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
0				SM	**COMPACTED FILL (Qcf)** Medium dense, dry, light brown, Silty, fine to medium SAND; ~20%-30% gravel 3/8" to ±2" in diameter -Becomes moist and light brown with decrease in gravel content below 1.5 feet -Excavates with trace cobble ±3" in diameter			
6	LB9-1					2		
8					-Becomes brown with increase in moisture content below 8 ft.			
10	LB9-2					3		
14				SC	Medium dense, moist, Clayey, fine to medium SAND; little gravel and cobble up to ±6" in diameter			
16	LB9-3					4		
18				SM&ML	**ALLUVIUM (Qal)** Medium dense, moist to wet, mottled dark brown to brown and black, Silty, fine to medium SAND to Sandy SILT; ~5%-15% gravel and cobble up to ±6"			
20	LB9-4					3		
22			▼		-Seepage at 22 feet			
				ML	Stiff, moist to wet, dark gray to black, Sandy SILT; little gravel and cobble up to ±6"; interbedded with silty, fine to coarse sand; moderate caving and hole belled out below 22 ft.			
24				SM				
26	LB9-5				Medium dense, wet to saturated, dark gray to black, Silty, fine to coarse SAND; some gravel and cobble up to ±7"; few organics	2		
28				ML	Stiff, wet, dark gray, Sandy SILT; few gravel and cobble up to 10"			
30				GM	**STADIUM CONGLOMERATE (Tst)** Dense, saturated, brown to yellowish brown, fine to medium, Sandy CONGLOMERATE			
					BORING TERMINATED AT 30 FEET Geotechnically logged to 22 feet			

Figure A-57,
Log of Boring LB 9, Page 1 of 1

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING LB 10

ELEV. (MSL.) 295' DATE COMPLETED 06-30-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, brown to light brown, Gravely SAND			
2				SM&SC	**COMPACTED FILL (Qcf)** Medium dense, moist, tan brown, Silty to Clayey, fine to medium SAND; few gravel			
4				SM	Medium dense, moist, brown to tan, Silty, fine to medium SAND; trace gravel			
6	LB10-1					4		
8								
10	LB10-2			SC	Medium dense, moist, brown, Clayey, fine to medium SAND; few gravel	3		
12								
14								
16	LB10-3			SM	Medium dense, moist, brown, Silty, fine to medium SAND; trace gravel	4		
18								
20	LB10-4					5	125.0	13.1
22								
24								
26	LB10-5					6		
28								
30	LB10-6					7	105.1	9.2
32								
34								

G2070-42-01.GPJ

Figure A-58,
Log of Boring LB 10, Page 1 of 3

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING LB 10

ELEV. (MSL.) 295' DATE COMPLETED 06-30-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36	LB10-7			SM	-Slight increase in moisture below 35 ft.	3		
38								
40	LB10-8			SC	Medium dense, moist, brown, Clayey, fine to medium SAND; trace gravel	3	105.0	14.8
42								
44				SM	Medium dense, moist, brown to olive brown, Silty, fine to medium SAND; few gravel and trace asphalt concrete			
46	LB10-9					7		
48								
50	LB10-10					10	124.8	11.4
52					-Becomes light brown and light gray; little gravel and cobble up to 6" with 6" thick concrete lens at 51.5 ft.			
54								
56	LB10-11					10		
58				SM&SC	Medium dense, moist, tan brown, Silty and Clayey, fine to coarse SAND; trace gravel			
60	LB10-12			SM	Medium dense, moist, brown, Silty, fine to medium SAND: trace gravel and few clay	13	111.7	10.3
62								
64								
66	LB10-13					7		
68								

Figure A-58,
Log of Boring LB 10, Page 2 of 3

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
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- ... CHUNK SAMPLE
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GEOCON

PROJECT NO. G2070-42-01

BORING LB 10

ELEV. (MSL.) 295' DATE COMPLETED 06-30-2017

EQUIPMENT BUCKET RIG BY: BORJA/REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
70	LB10-14			CL	Very stiff, moist, black and dark gray, Sandy CLAY; some gravel and cobble ±4"; slight organic odor	15		12.8
72				SC	Medium dense, moist, mottled light brown and greenish gray, Clayey, fine to medium SAND; little gravel and cobble ±6"			
74			▼		-Increase in moisture content; becomes mottled brown, dark brown, and greenish gray; slight to moderate seepage at 74.5 ft.			
76	LB10-15					14		
78				CL	Very stiff, wet, mottled dark gray, dark brown, and greenish gray, Sandy CLAY; few gravel and cobble ±4"			
80	LB10-16				-Becomes mottled dark brown and dark reddish brown at 79 ft.	25	100.1	20.4
82					-Excavates with pockets of silty clay; slightly odorous at 80.5 ft.			
84								
86	LB10-17				-Becomes dark gray and black at 85 ft.	15		
88			▼	GM/GC	**STADIUM CONGLOMERATE (Tst)** Very dense, moist to wet, mottled light brown and greenish gray, Sandy CLAY CONGLOMERATE; hole belled out below contact -Standing water at 89 feet			
90	LB10-18					25/3"		
					BORING TERMINATED AT 90.5 FEET Geotechnically logged to 87 feet			

Figure A-58,
Log of Boring LB 10, Page 3 of 3

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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PROJECT NO. G2070-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING SB 1 ELEV. (MSL.) 298' DATE COMPLETED 07-17-2017 EQUIPMENT CME 75 BY: G. CANNON MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, moist, dark olive brown, Clayey, fine to coarse SAND with gravel			
2								
4				SC	**COMPACTED FILL (Qcf)** Medium dense, moist, light olive, Clayey, fine to coarse SAND; trace gravel			
6								
8								
10	SB1-1					34		
12								
14								
16								
18								
20	SB1-2				-Becomes dense and dark yellowish brown below 20 feet	58	109.8	12.3
22								
24								
26								
28								

Figure A-59,
Log of Boring SB 1, Page 1 of 3

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING SB 1

ELEV. (MSL.) 298' DATE COMPLETED 07-17-2017

EQUIPMENT CME 75 BY: G. CANNON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	SB1-3			SC	-Becomes dense and olive brown below 30 feet	32	117.0	13.4
32								
34								
36								
38								
40	SB1-4				-Becomes dense and light yellowish brown below 40 feet	67	112.6	9.2
42								
44								
46								
48								
50	SB1-5					76/11"	116.5	10.3
52								
54								
56								
58								

Figure A-59,
Log of Boring SB 1, Page 2 of 3

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING SB 1

ELEV. (MSL.) 298' DATE COMPLETED 07-17-2017

EQUIPMENT CME 75 BY: G. CANNON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60	SB1-6			SC	-Becomes medium dense below 60 feet	37	115.9	10.3
62								
64								
66								
68								
70	SB1-7			SM	**STADIUM CONGLOMERATE (Tst)** Very dense, moist, mottled gray and red brown, Silty, fine SAND	50/3"		
72					-Cobble present at 72 feet -Refusal on cobble			
					BORING TERMINATED AT 73 FEET Groundwater not encountered			

Figure A-59,
Log of Boring SB 1, Page 3 of 3

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
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- ... CHUNK SAMPLE
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GEOCON

PROJECT NO. G2070-42-01

BORING SB 2

ELEV. (MSL.) 305' DATE COMPLETED 07-17-2017

EQUIPMENT CME 75 BY: G. CANNON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM/SC	**UNDOCUMENTED FILL (Qudf)** Loose to medium dense, damp, dark yellowish brown, Silty to Clayey, fine to coarse SAND with some gravel			
8				SC	**COMPACTED FILL (Qcf)** Dense to medium dense, moist, dark yellow brown, Clayey, fine to coarse SAND; some gravel			
10	SB2-1					64	119.2	10.0
20	SB2-2				-Becomes brown below 20 feet	84	113.9	9.0

Figure A-60,
Log of Boring SB 2, Page 1 of 4

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING SB 2

ELEV. (MSL.) 305' DATE COMPLETED 07-17-2017

EQUIPMENT CME 75 BY: G. CANNON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	SB2-3			SC		77	121.1	9.5
32								
34								
36								
38								
40	SB2-4				-Becomes very dense below 40 feet	92/10"	119.8	9.9
42								
44								
46								
48								
50	SB2-5				-Becomes medium dense below 50 feet	31	112.6	13.7
52								
54								
56								
58								

Figure A-60,
Log of Boring SB 2, Page 2 of 4

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING SB 2

ELEV. (MSL.) 305' DATE COMPLETED 07-17-2017

EQUIPMENT CME 75 BY: G. CANNON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60	SB2-6			SC		79	117.5	10.3
62								
64								
66								
68								
70	SB2-7					76	123.6	10.2
72								
74								
76								
78								
80								
82								
84	SB2-8					56	111.4	14.9
86								
88								

Figure A-60,
Log of Boring SB 2, Page 3 of 4

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2070-42-01

BORING SB 2

ELEV. (MSL.) 305' DATE COMPLETED 07-17-2017

EQUIPMENT CME 75 BY: G. CANNON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
90	SB2-9			SC	-No recovery	77		
	SB2-10					49		
92								
94								
	SB2-11		▼			88/8"		
96					-Groundwater encountered at 96 feet			
				GM	**STADIUM CONGLOMERATE (Tst)**			
98					Very dense, saturated, brown, fine to coarse, Sandy CONGLOMERATE; difficult drilling below 96.5 feet			
100	SB2-12					50/5"		
					BORING TERMINATED AT 100.5 FEET Groundwater encountered at 96 feet			

Figure A-60,
Log of Boring SB 2, Page 4 of 4

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

BORING SB 3

ELEV. (MSL.) 324' DATE COMPLETED 07-18-2017

EQUIPMENT CME 75 BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				GM	**UNDOCUMENTED FILL (Qudf)** Medium dense, damp, brown, Sandy GRAVEL; some silt			
4				SC	**COMPACTED FILL (Qcf)** Medium dense, moist, olive brown to brown, Clayey, fine to medium SAND; few gravel			
8				CL	Stiff, moist, olive brown to grayish brown, Sandy CLAY; trace			
10	SB3-1			SM	Medium dense, moist, mottled brown and light gray, Silty, fine to medium SAND; trace gravel	32		
12				CL	Stiff, moist, olive brown, Sandy CLAY; trace gravel; trace boulder at 14 feet			
14				SM	Medium dense, moist, grayish brown, Silty, fine to medium SAND; trace gravel			
18				SC	Medium dense, moist, olive brown to tan brown, Clayey, fine to medium SAND; few gravel			
20	SB3-2			SM	Medium dense, moist, tan brown, Silty, fine to medium SAND; fine gravel	45	119.0	10.5
24					-Becomes olive brown to grayish brown			
28								

Figure A-61,
Log of Boring SB 3, Page 1 of 4

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

BORING SB 3

ELEV. (MSL.) 324' DATE COMPLETED 07-18-2017

EQUIPMENT CME 75 BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	SB3-3			SM	-Becomes brown; few gravel	66	118.4	11.1
32								
34								
36								
38								
40	SB3-4				-Becomes very dense	82	119.0	12.5
42								
44								
46								
48				SC	Dense, moist, brown, Clayey, fine to medium SAND; trace gravel			
50	SB3-5					60	119.1	13.5
52								
54								
56								
58								

Figure A-61,
Log of Boring SB 3, Page 2 of 4

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

BORING SB 3

ELEV. (MSL.) 324' DATE COMPLETED 07-18-2017

EQUIPMENT CME 75 BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60	SB3-6			SC		55	122.4	10.6
62								
64								
66								
68								
70								
72								
74								
76								
78				SM	Dense, moist, tan brown, Silty, fine to medium SAND; trace gravel			
80	SB3-7					66		
82								
84								
86								
88								

Figure A-61,
Log of Boring SB 3, Page 3 of 4

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

BORING SB 3

ELEV. (MSL.) 324' DATE COMPLETED 07-18-2017

EQUIPMENT CME 75 BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
90								
92								
94								
96								
98								
100	SB3-8					65	117.3	13.0
102								
104								
106	SB3-9					50/2"		
108								
110			▼		-Groundwater encountered at 110 feet			
112				GM	**STADIUM CONGLOMERATE (Tst)** Very dense, saturated, brown, fine to coarse, Sandy CONGLOMERATE			
114								
					BORING TERMINATED AT 115.5 FEET Groundwater encountered at 110 feet			

Figure A-61,
Log of Boring SB 3, Page 4 of 4

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

BORING SB 4

ELEV. (MSL.) 307' DATE COMPLETED 07-19-2017

EQUIPMENT CME 75 BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Medium dense, moist, tan brown, Silty, fine to medium SAND; few gravel			
8				SC	**COMPACTED FILL (Qcf)** Medium dense to dense, moist, brown, Clayey, fine to medium SAND; little gravel			
10	SB4-1					69	121.4	10.4
14				SM	Dense, moist, grayish brown to brown, Silty, fine to medium SAND; few gravel			
16				CL	Hard, moist, brown, Sandy CLAY; trace gravel			
20	SB4-2					50	116.3	11.4
26				SC	Dense, moist, brown to olive brown, Clayey, fine to medium SAND; few gravel			
28								

Figure A-62,
Log of Boring SB 4, Page 1 of 3

G2070-42-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

BORING SB 4

ELEV. (MSL.) 307' DATE COMPLETED 07-19-2017

EQUIPMENT CME 75 BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	SB4-3			SC	-Excavates with little gravel	57	110.2	10.9
32								
34				CL	Very stiff, moist, brown, Sandy CLAY			
36								
38				SM	Dense to very dense, moist, brown, Silty, fine to medium SAND; little gravel			
40	SB4-4					67/11"	125.6	8.2
42								
44								
46								
48								
50	SB4-5				-Poor recovery	50/5"		
52								
54								
56								
58								

Figure A-62,
Log of Boring SB 4, Page 2 of 3

G2070-42-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2070-42-01

BORING SB 4

ELEV. (MSL.) 307' DATE COMPLETED 07-19-2017

EQUIPMENT CME 75 BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60		SM				
62						
64						
66						
68		SC	Dense, moist to wet, brown, Clayey, fine to coarse SAND; little gravel			
70	SB4-6			49	111.4	10.8
72						
74						
76						
78						
80	SB4-7		-No recovery at 80 feet due to groundwater	22		
82						
84						
86		GM	**STADIUM CONGLOMERATE (Tst)** Very dense, saturated, brown, fine to coarse, Sandy CONGLOMERATE			
88	SB4-8			50/2"		
			BORING TERMINATED AT 88 FEET Groundwater encountered at 80 feet			

G2070-42-01.GPJ

Figure A-62,
Log of Boring SB 4, Page 3 of 3

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX B

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. We tested selected samples for their in-place dry density and moisture content, maximum dry density and optimum moisture content, expansion index, shear strength, water-soluble sulfate characteristics, chloride concentration, pH and resistivity, and consolidation characteristics. The results of our laboratory tests are presented in the following tables and graphs. The in-place dry density and moisture content test results are presented on the exploratory boring logs in Appendix A.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557

Proctor Curve No.	Source and Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
T16-1	Dark brown, Silty SAND with some gravel	135.3	7.6
T19-2	Dark brown, fine to coarse, Sandy GRAVEL with little clay	131.7	8.2
T29-1	Dark brown, Clayey, fine to coarse SAND	128.4	9.5

TABLE B-II
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	Expansion Classification
	Before Test	After Test			
T5-1	10.0	22.2	107.8	45	Low
T9-2	9.2	16.7	113.8	3	Very Low
T16-1	8.5	15.0	114.2	4	Very Low
T19-2	9.7	16.4	111.1	1	Very Low
T29-1	10.0	20.8	109.3	47	Low
T34-1	8.8	15.0	113.8	3	Very Low

TABLE B-III
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080

Sample No.	Dry Density (pcf)	Moisture Content (%)		Unit Cohesion (psf)	Angle of Shear Resistance-Ultimate (degrees)
		Initial	Final		
SB1-3	117.0	13.4	14.1	975	34
SB3-3	118.4	11.1	13.1	540	38
T16-1*	122.0	7.2	12.7	650	32
T29-1*	114.5	10.4	17.2	700	26

*Samples remolded to approximately 90 percent relative compaction near optimum moisture content.

TABLE B-IV
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE CALIFORNIA TEST NO. 417

Sample No.	Water-Soluble Sulfate (%)	Classification
T5-1	0.040	Negligible (S0)
T9-2	0.0003	Negligible (S0)
T16-1	0.025	Negligible (S0)
T19-2	0.015	Negligible (S0)
T29-1	0.022	Negligible (S0)
T34-1	0.001	Negligible (S0)

TABLE B-V
SUMMARY OF LABORATORY CHLORIDE ION CONTENT TEST RESULTS
AASHTO T 291

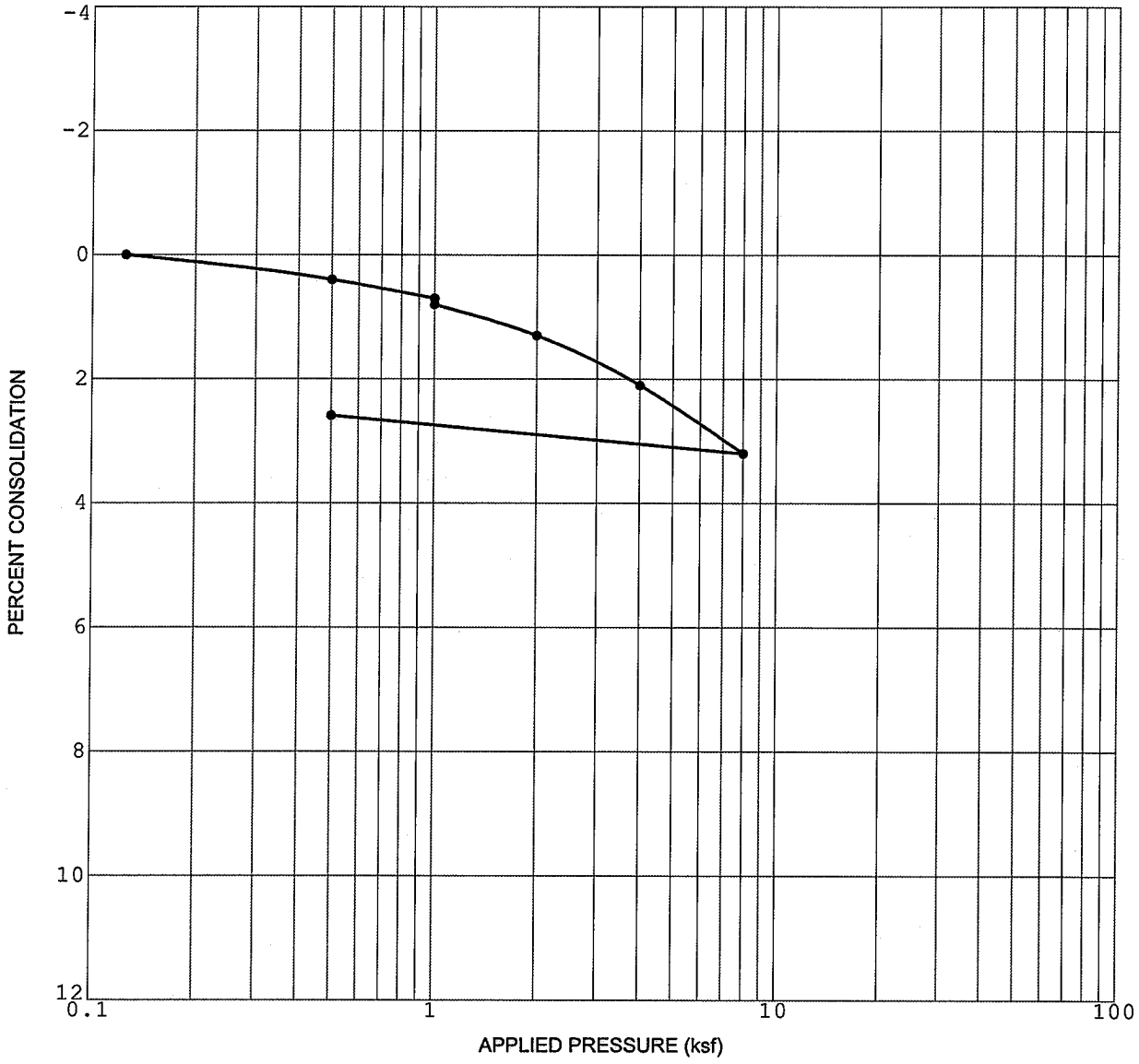
Sample No.	Chloride Ion Content (ppm)	Chloride Ion Content (%)
T5-1	1511	0.151
T29-1	520	0.052
T34-1	395	0.040

TABLE B-VI
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (PH) AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	pH	Resistivity (ohm-cm)
T5-1	7.4	300
T29-1	6.7	950

PROJECT NO. G2070-42-01

SAMPLE NO. LB1-4



Initial Dry Density (pcf)	124.9	**Initial Saturation (%)**	76.6
Initial Water Content (%)	9.5	**Sample Saturated at (ksf)**	1.0

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

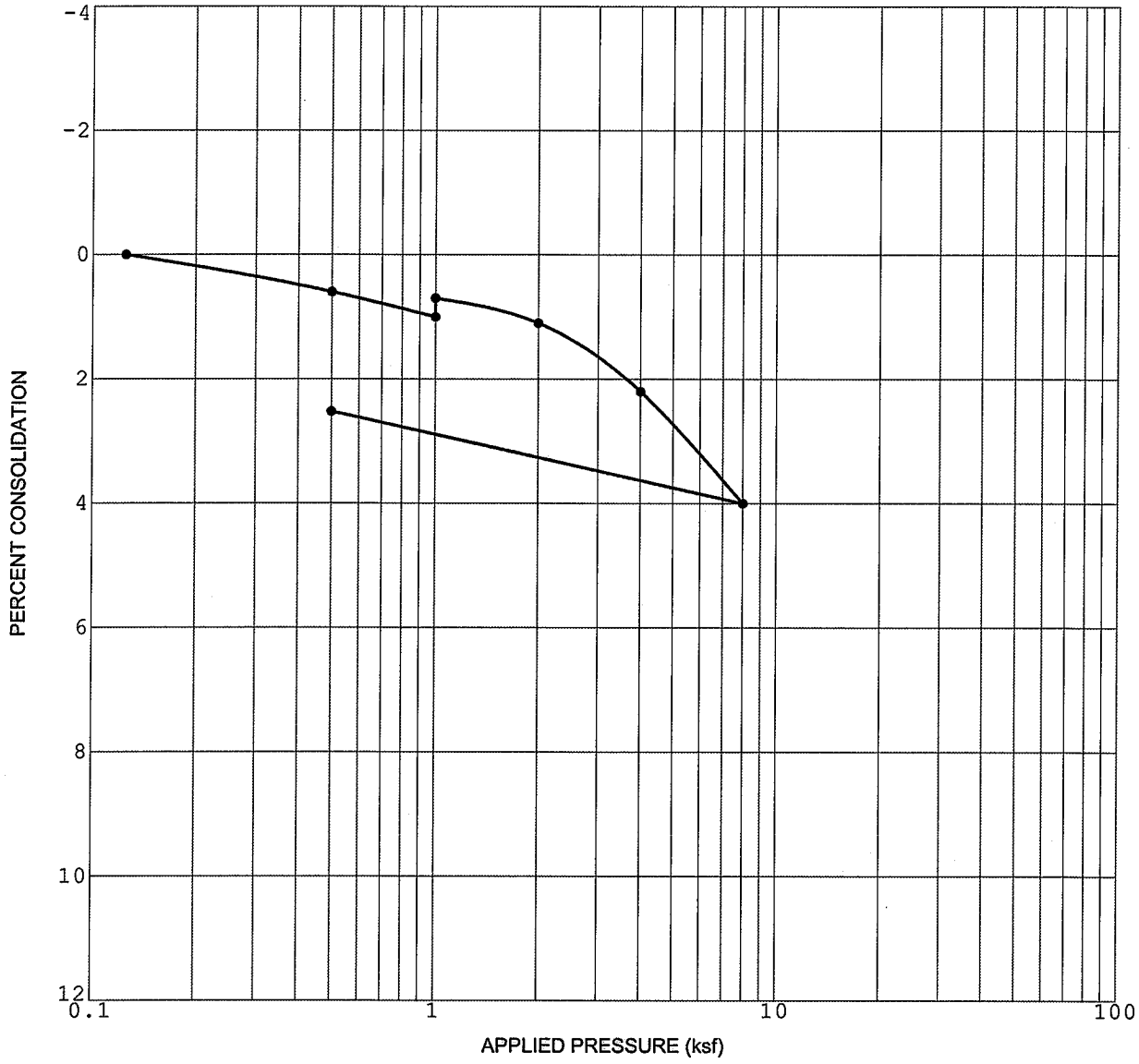
G2070-42-01.GPJ

Figure B-1

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. LB2-4



Initial Dry Density (pcf)	108.1
Initial Water Content (%)	14.7

Initial Saturation (%)	72.9
Sample Saturated at (ksf)	1.0

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

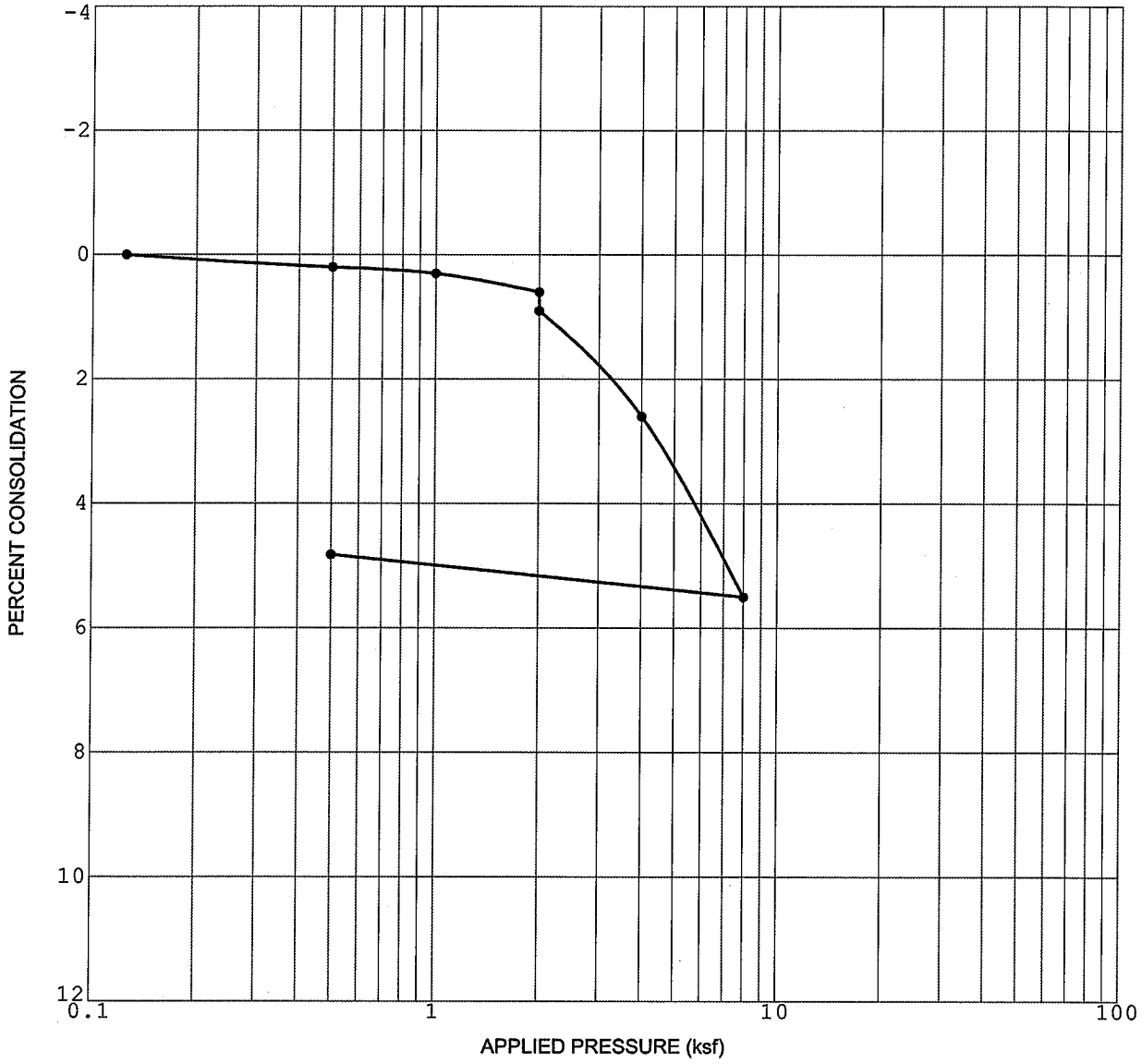
G2070-42-01.GPJ

Figure B-2

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. LB2-6



Initial Dry Density (pcf)	112.4	**Initial Saturation (%)**	59.1
Initial Water Content (%)	10.6	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

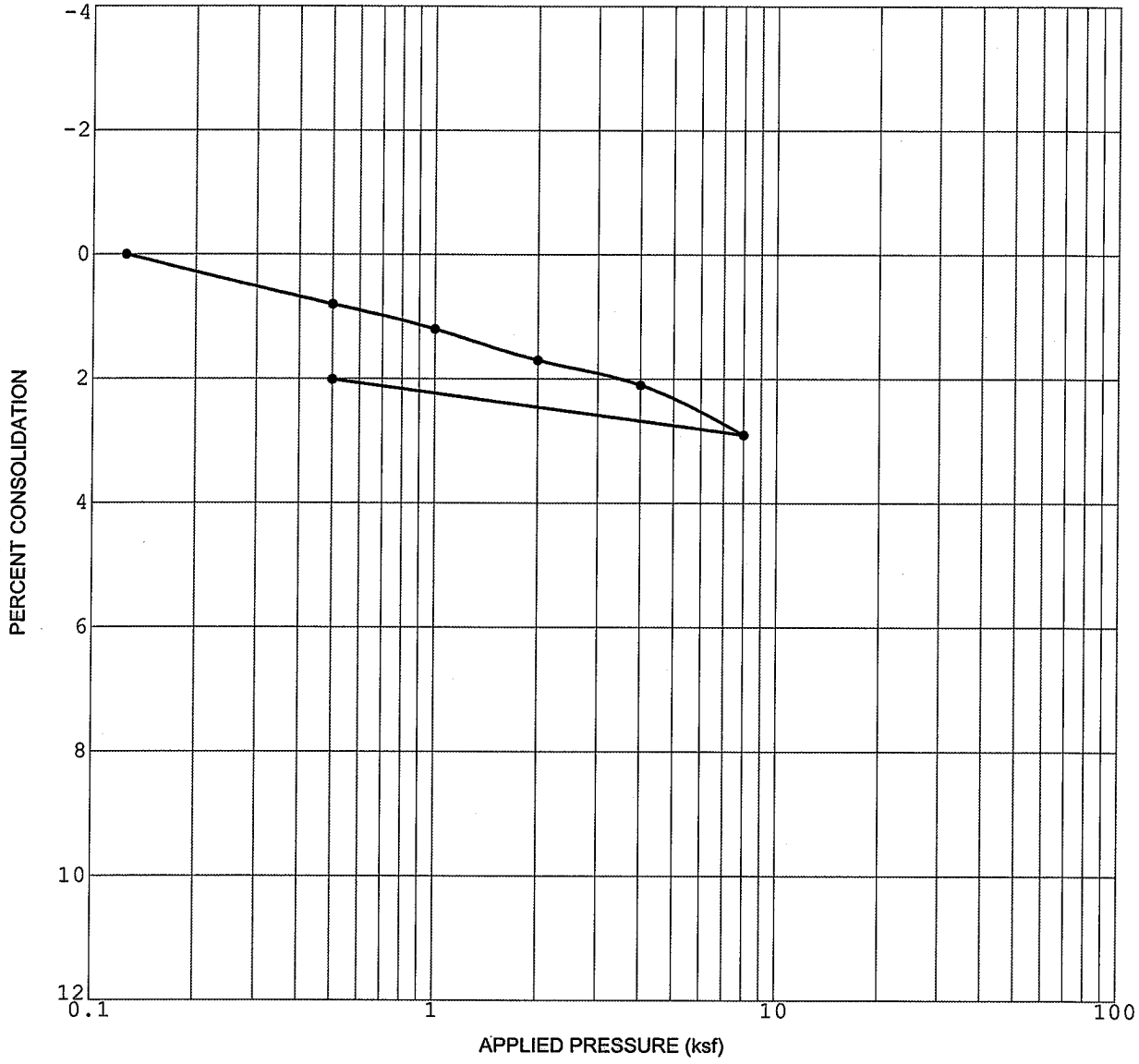
G2070-42-01.GPJ

Figure B-3

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. LB10-4



Initial Dry Density (pcf)	125.0
Initial Water Content (%)	13.1

Initial Saturation (%)	100
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

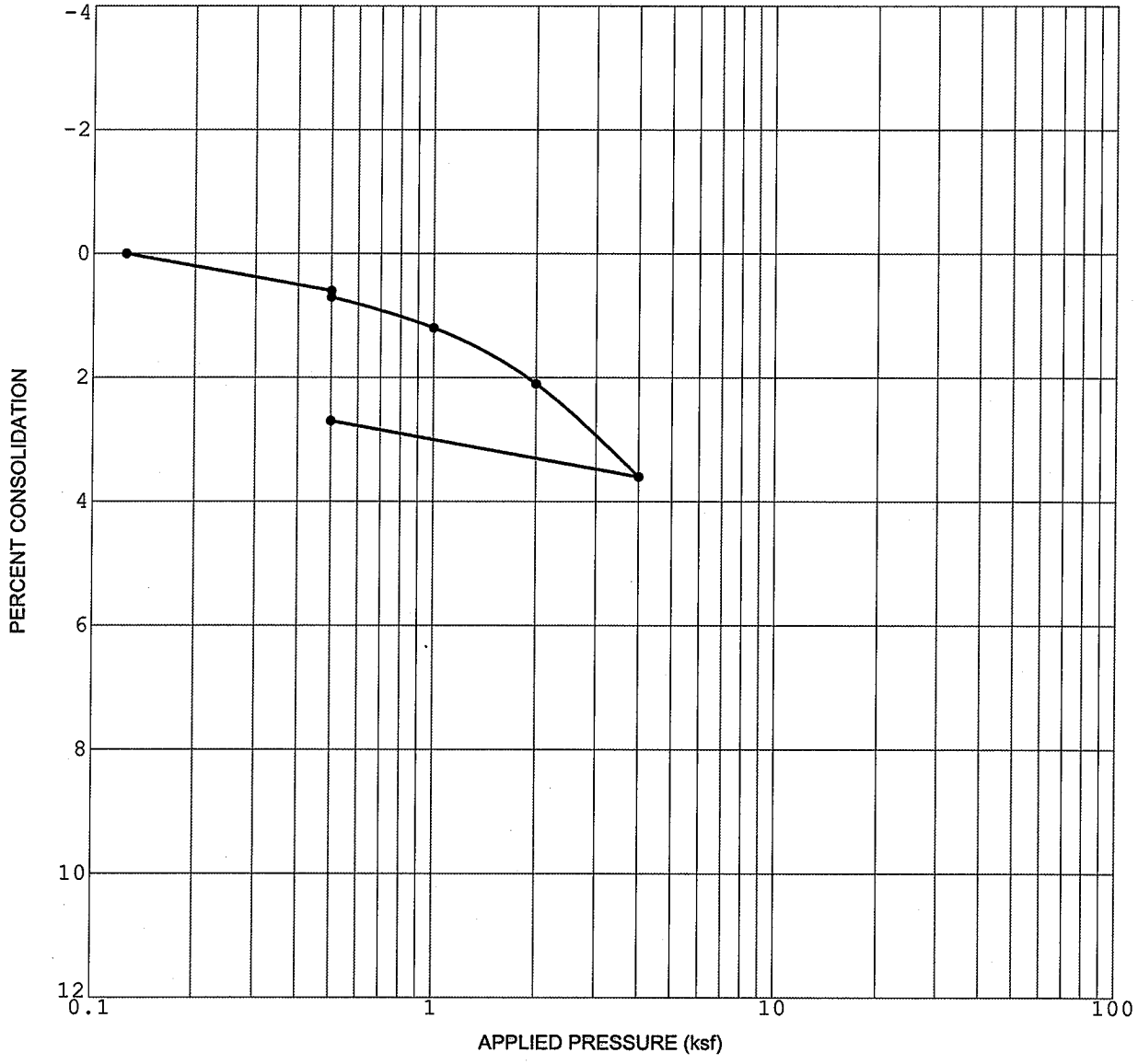
G2070-42-01.GPJ

Figure B-4

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. SB1-2



Initial Dry Density (pcf)	109.8	**Initial Saturation (%)**	71.3
Initial Water Content (%)	12.3	**Sample Saturated at (ksf)**	.5

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

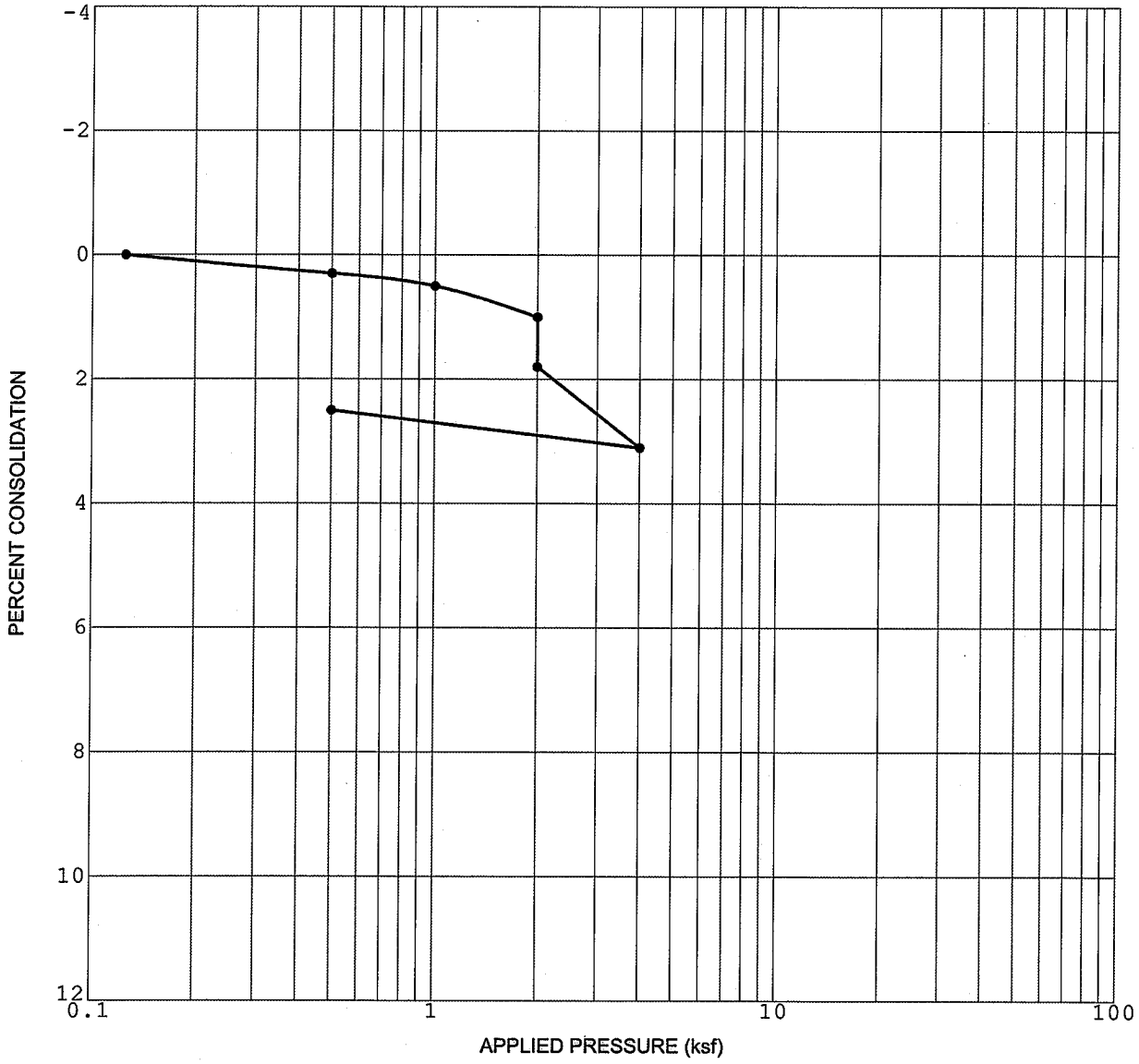
G2070-42-01.GPJ

Figure B-5

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. SB1-3



Initial Dry Density (pcf)	114.6
Initial Water Content (%)	10.4

Initial Saturation (%)	61.6
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

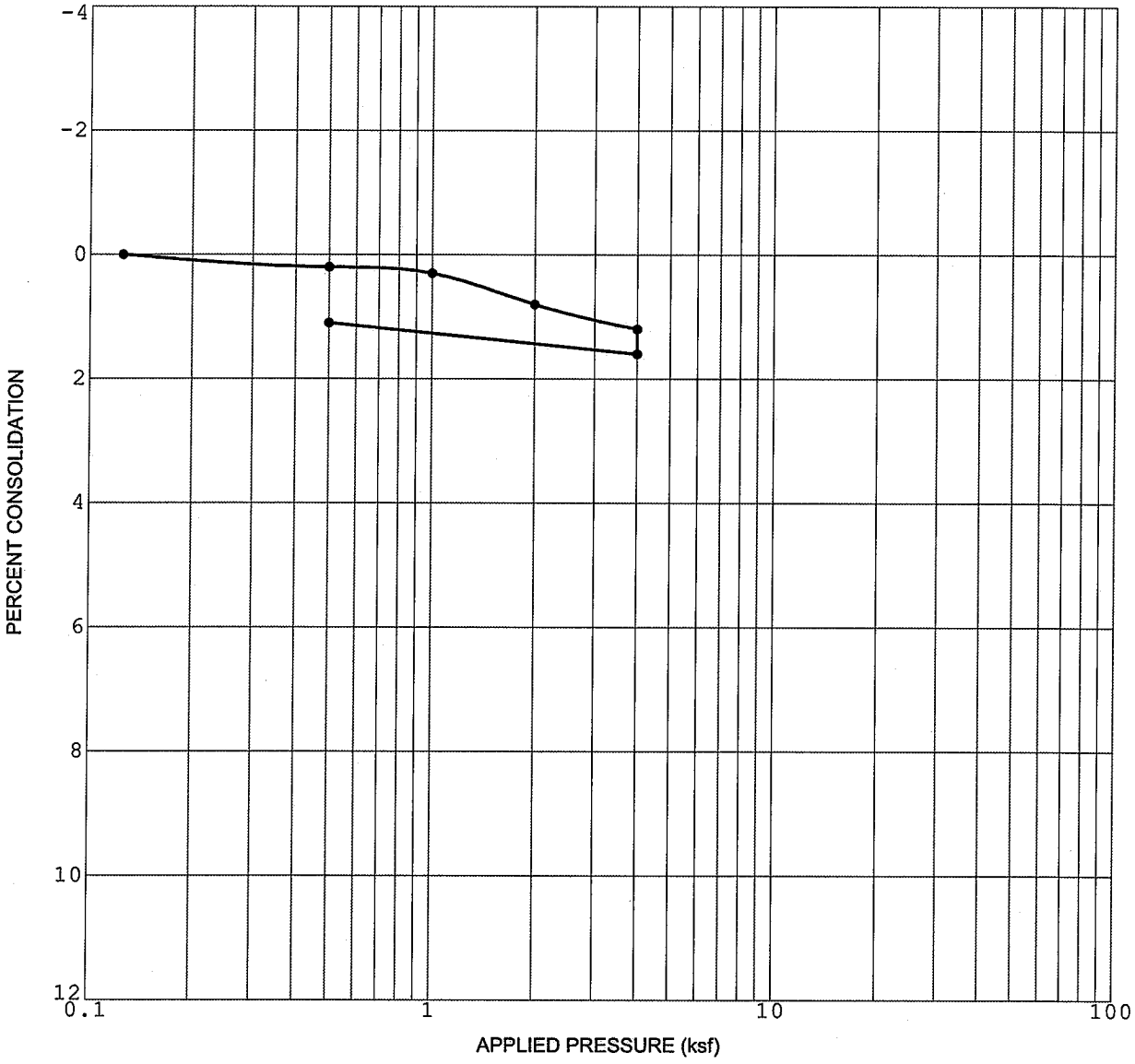
G2070-42-01.GPJ

Figure B-6

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. SB1-6



Initial Dry Density (pcf)	115.9	**Initial Saturation (%)**	63.6
Initial Water Content (%)	10.3	**Sample Saturated at (ksf)**	4.0

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

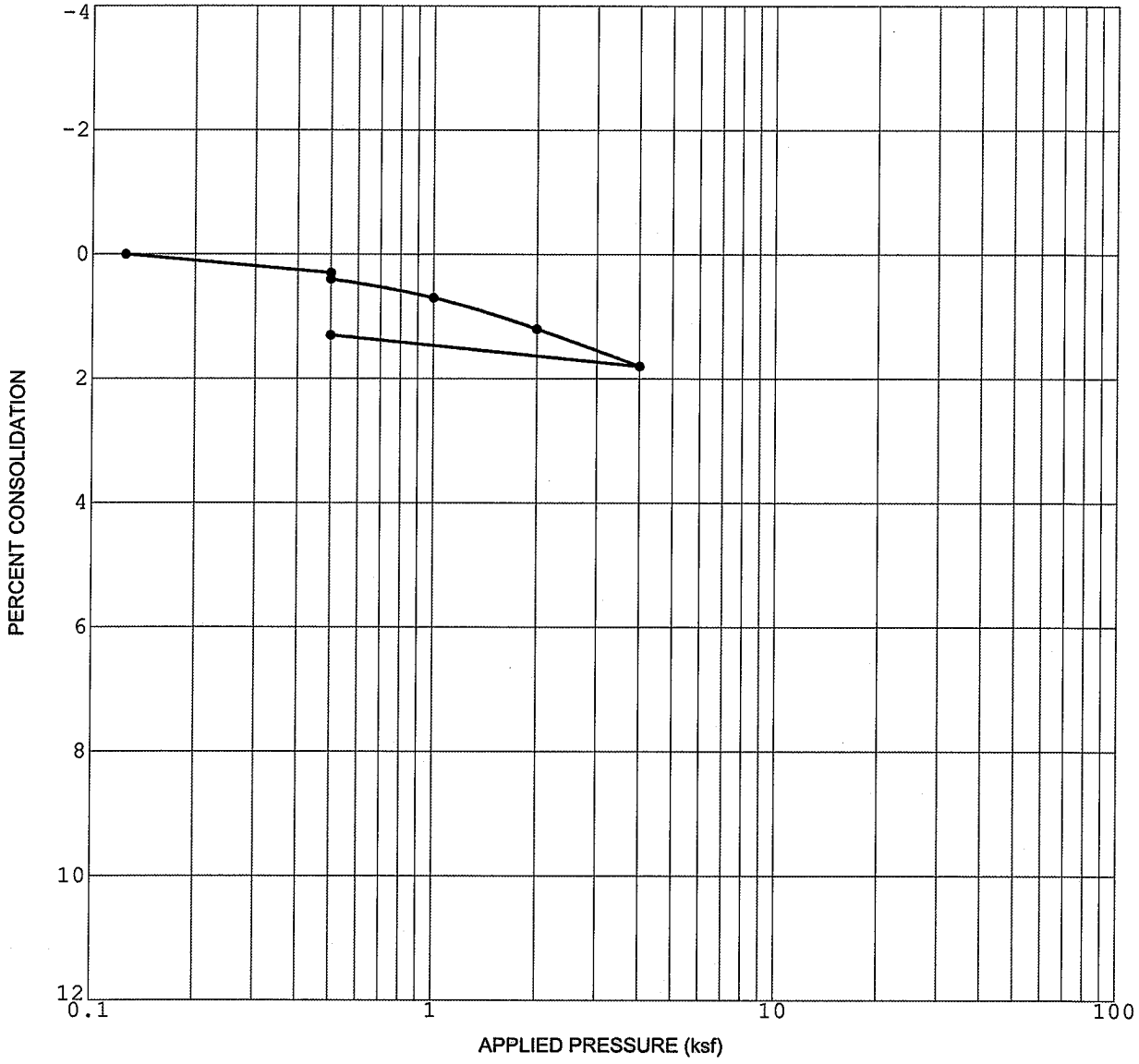
G2070-42-01.GPJ

Figure B-7

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. SB2-1



Initial Dry Density (pcf)	119.2	**Initial Saturation (%)**	67.7
Initial Water Content (%)	10.0	**Sample Saturated at (ksf)**	.5

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

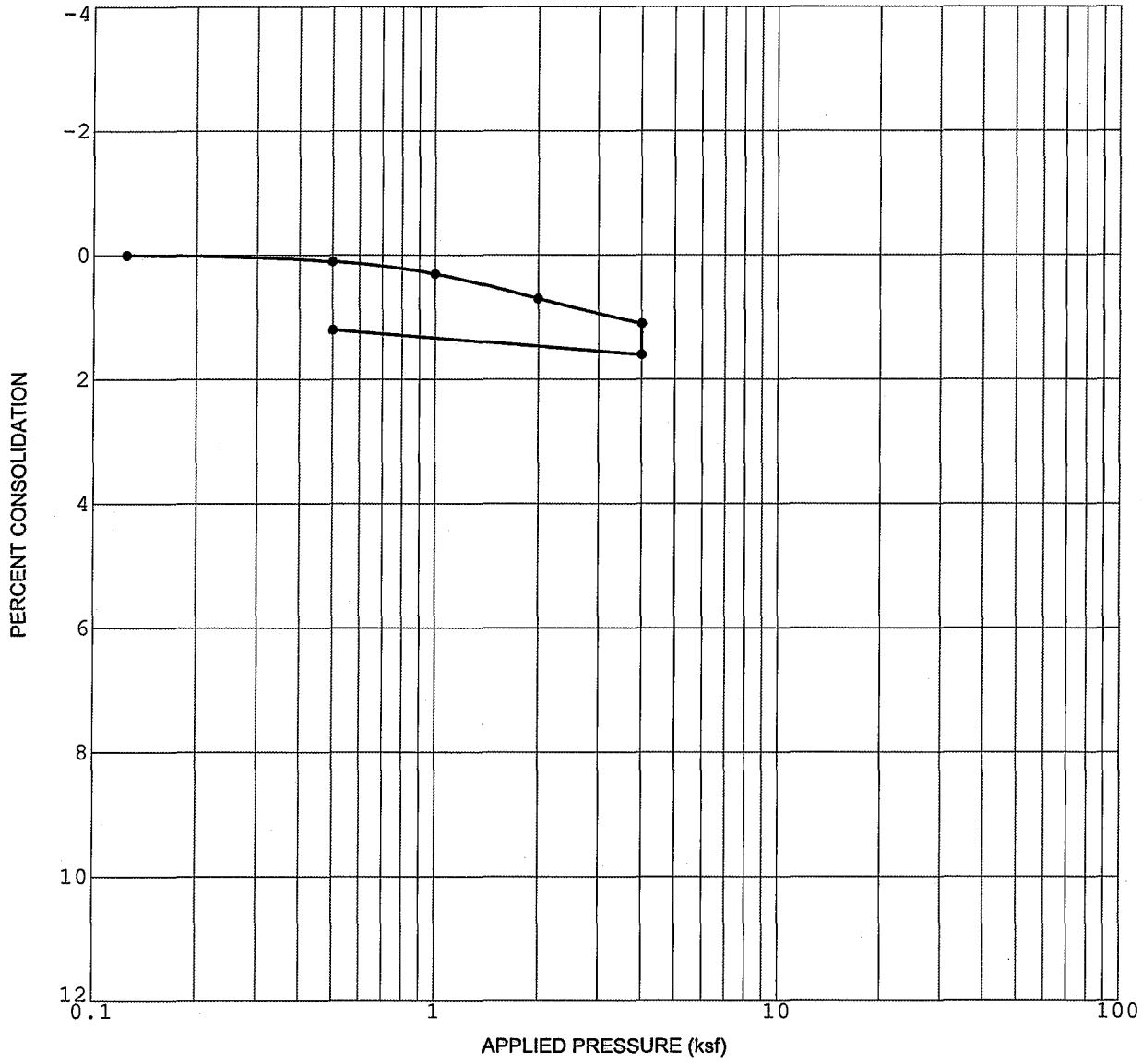
G2070-42-01.GPJ

Figure B-8

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. SB2-5



Initial Dry Density (pcf)	112.6	**Initial Saturation (%)**	76.9
Initial Water Content (%)	13.7	**Sample Saturated at (ksf)**	4.0

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

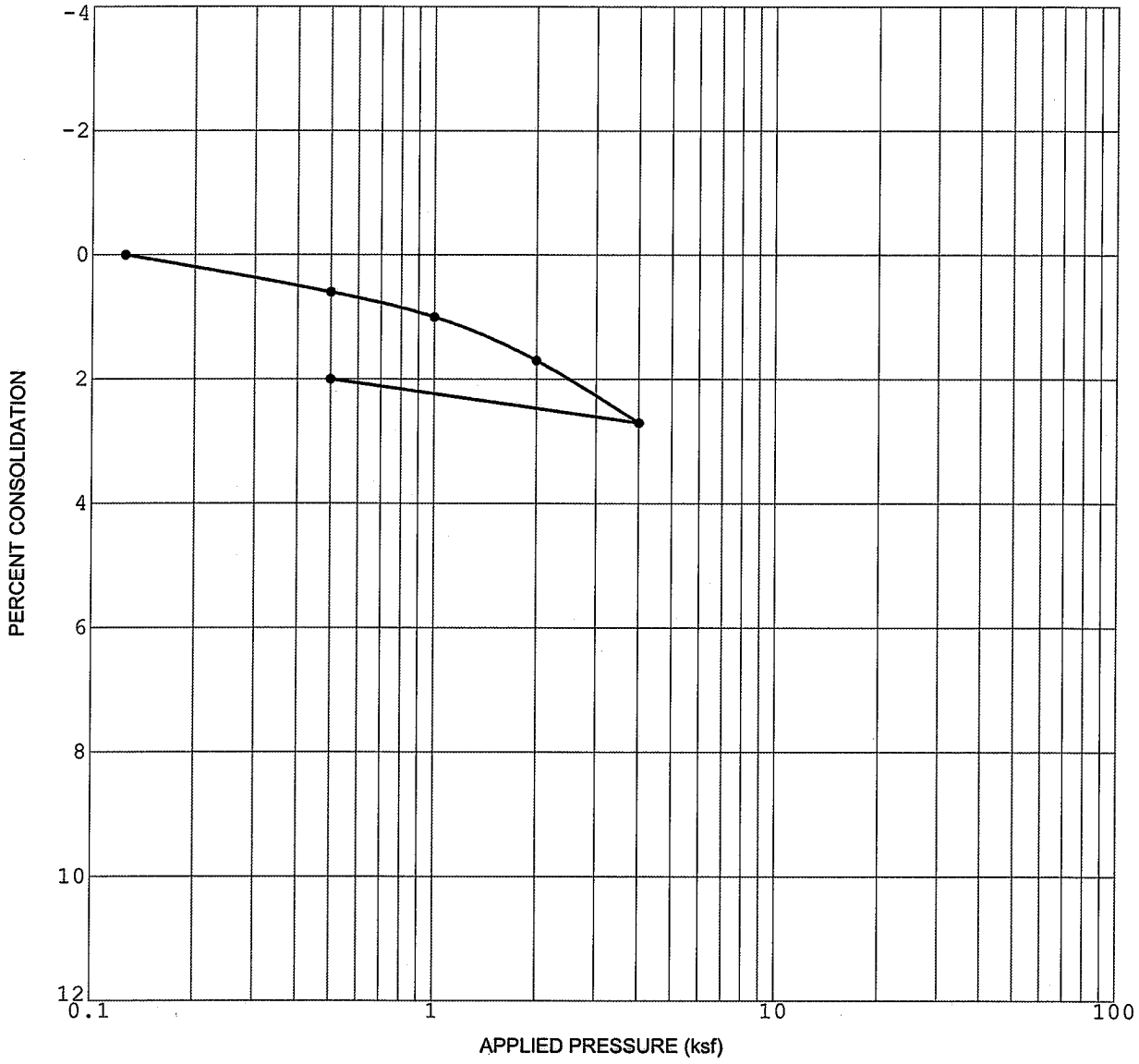
G2070-42-01.GPJ

Figure B-9

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. SB3-2



Initial Dry Density (pcf)	119.0
Initial Water Content (%)	10.5

Initial Saturation (%)	70.8
Sample Saturated at (ksf)	.5

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

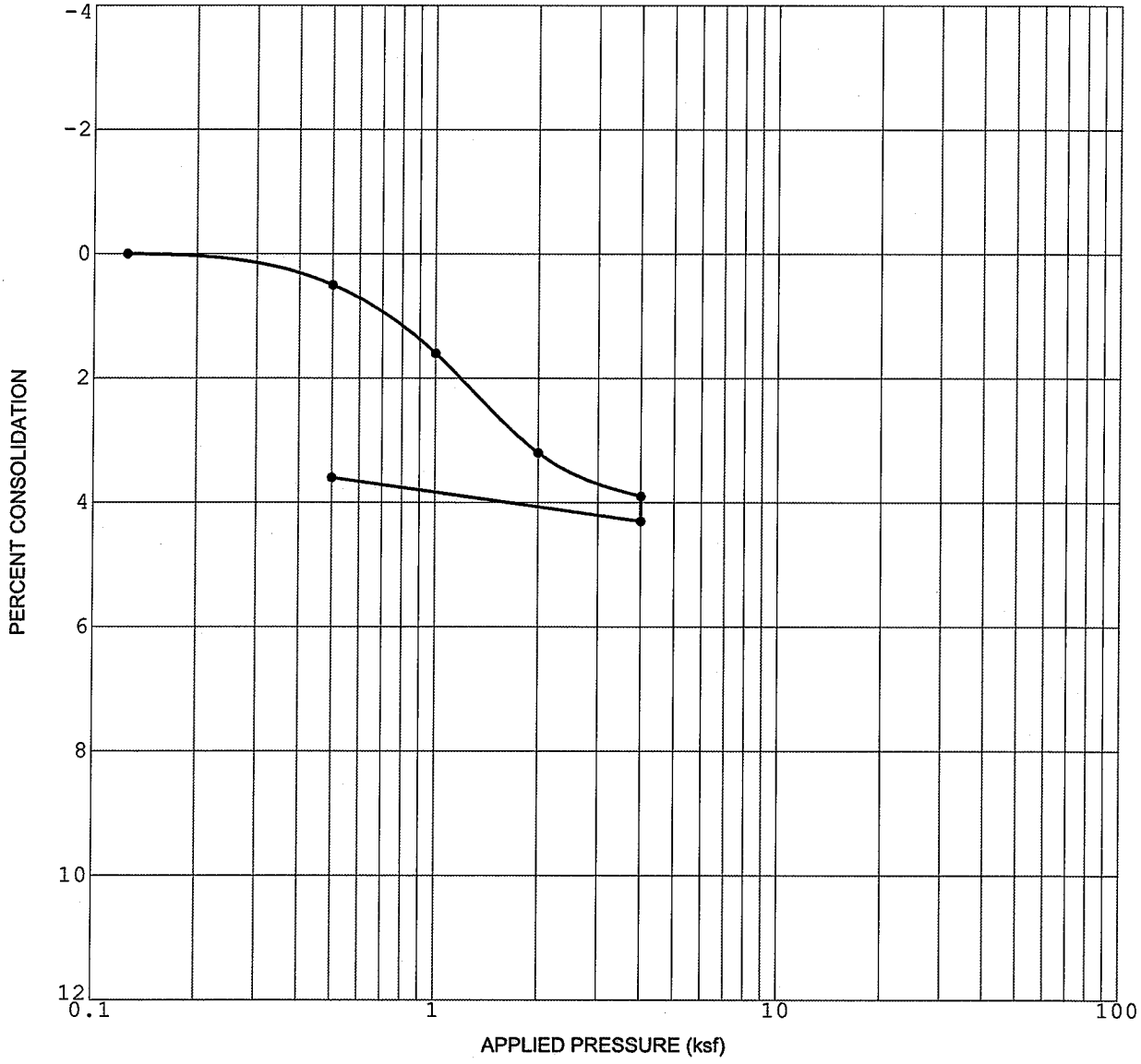
G2070-42-01.GPJ

Figure B-10

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. SB3-5



Initial Dry Density (pcf)	119.1	**Initial Saturation (%)**	91.6
Initial Water Content (%)	13.5	**Sample Saturated at (ksf)**	4.0

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

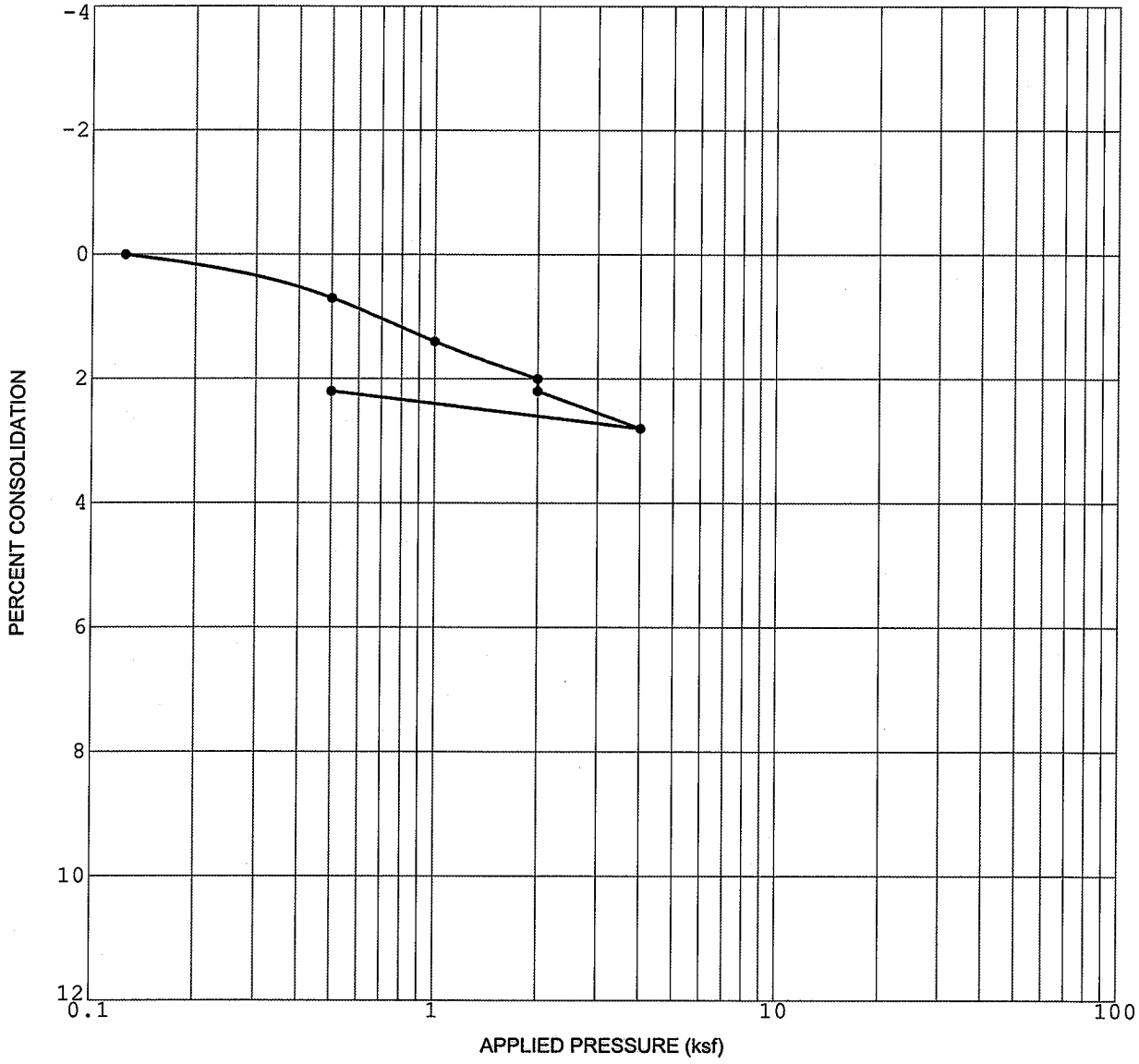
G2070-42-01.GPJ

Figure B-11

GEOCON

PROJECT NO. G2070-42-01

SAMPLE NO. SB4-1



Initial Dry Density (pcf)	121.4
Initial Water Content (%)	10.4

Initial Saturation (%)	75.1
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

HANSON CARROL CANYON

SAN DIEGO, CALIFORNIA

G2070-42-01.GPJ

Figure B-12

GEOCON

APPENDIX C

STORM WATER MANAGEMENT

We understand storm water management devices are being proposed in accordance with the current Storm Water Standards (SWS). If not properly constructed, there is a potential for distress to improvements and properties located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water to be detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeological study at the site. If infiltration of storm water runoff occurs, downstream properties and improvements may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of water infiltration.

Hydrologic Soil Group

The United States Department of Agriculture (USDA), Natural Resources Conservation Services, possesses general information regarding the existing soil conditions for areas within the United States. The USDA website also provides the Hydrologic Soil Group. Table C-1 presents the descriptions of the hydrologic soil groups.

TABLE C-1
HYDROLOGIC SOIL GROUP DEFINITIONS

Soil Group	Soil Group Definition
A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
B	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
C	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The property is underlain by undocumented fill, compacted fill, alluvium, colluvium, and the Stadium Conglomerate. Table C-2 presents the information from the USDA website for the subject property.

APPENDIX C

TABLE C-2
USDA WEB SOIL SURVEY – HYDROLOGIC SOIL GROUP

Map Unit Name	Map Unit Symbol	Approximate Percentage of Property	Hydrologic Soil Group
Altamont Clay, 15 to 30 percent slopes	AtE	0.2	C
Gravel Pits	GP	11.8	NA
Olivenhain cobbly loam, 2 to 9 percent slopes	OhC	3	D
Olivenhain cobbly loam, 9 to 30 percent slopes	OhE	5	D
Redding gravelly loam, 2 to 9 percent slopes	RdC	34	D
Redding cobbly loam, 9 to 30 percent slopes	RdE	10	D
Redding cobbly loam, dissected, 15 to 50 percent slopes	RfF	1	D
Riverwash	Rm	15	D
Terrace Escarpments	TeF	20	NA

Infiltration Testing

We performed in-place hydraulic conductivity tests to evaluate the infiltration characteristics of the bedrock geologic unit on the property (Stadium Conglomerate) using a Soilmoisture Corp Aardvark Permeameter. The tests were performed in 8-inch-diameter auger borings. The Geologic Map, Figure 2 shows the approximate locations of the infiltration tests. Table C-3 presents the results of the testing. The calculation sheets are also provided herein.

We used the guidelines presented in the Riverside County Low Impact Development BMP Design Handbook, which references the United States Bureau of Reclamation Well Permeameter Test Method (USBR 7300-89). Based on this widely-accepted guideline, the saturated hydraulic conductivity (Ksat) is equal to the infiltration rate.

The Ksat value determined from the Aardvark Permeameter test is the unfactored infiltration rate. The Ksat (infiltration rate) equation provided in the Riverside County Handbook was used to compute the unfactored infiltration rate.

TABLE C-3
UNFACTORED HYDRAULIC CONDUCTIVITY TEST RESULTS

Test No.	Geologic Unit	Infiltration Rate, I (inches/hour)	Factored* Field Infiltration Rate, I (inches/hour)
A-1	Tst	0.015	0.0075
A-2	Tst	0.006	0.003

*Factor of Safety of 2.0 for feasibility determination

STORM WATER MANAGEMENT CONCLUSIONS

Soil Types

Undocumented Fill (Qudf) – We encountered undocumented fill through the site. Recommendations are provided to remove the undocumented fill within structural improvement areas. In non-structural areas, the undocumented fill may be left in place. Infiltration should not occur within the undocumented fill due to the potential for adverse settlement. Undocumented fill is considered infeasible for full or partial infiltration.

Alluvium/Colluvium (Qal/Qc) – Alluvium is present within the creek drainages. Colluvium is present at the base and on the native slopes at the east end of the project. Recommendations are provided to remove replace alluvium and colluvium with compacted fill, therefore, alluvium and colluvium will not be present below proposed basins.

Compacted Fill (Qcf) – Compacted fill exists within several areas on the property. At the completion of grading, compacted fill will exist throughout the majority of the property. Compacted fill thickness up to 100 feet deep are expected. Infiltration should not occur within the compacted fill due to the potential for adverse settlement. Undocumented fill is considered infeasible for full or partial infiltration.

Stadium Conglomerate (Tst) – The Stadium Conglomerate is the underlying bedrock unit and exposed on the cut slopes along the perimeter of the property. The Stadium Conglomerate is very dense and cemented in many locations. The Stadium Conglomerate has very slow infiltration characteristics.

Groundwater Elevation

Groundwater was encountered in several borings within the southern portion of the property, which appears to be perched on the underlying Stadium Conglomerate.

Utilities and Structures

Existing utilities are present on the property. Many of the utilities will be abandoned to enable grading to be performed. Some utilities, including a trunk sewer main and electrical conduit will likely remain in place. Structures on the property will be removed during grading.

Soil or Groundwater Contamination

We are unaware of contaminated soil on the property. Therefore, full and partial infiltration associated with this risk is considered feasible.

Slopes

There are both ascending and descending slopes on the property. We recommend a 50-foot setback from the top of slopes. Basins within 50 feet of the top of slopes should be lined to prevent lateral water migration to the face of the slope.

Infiltration Rates

The results of the infiltration rates in the underlying bedrock of 0.006 to 0.015 inches per hour. The infiltration rates are not high enough to support full or partial infiltration.

Storm Water Management Devices

Because of the presence of undocumented fill, compacted fill, and the very low infiltration rates of the underlying Stadium Conglomerate bedrock, full and partial infiltration in considered infeasible and we recommend the basins be fully lined. The liner should be impermeable (e.g. High-density polyethylene, HDPE, with a thickness of about 30 mil or equivalent Polyvinyl Chloride, PVC). Penetration of the liner should be properly sealed. Drains should be incorporated in the basin to collect storm water runoff and transmit it to a suitable outlet structure. Overflow protection devices should also be incorporated into the design and construction of the basin.

Storm Water Standard Worksheets

The SWS requests the geotechnical engineer complete the *Categorization of Infiltration Feasibility Condition* (Worksheet C.4-1) worksheet information to help evaluate the potential for infiltration on the property. The attached Worksheet C.4-1 presents the completed information for the submittal process.

The regional storm water standards also have a worksheet (Worksheet Form D.5-1) that helps the project civil engineer estimate the factor of safety based on several factors. Table C-4 describes the suitability assessment input parameters related to the geotechnical engineering aspects for the factor of safety determination.

TABLE C-4
SUITABILITY ASSESSMENT RELATED CONSIDERATIONS FOR INFILTRATION FACILITY SAFETY FACTORS

Consideration	High Concern – 3 Points	Medium Concern – 2 Points	Low Concern – 1 Point
Assessment Methods	Use of soil survey maps or simple texture analysis to estimate short-term infiltration rates. Use of well permeameter or borehole methods without accompanying continuous boring log. Relatively sparse testing with direct infiltration methods	Use of well permeameter or borehole methods with accompanying continuous boring log. Direct measurement of infiltration area with localized infiltration measurement methods (e.g., Infiltrometer). Moderate spatial resolution	Direct measurement with localized (i.e. small-scale) infiltration testing methods at relatively high resolution or use of extensive test pit infiltration measurement methods.
Predominant Soil Texture	Silty and clayey soils with significant fines	Loamy soils	Granular to slightly loamy soils
Site Soil Variability	Highly variable soils indicated from site assessment or unknown variability	Soil boring/test pits indicate moderately homogenous soils	Soil boring/test pits indicate relatively homogenous soils
Depth to Groundwater/ Impervious Layer	<5 feet below facility bottom	5-15 feet below facility bottom	>15 feet below facility bottom

Based on our geotechnical investigation and the previous table, Table C-5 presents the estimated factor values for the evaluation of the factor of safety. This table only presents the suitability assessment safety factor (Part A) of the worksheet. The project civil engineer should evaluate the safety factor for design (Part B) and use the combined safety factor for the design infiltration rate.

TABLE C-5
FACTOR OF SAFETY WORKSHEET D.5-1 DESIGN VALUES[1]

Suitability Assessment Factor Category	Assigned Weight (w)	Factor Value (v)	Product (p = w x v)
Assessment Methods	0.25	2	0.50
Predominant Soil Texture	0.25	2	0.50
Site Soil Variability	0.25	2	0.50
Depth to Groundwater/Impervious Layer	0.25	2	0.55
Suitability Assessment Safety Factor, $S_A = \Sigma p$			2.0

[1] The project civil engineer should complete Worksheet D.5-1 using the data on this table. Additional information is required to evaluate the design factor of safety.

CONCLUSIONS

Our results indicate the underlying bedrock has very slow infiltration characteristics. Considering the presence of undocumented fill and relatively thick compacted fills, and the slow infiltration characteristics of the bedrock on the property, we recommend the basins utilize an impermeable liner.

GEOCON

Aardvark Permeameter Data Analysis

Project Name: THREE ROOTS
Project Number: G2070-42-01
Test Number: A-1

Date: 8/4/2017
By: N. BORJA

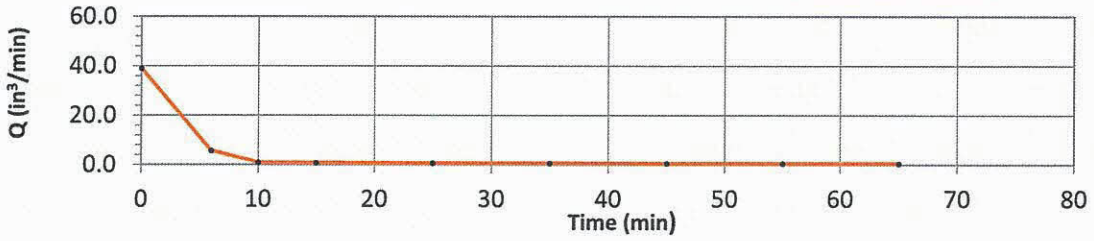
Borehole Diameter, d (in.):	8.00
Borehole Depth, **H** (in):	18.00
Distance Between Reservoir & Top of Borehole (in.):	30.50
Estimated Depth to Water Table, **S** (feet):	45.00
Height APM Raised from Bottom (in.):	2.00
Pressure Reducer Used:	No

Ref. EL (feet, MSL): 0.0
Bottom EL (feet, MSL): -1.5

Distance Between Resevoir and APM Float, **D** (in.):	39.25
Head Height Calculated, **h** (in.):	5.63
Head Height Measured, **h** (in.):	5.50
Distance Between Constant Head and Water Table, **L** (in.):	527.50

Reading	Time Elapsed (min)	Water Weight Consummed (lbs)	Water Volume Consummed (in^3)	Q (in^3/min)
1	0.00	0.000	0.00	0.00
2	6.00	8.445	233.86	38.977
3	4.00	0.825	22.85	5.712
4	5.00	0.170	4.71	0.942
5	10.00	0.270	7.48	0.748
6	10.00	0.235	6.51	0.651
7	10.00	0.225	6.23	0.623
8	10.00	0.205	5.68	0.568
9	10.00	0.205	5.68	0.568
10	10.00	0.200	5.54	0.554

Steady Flow Rate, Q (in^3/min): 0.563



Soil Matric Flux Potential, Φ_m

Φ_m= 0.010 in^2/min

Field-Saturated Hydraulic Conductivity (Infiltration Rate)

K_{sat} = 2.55E-04 in/min 0.015 in/hr

GEOCON

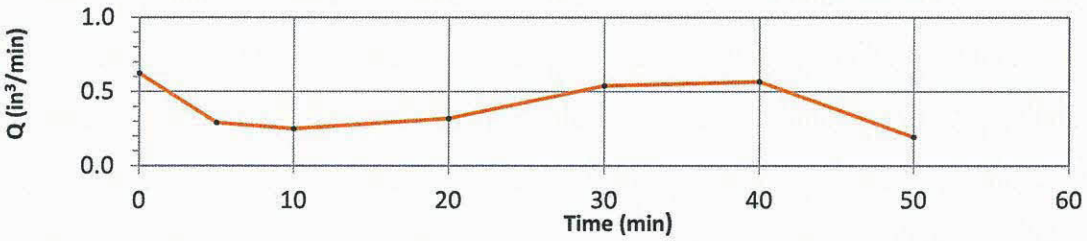
Aardvark Permeameter Data Analysis

Project Name:	THREE ROOTS	Date:	8/4/2017
Project Number:	G2070-42-01	By:	N. BORJA
Test Number:	A-2	Ref. EL (feet, MSL):	0.0
		Bottom EL (feet, MSL):	-4.0

Borehole Diameter, d (in.):	8.00
Borehole Depth, **H** (in):	47.75
Distance Between Reservoir & Top of Borehole (in.):	28.00
Estimated Depth to Water Table, **S** (feet):	45.00
Height APM Raised from Bottom (in.):	2.00
Pressure Reducer Used:	No

Distance Between Resevoir and APM Float, **D** (in.):	66.50
Head Height Calculated, **h** (in.):	5.72
Head Height Measured, **h** (in.):	4.88
Distance Between Constant Head and Water Table, **L** (in.):	497.13

Reading	Time Elapsed (min)	Water Weight Consummed (lbs)	Water Volume Consummed (in^3)	Q (in^3/min)
1	0.00	0.000	0.00	0.00
2	5.00	10.045	278.17	55.634
3	5.00	0.600	16.62	3.323
4	10.00	0.225	6.23	0.623
5	10.00	0.105	2.91	0.291
6	10.00	0.090	2.49	0.249
7	10.00	0.115	3.18	0.318
8	10.00	0.195	5.40	0.540
9	10.00	0.205	5.68	0.568
10	10.00	0.070	1.94	0.194
11	10.00	0.075	2.08	0.208
12	10.00	0.070	1.94	0.194
			Steady Flow Rate, Q (in^3/min):	0.198



Soil Matric Flux Potential, Φ_m

Φ_m= 0.004 in^2/min

Field-Saturated Hydraulic Conductivity (Infiltration Rate)

K_{sat} = 9.53E-05 in/min 0.006 in/hr

Categorization of Infiltration Feasibility Condition	Worksheet C.4-1

Part 1 - Full Infiltration Feasibility Screening Criteria

Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

The results of the field infiltration tests are as follows:

A-1: 0.015 inches/hour (0.0075 with a FOS of 2.0)

A-2: 0.006 inches/hour (0.003 with a FOS of 2.0)

The rates are less than 0.5 inches/hour. Therefore, full infiltration is not feasible.

2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

Based on the comprehensive study presented in the geotechnical documents, infiltration could not be incorporated without increasing the risk of geotechnical hazards including settlement within undocumented and compacted fill and uncontrolled water lateral migration.

The very slow infiltration rates in the Stadium Conglomerate suggest lateral migration of infiltration water will likely occur. The uncontrolled lateral migration could impact existing and proposed adjacent improvements and utilities.

Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: The groundwater elevation was found to be in excess of 15 feet below existing grades. It is our opinion that there is no significant increase in risk of groundwater contamination due to infiltration.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: We do not expect infiltration will cause water balance issues such as seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters.			
Part 1 Result*	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2	No	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

The results of the field infiltration tests are as follows:

A-1: 0.015 inches/hour (0.0075 with a FOS of 2.0)
A-2: 0.006 inches/hour (0.003 with a FOS of 2.0)

The rates are less than 0.1 inches/hour. The test results indicate that the geologic conditions do not allow for appreciable infiltration rate. Partial infiltration is not feasible.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

Based on the comprehensive study presented in the geotechnical documents, infiltration could not be incorporated without increasing the risk of geotechnical hazards including settlement within undocumented and compacted fill and uncontrolled water lateral migration.

The very slow infiltration rates in the Stadium Conglomerate suggest lateral migration of infiltration water will likely occur. The uncontrolled lateral migration could impact existing and proposed adjacent improvements and utilities.

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: The groundwater elevation is assumed to be in excess of 15 feet below existing grades. It is our opinion that there is no significant increase in risk of groundwater contamination due to infiltration. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: We did not provide a study regarding water rights. However, these rights are not typical in the San Diego area. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**		No

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

APPENDIX D

APPENDIX D

RECOMMENDED GRADING SPECIFICATIONS

FOR

3ROOTS
SAN DIEGO, CALIFORNIA

PROJECT NO. G2070-42-01

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9

and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

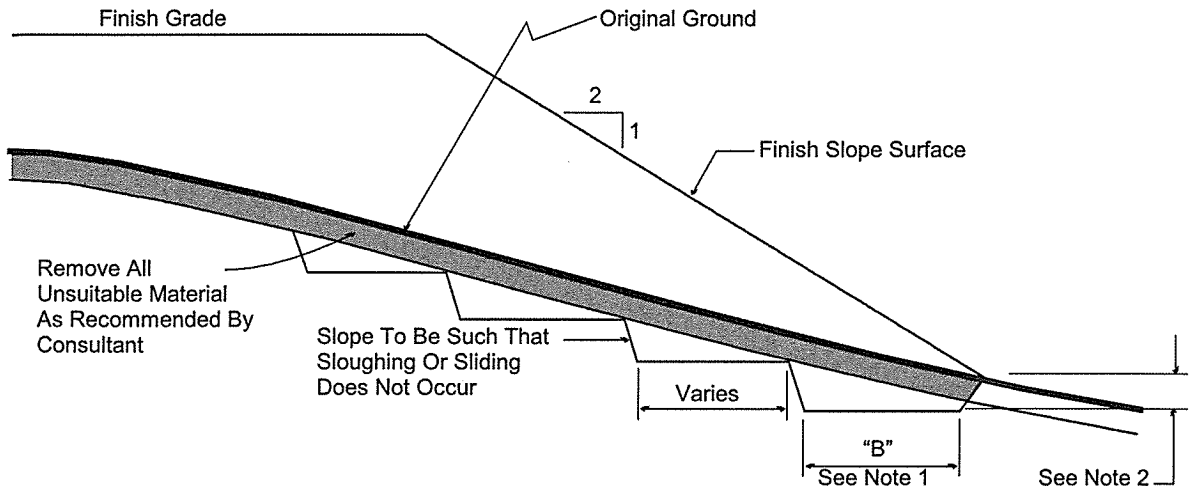
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES:

(1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection

variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

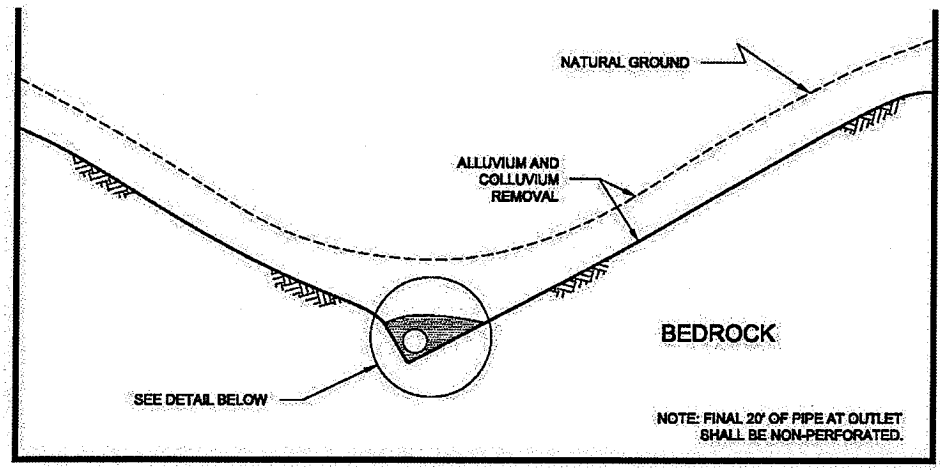
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

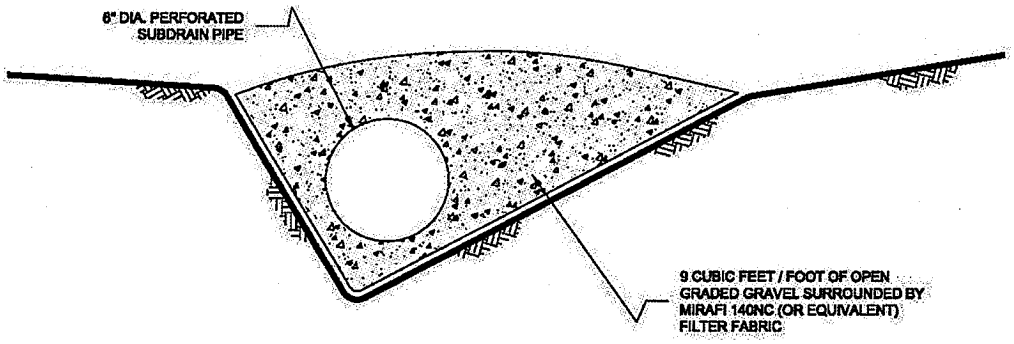
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

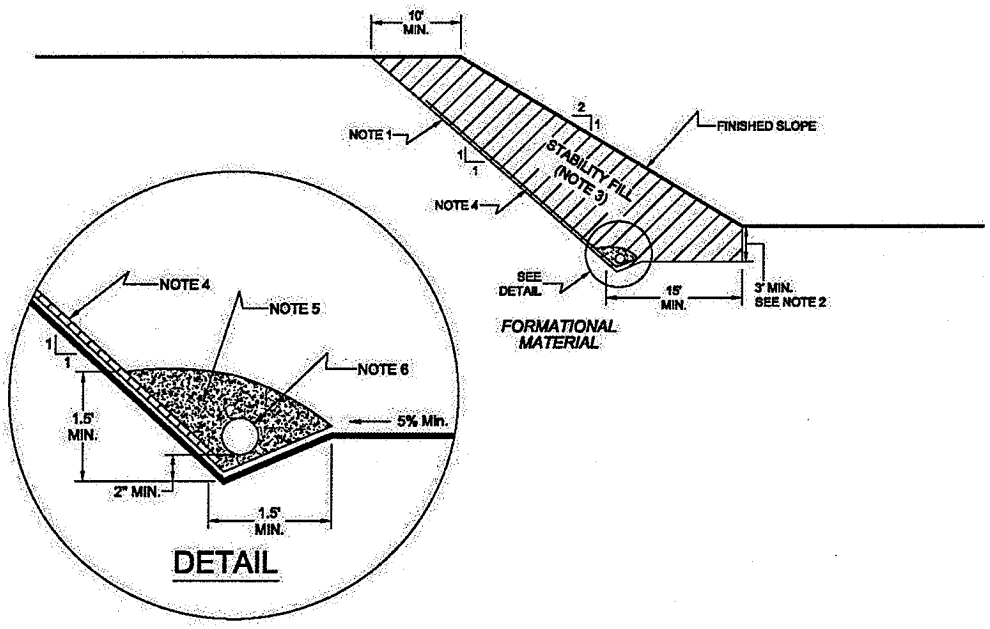
1.....6-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2.....6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

NO SCALE

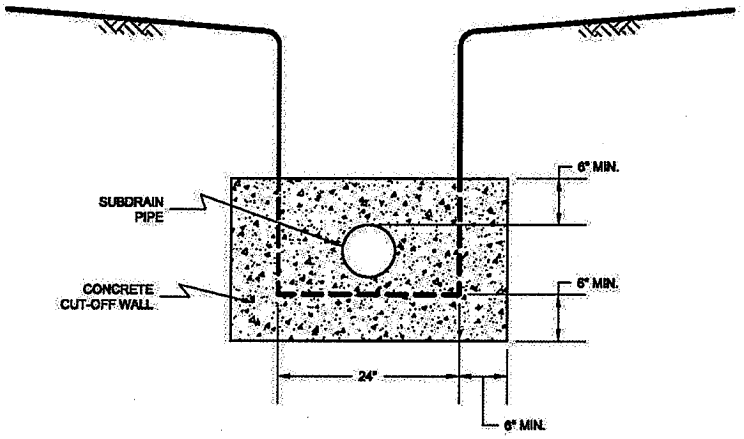
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

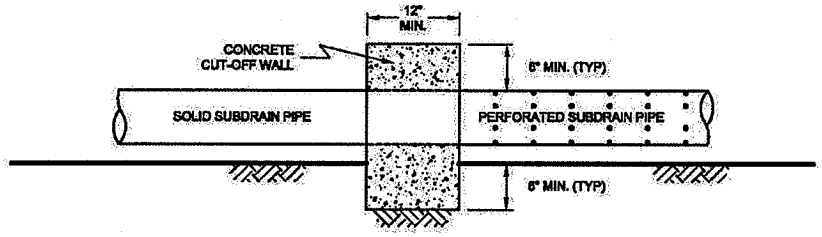
TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW

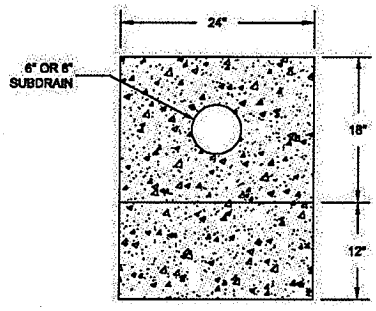


NO SCALE

7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

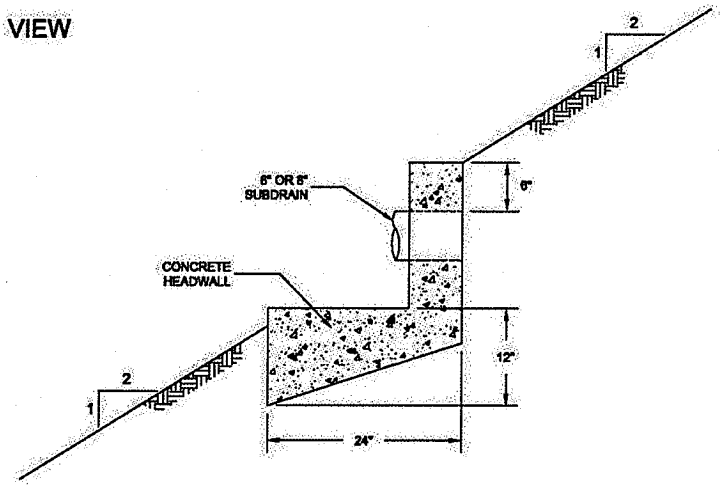
TYPICAL HEADWALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW



NOTE: HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test.*

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

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4. California Geological Survey, *Seismic Shaking Hazards in California,* Based on the USGS/ CGS Probabilistic Seismic Hazards Assessment (PSHA) Model, 2002 (revised April 2003). 0% probability of being exceeded in 50 years. http://redirect.conservation.ca.gov/cgs/rghm/pshamap/pshamain.html

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10. Risk Engineering, *EZ-FRISK,* Version 7.65.

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12. USGS computer program, *Seismic Hazard Curves and Uniform Hazard Response Spectra.*