Appendix G

Preliminary LID Report

Preliminary Low Impact Development (LID) Plan

Prepared for:
MW Investment Group, LLC
27702 Crown Valley Parkway, Suite D-4-197
Ladera Ranch, CA 92694
Matthew J. Waken
(626) 710-6377

Property:
Monterey Street
APN 8575-017-909, 8575-019-907, -908, -910, -911, -912, -913, -914,
8575-021-932, -934, -936, -922, and 8575-022-925
VTTM 83528
3700 Monterey Avenue
El Monte, CA 97131

Prepared by:
C&V Consulting, Inc.
9830 Irvine Center Drive
Irvine, CA 92618
(949) 916-3800
Philip Malcomson, P.E

Preparation Date:
February 2023
Revised Date:
November 2023

Receipt of WDID

REPLACE THIS SHEET

To be provided prior to final approval

Notice of Intent

REPLACE THIS SHEET

To be provided prior during final engineering

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Owner/Developer
Approval and Certification
of the
Preliminary Low Impact Development (LID) Plan

Project Name: ***Area Y, El Monte***

Project Number: **Vesting Tentative Tract 83528**
APN 8575-017-909; APN 8575-019-907, 908, 910, 911, 912, 913 and 014; APN 8575-021-932, 934, 936; APN 8575-022-922 and 925

Project Address: **3700 Monterey Avenue**
El Monte, CA 97131

This Preliminary Low Impact Development (LID) Plan for the ***Area Y, El Monte*** project has been prepared for MW Investment Group, LLC by C&V Consulting, Inc. It is intended to comply with the requirements of the City of El Monte's Conditions of Approval.

The undersigned is authorized to approve implementation of provisions of this plan as appropriate, and will strive to have the plan carried out by successors consistent with the County of Los Angeles LID Manual and the intent of the NPDES storm water requirements.

"I certify under penalty of law that this document and all attachments were prepared under my jurisdiction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Owner/Developer Signature	Date
Matthew J. Waken, Managing Member	**(626) 710-6377**
Owner/Developer's Name and Title	Telephone Number

Section 200

A. Contact Information/List of Responsible Parties

The property contact information is:

Matthew J. Waken
(626) 710-6377
MW Investment Group, LLC
27702 Crown Valley Parkway, Suite D-4-197
Ladera Ranch, CA 92694

The property owner shall have primary responsibility and significant authority for the implementation, maintenance, and inspection of the property BMPs. Duties of the Owner include but are not limited to:

- Implementing all elements of the LID, including but not limited to:
  - Implementation of prompt and effective erosion and sediment control measures
  - Implementing all non-storm water management, and materials and waste management activities, such as: monitoring, discharges, general site clean-up; vehicle and equipment cleaning, spill control; good construction housekeeping to ensure that no materials other than storm water are discharged which may have an adverse effect on receiving waters or storm drain systems, etc.
- Pre-storm inspections
- Storm event inspections
- Post-storm inspections
- Routine inspections as described in the LID
- Ensuring elimination of all unauthorized discharges
- The Owner shall be assigned authority to mobilize crews in order to make immediate repairs to the control measures.
- Coordinate all of the necessary corrections/repairs are made immediately, and that the project complies with the LID at all times.
- Managing and report any Illicit Connections or Illegal Discharges.

Section 300

A. References

The following documents are made a part of this LID by reference:

- Project plans and specifications for the City of El Monte to support the ***Area Y, El Monte*** project, prepared by C&V Consulting, Inc., 9830 Irvine Center Drive, Irvine, CA 92630.

- County of Los Angeles Department of Public Works, Low Impact Development Standards Manual dated February 2014

- State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002 dated July 1, 2010

- California Stormwater BMP Handbook – Construction, January 2009.

- California Stormwater BMP Handbook – New Development and Redevelopment, January 2003.

- Los Angeles County Municipal Stormwater/ NPDES Permit Order R4-2012-0175

Section 400 – Body of LID

A. Objectives

This Preliminary Low Impact Development (LID) Plan has four main objectives:

1) Identify all pollutant sources, including sources of sediment that may affect the quality of storm water discharges associated with daily use / activity (storm water discharges) from the property site.
2) Identify non-storm water discharges.
3) Identify, construct, implement and maintain Best Management Practices (BMPs) to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the property site.
4) Develop a maintenance schedule for BMPs designed to reduce or eliminate pollutants.

B. Project Background and Description

The proposed project is located at 3700 Monterey Avenue, in the City of El Monte. The site is bounded by an existing railroad to the north, El Monte Paseo to the east, Valley Boulevard to the south and existing Santa Fe Trail Plaza shopping mall to the west. The proposed development includes the construction of 18 buildings consisting of 87 new 3-story townhomes. The proposed 4.57-acre site will include private drive aisles, private garages, sidewalks, parking, and associated landscaping and open space areas. Existing and proposed street dedications have been accounted for in this total proposed area. The proposed site will be accessible via two (2) driveway entrances along Valley Boulevard and from the northeast from Railroad Street.

The site currently consists of 13 parcels. The southern portion of the site was demolished in 2012 and the remaining buildings were demolished by 2018. The site now includes landscaping, paved areas, and a parking lot. The elevations within the site generally vary from approximately 293.6’ to 287.8’ with surface runoff flowing in the southerly direction.

C. Vicinity Map

The proposed project is located at 3700 Monterey Avenue, in the City of El Monte. The site is bounded by an existing railroad to the north, El Monte Paseo to the east, Valley Boulevard to the south and existing Santa Fe Trail Plaza shopping mall to the west.

Refer to Figures 1 & 2 for Vicinity and Location Maps.

D. Existing Site Drainage Condition

Drainage at the site generally sheet flows towards the south to the public right-of-way of Valley Boulevard. Monterey Avenue and El Monte Avenue surface drains southerly to the gutter on the north side of Valley Boulevard. Surface flows then continue in the

westerly direction until entering a catch basin on Santa Anita and Vally Boulevard. The flows discharge to the Rio Hondo Channel and ultimately to the Los Angeles River. The Los Angeles River discharges into the Pacific Ocean at Queensway Bay/ San Pedro Bay. Water bodies to which site runoff is tributary to are listed on the most current 303(d) list for the following:

- Rio Hondo Channel
  - pH (TMDL)
  - Toxicity
  - Lead (TMDL)
  - Trash
  - Copper (TMDL)
  - Zinc (TMDL)
  - Indicator Bacteria (TMDL)
- Los Angeles River
  - Trash (TMDL)
  - Nutrients (Algae) (TMDL)
  - Ammonia (TMDL)
  - Indicator Bacteria (TMDL)
  - Oil
  - Copper/ Copper Dissolved (TMDL)
  - Lead (TMDL)
  - Cadmium (TMDL)
  - Ammonia (TMDL)
  - pH (TMDL)
  - Zinc, Dissolved (TMDL)
- Queensway Bay/ San Pedro Bay
  - Chlordane (TMDL)
  - PCBs
  - Trash (TMDL)
  - DDT (Sediment) (TMDL)
  - Toxicity

Surface runoff from the site drains through only engineered facilities to the Pacific Ocean, therefore Hydromodification Control requirements are not applicable for this project.

E. Proposed Site Drainage Conditions

The proposed project site consists of eighty-seven (87) 3-story townhomes. The proposed 4.57-acre site will include private drive aisles, private garages, sidewalks, parking, and associated landscaping and open space areas. The proposed drainage will flow through v-gutters in the proposed drive aisles to the curb and gutter of El Monte Ave and will convey flows towards the proposed catch basin located in the parking area near the west entrance along Valley Boulevard. The catch basin will collect and convey flows to the proposed 48" perforated Corrugated Metal Pipe (C.M.P.) Infiltration system to promote subsurface infiltration. The Infiltration System has been designed to retain and infiltrate the required Storm Water Quality Design Volume (SWQDv) for water quality treatment. A portion of the site on Railroad Street will be collected by two (2) catch basins that will enter the storm drain system and will be conveyed along the site to exit towards Valley Boulevard. During larger storm events producing a greater volume than the SWQDv, including the 25-, 50-, and 100-year storm events, stormwater will overflow out of the Retention/ Infiltration system and out of the second proposed catch basin and be conveyed to the public right-of-way via the driveway to Valley Avenue and will follow the historic drainage pattern.

Refer to Figure 3, Preliminary DMA Exhibit for additional information.

F. LID Project Types, Characteristics, & Activities

Per the Los Angeles Department of Public Works (LACDPW), *Low Impact Development Standards Manual*, dated February 2014, the proposed project is classified as a "Designated Project." A "Designated Project" is defined by the LACDPW as follows:

> "Redevelopment projects, which are developments that result in creation or addition or replacement of either: (1) 5,000 square feet or more of impervious surface on a site that was previously developed as described in the above bullets; or (2) 10,000 square feet or more of impervious surface area on a site that was previous developed as a single-family home."

G. Pollutant Source Identification and BMP Selection

The following is a list of materials to be used in the daily construction activities at the project site, which will potentially contribute to pollutants, other than sediment, to storm water runoff. Control Practices for each activity are identified below:

- Vehicle fluids, including oil, grease, petroleum, and coolants from personal vehicles
- Landscaping materials and wastes (topsoil, plant materials, herbicides, fertilizers, mulch, pesticides)
- General trash debris and litter
- Pet waste (bacteria/ fecal coliforms)

The Best Management Practices (BMPs) that have been selected for implementation on this project are detailed in the following sections.

H. Source Control BMPs

Project proponents shall implement Site Design concepts that achieve each of the following:

- Minimize Urban Runoff
- Minimize Impervious Footprint
- Conserve Natural Areas
- Minimize Directly Connected Impervious Areas (DCIAs)

Table-1 identifies the source control and treatment BMPs and how each is implemented to achieve each Site Design concept. BMP fact sheets are provided by the LACDPW *Low Impact Development Standards Manual* and the California Stormwater Quality Association.

Table-1: Source Control BMPs

BMP	BMP DESCRIPTION	CHECK ONE		IF NOT APPLICABLE, STATE BRIEF REASON
		INCLUDED?	NOT APPLICABLE	
	Non-Structural Source Control BMPs:			
	Education for Leasers', Operators, Occupants, or Employees	X		
	Activity Restrictions (CC&Rs)	X		
S-8	Landscape Irrigation Practices	X		
SD-32	Common Area Litter Control		X	No proposed trash enclosures.
SE-7	Street Sweeping Private Streets and Parking Lots	X		
	Drainage Facility Inspection and Maintenance	X		
	Structural Source Control BMPs:			
S-1	Storm Drain Message and Signage	X		
S-8	Landscape Irrigation Practices	X		

BMP	BMP DESCRIPTION	CHECK ONE		IF NOT APPLICABLE, STATE BRIEF REASON
		INCLUDED?	NOT APPLICABLE	
SD-11	Roof Runoff Controls	X		
	Protect Slopes and Channels		X	No proposed slopes and channels.
S-6	Outdoor Vehicle/Equipment/ Accessory Washing Area		X	Car Wash Racks are not permitted within the proposed development – Not Applicable.
	Proper Site Design:			
S-7	Fuel and Maintenance Area		X	No Fueling Areas
SD-33	Air/Water Supply Area Drainage		X	No Air/Water Supply
S-3	Outdoor Trash Storage and Waste Handling Area		X	No proposed trash enclosures.
S-4	Outdoor Loading/ Unloading Dock Area		X	Not Applicable
S-5	Outdoor Vehicle/Equipment Repair/Maintenance Area		X	No Maintenance Bays
S-6	Outdoor Vehicle/Equipment/ Accessory Washing Area		X	No Wash Areas
S-2	Outdoor Material Storage Area		X	No Material Storage
SD-36	Outdoor Work Areas or Processing Areas		X	No Work Areas
	Provide Wash Water Controls for Food Preparation Areas		X	No Food Prep Areas

Non-Structural Measures

Non-structural BMPs are generally managerial, educational, inspection and/ or maintenance oriented. These items consist of educating employees and occupants, developing and implementing HOA guidelines, implementing BMPs and enforcing Code requirements. Non-structural BMPs used for this project are summarized below:

Education for Employees and Occupants
Practical informational materials will be provided to homeowners, HOA and employees on general good housekeeping practices that contribute to protection of storm water quality. Among other things, these materials will describe the use of chemicals (including household type) that should be limited to the property, with no discharge of specified wastes via hosing or other direct discharge to gutters, catch basins and storm drains. Initially, the Owner will provide these materials. Thereafter, such materials will be available through the HOA education program.

This program must be maintained, enforced, and updated periodically by the HOA. Educational materials including, but not limited to, the materials included in Appendix F of this plan will be made available to the employees and contractors of the HOA.

Activity Restrictions
Activities on this site will be limited to activities related to residential living. The project's Conditions, Covenants, and Restrictions (CC&Rs) will outline the activities that are restricted on the property. Such activities related to the LID include car washing, car maintenance and disposal of used motor fluids, pet waste cleanup, and trash container areas.

Efficient Landscape System & Landscape Maintenance
Management programs will be designed and established by the HOA, who will maintain the common areas within the project site. These programs will include how to mitigate the potential dangers of fertilizer and pesticide usage (refer to the Maintenance and Frequency Table). Ongoing maintenance will be consistent with the State of California Model- Water Efficient Landscape Ordinance. Fertilizer and pesticide usage shall be consistent with County Management Guidelines for use of Fertilizers and Pesticides.

Common Area Litter Control
The HOA will be required to implement trash management and litter control procedures in the common areas aimed at reducing pollution of drainage water. The HOA may also contract with their landscape maintenance firm to provide this service during regularly scheduled maintenance, which should consist of litter patrol, emptying of trash receptacles in common areas, and noting trash disposal violations and reporting the violations to the HOA for remediation.

Street Sweeping in Private Streets and Parking Lots
The HOA shall have all streets and parking lots swept on a weekly basis. This procedure will be intensified around October 15th of each year prior to and throughout rain storm period.

Drainage Facility Inspection & Maintenance
The HOA will be responsible for implementing each of the BMPs detailed in this plan. The HOA will also be responsible for cleaning and maintaining the BMPs on a regular basis. Refer to Appendix G for the Operation and Maintenance Plan. Refer to Appendix C for site specific drainage BMP information.

Storm Drain Stenciling/ Signage
Phrase "No Dumping – Drains to Ocean" or equally effective phrase to be stenciled on catch basins to alert the public to the destination of pollutants discharged into storm water. This stenciling will be inspected and re-stenciled on a periodic basis by the HOA. Refer to Table 4 for maintenance frequency.

Landscape & Irrigation System Design
As part of the design of all common area landscape irrigation shall employ water conservation principals, including, but not limited to, such provisions as water sensors, programmable irrigation times (for short cycles), etc. will be used. Such common areas will be maintained by the HOA.

Title 22 CC&R Compliance
The HOA will comply with this Regulation as part of the development's CC&Rs. CC&Rs will be prepared as a separate document and reviewed by the City's Attorney.

Uniform Fire Code Implementation
The HOA will comply with this Code as part of the development's CC&Rs. CC&Rs will be prepared as a separate document and reviewed by the City's Attorney.

Employee Training
A training program will be established as it would apply to future employees, contractors, and homeowners of the HOA to inform and train in maintenance activities regarding the impact of dumping oil, paints, solvents, or other potentially harmful chemicals into storm drains; the proper use of fertilizers and pesticides in landscaping maintenance practices; and the impacts of littering and improper water disposal.

The HOA (or a hired firm) will conduct the training program which will include targeted training sessions with specific construction disciplines (landscaping, concrete finishers, painters, etc.). See Appendix F for examples of educational materials that will be provided to the Employees.

The project's CC&Rs will include provisions for future employee training programs conducted on a yearly based prior to the rainy season.

I. Structural BMPs

Structural BMPs shall be installed by the developer, through the construction and development of the project, for instance; landscaping and irrigation systems shall be designed by licensed landscape architects and installed by qualified contractors to specifications and standards of the City of El Monte. The structural BMPs used for this project are summarized below:

Expected pollutants associated with this development include vehicle discharge fluids, landscaping materials and waste, litter, and pet waste. To mitigate these pollutants, the structural best management practices summarized in Table-2 are proposed.

Table-2: Design BMPs

BMP	TECHNIQUE	INCLUDED? YES	INCLUDED? NO	BRIEF DESCRIPTION OF METHOD
SD-10	Minimize Impervious Area/Maximize Permeability (C-Factor Reduction)	X		We have incorporated landscape areas wherever possible within the project site. See Appendix B for details.
	Minimize Directly Connected Impervious Areas (DCIAs) (C-Factor Reduction)	X		We minimize DCIAs by limiting sidewalks and parking areas to the minimum necessary for proper use.
	Create Reduced or "Zero Discharge" Areas (Runoff Volume Reduction)	X		The entire SWQDv will be retained onsite through infiltration.

Table-3: Treatment BMPs

BMP	NAME	INCLUDED? YES	INCLUDED? NO	IF NOT APPLICABLE, STATE BRIEF REASON
VEG-1	Green Roof		X	
VEG-2	Stormwater Planter		X	
VEG-3	Tree-Well Filter		X	
VEG-4	Vegetated Swale		X	Space not available for BMP
VEG-5	Vegetated Filter Strip		X	Space not available for BMP
T-1	Sand Filter		X	Space not available for BMP
T-2	Consulted Wetland		X	
T-3	Extended Detention Basin		X	Space not available for BMP
T-4	Wet Pond		X	This is not a wetland area/ development
T-5	Permeable Pavement with an Underdrain		X	This is not a wetland area/ development.
T-6	Proprietary Treatment Control Measures		X	Space not available for BMP
RET-1	Bioretention		X	
RET-2	Infiltration Basin		X	Alternative BMP utilized

BMP	NAME	INCLUDED?		IF NOT APPLICABLE, STATE BRIEF REASON
		YES	NO	
RET-3	Infiltration Trench	X		Perforated C.M.P. Infiltration system was utilized.
RET-4	Drywell		X	Use of Drywell has been determined infeasible.
RET-5	Permeable Pavement without an Underdrain		X	Alternative BMP utilized
RET-6	Rain Barrel/ Cistern		X	
TC-40	Media Filter		X	Alternative BMP utilized
BIO-1	Biofiltration		X	Alternative BMP utilized

Drainage Management Area (DMA)	Size (ac)	Storm Water Quality Design Volume (SWQDv) (cf)	System Capacity (cf)	Treatment Capacity over 72 hrs (cf)
A1	4.57	3,488	3,513	4,781

The proposed 4.57-acre site will generate a Storm Water Quality Design Volume (SWQDv) of approximately 3,488 cf. Stormwater runoff will be collected and conveyed to 48" C.M.P. Infiltration/ Storage System that has a storage capacity of approximately 3,513 cf and provide approximately 4,781 cf of infiltrated volume over 72 hours. The Infiltration/ Storage System as designed will provide more than enough treatment and storage capacity for the site.

The C.M.P. infiltration system will be installed within a proposed drive aisle near the main entrance. Drainage from roof tops and landscape areas will be collected through area drains and piped to the proposed underground C.M.P. system. Runoff from these areas is pretreated through landscaping. Street runoff will be collected via a proposed curb inlet catch basin and conveyed to the Detention System. Once the infiltration/ detention system reach capacity, stormwater runoff will overflow through the second catch basin then the proposed driveway on Valley Boulevard.

Biofiltration

The project does not propose biofiltration because the entire SWQDv will be retained onsite and will infiltrate within 72 hours.

Catch Basin Inspection

The HOA will maintain the drainage systems, including catch basins and culverts. The HOA is required to have catch basins inspected and, if necessary, cleaned prior to the storm season, no later than October 15th each year or prior to the first 24-hour storm event, whichever occurs first. These duties may be contracted out to the landscape

maintenance firm hired by the HOA. Please see Appendix E for maintenance program. Refer to Appendix G for the Operation and Maintenance Plan.

Runoff-Minimizing Landscape Design
As part of the design of all common area landscape areas, similar planting material with similar water requirements will be used in order to reduce excess irrigation runoff and promote surface filtration. Such common areas will be maintained by the HOA.

Community Car Wash Racks
No community car wash rack or area will be provided, therefore, washing of vehicles by residents on the property will not be allow per the CC&Rs.

Wash Water Controls for Food Preparation Areas
A sign will be posted indicating that discharge of wash water to the municipal storm drain system is prohibited. All wash water should be disposed of to the sanitary sewer system. Restrictions will be enforced per the CC&Rs.

Self-Contained Washing
Self-contained washing of vehicles by residents or owners on the property will not be allowed per the CC&Rs.

Outdoor Material Storage Areas
Outdoor material storage areas refer to storage areas or storage facilities solely for the storage of materials. Improper storage of materials outdoors may provide an opportunity for toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to enter the storm water conveyance system. Outdoor Storage by residents or owners on the property will not be allowed per the CC&Rs.

J. BMP Maintenance, Inspection, and Repair

Inspections will be conducted as follows:

- Annually and prior to the start of the rainy season
- Every (1) month during rainy season
- At any other time(s) or intervals of time specified in the contract documents

Repairs and/ or maintenance procedures shall be carried out at the soonest possible time.

K. Inspection, Maintenance, and Responsibility for BMPs

Table-4 and Table-5 show the lists of the post-construction BMPs (routine non-structural and structural), the required ongoing maintenance, the inspection and maintenance frequency, the inspection criteria, and the entity or party responsible for implementation, maintenance, and/or inspection.

Table-4: Non-Structural BMP Maintenance Responsibility/Frequency Matrix

BMP	RESPONSIBILITY	FREQUENCY
Homeowner/ Business owner Education, Activity Restrictions	HOA will provide educational materials. Those materials and responsibilities must be passed onto subsequent property owners.	Continuous. CC&Rs to be provided to homeowners at the time they purchase the property and updates provided by the HOA as they occur.
Common Area Landscape Management	HOA will appoint a landscape maintenance contractor	Monthly during regular maintenance and use with management guidelines for use of fertilizers and pesticides.
Parking Areas and Drives Management	HOA will appoint a landscape maintenance contractor	The Drives Aisles are to be swept on a routine scheduled basis to facilitate the pickup of trash and debris (plant or otherwise) and to remove excessive oil, grease and build-up. During sweeping, debris is to be removed from the parking areas and drives and then scrubbed and rinsed. This sweeping schedule will be at a minimum occurrence of once a week and as necessary to rid / reduce active pollutants from the pavement areas. This maintenance requirement will be listed in the Convent, Conditions and Restrictions (CC&Rs) of this project. These CC&Rs will be recorded to the property at the County Recorder's Office and be included on the final Title report of these properties.
Litter Control by Sweeping	HOA will appoint a landscape maintenance contractor.	Weekly inspection of trash receptacles to ensure that lids are closed and pick up any excess trash on the ground, noting trash disposal violations to the HOA for remediation.
Employee Training	HOA will appoint a landscape contractor after construction.	Monthly for maintenance personnel and employees to include the educational materials contained in the approved LID.
Common Area Catch Basin Inspection & Cleaning	HOA will appoint a landscape maintenance contractor for common areas and storm drain facilities.	Inspect basins once a month. Clean debris and silt in bottom of catch basins as needed. Intensified on or about October 15th each year or prior to the first 24-hour storm event, whichever occurs first. Refer to Appendix E.

Table-5: Structural BMP Maintenance Responsibility/ Frequency Matrix

BMP	RESPONSIBILITY	FREQUENCY
Common Area Efficient Irrigation	HOA will appoint a landscape contractor after construction	Once a week, in conjunction with maintenance activities. Verify that runoff minimizing landscape design continues to function by checking that water sensors are functioning properly, that irrigation heads are adjusted properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather and day or night time temperatures.
Common Area Runoff Efficient Landscape Design	HOA will appoint a landscaping contractor	Once a week in conjunction with maintenance activities and prior to finalizing any replanting schemes. Verify that plants continue to be grouped according to similar water requirements in order to reduce excess irrigation runoff.
C.M.P. Infiltration System	HOA	System should be cleaned when an inspection reveals accumulated sediment or trash is clogging the discharge orifice. Record inspection observations and maintenances operations for the life of the system. Inspections shall occur annually and prior to any major rain event. Cleanings and maintenance shall occur every 12 months, during dry weather. Refer to manufacturer's specifications for specific system maintenance requirements.

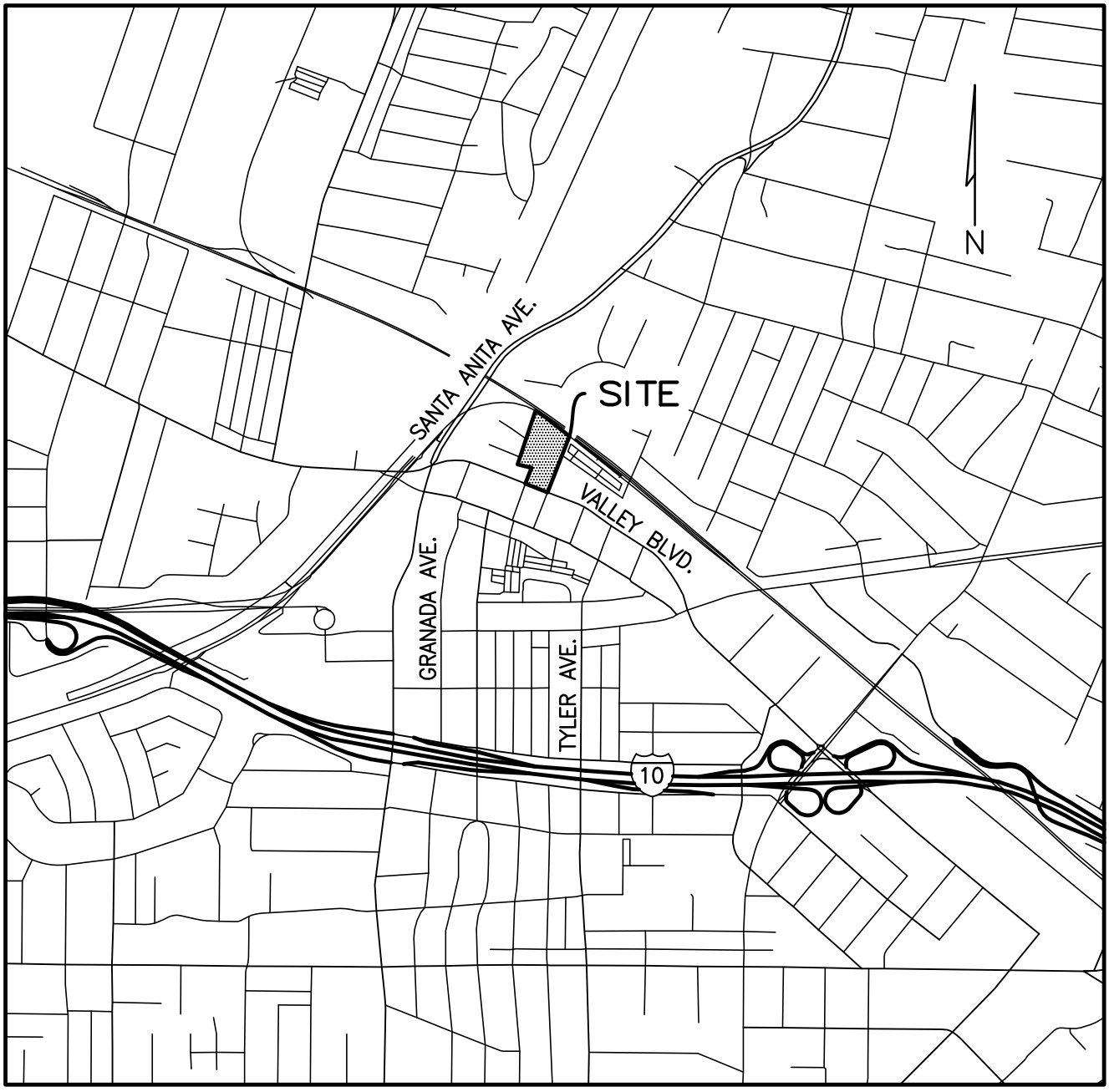
L. Operation/Maintenance Funding after Project Completion

The post-construction BMPs as described above will be funded and maintained by:

Matthew J. Waken
Tel: (626) 710-6377
MW Investment Group, LLC
27702 Crown Valley Parkway, Suite D-4-197
Ladera Ranch, CA 92694

Maintenance and requirements of the maintenance for the properties will be listed in the Convent, Conditions and Restrictions (CC&Rs) of this project and will be the responsibility of the property owner at all times. These CC&Rs will be recorded to the property at the County Recorder's Office and be included on the Title report of these properties.

Figure -1:
Project Vicinity Map



VICINITY MAP

NTS

Figure -2:
Project Location Map

MWIG-001

3700 MONTEREY AVE, EL MONTE, CA 97131

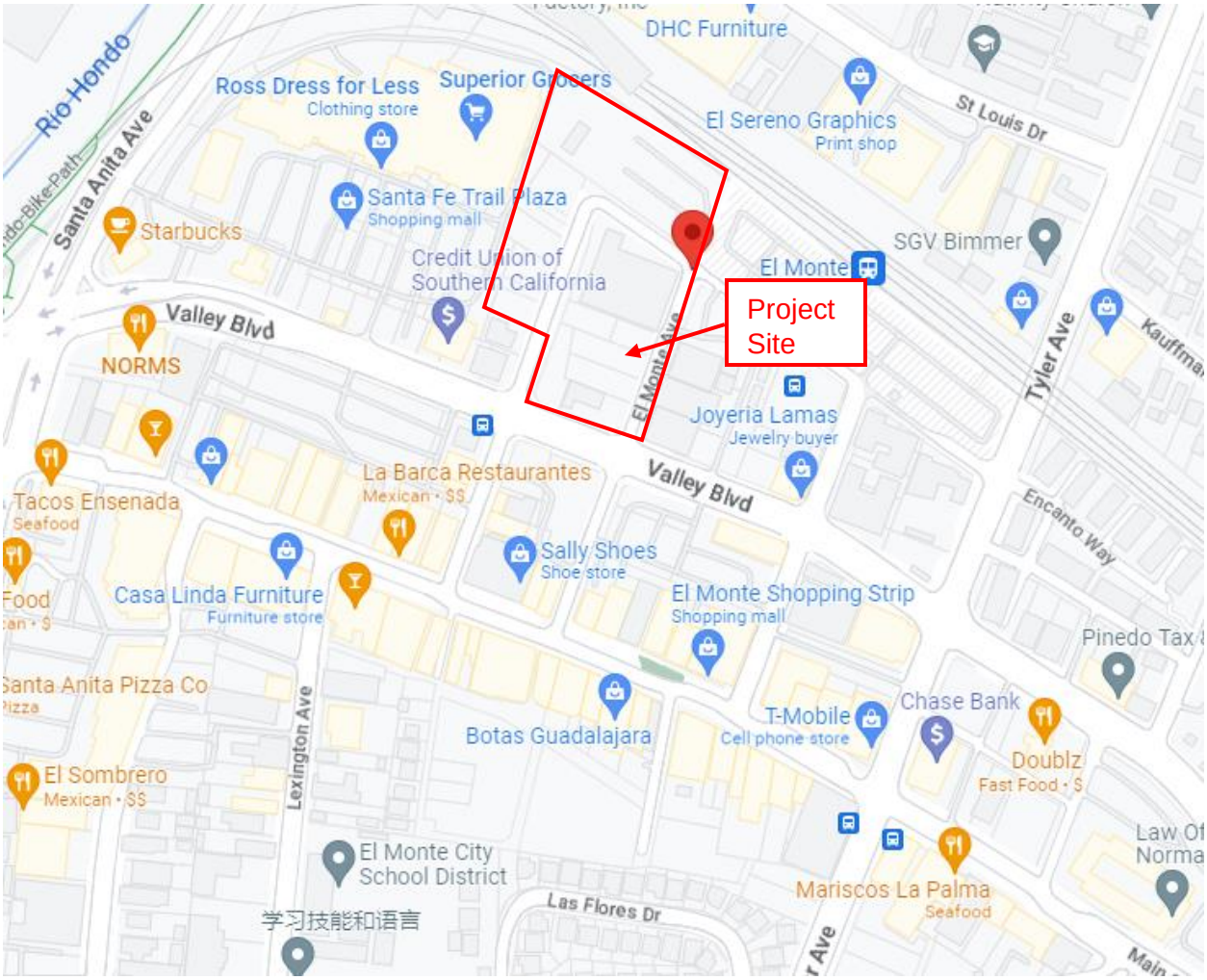


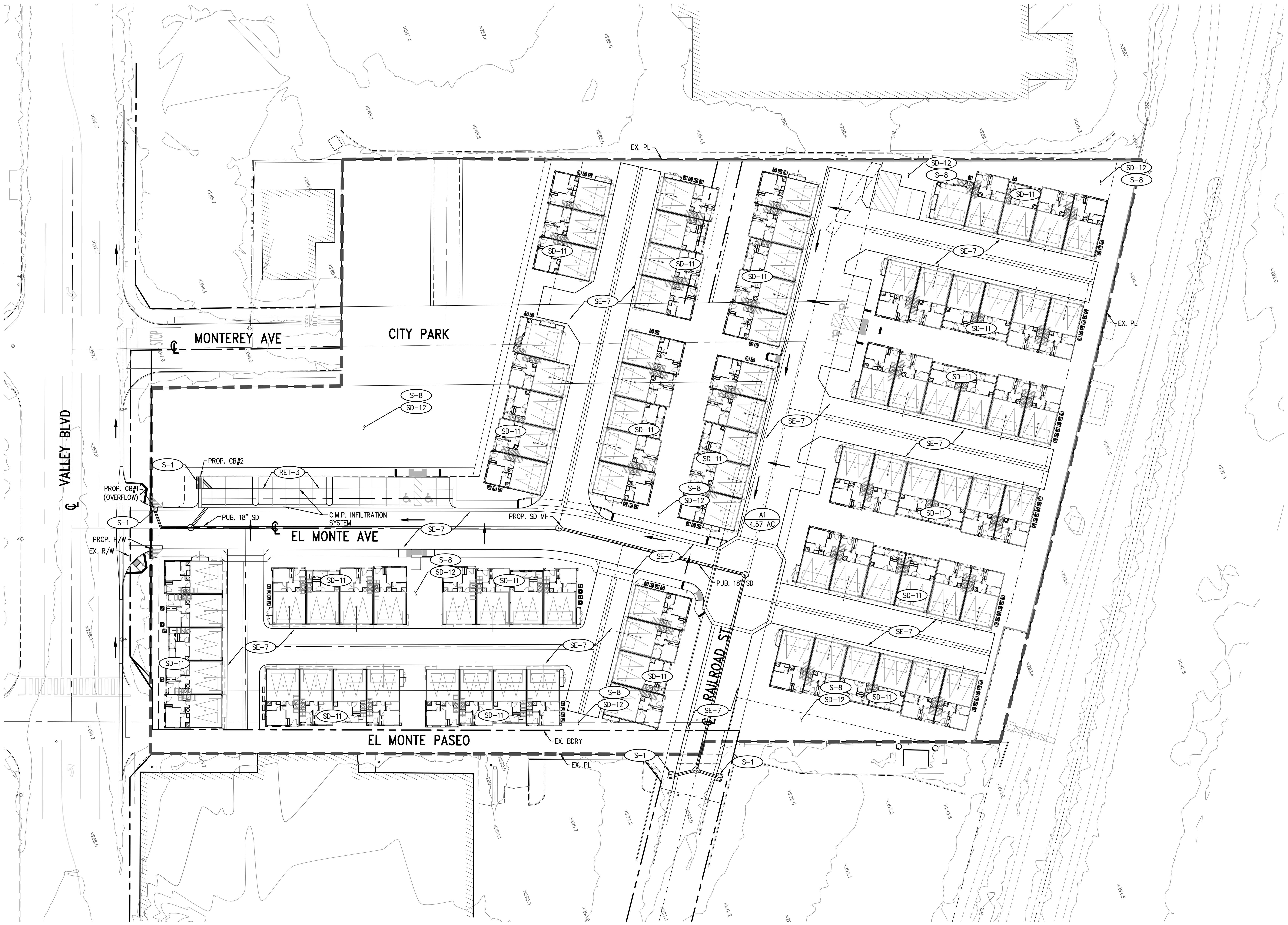
Figure -3:
Preliminary DMA Exhibit

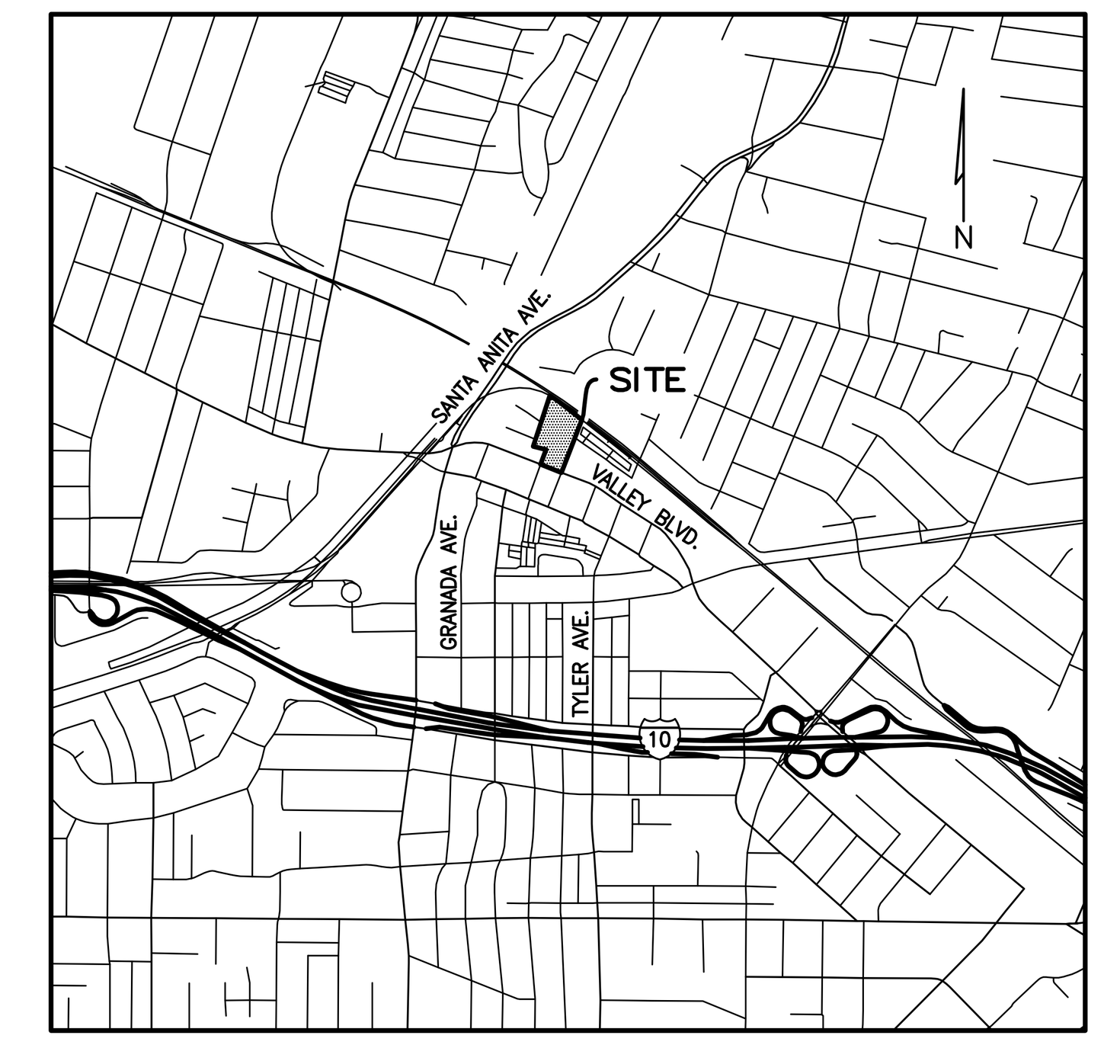
PRELIMINARY DMA EXHIBIT

VTTM 83528

3700 MONTEREY AVENUE

CITY OF EL MONTE, COUNTY OF LOS ANGELES





VICINITY MAP

NTS

LEGEND

- EXISTING RIGHT-OF-WAY/ BOUNDARY
- PROPOSED RIGHT-OF-WAY/ BOUNDARY
- DRAINAGE MANAGEMENT AREA (DMA)
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- DRAINAGE FLOW ARROWS
- PROPOSED CATCH BASIN
- DMA X / X.XX AC — DRAINAGE MANAGEMENT AREA (DMA) / ACREAGE

BEST MANGEMENT PRACTICES (BMPS)

S-8	SITE DESIGN & LANDSCAPE PLANNING
SD-11	ROOF RUNOFF CONTROLS
SD-12	EFFICIENT IRRIGATION
S-1	STORM DRAIN SIGNAGE
SE-7	STREET SWEEPING & VACUUMING
RET-3	C.M.P. INFILTRATION SYSTEM
DET	UNDERGROUND DETENTION SYSTEM

REVISIONS		
REV	DATE	DESCRIPTION

PREPARED FOR: MW INVESTMENT GROUP

PREPARED BY: C&V CONSULTING, INC. CIVIL ENGINEERING LAND PLANNING & SURVEYING
9830 IRVINE CENTER DRIVE
IRVINE, CALIFORNIA 92618
(949) 916-3800
INFO@CVC-INC.NET
WWW.CVC-INC.NET

REGISTERED PROFESSIONAL ENGINEER — DANE P. MCDOUGALL — C 80705 — CIVIL — STATE OF CALIFORNIA

CITY OF EL MONTE
DEPARTMENT OF DEVELOPMENT SERVICES / PLANNING DIVISION

VESTING TENTATIVE TRACT MAP NO. 83528
3700 MONTEREY AVENUE
PRELIMINARY DMA EXHIBIT

SHEET 1 OF 1

Figure -4:
Impaired Waters

COUNTY OF LOS ANGELES

LOS ANGELES RIVER WATERSHED

Los Angeles River Watershed

PACIFIC OCEAN

PROJECT SITE

MILES
0 1 2 4

LEGEND

- LOS ANGELES RIVER WATERSHED
- UNINCORPORATED AREA
- DAM / LAKE / RESERVOIR
- MAJOR RIVER
- MAJOR CHANNEL

Data contained in this map is produced in whole or part from the Los Angeles County Department of Public Works' digital database.

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Mapping & Property Management Division, Mapping & GIS Services Section

Appendix A:
Volume and Flow Rate Calculations & Hydrologic Report

The proposed development was analyzed for the 0.75-in storm event and the 85th Percentile storm event using the LACDPW HydroCalc software. The governing stormwater runoff volume between the two storm events was utilized for design. Below is a summary of the HydroCalc outputs:

DMA	85th Percentile Storm ✓		0.75-in Storm		Governing Volume (cfs)
	Volume (cf)	Flowrate (cfs)	Volume (cf)	Flowrate (cfs)	
1	3,488.77	0.158	2,813.61	0.119	3,488.77✓

Refer to LACDPW HydroCalc Output Data within this Appendix for Volume and Flowrate Calculations.

CMP Infiltration System Calculations:

DCV = 3,366 cf
K_{FIELD} = 2.9 in/hr *
Factor of Safety = 3.5
K_{DESIGN} = 0.83 in/hr

48" C.M.P. Infiltration System – Refer to Appendix C for C.M.P. system information.

$V_{CMP} = (\pi)(2^2)(100) = 2016$ cf
$V_{BACKFILL}$ = 1,497.6 cf
V_{TOTAL} = **3,513.6 cf > DCV = 3,488.77 cf** ✓

V_{INFIL} = (Infiltration Surface Area, sf)(K_{DESIGN}, in/hr)(T, hr)(1 ft/ 12 in),
Where T = 72-hour Drawdown Timeframe
$V_{INFIL\text{-}72\ HRS}$ = (960 sf)(0.83 in/hr)(72 hrs)(1 ft/ 12 in) = **4,781 cf > DCV = 3,488.77 cf** ✓

*Refer to Preliminary Geotechnical Evaluation and Recommendations dated February 10, 2023 prepared by LGC Geotechnical, Inc. for infiltration testing information.

Appendix B:
Site BMPs

S-1: Storm Drain Message and Signage

Purpose

Waste material dumped into storm drain inlets can adversely impact surface and ground waters. In fact, any material discharged into the storm drain system has the potential to significantly impact downstream receiving waters. Storm drain messages have become a popular method of alerting and reminding the public about the effects of and the prohibitions against waste disposal into the storm drain system. The signs are typically stenciled or affixed near the storm drain inlet or catch basin. The message simply informs the public that dumping of wastes into storm drain inlets is prohibited and/or that the drain ultimately discharges into receiving waters.

General Guidance

- The signs must be placed so they are easily visible to the public.
- Be aware that signs placed on sidewalk will be worn by foot traffic.

Design Specifications

- Signs with language and/or graphical icons that prohibit illegal dumping, must be posted at designated public access points along channels and streams within the project area. Consult with Los Angeles County Department of Public Works (LACDPW) staff to determine specific signage requirements for channels and streams.
- Storm drain message markers, placards, concrete stamps, or stenciled language/icons (e.g., “No Dumping – Drains to the Ocean”) are required at all storm drain inlets and catch basins within the project area to discourage illegal or inadvertent dumping. Signs should be placed in clear sight facing anyone approaching the storm drain inlet or catch basin from either side (see Figure D-1 and Figure D-2). LACDPW staff should be contacted to determine specific requirements for types of signs and methods of application. A stencil can be purchased for a nominal fee from LACDPW Building and Safety Office by calling (626) 458-3171. All storm drain inlet and catch basin locations must be identified on the project site map.

Maintenance Requirements

Legibility and visibility of markers and signs should be maintained (e.g., signs should be repainted or replaced as necessary). If required by LACDPW, the owner/operator or homeowner’s association shall enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards and signs.

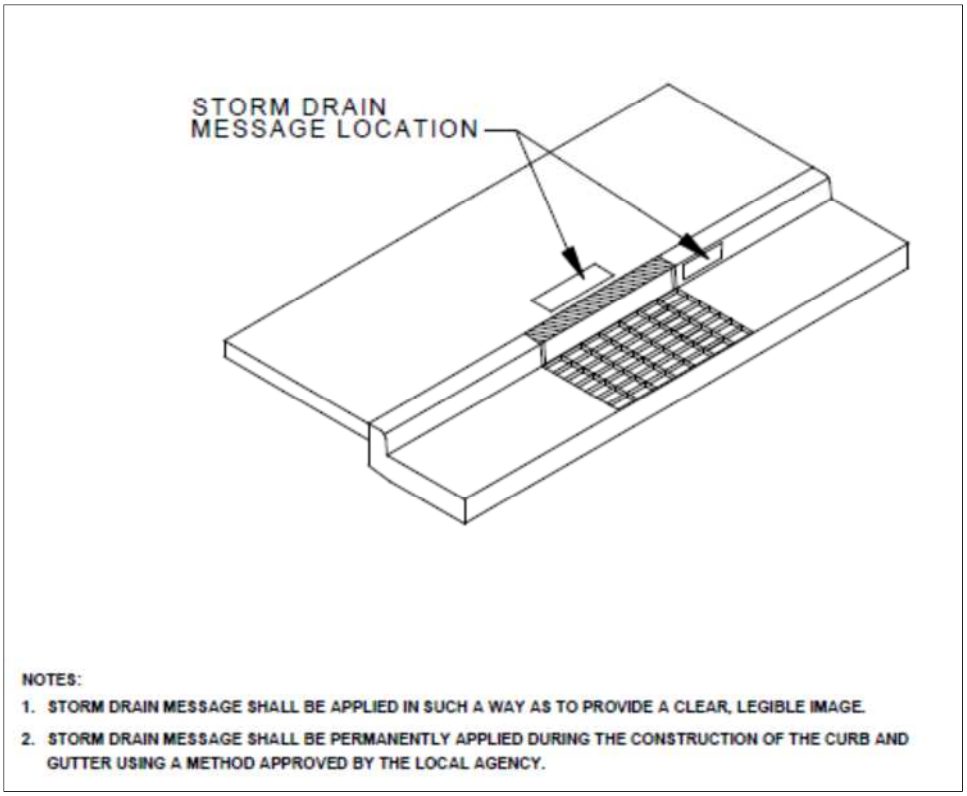

Figure D-1. Storm Drain Message Location – Curb Type Inlet

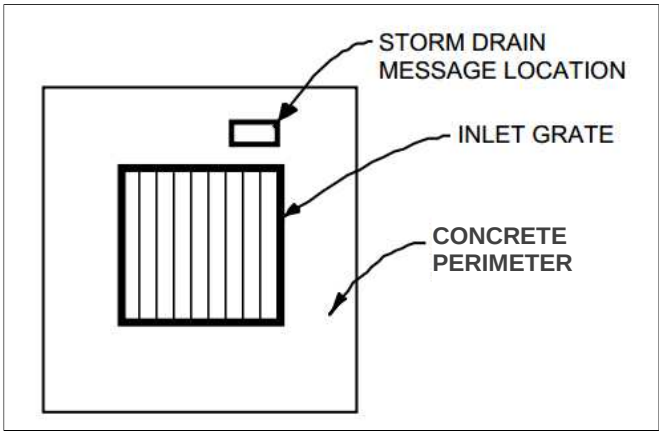

Figure D-2. Storm Drain Message Location – Catch Basin/Area Type Inlet

S-3: Outdoor Trash Storage and Waste Handling Area

Purpose

Stormwater runoff from areas where trash is stored or handled can be polluted. Loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or receiving waters. Waste handling operations (i.e., dumpsters, litter control, waste piles) may be sources of stormwater pollution.

Design Specifications

Wastes from commercial and industrial sites are typically hauled away for disposal by either public or commercial carriers that may have design or access requirements for waste storage areas. Design specifications for waste handling areas are regulated by local building and fire codes and by current County ordinances and zoning requirements. The design specifications, listed below in Table D-3, are recommendations and are not intended to conflict with requirements established by the waste hauler. The design specifications are intended to enhance local codes and ordinances while addressing stormwater runoff concerns. The waste hauler should be contacted prior to the design of trash storage and collection areas to determine established and accepted guidelines for designing trash collection areas. All hazardous waste must be handled in accordance with the legal requirements established in Title 22 of the California Code of Regulations. Conflicts or issues should be discussed with LACDPW staff.

Table D-3. Design Specifications for Outdoor Trash Storage and Waste Handling Area

Design Feature	Design Specifications
Surfacing	• Construct/pave outdoor trash storage and waste handling area with Portland cement concrete or an equivalent impervious surface.
Screens/Covers	• Install a screen or wall around trash storage area to prevent off-site transport of loose trash. • Use lined bins or dumpsters to reduce leaking of liquid wastes. • Use waterproof lids on bins/dumpsters or provide a roof to cover storage area enclosure (LACDPW discretion) to prevent precipitation from entering containers.
Grading/Drainage	• Berm and/or grade waste handling area to prevent stormwater run-on. • Locate waste handling area at least 35 feet from storm drains. • Divert drainage from adjoining roofs and pavement away from adjacent trash storage areas.
Signs	• Post signs on all dumpsters and/or inside enclosures prohibiting disposal of liquids and hazardous materials in accordance with any waste disposal ordinance.

Accumulated Water

Stormwater runoff, non-stormwater runoff, and spills will accumulate in containment areas and sumps with impervious surfaces. Contaminated accumulated water must be disposed of in accordance with applicable laws and regulations, and cannot be discharged directly to the storm drain or sanitary sewer system without appropriate permitting. Contact LACDPW (1-888-CLEAN-LA) for information regarding discharge of contaminated accumulated water.

Maintenance Requirements

The integrity of structural elements that are subject to damage (e.g., screens, covers, signs) must be maintained by the owner/operator as required by local codes and ordinances. Outdoor trash storage and waste handling areas must be checked periodically to ensure containment of accumulated water and prevention of stormwater run-on. Maintenance agreements between LACDPW and the owner/operator may be required. Failure to properly maintain building and property may subject the property owner to citation.

S-8: Landscape Irrigation Practices

Purpose

Irrigation runoff provides a pathway for pollutants (i.e., nutrients, bacteria, organics, sediment) to enter the storm drain system. By effectively irrigating, less runoff is produced resulting in less potential for pollutants to enter the storm drain system.

General Guidance

- Do not allow irrigation runoff from the landscaped area to drain directly to storm drain system.
- Minimize use of fertilizer, pesticides, and herbicides on landscaped areas.
- Plan sites with sufficient landscaped area and dispersal capacity (e.g., ability to receive irrigation water without generating runoff).
- Consult a landscape professional regarding appropriate plants, fertilizer, mulching applications, and irrigation requirements (if any) to ensure healthy vegetation growth.

Design Specifications

- Choose plants that minimize the need for fertilizer and pesticides.
- Group plants with similar water requirements and water accordingly.
- Use mulch to minimize evaporation and erosion.
- Include a vegetative boundary around project site to act as a filter.
- Design the irrigation system to only water areas that need it.
- Install an approved subsurface drip, pop-up, or other irrigation system.[1] The irrigation system should employ effective energy dissipation and uniform flow spreading methods to prevent erosion and facilitate efficient dispersion.
- Install rain sensors to shut off the irrigation system during and after storm events.
- Include pressure sensors to shut off flow-through system in case of sudden pressure drop. A sudden pressure drop may indicate a broken irrigation head or water line.
- If the hydraulic conductivity in the soil is not sufficient for the necessary water application rate, implement soil amendments to avoid potential geotechnical hazards (i.e., liquefaction, landslide, collapsible soils, and expansive soils).

[1] If alternative distribution systems (e.g., spray irrigation) are approved, the County will establish guidelines to implement these new systems.

- For sites located on or within 50 feet of a steep slope (15% or greater), do not irrigate landscape within three days of a storm event to avoid potential geotechnical instability.[2]
- Implement Integrated Pest Management practices.

For additional guidelines and requirements, refer to the Los Angeles County Department of Health Services.

Maintenance Requirements

Maintain irrigation areas to remove trash and debris and loose vegetation. Rehabilitate areas of bare soil. If a rain or pressure sensor is installed, it should be checked periodically to ensure proper function. Inspect and maintain irrigation equipment and components to ensure proper functionality. Clean equipment as necessary to prevent algae growth and vector breeding. Maintenance agreements between LACDPW and the owner/operator may be required. Failure to properly maintain building and property may subject the property owner to citation.

[2] As determined by the City of Los Angeles, Building and Safety Division

Roof Runoff Controls SD-11

Rain Garden

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain

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barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

Pop-up Drainage Emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Supplemental Information

Examples

- City of Ottawa's Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

Hager, Marty Catherine, Stormwater, "Low-Impact Development", January/February 2003. www.stormh2o.com

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD. www.lid-stormwater.net

Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition

Efficient Irrigation SD-12

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

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- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

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

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

Street Sweeping and Vacuuming SE-7

Objectives

EC	Erosion Control	
SE	Sediment Control	☒
TR	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.

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- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.
- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 yd^3 hopper) to $88/hour (9 yd^3 hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

Appendix C:
C.M.P. Infiltration System

RET-3: Infiltration Trench

Description

An infiltration trench is a narrow trench constructed in naturally pervious soils designed for retaining and infiltrating stormwater runoff into the underlying native soils and groundwater table. Infiltration trenches are typically filled with gravel and sand, although use of manufactured percolation tank modules may be considered in place of gravel fill. Infiltration trenches provide stormwater runoff treatment through a variety of natural mechanisms (i.e., filtration, adsorption, biological degradation) as water flows through the soil profile.

Infiltration trenches differ from infiltration basins in that the former are used for small drainage areas and stores stormwater runoff out of sight underground within the void spaces of rocks or stones or percolation tank modules. Infiltration basins are used for larger drainage areas and stormwater is stored within a visible ponded surface.

Infiltration vaults and infiltration leach fields are subsurface variations of the infiltration trench concept in which stormwater runoff is distributed to the upper zone of the subsurface gravel bed by means of perforated pipes.

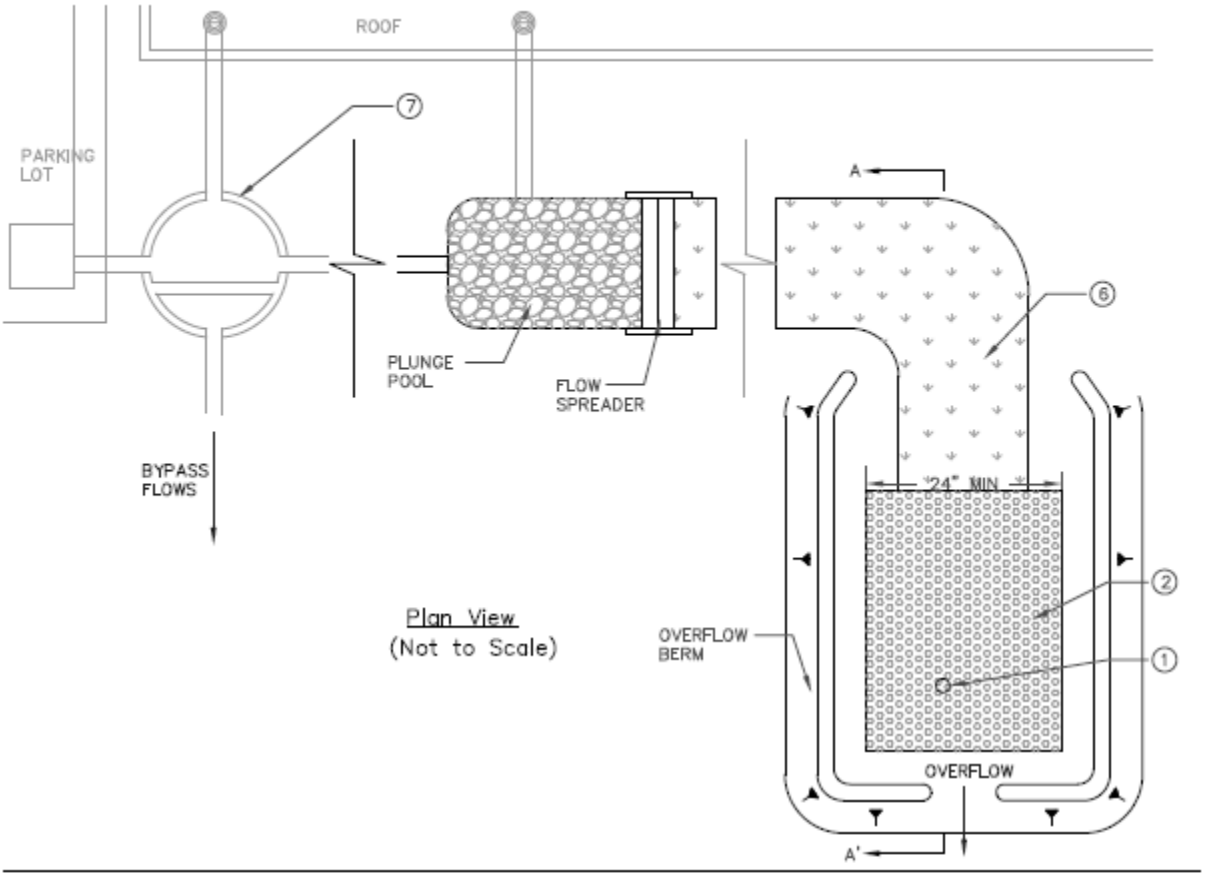
A schematic of a typical infiltration trench is presented in Figure E-3.

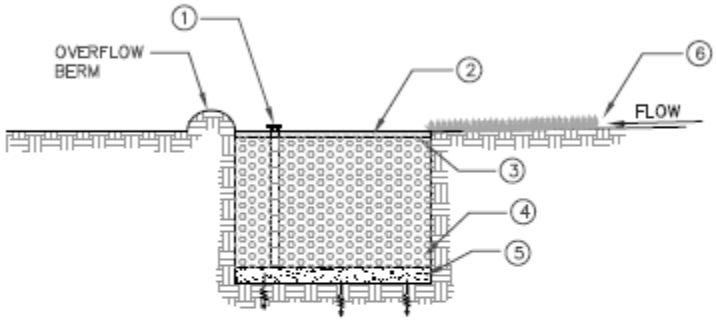
LID Ordinance Requirements

Infiltration trenches can be used to meet the on-site retention requirements of the LID Ordinance. Infiltration trenches will prevent pollutants in the SWQDv from being discharged off-site.

Advantages

- Reduces or eliminates stormwater runoff discharge to receiving water for most storm events
- Reduces peak stormwater runoff, which provides erosion control
- Provides groundwater recharge
- Provides effective treatment through settling and filtering while requiring relatively small space.
- Fits in narrow areas and unused areas of a development site.
- Is suitable for use when water is not available for irrigation or base flow.





NOTES:

1. OBSERVATION WELL WITH LOCKABLE ABOVE–GROUND CAP
2. 2" PEA GRAVEL FILTER LAYER
3. PROVIDE FILTER FABRIC IF NO PRETREATMENT IS PROVIDED
4. 3' – 5' DEEP TRENCH FILLED WITH 2" – 6" DIAMETER CLEAN STONE WITH 30% – 40% VOIDS
5. 6" DEEP SAND FILTER LAYER (OR FABRIC EQUIVALENT)
6. RUNOFF FILTERS THROUGH GRASS FILTER STRIP OR VEGETATED SWALE
7. OPTIONAL FLOW CONTROL DEVICE FOR OFF–LINE CONFIGURATIONS

Figure E-3. Infiltration Trench Schematic

Disadvantages

- Is not appropriate for areas with too low or too high permeability soils
- May not be appropriate for industrial sites or locations with contaminated soils or where spills may occur because of the potential threat to groundwater contamination
- Must be protected from high sediment loads
- May result in standing water, which may allow vector breeding
- Is not appropriate on fill or sites with steep slopes

General Constraints and Implementation Considerations

- Infiltration trenches can be integrated into open space buffers and other landscape areas.
- The potential for groundwater contamination must be carefully considered,. Infiltration trenches are not suitable for sites that:
    - Use or store chemicals or hazardous materials, unless they are prevented from entering the trench; or
    - Un-remediated “brownfield sites” where there is known groundwater or soil contamination.
- Infiltration trenches should be sited away from tree drip lines and kept free of vegetation.
- If the corrected in-situ infiltration rate exceed 2.4 in/hr, then stormwater runoff may need to be fully-treated with an upstream stormwater quality control measure prior to infiltration to protect groundwater quality.
- Infiltration trenches cannot be located on sites with a slope greater than 15 percent.
- Pretreatment to remove sediment is required to protect infiltration trench from high sediment loads.
- If possible, the entire tributary area of the infiltration trench should be stabilized before construction begins. If this is not possible, all flows should be diverted around the infiltration trench to protect it from sediment loads during construction or the top two inches of soil from the infiltration trench floor should be removed after the site has been stabilized. Excavated material should be stored such that it cannot be washed back into the infiltration trench if a storm occurs during construction.
- The equipment used to construct the infiltration trench should have extra wide low-pressure tires. Construction traffic should not enter the infiltration trench because it can compact soil, which reduces infiltration capacity. If heavy equipment is used on the base of the infiltration trench, the infiltrative capacity may be restored by tilling or aerating prior to placing the infiltrative bed.

- Clean, washed gravel should be placed in the excavated trench in lifts and lightly compacted with a plate compactor. Use of unwashed gravel can result in clogging.
- A geomembrane liner should be installed generously with overlapping seams on sides, bottom, and one foot below the surface of the infiltration trench.
- After construction is completed, the entire tributary area of the infiltration trench should be stabilized before allowing stormwater runoff to enter it.
- An observation well must be installed to check water levels, detention time, and evidence of clogging. An access road along the entire length of the infiltration trench is required unless it is located along an existing road or parking lot that can be safely used for maintenance access.

Design Specifications

The following sections provide design specifications for infiltration trenches.

Geotechnical

Due to the potential to contaminate groundwater, cause slope instability, impact surrounding structures, and potential for insufficient infiltration capacity, an extensive geotechnical site investigation must be conducted during the site planning process to verify site suitability for an infiltration trench. All geotechnical investigations must be performed according to the most recent GMED Policy GS 200.1. Soil infiltration rates and the groundwater table depth must be evaluated to ensure that conditions are satisfactory for proper operation of an infiltration trench. The project applicant must demonstrate through infiltration testing, soil logs, and the written opinion of a licensed civil engineer that sufficiently permeable soils exist on-site to allow the construction of a properly functioning infiltration trench.

Infiltration trenches are appropriate for soils with a minimum corrected in-situ infiltration rate of 0.3 in/hr. The geotechnical report must determine if the proposed project site is suitable for an infiltration trench and must recommend a design infiltration rate (see "Design Infiltration Rate" under the "Sizing" section). The geotechnical investigation should be such that a good understanding is gained as to how the stormwater runoff will move through the soil (horizontally or vertically) and if there are any geological conditions that could inhibit the movement of water.

Pretreatment

Pretreatment is important for all structural stormwater quality control measures, but it is particularly important for retention facilities. Pretreatment refers to design features that provide settling of large particles before stormwater runoff enters a stormwater quality control measure in order to reduce the long-term maintenance burden. Pretreatment should be provided to reduce the sediment load entering an infiltration trench in order to maintain the infiltration rate of the infiltration trench. To ensure that infiltration trenches are effective, the project applicant must incorporate pretreatment devices that provide

sediment reduction (e.g., vegetated swales, vegetated filter strips, sedimentation manholes, and proprietary devices).

Setbacks

Infiltration trenches must be sited following the setbacks from the most recent GMED Policy GS 200.1.

Geometry

- Infiltration trenches must be designed and constructed to be at least 24 inches wide and 3 to 5 feet deep.
- The longitudinal slope of the trench should not exceed three percent.
- The filter bed media layers must have the following composition and thickness:
    - Top layer: 2 inches of pea gravel
    - Middle layer: 3 to 5 feet of washed 2- to 6-inch gravel; void spaces should be approximately 30 to 40 percent
    - Bottom layer: 6 inches of sand or geomembrane liner equivalent.

Sizing

Infiltration trenches are sized a simple sizing method where the SWQDv must be completely infiltrated within 96 hours. Infiltration trenches provide stormwater runoff storage in the voids of the rock fill or percolation tank modules.

Step 1: Determine the SWQDv

Infiltration trenches must be designed to capture and retain the SWQDv (see Section 6 for SWQDv calculation procedures).

Step 2: Determine the design infiltration rate

Determine the corrected in-situ infiltration rate (f_{design}) of the native soil using the procedures described in the most recent GMED Policy GS 200.1.

Step 3: Calculate the surface area

Determine the size of the required infiltration surface by assuming the SWQDv will fill the available void spaces of the gravel storage layer. The maximum depth of stormwater runoff that can be infiltrated within the maximum retention time (96 hrs) is calculated using the following equation:

$$d_{max} = \frac{f_{design}}{12} \times t$$

Where:

d_{max} = Maximum depth of water that can be infiltrated within the maximum retention time [ft];
f_{design} = Design infiltration rate [in/hr]; and
t = Maximum retention time (max 96 hrs) [hr].

Select the infiltration trench depth (d_t) such that:

$$d_t \leq \frac{d_{max}}{n_t}$$

Where:

d_t = Depth of infiltration trench [ft];
d_{max} = Maximum depth of water that can be infiltrated within the maximum retention time [ft]; and
n_t = Infiltration trench fill porosity.

Calculate the infiltrating surface area (bottom of the infiltration trench) required:

$$A = \frac{SWQDv}{d_t \times n_t}$$

Where:

A = Surface area of the bottom of the infiltration trench [ft^2];
SWQDv = Stormwater quality design volume [ft^3];
d_t = Depth of infiltration trench fill [ft]; and
n_t = Infiltration trench porosity.

Flow Entrance and Energy Dissipation

Energy dissipation controls, constructed of sound materials such as stones, concrete, or proprietary devices that are rated to withstand the energy of the influent flow, must be installed at the inlet to the infiltration trench. Flow velocity at the inlet must be 4 ft/s or less. Consult with LACDPW for the type and design of energy dissipation structure.

Drainage

The specifications for designing drainage systems for infiltration trenches are presented below:

- The bottom of infiltration trench must be native soil that is over-excavated at least one foot in depth with the soil replaced uniformly without compaction. Amending the excavated soil with two to four inches (~15 to 30 percent) of coarse sand is recommended.

- The use of vertical piping, either for distribution or infiltration enhancement, is prohibited. This application may be classified as a Class V Injection Well per 40 CFR Part 146.5(e)(4).
- The infiltration capacity of the subsurface layers should be sufficient to ensure a maximum detention time of 96 hours. An observation well must be installed to allow observation of detention time.

Hydraulic Restriction Layer

The entire infiltrative area, including the side slopes must lined with a geomembrane liner to prevent soil from migrating into the top layer and reducing the infiltration capacity. The specifications of the geomembrane liner are presented in Table E-5. The entire trench area, including the sides, must be lined with a geomembrane liner prior to placing the media bed. Provide generous overlap at the seams.

Table E-5. Geomembrane Liner Specifications for Infiltration Trenches

Parameter	Test Method	Specifications
Material		Nonwoven geomembrane liner
Unit weight		8 oz/yd^3 (minimum)
Filtration rate		0.08 in/sec (minimum)
Puncture strength	ASTM D-751 (Modified)	125 lbs (minimum)
Mullen burst strength	ASTM D-751	400 lb/in^2 (minimum)
Tensile strength	AST D-1682	300 lbs (minimum)
Equiv. opening size	US Standard Sieve	No. 80 (minimum)

Observation Well

The observation well is a vertical section of perforated PVC pipe, four- to six-inch diameter, installed flush with the top of the infiltration trench on a footplate and with a locking, removable cap. The observation well is needed to monitor the infiltration rate in infiltration trench and is useful for marking the location of the infiltration trench.

Vegetation

- Infiltration trenches must be kept free of vegetation.
- Trees and other large vegetation should be planted away from infiltration trenches such that drip lines do not overhang the infiltration area.

Restricted Construction Materials

Use of pressure-treated wood or galvanized metal at or around an infiltration trench is prohibited.

Overflow Device

An overflow device must be provided in the event that stormwater runoff overtops the infiltration trench or if the infiltration trench becomes clogged. The overflow device must be able to convey stormwater runoff to a downstream conveyance system or other acceptable discharge point.

Maintenance Access

The infiltration trench must be safely accessible during wet and dry weather conditions if it is publicly-maintained. An access road along the entire length of the infiltration trench is required unless the trench is located along an existing road or parking lot that can be safely used for maintenance access. If the infiltration trench becomes plugged and fails, access is needed to excavate the infiltration trench and replace the filter bed media. All dimensions of the infiltration trench should also be increased by two inches to provide a fresh surface for infiltration. To prevent damage and compaction, access must able to accommodate a backhoe working at "arm's length" from the infiltration trench.

Maintenance Requirements

Maintenance and regular inspections are important for proper function of infiltration trenches. The following are general maintenance requirements:

- Conduct regular inspection and routine maintenance for pretreatment devices.
- Inspect infiltration trench and its observation well frequently to ensure that water infiltrates into the subsurface completely within the maximum detention time of 96 hours. If water is present in the observation well more than 96 hours after a major storm, the infiltration trench may be clogged. Maintenance activities triggered by a potentially clogged facility include:
    - Check for debris/sediment accumulation, rake surface and remove sediment (if any), and evaluate potential sources of sediment and vegetative or other debris (i.e., embankment erosion, channel scour, overhanging trees). If suspected upstream sources are outside of the County's jurisdiction, additional pretreatment (i.e., trash racks, vegetated swales) may be necessary.
    - Assess the condition of the top aggregate layer for sediment buildup and crusting. Remove the top layer of pea gravel and replace. If slow draining conditions persist, the entire infiltration trench may need to be excavated and replaced.
- Eliminate standing water to prevent vector breeding.
- Inspect infiltration trenches annually. Remove and dispose of trash and debris as needed, but at least prior to the beginning of the wet season.
- Inspect overflow devices for obstructions or debris, which should be removed immediately. Repair or replace damaged pipes upon discovery.

A summary of potential problems that may need to be addressed by maintenance activities is presented in Table E-6.

The County requires execution of a maintenance agreement to be recorded by the property owner for the on-going maintenance of any privately-maintained stormwater quality control measures. The property owner is responsible for compliance with the maintenance agreement. A sample maintenance agreement is presented in Appendix H.

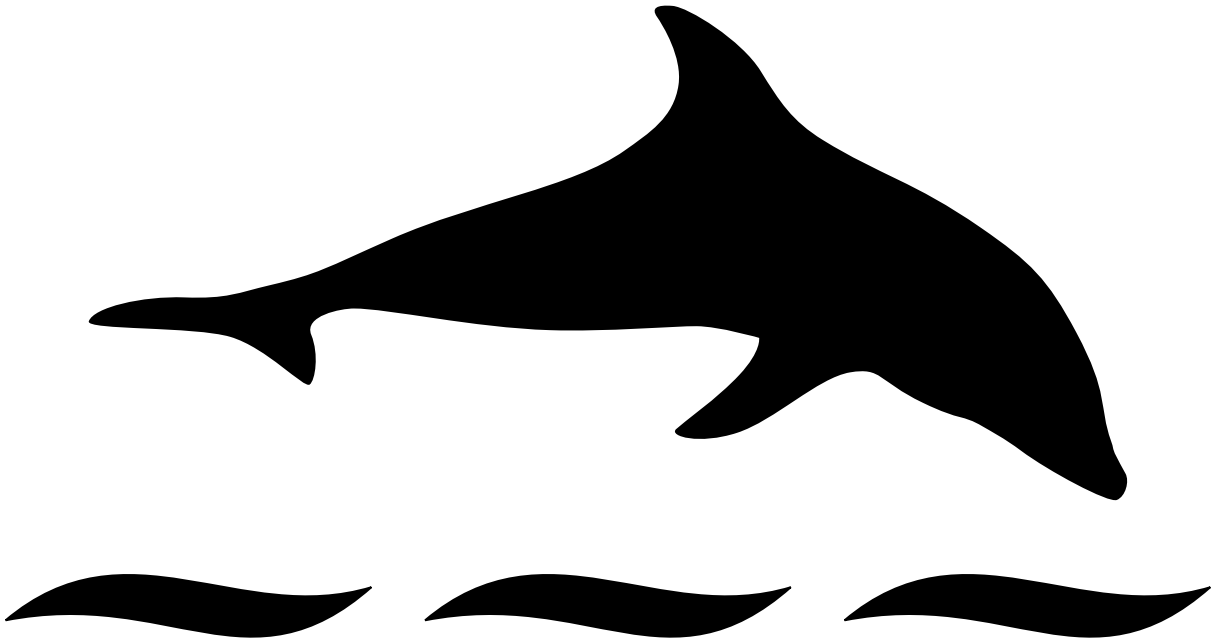
Table E-6. Infiltration Trench Troubleshooting Summary

Problem	Conditions When Maintenance Is Needed	Maintenance Required
Trash and Debris	Trash and debris > 5 ft^3/1,000 ft^2	Remove and dispose of trash and debris.
Contaminants and Pollution	Any evidence of oil, gasoline, contaminants, or other pollutants	Remove any evidence of visual contamination.
Erosion/Sediment Accumulation	Undercut or eroded areas at inlet structures	Repair eroded areas and re-grade if necessary.
	Accumulation of sediment, debris, and oil/grease in pretreatment devices	Remove sediment, debris, and/or oil/grease.
	Accumulation of sediment, debris, and oil/grease on surface, inlet or overflow structures	Remove sediment, debris, and/or oil/grease.
Water Drainage Rate	Standing water, or by inspection of observation wells	Remove the top layer of the infiltration trench bottom and replace if necessary.

Appendix D:
"NO DUMPING – DRAINS TO OCEAN" Stencil Examples

Sample Stencil 1

NO DUMPING



DRAINS TO OCEAN

Sample Stencil 2

Appendix E:
Catch Basin Cleaning

OPERATION & MAINTENANCE PLAN
FOR FILTER INSERT

The maintenance program will include the following key components:

1. **REGULAR SWEEPING AND REMOVAL OF DEBRIS:**
   Vehicle parking lot will be swept on a regular basis. Sediment and debris (litter, leaves, papers and cans, etc.) within the area, especially around the drainage inlet, will be collected and removed. The frequency of sweeping will be based on the amount of sediment and debris generated.

2. **REGULAR INSPECTIONS:**
   The catch basin, downspout, or trench drain filter insert will be inspected on a regular basis. The frequency of inspection will be based on pollutant loading, amount of debris, leaves, etc., and amount of runoff. At a minimum, there will be three inspections per year.

3. **CONDUCT OF THE VISUAL INSPECTION:**
   a. Broom sweep around the inlet and remove the inlet grate.
   b. Inspect the filter liner for serviceability. If called for, the filter body will be replaced.
   c. Check the condition of the adsorbent pouches and visually check the condition of the enclosed adsorbent. If the surface of the granules is more than 50% coated with a dark gray or black substance, the pouches will be replaced with new ones.
   d. Check for loose or missing nuts (on some models) and gaps between the filter and the inlet wall, which would allow bypass of the filter during low flows.
   e. The filter components will be replaced in the inlet and the grate replaced.

4. **CLEANING OUT THE FILTER INSERT:**
   Regardless of the model of filter insert, the devices must be cleaned out on a recurring basis. The manufacturer recommends at least three cleanings per year – more in high exposure areas. For the Flo-Gard+Plus filters, the filter must be cleaned when the solids level reaches close to the fullel tip.
   a. The Standard Filter, in most cases, can be cleaned out by removing the device from the inlet and dumping the contents into a DOT approved drum for later disposal. If the oil-absorbant pouches need to be changed, the time to change them is immediately after dumping and before the filter is replaced in the inlet.
   b. Because of weight, method of installation and so forth, some filter inserts will be cleaned with the aid of a vactor truck. If necessary, the oil-absorbant pouches will be changed after the pollutants have been removed and as the filter is being returned to service.

5. **MAINTENANCE LOG:**
   Keep a log of all inspections and maintenance performed on the catch basins, trench drains, and filter inserts. Keep this log on-site.

CATCH BASIN MAINTENANCE RECORD

SITE INFORMATION	
Contact:	Phone: ( )
Project Name:	
Address:	
Filter No. & Model:	

SERVICE INFORMATION		
Date of Service:	By:	
☐ Inspection	☐ Clean Debris	☐ Clean Silt/Sediment
☐ Replace Pouch	☐ Replace Rock	☐ Repair/Replace Parts
Comments:		
Approval Signature:		

SITE INFORMATION	
Contact:	Phone: ( )
Project Name:	
Address:	
Filter No. & Model:	

SERVICE INFORMATION		
Date of Service:	By:	
☐ Inspection	☐ Clean Debris	☐ Clean Silt/Sediment
☐ Replace Pouch	☐ Replace Rock	☐ Repair/Replace Parts
Comments:		
Approval Signature:		

CATCH BASIN MAINTENANCE RECORD

SITE INFORMATION		
Contact:	Phone: ( )	
Project Name:		
Address:		
Filter No. & Model:		

SERVICE INFORMATION		
Date of Service:	By:	
☐ Inspection	☐ Clean Debris	☐ Clean Silt/Sediment
☐ Replace Pouch	☐ Replace Rock	☐ Repair/Replace Parts
Comments:		
Approval Signature:		

SITE INFORMATION		
Contact:	Phone: ( )	
Project Name:		
Address:		
Filter No. & Model:		

SERVICE INFORMATION		
Date of Service:	By:	
☐ Inspection	☐ Clean Debris	☐ Clean Silt/Sediment
☐ Replace Pouch	☐ Replace Rock	☐ Repair/Replace Parts
Comments:		
Approval Signature:		

Appendix F:
Operation & Maintenance Plan

Contech® CMP Detention Inspection and Maintenance Guide

Underground stormwater detention and infiltration systems must be inspected and maintained at regular intervals for purposes of performance and longevity.

Inspection

Inspection is the key to effective maintenance of CMP detention systems and is easily performed. Contech recommends ongoing, annual inspections. Sites with high trash load or small outlet control orifices may need more frequent inspections. The rate at which the system collects pollutants will depend more on-site specific activities rather than the size or configuration of the system.

Inspections should be performed more often in equipment washdown areas, in climates where sanding and/or salting operations take place, and in other various instances in which one would expect higher accumulations of sediment or abrasive/corrosive conditions. A record of each inspection is to be maintained for the life of the system.

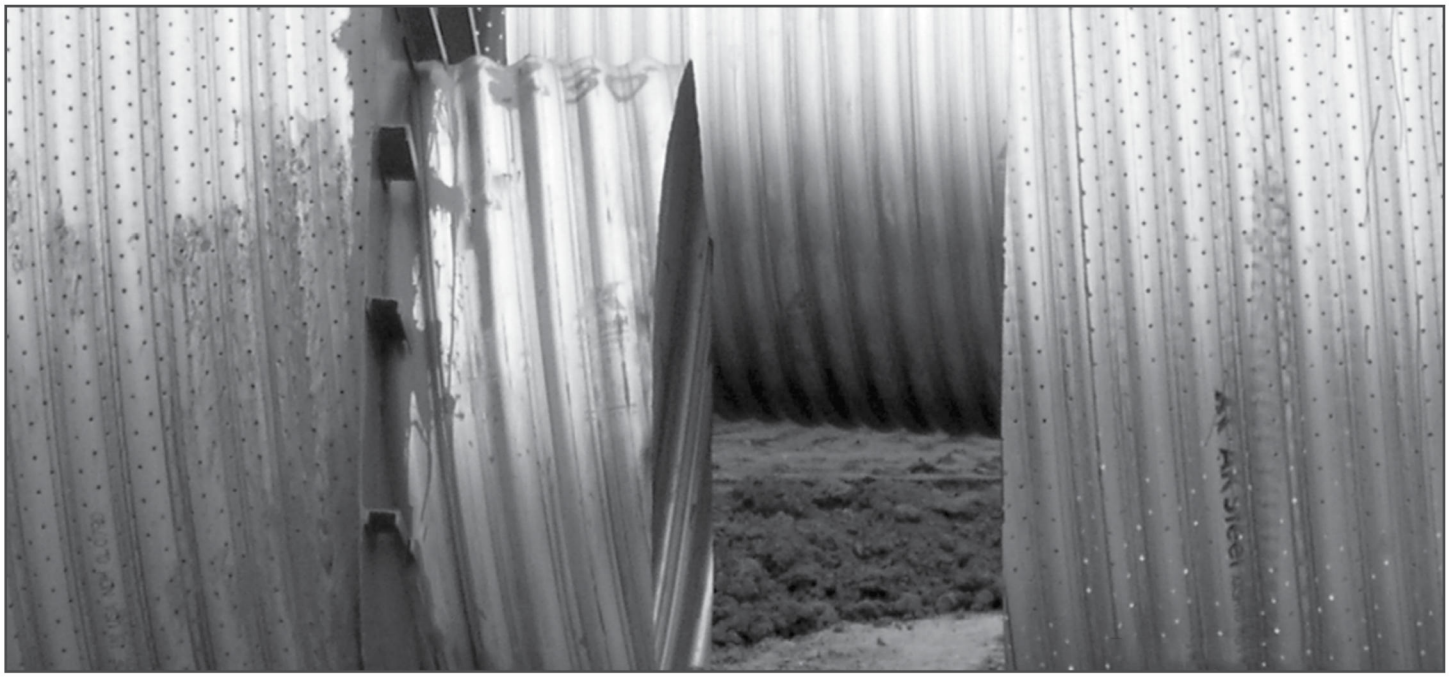
Maintenance

CMP detention systems should be cleaned when an inspection reveals accumulated sediment or trash is clogging the discharge orifice. Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities. Contech suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

Annual inspections are best practice for all underground systems. During this inspection if evidence of salting/de-icing agents is observed within the system, it is best practice for the system to be rinsed, including above the spring line soon after the spring thaw as part of the maintenance program for the system.

Maintaining an underground detention or infiltration system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

The foregoing inspection and maintenance efforts help ensure underground pipe systems used for stormwater storage continue to function as intended by identifying recommended regular inspection and maintenance practices. Inspection and maintenance related to the structural integrity of the pipe or the soundness of pipe joint connections is beyond the scope of this guide.



CONTECH®
CMP DETENTION SYSTEMS

CONTECH®
ENGINEERED SOLUTIONS

Appendix G:
Soils Report

February 10, 2023 Project No. 22116-01

Mr. Matthew J. Waken
MW Investment Group, LLC
27702 Crown Valley Parkway, Suite D-4-197
Ladera Ranch, CA 92694

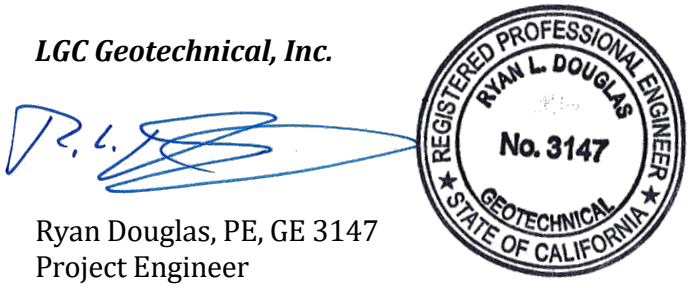
Subject: ***Preliminary Geotechnical Evaluation and Recommendations, Proposed Residential Development, 3700 Monterey Avenue, El Monte, California***

In accordance with your request and authorization, LGC Geotechnical, Inc. has performed a preliminary geotechnical evaluation for the proposed residential development located at 3700 Monterey Avenue in the City of El Monte, California. The purpose of our study was to evaluate the existing onsite geotechnical conditions and to provide geotechnical recommendations, including infiltration testing, relative to the proposed residential development.

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

Respectfully Submitted,

LGC Geotechnical, Inc.



Ryan Douglas, PE, GE 3147
Project Engineer

RLD/RNP/BPP/amm

Distribution: (1) Addressee (electronic copy)

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1.0 INTRODUCTION

1.1 Purpose and Scope of Services

This report presents the results of our preliminary geotechnical evaluation for the proposed approximately 4-acre residential development located at 3700 Monterey Avenue in the City of El Monte, California. Refer to the Site Location Map (Figure 1).

The purpose of our study was to provide a geotechnical evaluation relative to the proposed residential development. As part of our scope of work, we have: 1) reviewed available geotechnical information and in-house geologic maps pertinent to the site (Appendix A); 2) performed a subsurface geotechnical evaluation of the site consisting of the excavation and sampling of six small-diameter borings ranging from approximately 6.5 to 51.5 feet below existing ground surface, 3) performed three falling head infiltration tests within borings; 4) performed laboratory testing of select soil samples obtained during our subsurface evaluation; and 5) prepared this preliminary geotechnical summary report presenting our findings and preliminary conclusions and recommendations for the development of the proposed project.

It should be noted that our evaluation and this report only address geotechnical issues associated with the site and do not address any environmental issues.

1.2 Background

Review of historical aerials indicates the site consisted of several residential structures in the southern end and one large structure in the northern end of the site that were constructed prior to 1948. Between 1954 and 1964 a parking lot was constructed on the western portion of the site. Between 1988 and 1992 some of the residential structures in the northwestern portion of the site were demolished and an on-grade storage area was constructed. Between 2000 and 2003 the current parking lot in the northern portion of the site was constructed. Starting in 2012 buildings in the southern portion of the site were demolished and the remaining buildings were demolished by 2018. In 2018 an additional parking lot in the middle of the site was constructed. The site has remained largely the same since then (Historic Aerials, 2023).

1.3 Project Description

The approximately 4-acre site is bounded south by Valley Boulevard, to the west by Monterey Boulevard, to the north by railroad tracks and to the east by an existing industrial development. The site is currently occupied by vacant land, streets, and a parking lot.

Proposed development will consist of 87 multi-family units, streets, water quality systems, and associated improvements. The preliminary site plan (C&V Consulting, 2023) is presented on Figure 2, Geotechnical Map (rear of text). The proposed development will be on-grade with only minor grade changes anticipated. The proposed residential development is anticipated to consist of relatively light building loads (column and wall loads maximum of 20 kips and 2 kips per linear foot, respectively).

The recommendations given in this report are based upon at-grade structures with estimated structural loads and grading information indicated above. LGC Geotechnical should be provided with any updated project information, plans and/or any structural loads when they become available, in order to either confirm or modify the recommendations provided herein.

LGC Geotechnical, Inc.	

FIGURE 1
Site Location Map

PROJECT NAME	MWIG - El Monte
PROJECT NO.	22116-01
ENG. / GEOL.	RLD
SCALE	Not to Scale
DATE	February 2023

1.4 Subsurface Geotechnical Evaluation

A limited subsurface geotechnical evaluation of the site was performed by LGC Geotechnical. Our exploration program consisted of drilling and sampling six small-diameter exploratory hollow-stem borings (HS-1, HS-2, and I-1 through I-4) for the purpose of obtaining samples for evaluation and laboratory testing of site soils, with four of the borings (I-1 through I-4) utilized for infiltration testing. It should be noted, infiltration test boring I-1 was abandoned after multiple attempts resulted in drilling refusal on what appeared to be buried slurry and construction debris.

The borings were drilled by 2R Drilling under subcontract to LGC Geotechnical. The depths of the borings ranged from approximately 6.5 to 51.5 feet below existing grade. An LGC Geotechnical representative observed the drilling operations, logged the borings, and collected soil samples for laboratory testing. The borings were performed using a truck-mounted drill rig equipped with 6 and 8-inch-diameter hollow-stem augers. Bulk samples of the near-surface soils were logged and collected for laboratory testing from select borings. Driven soil samples were collected by means of the Standard Penetration Test (SPT) and Modified California Drive (MCD) sampler generally obtained at 2.5 and 5-foot vertical increments. The MCD is a split-barrel sampler with a tapered cutting tip and lined with a series of 1-inch-tall brass rings. The SPT sampler (1.4-inch ID) and MCD sampler (2.4-inch ID, 3.0-inch OD) were driven using a 140-pound automatic hammer falling 30 inches to advance the sampler a total depth of 18 inches or until refusal. The raw blow counts for each 6-inch increment of penetration were recorded on the boring logs. The borings were subsequently backfilled with bentonite chips and capped with asphalt cold patch, where necessary.

With I-1 omitted, infiltration testing was performed within the other three borings, I-2, I-3 and I-4, to depths of approximately 10 feet below existing grade. An LGC Geotechnical engineer installed standpipes, backfilled the borings with crushed rock and pre-soaked the infiltration holes prior to testing. Infiltration testing was performed per the County of Los Angeles testing guidelines (2021). Standpipes were removed and the locations were subsequently backfilled with native soils at the completion of testing. Some settlement of the backfill soils may occur over time.

The approximate locations of our subsurface explorations are provided on the Geotechnical Map (Figure 2). The boring and infiltration boring logs are provided in Appendix B.

1.5 Field Infiltration Testing

Three shallow infiltration test wells were installed in Borings I-2 through I-4 to an approximate depth of 10 feet below existing grade. Infiltration test boring I-1 only reached a depth of approximately 6.5 feet below existing grade and was abandoned due to drilling refusal on slurry and construction debris. The approximate infiltration boring locations are shown on the Geotechnical Map (Figure 2).

Estimation of infiltration rates was performed in general accordance with the "Boring Percolation Test Procedure" guidelines set forth by the County of Los Angeles testing guidelines (2021). The borings for the infiltration tests were excavated using a drill rig equipped with 8-inch diameter hollow-stem augers. A 3-inch diameter perforated PVC pipe

was placed in the borehole above a thin layer of gravel and the annulus was backfilled with gravel. Infiltration tests were performed using relatively clean water free of particulates, silt, etc. The infiltration wells were pre-soaked during the day of drilling and a 30-minute pre-test was performed during the day of testing. During the pre-test, water was added to the boring and was observed after 10 minutes and 30 minutes to determine test methodology. The water remained in all three borings (I-2 through I-4) after 30 minutes. Therefore, the test procedure utilizing a thirty-minute reading interval was performed on all infiltration test holes. Readings were taken a minimum of 6 times or until a "stabilized rate" was established. A "stabilized rate" is when the highest and lowest readings are within 10 percent of each other over three consecutive readings. At the completion of infiltration testing, the pipe was removed, and the holes were backfilled and tamped. Some settlement of the backfill should be expected.

Based on the County of Los Angeles testing guidelines (2021), the infiltration rate is calculated by dividing the volume of water discharged by the surface area of the test section (including the sidewalls and bottom of the boring) over a specific time period. The measured infiltration rate is taken as the average of the last three readings during which a "stabilized rate" is achieved. The measured infiltration rates are provided in Table 1 below.

TABLE 1

Summary of Field Infiltration Testing

Infiltration Test Location	Approximate Infiltration Test Depth (ft)	Measured Infiltration Rate* (inch/hr.)
I-2	10.0	2.9
I-3	10.0	1.9
I-4	10.0	2.3

*Does Not Include Required Reduction Factors for Design.

Please note that the values provided in Table 1 do not include reduction factors associated with the test procedure, site variability, and long-term siltation plugging that are used to calculate the design infiltration rate. Infiltration test data is presented in Appendix D. Refer to Section 4.6 for recommendations regarding infiltration of stormwater.

1.6 Laboratory Testing

Representative bulk, grab, and driven (relatively undisturbed) samples were retained for laboratory testing during our field evaluation. Laboratory testing included in-situ moisture content and in-situ dry density, fines content, Atterberg limits, collapse/swell potential, expansion index, laboratory compaction, and corrosion (sulfate, chloride, pH and minimum resistivity).

The following is a summary of the laboratory test results:

- Dry density of the samples collected ranged from approximately 78 pounds per cubic foot (pcf) to 110 pcf, with an average of 96 pcf. Field moisture contents ranged from approximately 2 to 32 percent, with an average of approximately 12 percent.
- Four sieve particle size analyses test were performed and indicated a fines content (passing No. 200 sieve) ranging from 7 to 56 percent.
- One Atterberg Limit (liquid limit and plastic limit) test was performed. Results indicated a Plasticity Index (PI) value of 9.
- Two swell/collapse tests performed. Results are provided in Appendix C.
- Expansion potential testing indicated an expansion index of 2, corresponding to "Very Low" expansion potential.
- Laboratory compaction of a near-surface bulk sample resulted in a maximum dry density of 115.0 pcf at an optimum moisture content of 14.0 percent.
- Corrosion testing indicated soluble sulfate content of less than 0.04 percent, a chloride content of 262 parts per million (ppm), pH of 7.84 and a minimum resistivity of 1,200 ohm-centimeters.

A summary of the laboratory test results is presented in Appendix C. The moisture and dry density results are presented on the boring logs in Appendix B.

2.0 GEOTECHNICAL CONDITIONS

2.1 Regional Geology

The subject site is generally located within the Peninsular Ranges Geomorphic Province of California, more specifically within the San Gabriel Valley which is located along the southern boundary of the San Gabriel Mountains. As the adjacent San Gabriel Mountains have uplifted, the San Gabriel Valley has subsided and filled with sediment. Large river systems in the San Gabriel Mountains, along with smaller localized streams, have deposited broad alluvial fans that cover the majority of the San Gabriel Valley. As such, the site is underlain at depth by unconsolidated alluvial sediments mapped as alluvial gravel, sand and silt of valleys and flood plains.

2.2 Site-Specific Geology and Generalized Subsurface Conditions

Based on the results of our subsurface evaluation, we encountered varying amounts of undocumented artificial fill ranging in depth from approximately 0 to 7.5 feet below existing ground surface, underlain by surficial sediments mapped as Holocene young alluvial deposits. These sediments are associated primarily with flood deposits of the north-south trending San Gabriel and Rio Hondo River system located to the east and west of the subject site, respectively.

The field explorations (borings) indicate the native alluvial soils generally consist of variable amounts of sand, silt, and gravel, that is light brown to brown, slightly moist to very moist, and generally medium dense/medium stiff to very dense/very stiff, to the maximum explored depth of approximately 51.5 feet below existing grade.

The undocumented artificial fill encountered within portions of the site consist of loose to medium dense silty sand and sandy silt. Slurry, construction debris, trash and soil were found intermixed within the undocumented fill. This material is unsuitable for support of residential buildings and should be removed and recompacted per our recommendations.

It should be noted that borings are only representative of the location and time where/when they are performed and varying subsurface conditions may exist outside of the performed location. In addition, subsurface conditions can change over time. The soil descriptions provided above should not be construed to mean that the subsurface profile is uniform, and that soil is homogeneous within the project area. For details on the stratigraphy at the exploration locations, refer to Appendix B.

2.3 Groundwater

Groundwater was not encountered to the maximum depth of approximately 51.5 feet below existing ground surface during our subsurface evaluation. The bottom of the nearby Rio Hondo River located less than approximately 1,000 feet to the west of the subject site is situated approximately 25 feet lower in elevation than the subject site. It is reasonable to assume the historic high groundwater would be controlled by the adjacent Rio Hondo River thalweg;

therefore, we recommend the historic high groundwater for the subject site be conservatively assumed at a depth of 25 feet below existing grade.

Seasonal fluctuations of groundwater elevations should be expected over time. In general, groundwater levels fluctuate with the seasons and local zones of perched groundwater may be present due to local seepage caused by irrigation and/or recent precipitation. Local perched groundwater conditions or surface seepage may develop once site development is completed.

2.4 Seismic Design Criteria

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2022 California Building Code (CBC) and applicable portions of ASCE 7-16 which has been adopted by the CBC. Since the site contain soils that are susceptible to liquefaction (refer to section below "Liquefaction and Dynamic Settlement"), ASCE 7-16 which has been adopted by the CBC requires that site soils be assigned Site Class "F" and a site-specific response spectrum be performed. However, in accordance with Section 20.3.1 of ASCE 7-16, if the fundamental periods of vibration of the planned structure are equal to or less than 0.5 seconds, a site-specific response spectrum is not required and ASCE 7-16/2022 CBC site class and seismic parameters may be used in lieu of a site-specific response spectrum. **It should be noted that the seismic parameters provided herein are not applicable for any structure having a fundamental period of vibration greater than 0.5 seconds. Additionally, the following seismic parameters are only applicable for code-based acceleration response spectra and are not applicable for where site-specific ground motion procedures are required by ASCE 7-16.** Representative site coordinates of latitude 34.07785 degrees north and longitude -118.03746 degrees west were utilized in our analyses. The maximum considered earthquake (MCE) spectral response accelerations (S_{MS} and S_{M1}) and adjusted design spectral response acceleration parameters (S_{DS} and S_{D1}) for Site Class D are provided in Table 2 on the following page. The structural designer should contact the geotechnical consultant if structural conditions (e.g., number of stories, seismically isolated structures, etc.) require site-specific ground motions.

A deaggregation of the PGA based on a 2,475-year average return period (MCE) indicates that an earthquake magnitude of 6.93 at a distance of approximately 11.22 km from the site would contribute the most to this ground motion (USGS, 2014).

Section 1803.5.12 of the 2022 CBC (per Section 11.8.3 of ASCE 7) states that the maximum considered earthquake geometric mean (MCE_G) Peak Ground Acceleration (PGA) should be used for liquefaction potential. The PGA_M for the site is equal to 0.884g (SEAOC, 2022).

TABLE 2

Seismic Design Parameters

Selected Parameters from 2022 CBC, Section 1613 - Earthquake Loads	Seismic Design Values	Notes/Exceptions
Distance to applicable faults classifies the site as a "Near-Fault" site.		Section 11.4.1 of ASCE 7
Site Class	D*	Chapter 20 of ASCE 7
Ss (Risk-Targeted Spectral Acceleration for Short Periods)	1.868g	From SEAOC, 2022
S_1 (Risk-Targeted Spectral Accelerations for 1-Second Periods)	0.678g	From SEAOC, 2022
F_a (per Table 1613.2.3(1))	1.000	For Simplified Design Procedure of Section 12.14 of ASCE 7, F_a shall be taken as 1.4 (Section 12.14.8.1)
F_v (per Table 1613.2.3(2))	1.700	Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7
S_{MS} for Site Class D [Note: $S_{MS} = F_aS_S$]	1.868g	-
S_{M1} for Site Class D [Note: $S_{M1} = F_vS_1$]	1.153g	Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7
S_{DS} for Site Class D [Note: $S_{DS} = (^2/_3)S_{MS}$]	1.245	-
S_{D1} for Site Class D [Note: $S_{D1} = (^2/_3)S_{M1}$]	0.768g	Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7
C_{RS} (Mapped Risk Coefficient at 0.2 sec)	0.897	ASCE 7 Chapter 22
C_{R1} (Mapped Risk Coefficient at 1 sec)	0.896	ASCE 7 Chapter 22
*Since site soils are Site Class D and S_1 is greater than or equal to 0.2, the seismic response coefficient Cs is determined by Eq. 12.8-2 for values of $T \leq 1.5T_s$ and taken equal to 1.5 times the value calculated in accordance with either Eq. 12.8-3 for $T_L \geq T > T_s$, or Eq. 12.8-4 for $T > T_L$. Refer to ASCE 7-16.		

2.5 Faulting

The subject site is not located within a State of California Earthquake Fault Zone (i.e., Alquist-Priolo Earthquake Fault Act Zone) and no active faults are known to cross the site (CGS, 2017). The possibility of damage due to ground rupture is considered low since no active faults are known to cross the site.

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the

Southern California region, which may affect the site, include ground lurching and shallow ground rupture, soil liquefaction, and dynamic settlement. These secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault and the onsite geology. The closest major active faults that could produce these secondary effects include the Raymond, Elysian Park, Elsinore, and Sierra Madre Faults among others (USGS, 2014). A discussion of these secondary effects is provided in the following sections.

2.5.1 Liquefaction and Dynamic Settlement

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

Based on our review of the State of California Seismic Hazard Zone for liquefaction potential for the El Monte Quadrangle (CGS, 2017), the site is located within a liquefaction hazard zone. Subsurface field data indicates that the site contains isolated sandy layers susceptible to liquefaction interfingered with fine-grained non-liquefiable soils and dense sands. Groundwater was not encountered during our recent evaluation to a maximum explored depth of approximately 50 feet; therefore, an in-situ groundwater depth of 50 feet below existing grade and historic high groundwater depth of 25 feet below existing grade were used in the liquefaction analysis. Liquefaction potential was evaluated using the procedures outlined by Special Publication 117A (SCEC, 1999 & CGS, 2008) and the applicable seismic criteria (e.g., 2022 CBC). Liquefaction induced settlement was estimated using the PGA_M per the 2022 CBC and a moment magnitude of 6.93 (USGS, 2014).

Results indicate total seismic settlement on the order of 2 inches. Differential seismic settlement can be estimated as half of the total estimated seismic settlement over a horizontal span of about 40 feet. This can be mitigated by constructing a lightly stiffened post-tensioned slab (interconnecting isolated pad footings with grade beams) placed over compacted fill per our recommendations.

2.5.2 Lateral Spreading

Lateral spreading is a type of liquefaction-induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluid mass,

gravity plus the earthquake inertial forces may cause the mass to move downslope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements and such movement typically damages pipelines, utilities, bridges, and structures.

Due to the lack of nearby "free face" conditions, the potential for lateral spreading is considered very low.

2.6 Oversized Material

Oversized material (material larger than 8 inches in maximum dimension) will likely be encountered within the undocumented artificial fill materials. These oversized materials are expected to consist of construction debris, concrete, slurry and trash produced as a result of demolition of the previous site improvements. If encountered recommendations are provided for appropriate handling of oversized materials in Appendix E.

The oversized construction debris and trash (besides concrete without rebar and asphalt) should be exported from the site. If feasible, crushing oversized materials onsite or exporting oversized materials may be considered. Incorporating oversized materials into "rock fills" (windrows, rock blankets or individual rock burial) is likely not feasible due to the limited depth of grading. Special handling recommendations should be provided on a case-by-case basis, if necessary.

2.7 Expansion Potential

Based on the results of our laboratory testing, site soils are anticipated to have a "Very Low" expansion potential. Final expansion potential of site soils should be determined at the completion of grading. Results of expansion testing at finish grades will be utilized to confirm final foundation design.

3.0 CONCLUSIONS

Based on the results of our geotechnical evaluation, it is our opinion that the proposed development is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are implemented.

The following is a summary of the primary geotechnical factors that may affect future development of the site:

- In general, field explorations (borings) indicate primarily native soils consisting of variable amounts of sand and silt, which is brown to light brown, dry to moist, and medium dense/medium stiff to very dense/very stiff, to the maximum explored depth of approximately 51.5 feet below existing grade. Variable amounts of undocumented artificial fill are present in portions of the site. The near-surface loose and compressible soils are not suitable for the planned improvements in their present condition (refer to Section 4.1).
- Groundwater was not encountered during our subsurface evaluation to the maximum explored depth of approximately 51.5 feet below current grade. The bottom of the nearby Rio Hondo River located less than approximately 1,000 feet to the west of the subject site is situated approximately 25 feet lower in elevation than the subject site; therefore, we recommend the historic high groundwater for the subject site be conservatively assumed at a depth of 25 feet below existing grade.
- Active or potentially active faults are not known to exist on or in the immediate vicinity of the site. The main seismic hazard that may affect the site is from ground shaking from one of the active regional faults. The subject site will likely experience strong seismic ground shaking during its design life.
- The site is located within a State of California Seismic Hazard Zone for liquefaction potential (CGS, 2017).
- Based on the results of preliminary laboratory testing, site soils are anticipated to have "Very Low" expansion potential. Final design expansion potential must be determined at the completion of grading.
- Some of the onsite soils may not be suitable for retaining wall backfill due to the material size (greater than 3 inches in maximum dimension) and fines content. Therefore, select grading, screening and stockpiling of the onsite sandy soils or import of sandy soils meeting the criteria outlined above should be anticipated by the contractor for obtaining suitable retaining wall backfill soil.
- Excavations into the existing site soils should be feasible with heavy construction equipment in good working order. From a geotechnical perspective, the existing onsite soils are suitable material for use as fill, provided that they are relatively free from rocks (larger than 8 inches in maximum dimension), construction debris, and significant organic material.
- Oversized material (material larger than 8 inches in maximum dimension) will likely be encountered within the undocumented artificial fill materials. These oversized materials are expected to consist of construction debris, concrete, slurry, and trash produced as a result of demolition of the previous site improvements. The oversized construction debris and trash (besides concrete without rebar and asphalt) should be exported from the site. Incorporating the oversized material into "rock fills" is likely not feasible due to the limited depth of grading.

4.0 PRELIMINARY RECOMMENDATIONS

The following recommendations are to be considered preliminary and should be confirmed upon completion of grading and earthwork operations. In addition, they should be considered minimal from a geotechnical viewpoint, as there may be more restrictive requirements from the architect, structural engineer, building codes, governing agencies, or the owner.

It should be noted that the following geotechnical recommendations are intended to provide sufficient information to develop the site in general accordance with the 2022 CBC requirements. With regard to the potential occurrence of potentially catastrophic geotechnical hazards such as fault rupture, earthquake-induced landslides, liquefaction, etc. the following geotechnical recommendations should provide adequate protection for the proposed development to the extent required to reduce seismic risk to an "acceptable level." The "acceptable level" of risk is defined by the California Code of Regulations as "that level that provides reasonable protection of the public safety, though it does not necessarily ensure continued structural integrity and functionality of the project" [Section 3721(a)]. Therefore, repair and remedial work of the proposed improvements may be required after a significant seismic event. With regards to the potential for less significant geologic hazards to the proposed development, the recommendations contained herein are intended as a reasonable protection against the potential damaging effects of geotechnical phenomena such as expansive soils, fill settlement, groundwater seepage, etc. It should be understood, however, that although our recommendations are intended to maintain the structural integrity of the proposed development and structures given the site geotechnical conditions, they cannot preclude the potential for some cosmetic distress or nuisance issues to develop as a result of the site geotechnical conditions.

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

4.1 Site Earthwork

We anticipate that earthwork at the site will consist of the removal of existing improvements associated with the former land use followed by the required earthwork removals, precise grading and construction of the proposed new improvements, including the residential structures, subsurface utilities, interior streets, etc.

We recommend that earthwork onsite be performed in accordance with the following recommendations, future grading plan review report(s), the 2022 CBC/City of El Monte grading requirements, and the General Earthwork and Grading Specifications included in Appendix E. In case of conflict, the following recommendations shall supersede those included in Appendix E. The following recommendations should be considered preliminary and may be revised within the future grading plan review report or based on the actual conditions encountered during site grading.

4.1.1 Site Preparation

Prior to grading of areas to receive structural fill or engineered improvements, the areas should be cleared of existing asphalt, surface obstructions, and demolition debris.

Vegetation and debris should be removed and properly disposed of off-site. Holes resulting from the removal of buried obstructions, which extend below proposed finish grades, should be replaced with suitable compacted fill material. Any abandoned sewer or storm drain lines should be completely removed and replaced with properly placed compacted fill. Deeper demolition may be required in order to remove existing foundations. We recommend the trenches associated with demolition which extend below the remedial grading depth be backfilled and properly compacted prior to the demolition contractor leaving the site.

If cesspools or septic systems are encountered, they should be removed in their entirety. The resulting excavation should be backfilled with properly compacted fill soils. As an alternative, cesspools can be backfilled with lean sand-cement slurry. Any encountered wells should be properly abandoned in accordance with regulatory requirements. At the conclusion of the clearing operations, a representative of LGC Geotechnical should observe and accept the site prior to further grading.

4.1.2 Removal and Recompaction Depths and Limits

In order to provide a relatively uniform bearing condition for the planned building structures, upper loose/compressible soils are to be temporarily removed and recompacted as properly compacted fills. Existing undocumented artificial fill within the influence of the proposed structural improvements should be removed to suitable, competent native materials prior to placement of artificial fill to design grades. For preliminary planning purposes, the depth of required removals and recompaction may be estimated as indicated below. It should be noted that updated recommendations may be required based on changes to building layouts and/or grading plan.

Building Structures: Estimated removal and recompaction depths range from approximately 5 to 7.5 feet below existing grade within the influence of proposed building pads. However, deeper removal and recompaction may be required during grading if undocumented artificial fills extend below the estimated removal bottoms. Estimated depths of temporary removal and recompaction are depicted on the Geotechnical Map (Figure 2). We recommend a minimum removal and recompaction depth of 5 feet below existing grade for areas not identified on the Geotechnical Map. Where space is available, the envelope for removal and recompaction should extend laterally a minimum distance equal to the depth of removal and recompaction below finish grade or 5 feet beyond the edges of the proposed building improvements, whichever is larger.

Minor Site Structures: For minor site structures such as free-standing walls, retaining walls, etc., temporary removal and recompaction should extend a minimum of 3 feet below existing grade or 2 feet below proposed footings, whichever is greater. Where space is available, the envelope for removal and recompaction should extend laterally a minimum distance of 3 feet beyond the edges of the proposed minor site structure improvements.

Pavement and Hardscape Areas: Within pavement and hardscape areas, temporary removal and recompaction should extend to a depth of at least 2 feet below existing grade

or 2 feet below the bottom of the pavement section, whichever is deeper. Pavement areas encountering undocumented fill materials may require deeper removal and recompaction and should be determined based on the conditions exposed during grading. In general, the envelope for removal and recompaction should extend laterally a minimum lateral distance of 2 feet beyond the edges of the proposed pavement or hardscape improvements.

Local conditions may be encountered during excavation that could require additional over-excavation beyond the above noted minimum in order to obtain an acceptable subgrade. The actual depths and lateral extents of grading will be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Removal areas and areas to be over-excavated should be accurately staked in the field by the Project Surveyor.

4.1.3 Temporary Excavations

Temporary excavations should be performed in accordance with project plans, specifications, and all Occupational Safety and Health Administration (OSHA) requirements. Excavations should be laid back or shored in accordance with OSHA requirements before personnel or equipment are allowed to enter.

Based on our field evaluation, the majority of the site soils within the upper 5 to 10 feet are anticipated to be OSHA Type "B" soils (refer to the attached boring logs). Sandy soils are present and should be considered susceptible to caving. Soil conditions should be regularly evaluated during construction to verify conditions are as anticipated. The contractor shall be responsible for providing the "competent person", required by OSHA standards, to evaluate soil conditions. Close coordination with the geotechnical consultant should be maintained to facilitate construction while providing safe excavations. Excavation safety is the sole responsibility of the contractor.

Where proposed improvements will be adjacent to property lines, the potential for impacting existing offsite improvements may be reduced by performing "ABC" slot cuts while performing earthwork removal and recompaction. "ABC" slot cuts are defined as excavations perpendicular to sensitive property boundaries that are divided into multiple "slots" of equal width. If slots are labeled A, B, C, A, B, C, etc., then all "A" slots can be excavated at the same time but must be backfilled before all "B" slots can be excavated, etc. Any given slot should be backfilled immediately with properly compacted fill to finish grade prior to excavation of the adjacent two slots. Please note sands susceptible to caving are present at the site. Recommendations for slot cut dimensions should be evaluated during grading. Protection of the existing offsite improvements during grading is the responsibility of the contractor.

Vehicular traffic, stockpiles, and equipment storage should be set back from the perimeter of excavations a distance equivalent to a 1:1 projection from the bottom of the excavation. Once an excavation has been initiated, it should be backfilled as soon as practical. Prolonged exposure of temporary excavations may result in some localized instability. Excavations should be planned so that they are not initiated without sufficient time to shore/fill them prior to weekends, holidays, or forecasted rain.

It should be noted that any excavation that extends below a 1:1 (horizontal to vertical) projection of an existing foundation will remove existing support of the structure foundation. If requested, temporary shoring parameters will be provided.

4.1.4 Removal Bottoms and Subgrade Preparation

In general, removal bottom areas and any areas to receive compacted fill should be scarified to a minimum depth of 6 inches, brought to near-optimum moisture content (generally within optimum and 2 percent above optimum moisture content), and re-compacted per project recommendations.

Removal bottoms, over-excavation bottoms and areas to receive fill should be observed and accepted by the geotechnical consultant prior to subsequent fill placement. Soil subgrade for planned footings and improvements (e.g., slabs, etc.) should be firm and competent.

4.1.5 Material for Fill

From a geotechnical perspective, the onsite soils are generally considered suitable for use as general compacted fill, provided they are screened of organic materials, construction debris and oversized material (8 inches in greatest dimension).

From a geotechnical viewpoint, any required import soils for general fill (i.e., non-retaining wall backfill) should consist of clean, granular soils of "Very Low" expansion potential (expansion index 20 or less based on ASTM D 4829), and generally free of organic materials, construction debris and material greater than 3 inches in maximum dimension. Import for required retaining wall backfill should meet the criteria outlined in the following paragraph. Source samples should be provided to the geotechnical consultant for laboratory testing a minimum of four working days prior to planned importation.

Retaining wall backfill should consist of sandy soils with a maximum of 35 percent fines (passing the No. 200 sieve) per American Society for Testing and Materials (ASTM) Test Method D1140 (or ASTM D6913/D422) and a "Very Low" expansion potential (EI of 20 or less per ASTM D4829). Soils should also be screened of organic materials, construction debris, and any material greater than 3 inches in maximum dimension. Some of the onsite soils may not be suitable for retaining wall backfill due to the material size (greater than 3 inches in maximum dimension) and fines content. Therefore, select grading, screening and stockpiling of the onsite sandy soils or import of sandy soils meeting the criteria outlined above should be anticipated by the contractor for obtaining suitable retaining wall backfill soil.

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

The placement of demolition materials in compacted fill is acceptable from a geotechnical viewpoint provided the demolition material is broken up into pieces not larger than approximately 2 to 4-inches in maximum dimension, and well blended into fill soils with essentially no resulting voids. Demolition material placed in fills must be free of construction debris (wood, brick, etc.) and reinforcing steel. If asphalt concrete fragments will be incorporated into the demolition materials, approval from an environmental viewpoint may be required and is not the purview of the geotechnical consultant. From our previous experience, we recommend that asphalt concrete fragments be limited to fill areas within planned streets, alleys or non-structural areas (i.e., not within building pad areas).

4.1.6 Placement and Compaction of Fills

Material to be placed as fill should be brought to near-optimum moisture content (generally within optimum and 2 percent above optimum moisture content) and recompacted to at least 90 percent relative compaction (per ASTM D1557). Moisture conditioning of site soils will be required in order to achieve adequate compaction. Soils are present that will require additional moisture in order to achieve the required compaction. Drying and/or mixing the very moist soils may also be required prior to reusing the materials in compacted fills.

The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in compacted thickness. Each lift should be thoroughly compacted and accepted prior to subsequent lifts. Generally, placement and compaction of fill should be performed in accordance with local grading ordinances and with observation and testing performed by the geotechnical consultant. Oversized material as previously defined should be removed from site fills. During backfill of excavations, the fill should be properly benched into firm and competent soils of temporary backcut slopes as it is placed in lifts.

Aggregate base material should be compacted to at least 95 percent relative compaction at or slightly above optimum moisture content per ASTM D1557. Subgrade below aggregate base should be compacted to at least 90 percent relative compaction per ASTM D1557 at or slightly above optimum moisture content (generally within optimum and 2 percent above optimum moisture content).

If gap-graded ¾-inch rock is used for backfill (around storm drain storage chambers, retaining wall backfill, etc.) it will require compaction. Rock shall be placed in thin lifts (typically not exceeding 6 inches) and mechanically compacted with observation by geotechnical consultant. Backfill rock shall meet the requirements of ASTM D2321. Gap-graded rock is required to be wrapped in filter fabric (Mirafi 140N or approved alternative) or at the very minimum to be vertically separated from the trench backfill with filter fabric to prevent the migration of fines into the rock backfill.

4.1.7 Trench and Retaining Wall Backfill and Compaction

Bedding material used within the pipe zone should conform to the requirements of the current Greenbook and the pipe manufacturer. Where applicable, sand having a sand equivalent (SE) of 20 or greater (per Caltrans Test Method [CTM] 217) may be used to bed and shade the pipes within the bedding zone. Sand backfill should be densified by jetting or flooding and then tamped to ensure adequate compaction. Bedding sand should be from a natural source, manufactured sand from recycled material is not suitable for jetting. The onsite soils may generally be considered suitable as trench backfill (zone defined as 12 inches above the pipe to subgrade), provided the soils are screened of rocks greater than 6 inches in maximum dimension, construction debris and organic material. Trench backfill should be compacted in uniform lifts (as outlined above in Section "Material for Fill") by mechanical means to at least 90 percent relative compaction (per ASTM D1557). If gap-graded rock is used for trench backfill, refer to the above Section.

Retaining wall backfill should consist of sandy soils as outlined in preceding Section 4.1.5. The limits of select sandy backfill should extend at minimum ½ the height of the retaining wall or the width of the heel (if applicable), whichever is greater (Figure 3). Retaining wall backfill soils should be compacted in relatively uniform thin lifts to at least 90 percent relative compaction (per ASTM D1557). Jetting or flooding of retaining wall backfill materials should not be permitted.

In backfill areas where mechanical compaction of soil backfill is impractical due to space constraints, typically sand-cement slurry may be substituted for compacted backfill. The slurry should contain about one sack of cement per cubic yard. When set, such a mix typically has the consistency of compacted soil. Sand cement slurry placed near the surface within landscape areas should be evaluated for potential impacts on planned improvements.

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

4.1.8 Shrinkage and Subsidence

Allowance in the earthwork volumes budget should be made for an estimated 5 to 20 percent reduction (shrink) in volume of near-surface (upper approximate 5 feet) soils. It should be stressed that these values are only estimates and that an actual shrinkage factor would be extremely difficult to predetermine. Subsidence, due to earthwork operations, is expected to be on the order of 0.1 feet. These values are estimates only and exclude losses due to removal of vegetation or debris. The effective shrinkage of onsite soils will depend primarily on the type of compaction equipment and method of compaction used onsite by the contractor and accuracy of the topographic survey.

4.2 Preliminary Foundation Recommendations

Provided that the remedial grading recommendations provided herein are implemented, the site may be considered suitable for the support of the proposed residential structures using a post-

tensioned foundation system. Due to liquefaction potential (Site Class "F") and dynamic settlement any isolated pad structural footings should be interconnected with grade beams. Proposed building foundations should be designed in consideration of site liquefaction potential and dynamic settlement outlined in Section 2.5.1.

Site soils are anticipated to be of Very Low expansion potential (EI of 20 or less per ASTM D4829). However, this must be verified based on as-graded conditions. Recommended soil bearing and estimated static settlement due to structural loads are provided in Section 4.3.

Preliminary foundation recommendations are provided in the following sections. Please note that the following foundation recommendations are preliminary and must be confirmed by LGC Geotechnical at the completion of grading.

4.2.1 Provisional Post-Tensioned Foundation Design Parameters

We recommend post-tensioned foundations be designed for the more conservative of the differential seismic settlement (1 inch over 40 horizontal feet) or the post-tension parameters provided in Table 3. These parameters have been determined in general accordance with the Post-Tensioning Institute (PTI, 2012) Standard Requirements (PTI DC 10.5), referenced in Chapter 18 of the 2022 CBC. In utilizing these parameters, the foundation engineer should design the foundation system in accordance with the allowable deflection criteria of applicable codes and the requirements of the structural designer/architect. Other types of stiff slabs may be used in place of the CBC post-tensioned slab design provided that, in the opinion of the foundation structural designer, the alternative type of slab is at least as stiff and strong as that designed by the CBC/PTI method to resist expansive soils.

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

Table 3 presented on the following page summarize our recommendations for the post-tensioned foundation slab component. Final foundation design should be determined at the completion of grading.

TABLE 3

Preliminary Geotechnical Parameters for Post-Tensioned Foundation

Parameter	PT Slab with Perimeter Footing	PT Mat with Thickened Edge
Center Lift Edge moisture variation distance, e_m Center lift, y_m	 9.0 feet 0.25 inch	 9.0 feet 0.3 inch
Edge Lift Edge moisture variation distance, e_m Edge lift, y_m	 5.5 feet 0.55 inch	 5.5 feet 0.66 inch
Modulus of Subgrade Reaction, k (assuming presoaking as indicated below)	200 pci	200 pci
Minimum perimeter footing/thickened edge embedment below finish grade	12 inches	6 inches
Perimeter foundation reinforcement	N/A[2]	N/A[2]
Presoak (moisture conditioning)	100% of Opt. 12 inches	100% of Opt. 12 inches

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

4.2.3 Foundation Subgrade Preparation and Maintenance

Moisture conditioning of the subgrade soils is recommended prior to trenching the foundation. The recommendations specific to the anticipated site soil conditions are presented in Table 5. The subgrade moisture condition of the building pad soils should be maintained at near optimum moisture content up to the time of concrete placement. This moisture content should be maintained around the immediate perimeter of the slab during construction and up to occupancy of the homes.

The geotechnical parameters provided herein assume that if the areas adjacent to the foundation are planted and irrigated, these areas will be designed with proper drainage and adequately maintained so that ponding, which causes significant moisture changes below the foundation, does not occur. Our recommendations do not account for

excessive irrigation and/or incorrect landscape design. Plants should only be provided with sufficient irrigation for life and not overwatered to saturate subgrade soils. Sunken planters placed adjacent to the foundation, should either be designed with an efficient drainage system or liners to prevent moisture infiltration below the foundation. Some lifting of the perimeter foundation beam should be expected even with properly constructed planters.

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

Future homeowners should be informed and educated regarding the importance of maintaining a constant level of soil-moisture. The builder should provide these recommendations to future homeowners.

4.2.4 Slab Underlayment Guidelines

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

4.3 Soil Bearing and Lateral Resistance

Provided our earthwork recommendations are implemented, an allowable soil bearing pressure of 1,500 pounds per square foot (psf) may be used for the design of footings having a minimum width of 12 inches and minimum embedment of 12 inches below lowest adjacent ground surface. This value may be increased by 300 psf for each additional foot of embedment of 150 psf for each additional foot of foundation width to a maximum value of 2,500 psf. A mat foundation a minimum of 6 inches below lowest adjacent grade may be designed for an allowable soil bearing pressure of 1,200 psf. These allowable bearing pressures are applicable for level (ground slope equal to or flatter than 5H:1V) conditions only. Bearing values indicated are for total dead loads and frequently applied live loads and may be increased by ⅓ for short duration loading (i.e., wind or seismic loads).

In utilizing the above-mentioned allowable bearing capacity, and provided our earthwork recommendations are implemented, foundation settlement due to structural loads is anticipated to be 1-inch or less. Differential settlement may be taken as half of the total settlement (i.e., ½-

inch over a horizontal span of 40 feet). Seismic settlement due dry sand settlement is presented in Section 2.5.1.

Resistance to lateral loads can be provided by friction acting at the base of foundations and by passive earth pressure. For concrete/soil frictional resistance, an allowable coefficient of friction of 0.3 may be assumed with dead-load forces. An allowable passive lateral earth pressure of 225 psf per foot of depth (or pcf) to a maximum of 2,250 psf may be used for the sides of footings poured against properly compacted fill. Allowable passive pressure may be increased to 300 pcf (maximum of 3,000 psf) for short duration seismic loading. This passive pressure is applicable for level (ground slope equal to or flatter than 5H:1V) conditions. Frictional resistance and passive pressure may be used in combination without reduction. We recommend that the upper foot of passive resistance be neglected if finished grade will not be covered with concrete or asphalt. The provided allowable passive pressures are based on a factor of safety of 1.5 and 1.1 for static and seismic loading conditions, respectively.

4.4 Lateral Earth Pressures for Retaining Walls

Lateral earth pressures for approved native sandy or import soils meeting indicated project requirements are provided below. Lateral earth pressures are provided as equivalent fluid unit weights, in psf per foot of depth (or pcf). These values do not contain an appreciable factor of safety, so the retaining wall designer should apply the applicable factors of safety and/or load factors during design. A soil unit weight of 120 pcf may be assumed for calculating the actual weight of soil over the wall footing.

The following lateral earth pressures are presented in Table 4 below for approved granular soils with a maximum of 35 percent fines (passing the No. 200 sieve per ASTM D-421/422) and a "Very Low" expansion potential (EI of 20 or less per ASTM D4829). Some of the onsite soils may not be suitable for retaining wall backfill due to the material size (greater than 3 inches in maximum dimension) and fines content. Therefore, select grading, screening and stockpiling of the onsite soils or import or soils meeting the criteria outlined above should be anticipated by the contractor for obtaining suitable retaining wall backfill soil. The wall designer should clearly indicate on the retaining wall plans the required select sandy soil backfill criteria. These preliminary findings should be confirmed during grading.

TABLE 4

Lateral Earth Pressures – Approved Onsite or Imported Sandy Soils

Conditions	**Equivalent Fluid Unit Weight (pcf)**	**Equivalent Fluid Unit Weight (pcf)**
	Level Backfill	**2:1 Sloped Backfill**
	Approved Sandy Soils	**Approved Sandy Soils**
Active	35	55
At-Rest	55	70

If the wall can yield enough to mobilize the full shear strength of the soil, it can be designed for "active" pressure. If the wall cannot yield under the applied load, the earth pressure will be higher. This would include 90-degree corners of retaining walls. Such walls should be designed for "at-rest." The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated, the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical engineer.

Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. To reduce, but not eliminate, saturation of near-surface (upper approximate 1-foot) soils in front of the retaining walls, the perforated subdrain pipe should be located as low as possible behind the retaining wall. The outlet pipe should be sloped to drain to a suitable outlet. In general, we do not recommend retaining wall outlet pipes be connected to area drains. If subdrains are connected to area drains, special care and information should be provided to homeowners to maintain these drains. Typical retaining wall drainage is illustrated in Figure 3. It should be noted that the recommended subdrain does not provide protection against seepage through the face of the wall and/or efflorescence. Efflorescence is generally a white crystalline powder (discoloration) that results when water containing soluble salts migrates over a period of time through the face of a retaining wall and evaporates. If such seepage or efflorescence is undesirable, retaining walls should be waterproofed to reduce this potential. Please note that waterproofing and outlet systems are not the purview of the geotechnical consultant.

Surcharge loading effects from any adjacent structures should be evaluated by the retaining wall designer. In general, structural loads within a 1:1 (horizontal to vertical) upward projection from the bottom of the proposed retaining wall footing will surcharge the proposed retaining wall. In addition to the recommended earth pressure, retaining walls adjacent to streets should be designed to resist a uniform lateral pressure of 80 pounds per square foot (psf) due to normal street vehicle traffic if applicable. Uniform lateral surcharges may be estimated using the applicable coefficient of lateral earth pressure using a rectangular distribution. A factor of 0.45 and 0.3 may be used for at-rest and active conditions, respectively. The retaining wall designer should contact the geotechnical engineer for any required geotechnical input in estimating any applicable surcharge loads.

If retaining walls greater than 6 feet in height are proposed, the retaining wall designer should contact LGC Geotechnical for specific seismic lateral earth pressure increments based on the configuration and height of the planned retaining wall structures.

Soil bearing and lateral resistance (friction coefficient and passive resistance) are provided in Section 4.3. Earthwork considerations (temporary backcuts, backfill, compaction, etc.) for retaining walls are provided in Section 4.1 (Site Earthwork) and the subsequent earthwork related sub-sections.

4.5 Control of Surface Water and Drainage Control

From a geotechnical perspective, we recommend that compacted finished grade soils adjacent to proposed residences be sloped away from the proposed residence and towards an approved drainage device or unobstructed swale. Drainage swales, wherever feasible, should not be constructed within 5 feet of buildings. Where lot and building geometry necessitates that the

side yard drainage swales be routed closer than 5 feet to structural foundations, we recommend the use of area drains together with drainage swales. Drainage swales used in conjunction with area drains should be designed by the project civil engineer so that a properly constructed and maintained system will prevent ponding within 5 feet of the foundation. Code compliance of grades is not the purview of the geotechnical consultant.

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

4.6 Subsurface Water Infiltration

It should be noted that intentionally infiltrating storm water conflicts with the geotechnical engineering objective of directing surface water away from structures and improvements. The geotechnical stability and integrity of a site is reliant upon appropriately handling surface water.

In general, the vast majority of geotechnical distress issues are directly related to improper drainage. Distress in the form of movement of foundations and other improvements could occur as a result of soil saturation and loss of soil support of foundations and pavements, settlement, collapse, internal soil erosion, and/or expansion. Additionally, off-site properties and improvements may be subjected to seepage, springs, instability, movements of foundations or other impacts as a result of water infiltration and migration. Infiltrated water may enter underground utility pipe zones or other highly permeable layers and migrate laterally along these layers, potentially impacting other improvements located far away from the point of infiltration. Any proposed infiltration system should not be located near slopes or settlement sensitive existing/proposed improvements in order to reduce the potential for slope failures and geotechnical distress issues related to infiltration.

If water must be infiltrated due to regulatory requirements, we recommend the absolute minimum amount of water be infiltrated and that the infiltration areas not be located near settlement-sensitive existing/proposed improvements, basement/retaining walls, or any slopes. As with all systems that are designed to concentrate surface flow and direct the water into the subsurface soils, some minor settlement, nuisance type localized saturation and/or other water related issues should be expected. Due to variability in geologic and hydraulic conductivity characteristics, these effects may be experienced at the onsite location and/or potentially at other locations beyond the physical limits of the subject site. Infiltrated water may enter underground utility pipe zones or flow along heterogeneous soil layers or geologic structure and migrate laterally impacting other improvements which may be located far away or at an elevation much lower than the infiltration source. Recommendations for subsurface water infiltration are provided below.

The design infiltration rate is determined by dividing the measured infiltration rate by total reduction factor. The total reduction factor is calculated from a series of reduction factors, including; test procedure (RF_t), site variability (RF_v) and long-term siltation plugging and maintenance (RF_s). Based on the Los Angeles County testing guidelines (2021), the reduction factor for long-term siltation plugging and maintenance (RF_s) is the purview of the infiltration system designer.

The reduction factors are provided in Table 5 below. The total reduction factor is calculated as the product of the series of reduction factors listed in Table 5 below ($RF_t + RF_v + RF_s$).

TABLE 5

Shallow Surface Infiltration - Reduction Factors Applied to Measured Infiltration Rate

Consideration	Reduction Factor
Test procedure, boring percolation, RF_t	1.0
Site variability, number of tests, etc., RF_v	1.5
Long-term siltation plugging and maintenance, RF_s	1.0*
Total Reduction Factor, RF = $RF_t + RF_v + RF_s$	**3.5**

*Reduction Factor for long-term siltation plugging and maintenance to be confirmed by Civil Engineer

Per the requirements of the Los Angeles County testing guidelines (2021), subsurface materials shall have a design infiltration rate equal to or greater than 0.3 inches per hour. The test procedure, site variability considerations and long-term siltation plugging and maintenance (RF_t, RF_v and RF_s) result in a total reduction factor of 3.5. When total reduction factor presented in Table 5 is applied to the measured infiltration rates presented in Table 1, the resulting design infiltration rate will be greater than the minimum required by the County of Los Angeles for infiltration. Therefore, onsite infiltration of stormwater is considered feasible from a geotechnical viewpoint. Results of infiltration testing are provided in Appendix D.

The following should be considered for design of any required infiltration system:

- Water discharge from any infiltration systems should not occur within the zone of influence of foundation footings (column and load bearing wall locations). From a geotechnical perspective we recommend a minimum infiltration system setback of 10 feet from the structural improvements.
- An adequate setback distance between any infiltration facility and adjacent property lines should be maintained.
- We recommend the design of any infiltration system include at least one redundancy or overflow system. It may be prudent to provide an overflow system directly connected to the storm drain system in order to prevent failure of the infiltration system, either as a result of lower than anticipated infiltration and/or very high flow volumes.
- The infiltration values provided are based on clean water and this requires the removal of trash, debris, soil particles, etc., and on-going maintenance. Over time, siltation and plugging may reduce the infiltration rate and subsequent effectiveness of the infiltration system. It should be noted that methods to prevent this shall be the responsibility of the infiltration designer and are not the purview of the geotechnical consultant. If adequate measures cannot be incorporated into the design and maintenance of the system, then the infiltration rates may need to be further reduced. These and other factors should be considered in selecting a design infiltration rate.
- Any designed infiltration system will require routine periodic maintenance.

- Contamination and environmental suitability of the site for infiltration was not evaluated by us and should be evaluated by others (environmental consultant). We only addressed the geotechnical issues associated with stormwater infiltration.

LGC Geotechnical should be provided with details for any planned required infiltration system early in the design process for geotechnical input.

4.7 Preliminary Asphalt Pavement Sections

For the purpose of these preliminary recommendations, we have selected a preliminary design R-value of 35 (assumed) and calculated pavement sections for assumed Traffic Indices (TI) of 5.0 (or less), 5.5, and 6.0. These recommendations must be confirmed with R-Value testing of representative near-surface soils at the completion of grading and after underground utilities have been installed and backfilled. Final street sections should be confirmed by the project civil engineer based upon the final design Traffic Index. Determination of the TI is not the purview of the geotechnical consultant. If requested, LGC Geotechnical will provide sections for alternate TI values.

TABLE 6

Preliminary Pavement Sections

Assumed Traffic Index	5.0 or less	5.5	6.0
R -Value Subgrade	35	35	35
AC Thickness	4.0 inches	4.0 inches	4.0 inches
Base Thickness	4.0 inches	5.0 inches	6.0 inches

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

Earthwork recommendations regarding aggregate base and subgrade are provided in Section 4.1 "Site Earthwork" and the related sub-sections of this report.

4.8 Soil Corrosivity

Although not corrosion engineers (LGC Geotechnical is not a corrosion consultant), several governing agencies in Southern California require the geotechnical consultant to determine the corrosion potential of soils to buried concrete and metal facilities. We therefore present the results of our testing with regard to corrosion for the use of the client and other consultants, as they determine necessary.

Corrosion testing of near-surface bulk samples indicated soluble sulfate contents less than 0.04

percent, a chloride content of 262 parts per million (ppm), pH of 7.84 and minimum resistivity of 1200 ohm-centimeters. Based on Caltrans Corrosion Guidelines (Caltrans, 2021), soils are considered corrosive to structural elements if the pH is 5.5 or less, or the chloride concentration is 500 ppm or greater, or the sulfate concentration is 1,500 ppm (0.15 percent) or greater. Based on the test results, soils are not considered corrosive using Caltrans criteria. Note that based on minimum resistivity the soils are considered severely corrosive to metallic improvements. If improvements that may be susceptible to corrosion are proposed, it is recommended that further evaluation by a corrosion engineer be performed.

Based on laboratory sulfate test results, the near surface soils are designated to a class "S0" per ACI 318, Table 19.3.1.1 with respect to sulfates. Concrete in direct contact with the onsite soils can be designed according to ACI 318, Table 19.3.2.1 using the "S0" sulfate classification.

Laboratory testing may need to be performed at the completion of grading by the project corrosion engineer to further evaluate the as-graded soil corrosivity characteristics. Accordingly, revision of the corrosion potential may be needed, should future test results differ substantially from the conditions reported herein. The client and/or other members of the development team should consider this during the design and planning phase of the project and formulate an appropriate course of action.

4.9 Nonstructural Concrete Flatwork

Nonstructural concrete flatwork (such as walkways, bicycle trails, patio slabs, etc.) has a potential for cracking due to changes in soil volume related to soil-moisture fluctuations. To reduce the potential for excessive cracking and lifting, concrete may be designed in accordance with the minimum guidelines outlined in Table 7 on the following page. These guidelines will reduce the potential for irregular cracking and promote cracking along construction joints but will not eliminate all cracking or lifting. Thickening the concrete and/or adding additional reinforcement will further reduce cosmetic distress.

TABLE 7

Nonstructural Concrete Flatwork for Very Low Expansion Potential

	Community Sidewalks (≤6 feet wide)	**Patios/ Walkways** (adjacent to homes or flatwork >6 feet wide)	**Private Vehicular Driveways**	**City Sidewalk Curb and Gutters**
Minimum Thickness (in.)	4 (nominal)	4 (full)	4 (full)	City/Agency Standard
Presoaking	Wet down prior to placing	Wet down prior to placing	Wet down prior to placing	City/Agency Standard
Reinforcement	—	No. 3 at 24 inches on centers	No. 3 at 24 inches on centers	City/Agency Standard
Thickened Edge (in.)	—	—	—	City/Agency Standard
Crack Control Joints	Saw cut or deep open tool joint to a minimum of $^1/_3$ the concrete thickness	Saw cut or deep open tool joint to a minimum of $^1/_3$ the concrete thickness	Saw cut or deep open tool joint to a minimum of $^1/_3$ the concrete thickness	City/Agency Standard
Maximum Joint Spacing	5 feet	6 feet	10 feet or quarter cut whichever is closer	City/Agency Standard
Aggregate Base Thickness (in.)	—	—	—	City/Agency Standard

4.10 Geotechnical Plan Review

When available, project plans (grading, foundation, retaining wall etc.) should be reviewed by LGC Geotechnical in order to verify our geotechnical recommendations are implemented. Updated recommendations and/or additional field work may be necessary.

4.11 Geotechnical Observation and Testing During Construction

The recommendations provided in this report are based on limited subsurface observations and geotechnical analysis. The interpolated subsurface conditions should be checked in the field during construction by a representative of LGC Geotechnical. Geotechnical observation and testing is required per Section 1705 of the 2022 CBC.

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

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

5.0 LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is based on data obtained from limited observations of the site, which have been extrapolated to characterize the site. While the scope of services performed is considered suitable to adequately characterize the site geotechnical conditions relative to the proposed development, no practical evaluation can completely eliminate uncertainty regarding the anticipated geotechnical conditions in connection with a subject site. Variations may exist and conditions not observed or described in this report may be encountered during grading and construction.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the other consultants (at a minimum the civil engineer, structural engineer, landscape architect) and incorporated into their plans. The contractor should properly implement the recommendations during construction and notify the owner if they consider any of the recommendations presented herein to be unsafe, or unsuitable.

The findings of this report are valid as of the present date. However, changes in the conditions of a site can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. The findings, conclusions, and recommendations presented in this report can be relied upon only if LGC Geotechnical has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site. This report is intended exclusively for use by the client, any use of or reliance on this report by a third party shall be at such party's sole risk.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and modification.

LEGEND

HS-2
T.D. = 26.5'

Approximate Location of Hollow Stem Auger Boring by LGC Geotechnical, With Total Depth in Feet

I-4
T.D. = 10'

Approximate Location of Hollow Stem Infiltration Boring by LGC Geotechnical, with Total Depth in Feet

7.5

Approximate Removal and Recompaction Depth Below Existing Grade, Shown in Feet

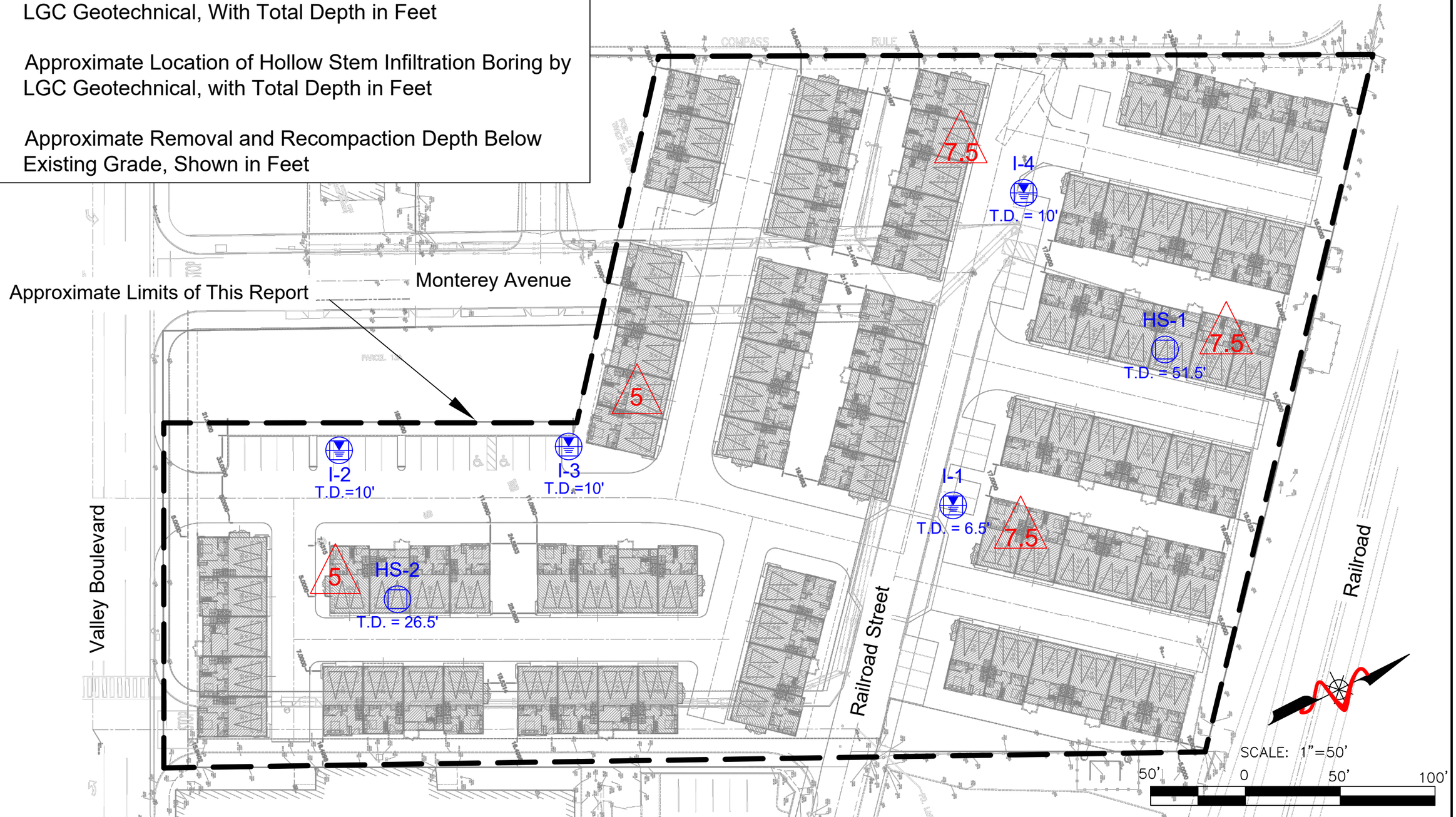

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FIGURE 2
Geotechnical Map

PROJECT NAME	MWIG - El Monte
PROJECT NO.	22116-01
ENG. / GEOL.	RLD
SCALE	1" = 50'
DATE	February 2023

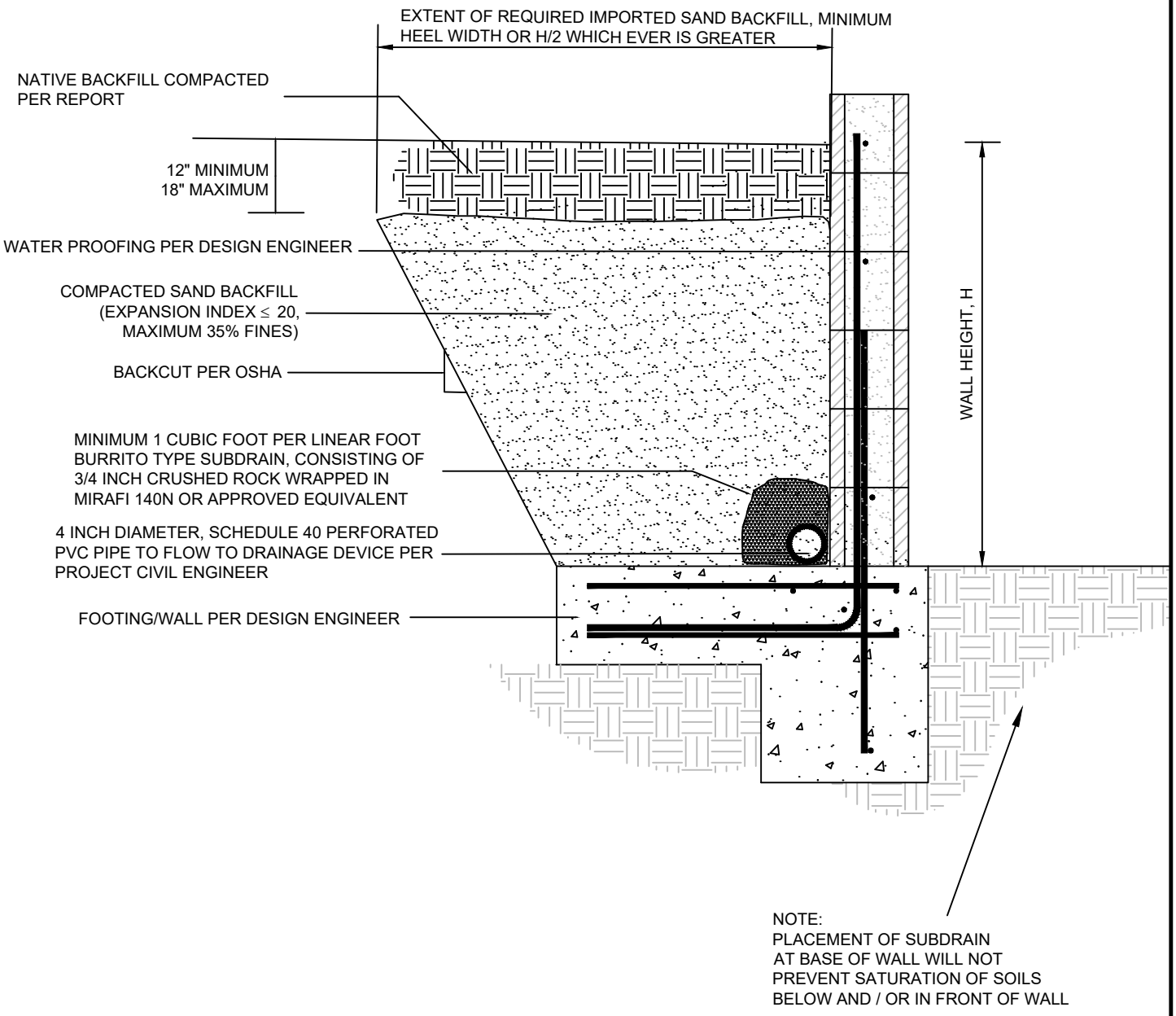

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FIGURE 3
Retaining Wall Backfill Detail

PROJECT NAME	MWIG - El Monte
PROJECT NO.	22116-01
ENG. / GEOL.	RLD
SCALE	Not to Scale
DATE	February 2023

Appendix A
References

APPENDIX A

References

American Concrete Institute, 2019, Building Code Requirements for Structural Concrete (ACI 318-19) and Commentary (ACI 318R-19).

American Society of Civil Engineers (ASCE), 2017, Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-16, 2017.

_____, 2018, Standard 7-16, Minimum Design Loads for Buildings and Associated Criteria for Buildings and Other Structures, Supplement 1, effective: December 12, 2018.

American Society for Testing and Materials (ASTM), Volume 04.08 Soil and Rock (I): D420 – D5876.

Bray, J.D., and Sancio, R. B., 2006, Assessment of Liquefaction Susceptibility of Fine-Grained Soils, *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, pp. 1165-1177, dated September 2006.

C&V Consulting, Inc., 2023, Preliminary Site Plan, 3700 Monterey Avenue, El Monte, California, received February 10, 2023.

California Building Standards Commission, 2022, California Building Code, California Code of Regulations Title 24, Volumes 1 and 2, dated July 2022.

California Department of Transportation (Caltrans), 2017, Highway Design Manual, Updated November 20, 2017.

_____, 2021, Corrosion Guidelines, Version 3.2, dated May 2021.

California Department of Conservation, Division of Mines and Geology (CDMG), 1998, Seismic Hazard Zone Report for the El Monte 7.5-Minute Quadrangle, Los Angeles County, California, dated 1998.

_____, 1999, Seismic Hazard Zones Official Map, El Monte Quadrangle, Los Angeles County, California, dated 1999.

California Geological Survey (CGS), 2008, California Geological Society Special Publication 117A: Guidelines for Evaluating and Mitigating Seismic Hazards in California.

_____, Earthquake Zones of Required Investigation, El Monte Quadrangle, Revised Official Map dated: June 15, 2017.

_____, 2018, Special Publication 42: Earthquake Fault Zones, A Guide for Government Agencies, Property Owners/Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California, Revised 2018

County of Los Angeles, 2021, Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration, GS200.1, dated June 30, 2021.

Historic Aerials, 2023, viewed February 2, 2022, Aerial Maps from 1948 to 2020 https://www.historicaerials.com/

Dibblee, Jr., Thomas W., 1999, Geologic Map of the El Monte and Baldwin Park Quadrangles, Los Angeles, California, Dibblee Geological Foundation Map #DF-69, May 1999.

NCEER, 1997, "Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils", T. L. Youd and I. M. Idriss Editors, Technical Report NCEER-97-0022, NCEER, Buffalo, NY.

Post-Tensioning Institute (PTI), 2012, Standard Requirements for Design and Analysis of Shallow Post-Tensioned Concrete Foundations on Expansive Soils, PTI DC10.5-12.

Southern California Earthquake Center (SCEC), 1999, "Recommended Procedure for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigation Liquefaction Hazards in California", Edited by Martin, G.R., and Lew, M., dated March 1999.

Structural Engineers Association of California (SEAOC), 2023, Seismic Design Maps, Retrieved January 9, 2023, from https://seismicmaps.org/

Tokimatsu, K., and Seed, H. B., 1987, "Evaluation of Settlements in Sands Due to Earthquake Shaking", Journal of Geotechnical Engineering, ASCE, Vol. 113, No. 8, pp. 861-878.

United States Geological Survey (USGS), 2014, Unified Hazard Tool, Dynamic: Conterminous U.S. 2014 (update)(v4.2.0), Retrieved January 9, 2023, from: https://earthquake.usgs.gov/hazards/interactive/

Appendix B
Field Exploration Logs

Geotechnical Boring Log Borehole HS-1

Date: 01/05/2023 | **Drilling Company:** 2R Drilling

Project Name: MWIG - El Monte | **Type of Rig:** Truck Mounted

Project Number: 22116-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~284' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By RNP
Sampled By RNP
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 5' - <u>Undocumented Artifcial Fill (afu):</u>** @0'- 2" of Asphalt, No Base	
		B-1	R-1	5 4 5	98.2	7.1	SM	@2.5'- Silty SAND with Gravel: brown, slightly moist, loose, disturbed	
280								**@5' to T.D. - <u>Quaternary Alluvium (Qa):</u>**	
	5		R-2	2 2 4	88.5	10.3	SM/ML	@5'- Silty SAND/Sandy SILT: brown, moist, medium stiff	
			R-3	3 4 5	95.6	17.3	ML	@7.5'- SILT with Sand: olive brown, very moist, medium stiff	CO
275									
	10		R-4	4 9 11	108.0	11.3	SM	@10'- Silty SAND: brown, moist, medium dense	
270									
	15		SPT-1	2 3 3		23.4	CL	@15'- Sandy CLAY: brown, very moist, stiff	AL -#200
265									
	20		SPT-2	3 4 5		4.1	SP-SM	@20'- SAND with Silt: light brown, slightly moist, medium dense	-#200
260									
	25		SPT-3	2 6 5		8.6	SC	@25'- Clayey SAND: dark yellowish brown, moist, medium dense	-#200
255									
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 3/14/2022

Geotechnical Boring Log Borehole HS-1

Date: 01/05/2023 | **Drilling Company:** 2R Drilling

Project Name: MWIG - El Monte | **Type of Rig:** Truck Mounted

Project Number: 22116-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~284' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By RNP
Sampled By RNP
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		SPT-4	8 14 19		22.6	ML	@30'- Sandy SILT: brown, very moist, hard	
250	35		SPT-5	8 12 17		5.6	SP-SM	@35'- SAND with Silt and Gravel: pale yellowish brown, slightly moist, dense	
245	40		SPT-6	14 14 14		2.3		@40'- SAND with Silt and Gravel: yellowish brown, dry, dense	-#200
240	45		SPT-7	12 17 19		2.9		@45'- SAND with Silt and Gravel: yellowish brown, dry, dense	
235	50		SPT-8	9 19 33		15.6	SC	@50'- Clayey SAND with Gravel: olive brown, very moist, very dense	
230	55							Total Depth = 51.5' Groundwater Not Encountered Cuttings Drummed Backfilled with Bentonite Chips on 01/05/2023	
225	60								

LGC Geotechnical, Inc.

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CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-2

Date: 01/05/2023 | **Drilling Company:** 2R Drilling

Project Name: MWIG - El Monte | **Type of Rig:** Truck Mounted

Project Number: 22116-01 | **Drop:** 30" | **Hole Diameter:** 6"

Elevation of Top of Hole: ~281' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By RNP
Sampled By RNP
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
280	0	B-1						**@0' to T.D. - <u>Quaternary Alluvium (Qa):</u>** @0'- Gravel with Vegetation	CR MD EI
			R-1	3 5 6	87.9	6.9	ML	@2.5'- Sandy SILT: light brown, slightly moist, stiff	
275	5		R-2	3 5 7	86.4	32.2		@5'- SILT: grayish brown, very moist, stiff	
			R-3	4 6 7	104.8	6.9	SM	@7.5'- Silty SAND: olive brown, slightly moist, medium dense	CO
270	10		R-4	4 8 11	90.9	30.1	ML	@10'- SILT: brown, very moist, very stiff	
265	15		SPT-1	3 4 9		24.5		@15'- Sandy SILT: grayish brown, very moist, very stiff	
260	20		SPT-2	3 4 3		20.4		@20'- Sandy SILT: brown, very moist, stiff	
255	25		SPT-3	8 9 12		2.7	SM	@25'- Silty SAND: pale brown, medium dense, dry; trace amount of cobbles	
	30							Total Depth = 26.5' Groundwater Not Encountered Cuttings Drummed and Backfilled with Bentonite Chips on 01/05/2023	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

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MD	MAXIMUM DENSITY
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EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 3/14/2022

Geotechnical Boring Log Borehole I-1

Date: 01/05/2023 | **Drilling Company:** 2R Drilling

Project Name: MWIG - El Monte | **Type of Rig:** Truck Mounted

Project Number: 22116-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~282' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By RNP
Sampled By RNP
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
280	0		R-1	5 5 5	109.5	12.6	SP-SM to SM	**@0' to T.D. - <u>Undocumented Artificial Fill (afu):</u>** @0'- 2" of Asphalt, No Base @2.5'- : SAND with Silt to Silty SAND: yellowish brown, moist, loose, trace amount of gravels	
275	5		R-2	4 5 7	109.4	15.8	SM	@5'- Silty SAND with Gravel: dark gray, very moist, medium dense @6.5'- Refusal Due to Slurry and Construction Debris	
270	10							Total Depth = 6.5' Groundwater Not Encountered Backfilled with Cuttings on 01/05/2023 Test Not Run Due to Large Pieces of Construction Debris in Fill	
265	15								
260	20								
255	25								
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 3/14/2022

Geotechnical Boring Log Borehole I-2

Date: 01/05/2023 | **Drilling Company:** 2R Drilling

Project Name: MWIG - El Monte | **Type of Rig:** Truck Mounted

Project Number: 22116-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~281' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By RNP
Sampled By RNP
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
280	0							**@0' to T.D. - <u>Quaternary Alluvium (Qa):</u>**	
								@0'- Gravel with Vegetation	
			R-1	5 5 6	85.1	4.4	ML	@2.5'- Sandy SILT: light brown, dry, stiff	
	5		R-2	3 5 7	77.9	18.7		@5'- Sandy SILT: light brown, very moist, stiff; rootlets	
275			R-3	7 9 11	103.0	2.6	SM	@7.5'- Silty SAND: light brown, dry, medium dense	
	10							Total Depth = 10'	
270								Groundwater Not Encountered	
								Installed PVC Pipe, Filter Fabric Sock, Gravel to the Top	
								Presoaked with Water	
								Backfilled with Cuttings on 01/06/2023	
	15								
265									
	20								
260									
	25								
255									
	30								

Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 3/14/2022

Geotechnical Boring Log Borehole I-3

Date: 01/05/2023 | **Drilling Company:** 2R Drilling

Project Name: MWIG - El Monte | **Type of Rig:** Truck Mounted

Project Number: 22116-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~281' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By RNP
Sampled By RNP
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
280	0							**@0' to T.D. - <u>Quaternary Alluvium (Qa):</u>** @0'- Gravel with Vegetation	
			R-1	4 5 6	86.8	12.7	SM	@2.5'- Silty SAND: pale olive brown, moist, loose	
	5		R-2	4 5 6	93.1	8.4		@5'- Silty SAND: light brown, moist, loose	
275			R-3	4 6 8	106.0	9.4		@7.5'- Silty SAND: brown, moist, medium dense; trace amount of gravels	
	10							Total Depth = 10' Groundwater Not Encountered Installed PVC Pipe, Filter Fabric Sock, Gravel to the Top Presoaked with Water Backfilled with Cuttings on 01/06/2023	
270									
	15								
265									
	20								
260									
	25								
255									
	30								

Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 3/14/2022

Geotechnical Boring Log Borehole I-4

Date: 01/05/2023 | **Drilling Company:** 2R Drilling

Project Name: MWIG - El Monte | **Type of Rig:** Truck Mounted

Project Number: 22116-01 | **Drop:** 30" | **Hole Diameter:** 8"

Elevation of Top of Hole: ~282' MSL | **Drive Weight:** 140 pounds

Hole Location: See Geotechnical Map

Logged By RNP
Sampled By RNP
Checked By RLD

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
280	0		R-1	7 9 8		3.1	SM	**@0' to 7.5' - <u>Undocumented Artificial Fill (afu):</u>** @0'- Gravel and Broken Asphalt @2.5'- Limited Recovery: Silty SAND: brown, dry, medium dense; Chunks of Asphalt	
275	5		R-2	8 6 6				@5'- No Recovery: Chunks of Asphalt **@7.5' to T.D. - <u>Quaternary Alluvium (Qa):</u>** @7.5'- Silty SAND: dark brown, moist, medium dense	
			R-3	6 9 12					
270	10							Total Depth = 10' Groundwater Not Encountered Installed PVC Pipe, Filter Fabric Sock, Gravel to the Top Presoaked with Water Backfilled with Cuttings on 01/06/2023	
265	15								
260	20								
255	25								
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 3/14/2022

Appendix C
Laboratory Test Results

APPENDIX C

Laboratory Testing Procedures and Test Results

The laboratory testing program was formulated towards providing data relating to the relevant engineering properties of the soils with respect to residential construction. Samples considered representative of site conditions were tested in general accordance with American Society for Testing and Materials (ASTM) procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and a table summarizing the test results.

Moisture and Density Determination Tests: Moisture content (ASTM D2216) and dry density determinations (ASTM D2937) were performed on relatively undisturbed samples obtained from the test borings and/or trenches. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined from undisturbed or disturbed samples.

Expansion Index: The expansion potential of selected samples was evaluated by the Expansion Index Test, Standard ASTM D4829. Specimens are molded under a given compactive energy to approximately the optimum moisture content and approximately 50 percent saturation or approximately 90 percent relative compaction. The prepared 1-inch-thick by 4-inch-diameter specimens are loaded to an equivalent 144 psf surcharge and are inundated with tap water until volumetric equilibrium is reached. The results of these tests are presented in the table below.

Sample Location	Expansion Index	Expansion Potential*
HS-2 @ 1-5 feet	2	Very Low

* ASTM D4829

Grain Size Distribution/Fines Content: Representative samples were dried, weighed and soaked in water until individual soil particles were separated (per ASTM D421) and then washed on a No. 200 sieve (ASTM D1140). Where applicable, the portion retained on the No. 200 sieve and dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D6913 (sieve).

Sample Location	Description	% Passing # 200 Sieve
HS-1 @ 15 feet	Sandy Clay	56
HS-1 @ 20 feet	Sand with Silt	8
HS-1 @ 25 feet	Clayey Sand	16
HS-1 @ 40 feet	Sand with Silt	7

Laboratory Testing Procedures and Test Results

Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined per ASTM D4318 for engineering classification of fine-grained material and presented in the table below. The USCS soil classification indicated in the table below is based on the portion of sample passing the No. 40 sieve and may not necessarily be representative of the entire sample. The plot is provided in this Appendix.

Sample Location	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS Soil Classification
HS-1 @ 15 feet	30	21	9	CL

Collapse/Swell Potential: Two collapse tests were performed per ASTM D4546. Samples (2.4 inches in diameter and 1-inch in height) were placed in a consolidometer and loaded to their approximate in-situ effective stress. The results are in this appendix.

Maximum Density Tests: The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D1557. The results of these tests are presented in the table below:

Sample Location	Sample Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
HS-2 @ 1-5 feet	Brown Sandy Silt	115.0	14.0

Chloride Content: Chloride content was tested in accordance with Caltrans Test Method (CTM) 422. The results are presented below.

Sample Location	Chloride Content, ppm
HS-2 @ 1-5 feet	262

Laboratory Testing Procedures and Test Results

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geochemical methods (CTM 417). The soluble sulfate content is used to determine the appropriate cement type and maximum water-cement ratios. The test results are presented in the table below.

Sample Location	Sulfate Content (ppm)	Sulfate Exposure Class *
HS-2 @ 1-5 feet	373	S0

*Based on ACI 318R-14, Table 19.3.1.1

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with CTM 643 and standard geochemical methods. The results are presented in the table below.

Sample Location	pH	Minimum Resistivity (ohms-cm)
HS-2 @ 1-5 feet	7.84	1200

ONE-DIMENSIONAL SWELL OR SETTLEMENT POTENTIAL OF COHESIVE SOILS

ASTM D 4546

Project Name:	MWIG – El Monte	Tested By:	GB/JD	Date:	01/11/23
Project No.:	22116-01	Checked By:	J. Ward	Date:	01/25/23
Boring No.:	HS-1	Sample Type:	Ring		
Sample No.:	R-3	Depth (ft.)	7.5		
Sample Description:	Olive brown silt with sand (ML)s				

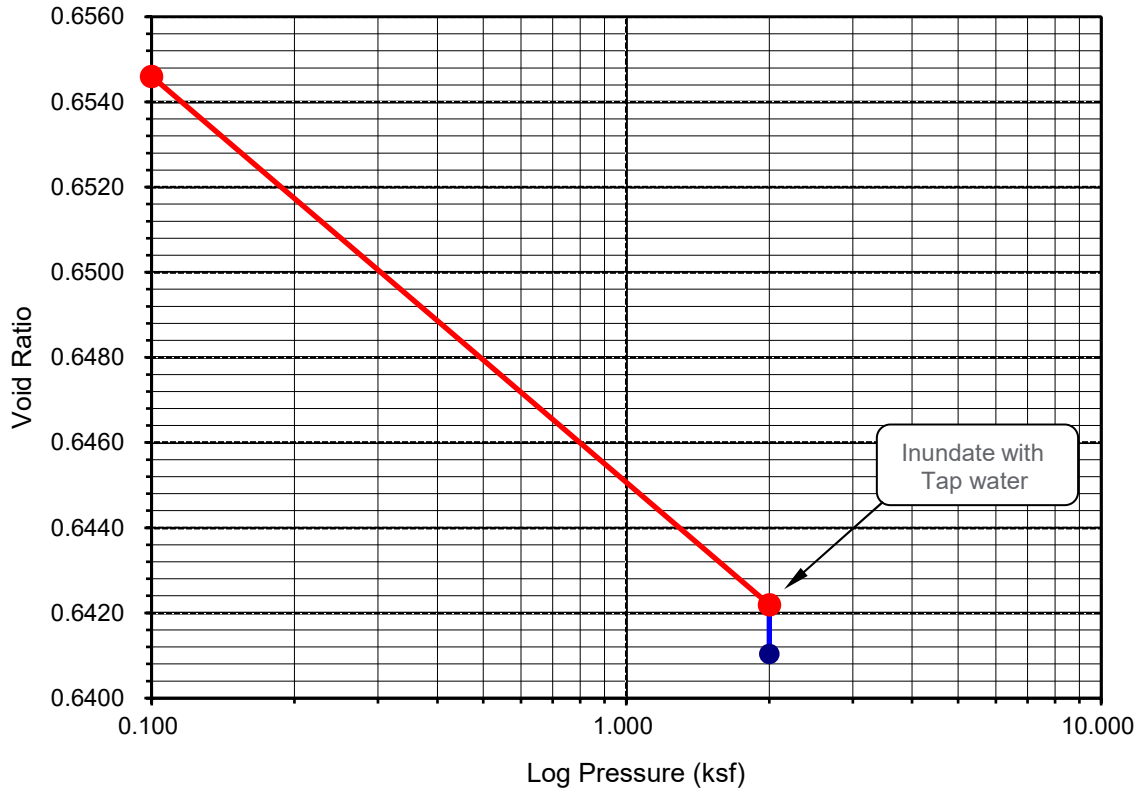
Initial Dry Density (pcf):	101.9
Initial Moisture (%):	13.86
Initial Length (in.):	1.0000
Initial Dial Reading:	0.0982
Diameter(in):	2.415

Final Dry Density (pcf):	103.4
Final Moisture (%) :	23.3
Initial Void ratio:	0.6548
Specific Gravity(assumed):	2.70
Initial Saturation (%)	57.2

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.100	0.0983	0.9999	0.00	-0.01	0.6546	-0.01
2.000	0.1093	0.9889	0.35	-1.11	0.6422	-0.76
H2O	0.1100	0.9882	0.35	-1.18	0.6410	-0.83

Percent Swell (+) / Settlement (-) After Inundation = -0.07

Void Ratio - Log Pressure Curve



ONE-DIMENSIONAL SWELL OR SETTLEMENT POTENTIAL OF COHESIVE SOILS

ASTM D 4546

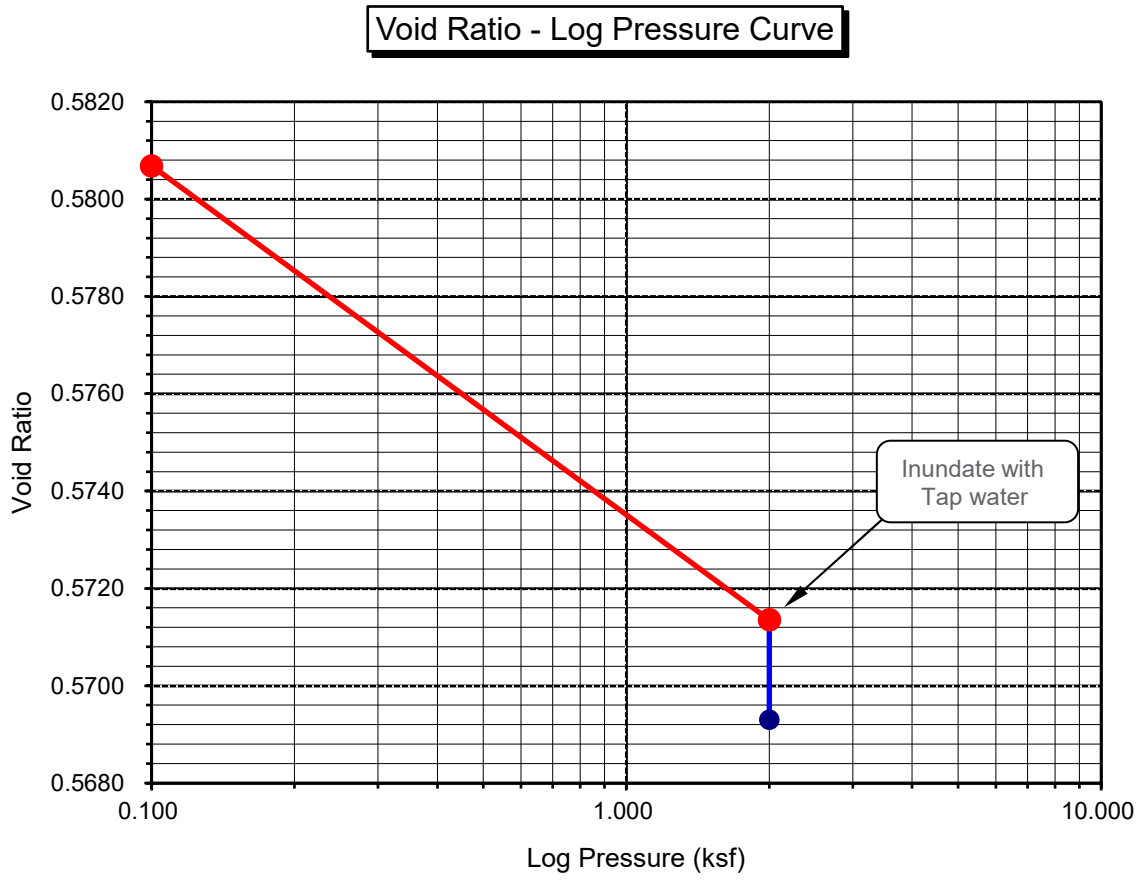
Project Name:	MWIG – El Monte		Tested By:	GB/JD	Date: 01/11/23
Project No.:	22116-01		Checked By:	J. Ward	Date: 01/25/23
Boring No.:	HS-2		Sample Type:	Ring	
Sample No.:	R-3		Depth (ft.)	7.5	
Sample Description:	Olive brown silty sand (SM)				

Initial Dry Density (pcf):	106.6
Initial Moisture (%):	6.76
Initial Length (in.):	1.0000
Initial Dial Reading:	0.1187
Diameter(in):	2.415

Final Dry Density (pcf):	108.2
Final Moisture (%) :	18.4
Initial Void ratio:	0.5808
Specific Gravity(assumed):	2.70
Initial Saturation (%)	31.4

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.100	0.1188	0.9999	0.00	-0.01	0.5807	-0.01
2.000	0.1281	0.9906	0.34	-0.94	0.5714	-0.60
H2O	0.1294	0.9893	0.34	-1.07	0.5693	-0.73

Percent Swell (+) / Settlement (-) After Inundation = -0.13



Appendix D
Infiltration Test Results

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite A, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: MWIG - El Monte
Project Number: 22116-01
Date: 1/6/2023
Location: I-2 (HS-4)

Test hole dimensions (if circular)	
Boring Depth (feet)*:	10
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

Pre-Soak /Pre-Test

No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Comments
Pre-Test	10:50	11:20	30.0	8.87	9.82	0.95	

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, Δt (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, ΔD (feet)	Surface Area of Test Section (feet ^2)	Raw Percolation Rate (in/hr)
1	11:22	11:52	30.0	8.38	9.66	1.28	3.74	2.9
2	11:55	12:25	30.0	8.00	9.39	1.39	4.54	2.6
3	12:27	12:57	30.0	7.87	9.22	1.35	4.81	2.4
4	14:00	14:30	30.0	8.12	9.48	1.36	4.29	2.7
5	14:32	15:02	30.0	8.23	9.45	1.22	4.06	2.5
6	15:10	15:40	30.0	8.12	9.55	1.43	4.29	2.8
7	15:42	16:12	30.0	8.21	9.59	1.38	4.10	2.8
8	16:14	16:44	30.0	8.37	9.73	1.36	3.76	3.0
9								
10								
11								
12								

Measured Infiltration Rate	**2.9**
Feasibility Factor of Safety	See Report
Feasibility Infiltration Rate	**See Report**

Sketch:

Notes:

Based on Guidelines from: LA County dated 06/2017
Spreadsheet Revised on: 12/23/2019

LGC Geotechnical, Inc.

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite A, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: MWIG - El Monte
Project Number: 22116-01
Date: 1/6/2023
Location: I-3 (HS-5)

Test hole dimensions (if circular)	
Boring Depth (feet)*:	10
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

Pre-Soak /Pre-Test

No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Comments
Pre-Test	10:54	11:24	30.0	8.08	9.23	1.15	

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, Δt (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, ΔD (feet)	Surface Area of Test Section (feet ^2)	Raw Percolation Rate (in/hr)
1	11:26	11:56	30.0	7.65	8.55	0.90	5.27	1.4
2	11:58	12:28	30.0	7.64	8.55	0.91	5.29	1.4
3	12:31	13:01	30.0	7.55	8.40	0.85	5.48	1.3
4	14:03	14:33	30.0	7.87	9.10	1.23	4.81	2.1
5	14:37	15:07	30.0	7.07	8.59	1.52	6.49	2.0
6	15:08	15:38	30.0	7.13	8.55	1.42	6.36	1.9
7	15:40	16:10	30.0	7.24	8.60	1.36	6.13	1.9
8	16:12	16:42	30.0	7.48	8.79	1.31	5.63	2.0
9								
10								
11								
12								

Measured Infiltration Rate	**1.9**
Feasibility Factor of Safety	See Report
Feasibility Infiltration Rate	**See Report**

Sketch:

Notes:

Based on Guidelines from: LA County dated 06/2017
Spreadsheet Revised on: 12/23/2019

LGC Geotechnical, Inc.

Infiltration Test Data Sheet

LGC Geotechnical, Inc
131 Calle Iglesia Suite A, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: MWIG - El Monte
Project Number: 22116-01
Date: 1/6/2023
Location: I-4 (HS-6)

Test hole dimensions (if circular)	
Boring Depth (feet)*:	10
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

Pre-Soak /Pre-Test

No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Comments
Pre-Test	11:01	11:31	30.0	8.05	9.21	1.16	

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, Δt (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, ΔD (feet)	Surface Area of Test Section (feet ^2)	Raw Percolation Rate (in/hr)
1	11:32	12:02	30.0	7.85	9.18	1.33	4.85	2.3
2	12:04	12:34	30.0	7.87	9.23	1.36	4.81	2.4
3	12:36	13:06	30.0	7.50	8.89	1.39	5.59	2.1
4	14:07	14:37	30.0	7.79	9.21	1.42	4.98	2.4
5	14:41	15:11	30.0	7.96	9.26	1.30	4.62	2.4
6	15:15	15:45	30.0	7.80	9.11	1.31	4.96	2.2
7								
8								
9								
10								
11								
12								

Measured Infiltration Rate	**2.3**
Feasibility Factor of Safety	See Report
Feasibility Infiltration Rate	**See Report**

Sketch:

Notes:

Based on Guidelines from: LA County dated 06/2017
Spreadsheet Revised on: 12/23/2019

LGC Geotechnical, Inc.

Appendix E
General Earthwork & Grading Specifications for Rough Grading

General Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent

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

1.2 The Geotechnical Consultant of Record

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

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

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

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

1.3 The Earthwork Contractor

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

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

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

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

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

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

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

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

2.2 Processing

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

2.3 Over-excavation

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

2.4 Benching

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

2.5 Evaluation/Acceptance of Fill Areas

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

3.0 Fill Material

3.1 General

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

3.2 Oversize

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

3.3 Import

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

4.0 Fill Placement and Compaction

4.1 Fill Layers

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

4.2 Fill Moisture Conditioning

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

4.3 Compaction of Fill

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

4.4 Compaction of Fill Slopes

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

4.5 Compaction Testing

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

4.6 Frequency of Compaction Testing

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

4.7 Compaction Test Locations

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

5.0 Subdrain Installation

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

6.0 Excavation

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

7.0 Trench Backfills

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

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

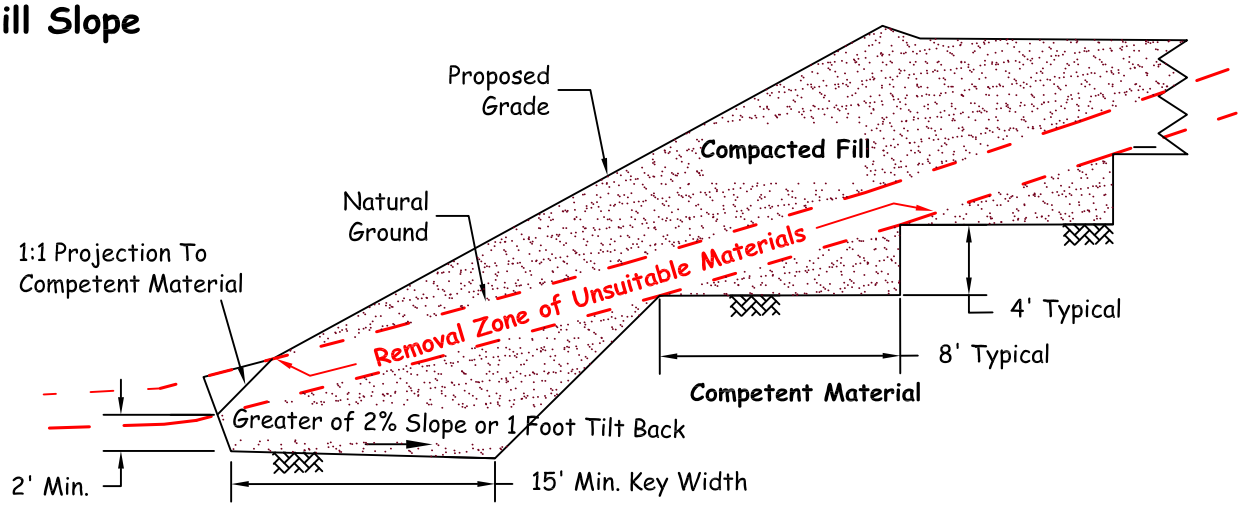
the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

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

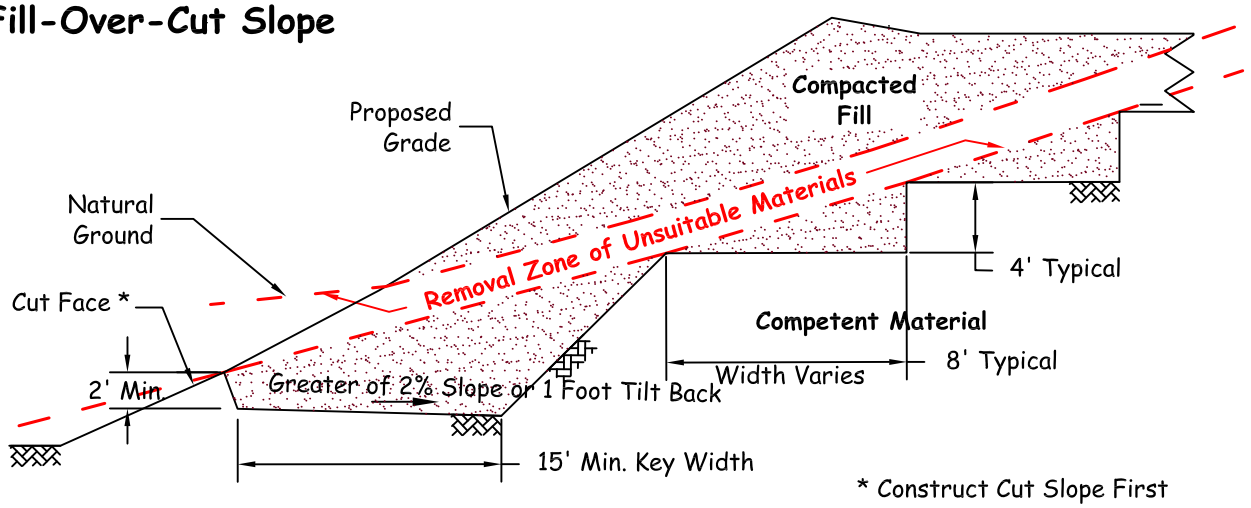
7.4 The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

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

Fill Slope

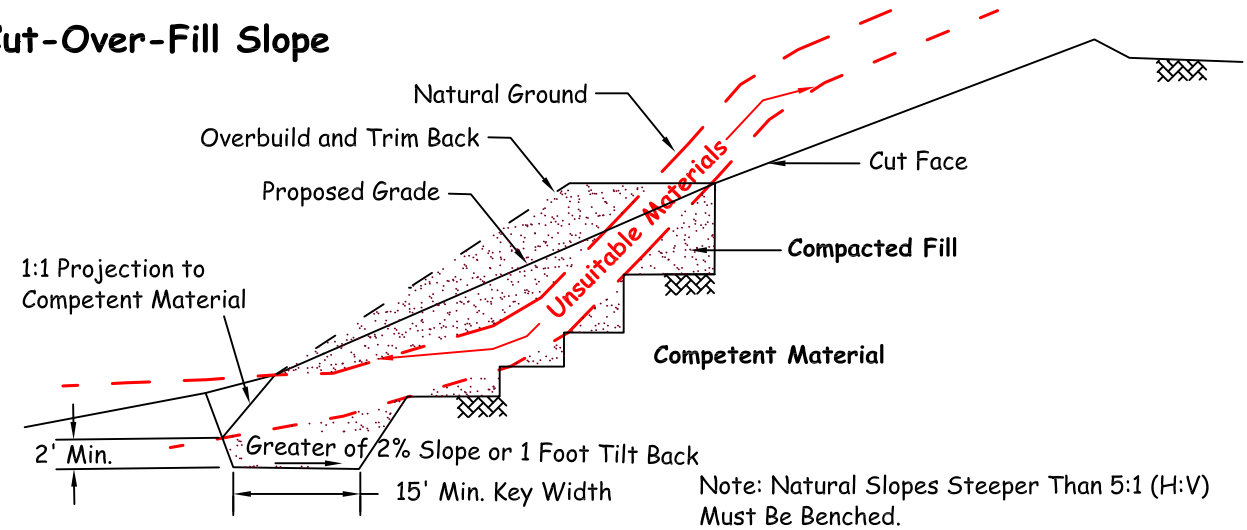


Fill-Over-Cut Slope



* Construct Cut Slope First

Cut-Over-Fill Slope



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

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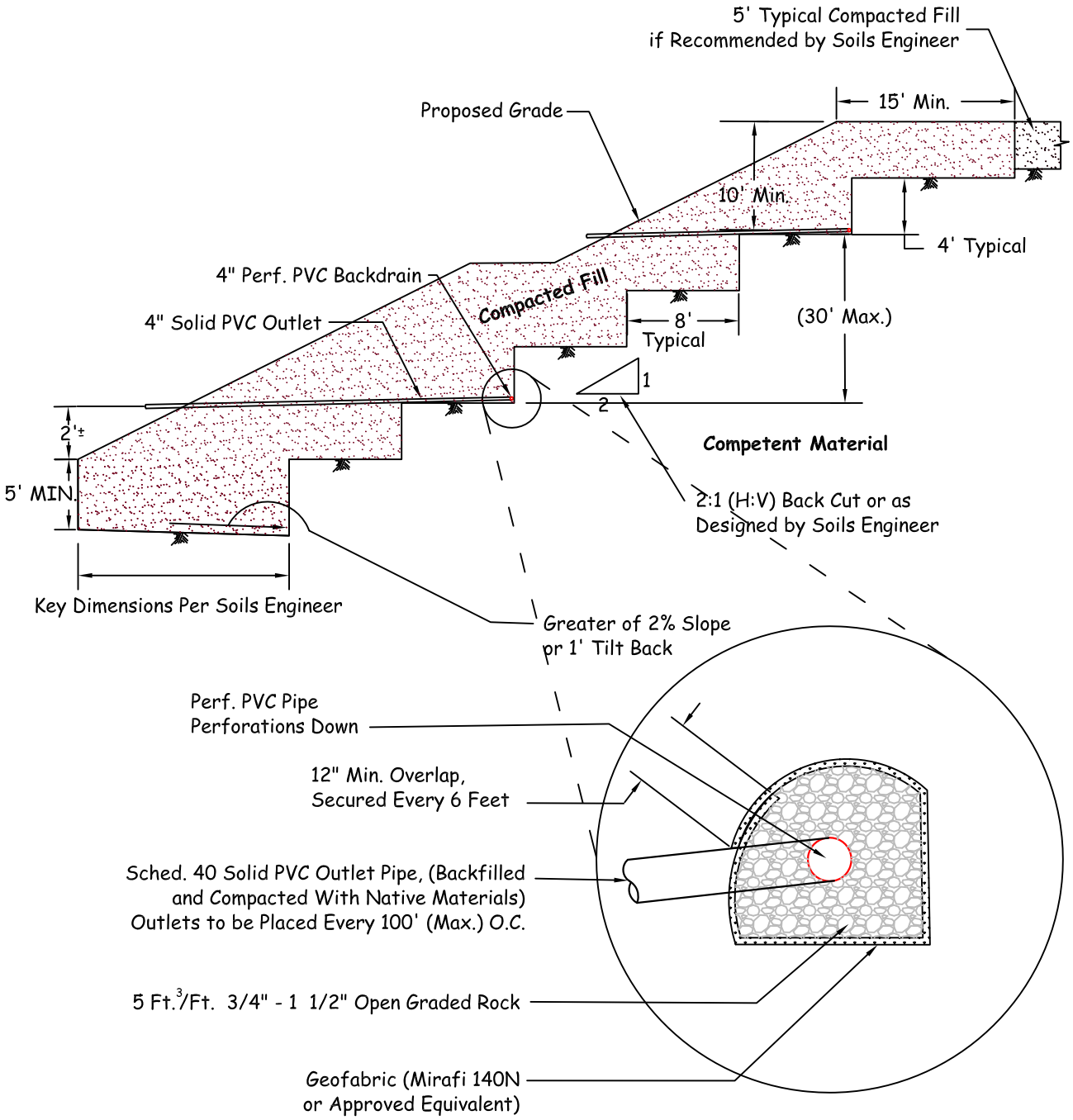
KEYING AND BENCHING



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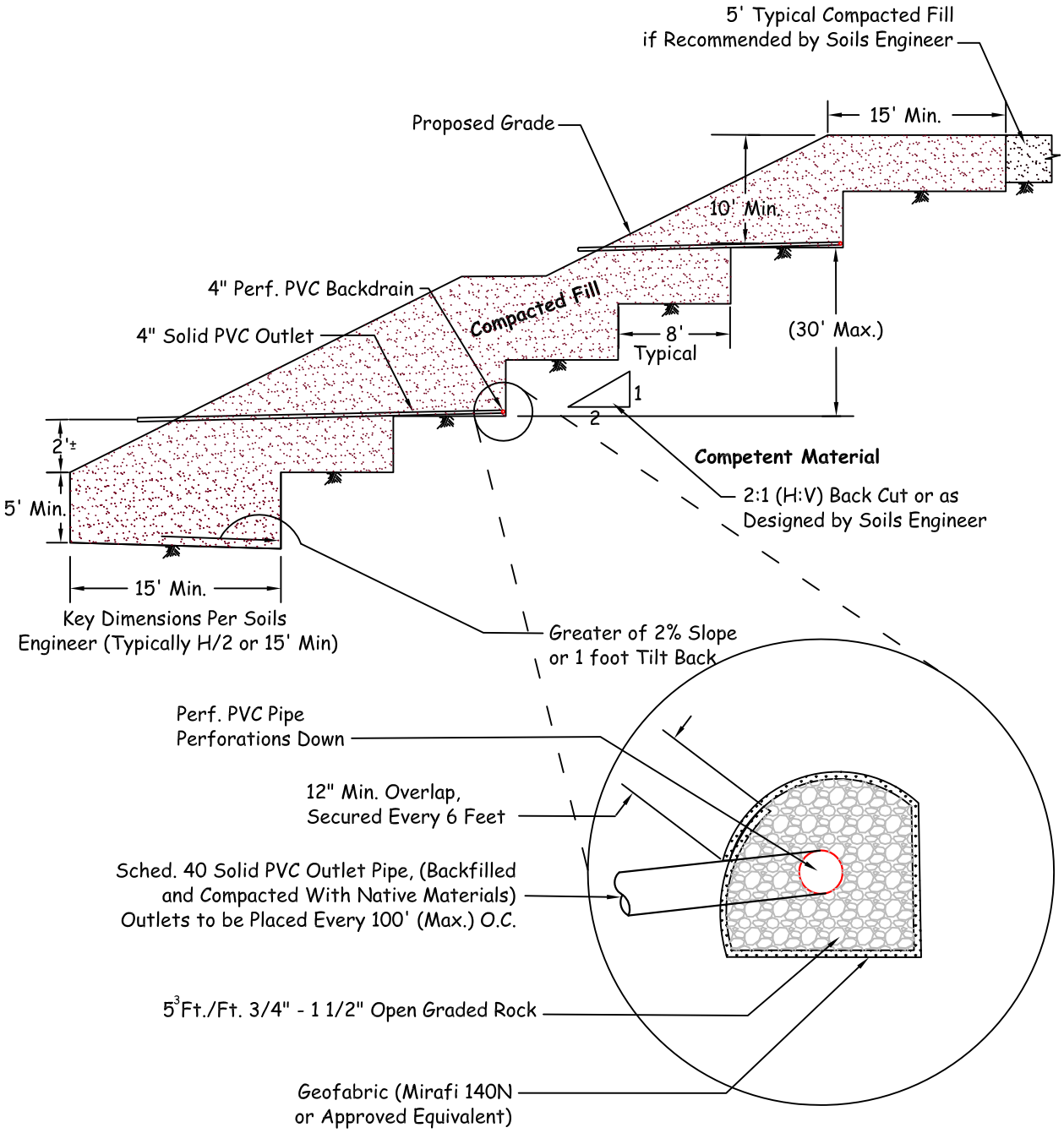
TYPICAL BUTTRESS DETAIL



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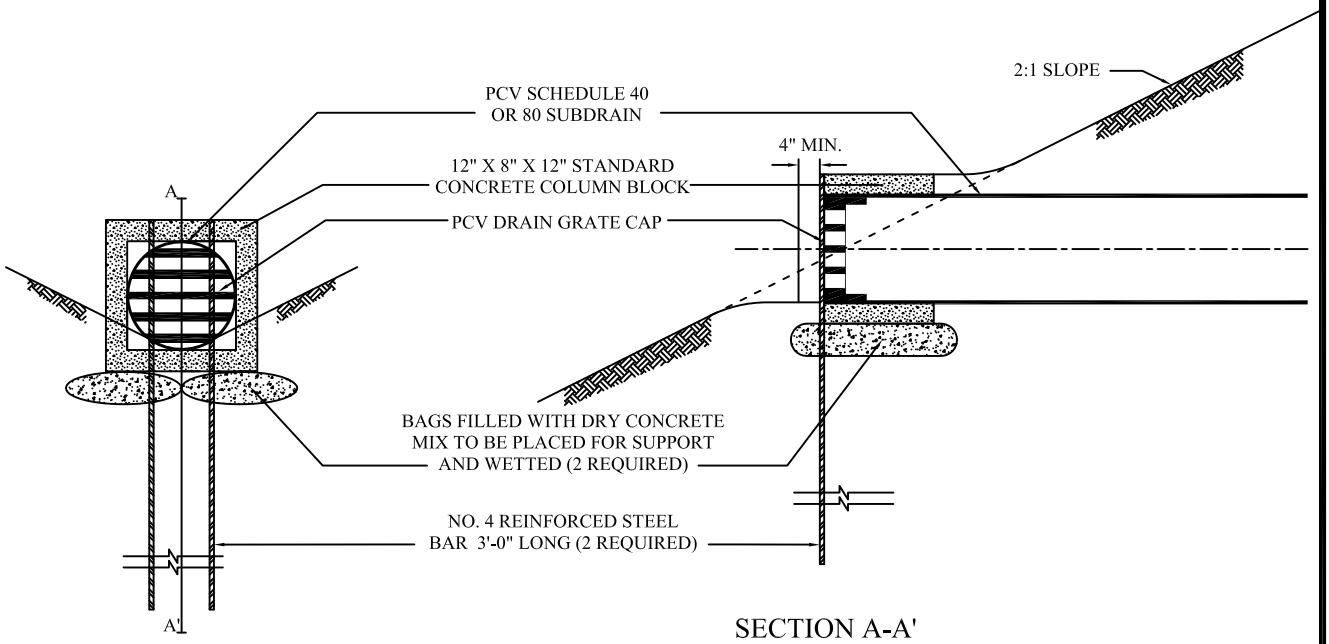
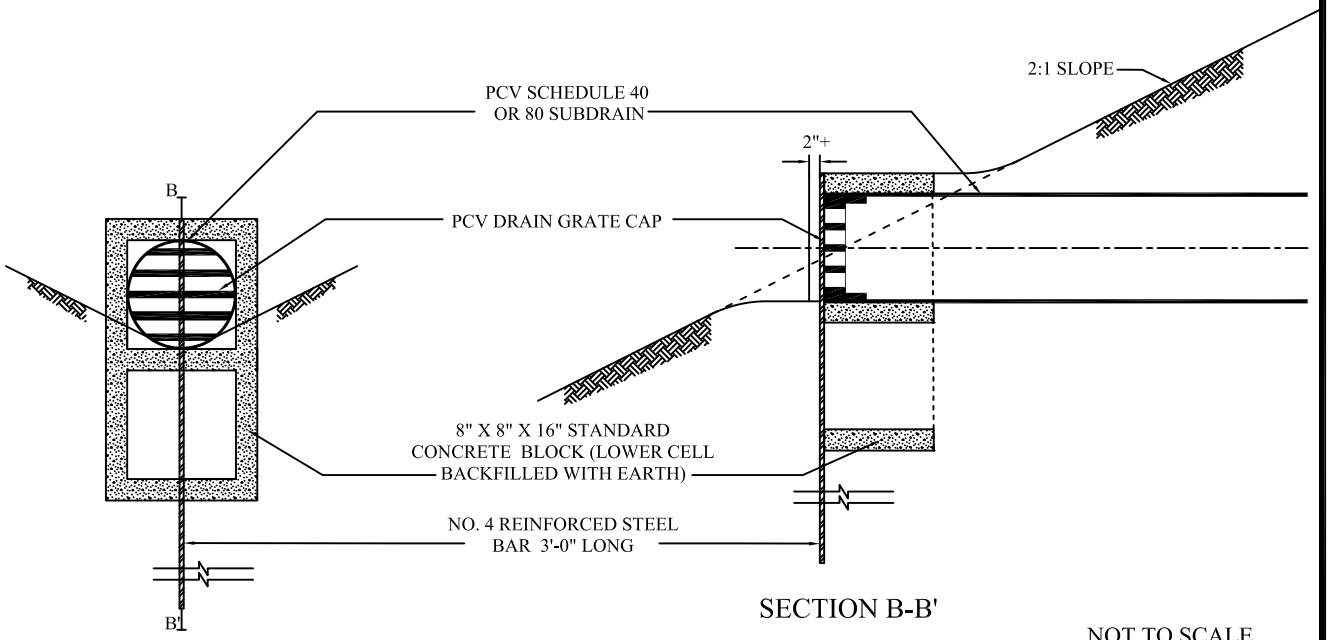
TYPICAL STABILIZATION FILL DETAIL

SUBDRAIN OUTLET MARKER -6" & 8" PIPE



SECTION A-A'

SUBDRAIN OUTLET MARKER -4" PIPE



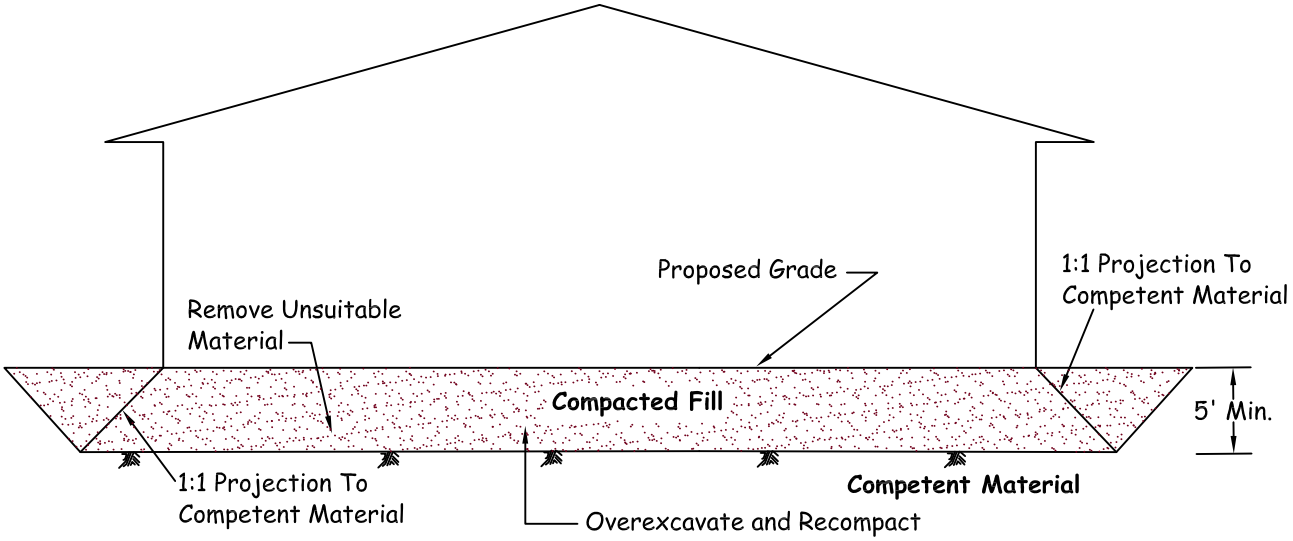
SECTION B-B'

NOT TO SCALE

LGC Geotechnical, Inc.

SUBDRAIN OUTLET MARKER DETAIL

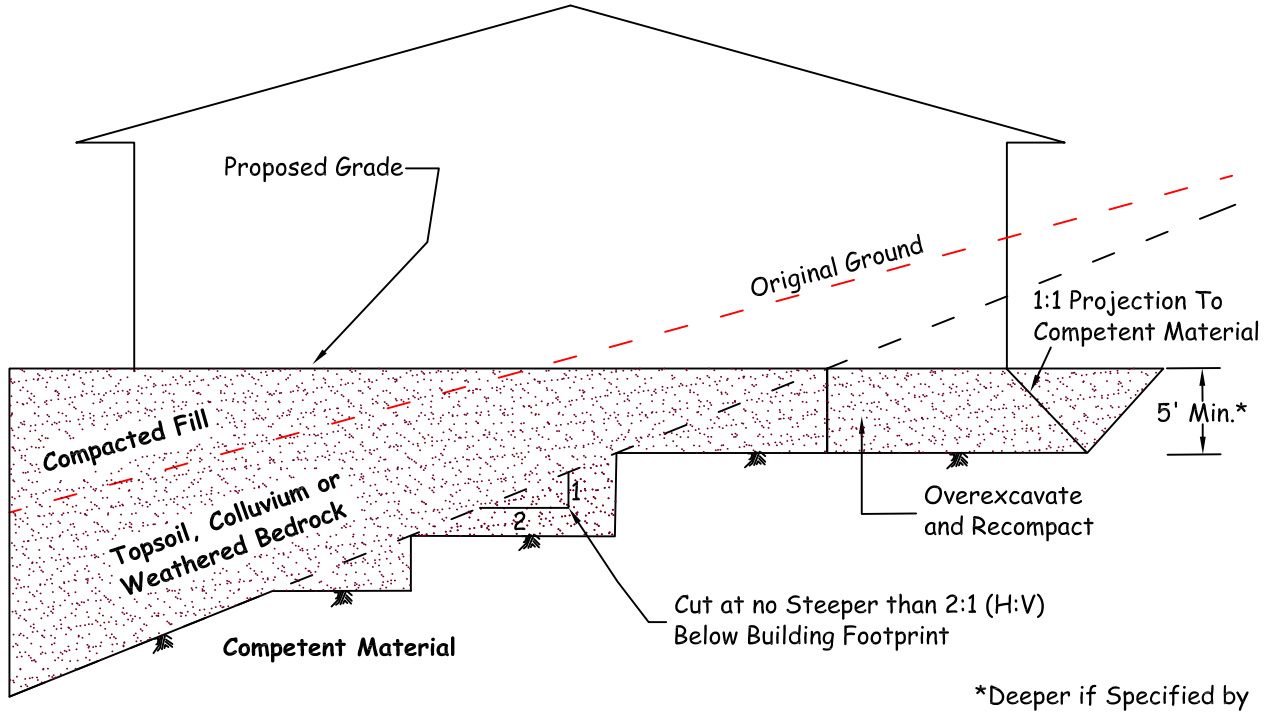
Cut Lot
(Exposing Unsuitable Soils at Design Grade)



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

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

Cut/Fill Transition Lot



*Deeper if Specified by Soils Engineer

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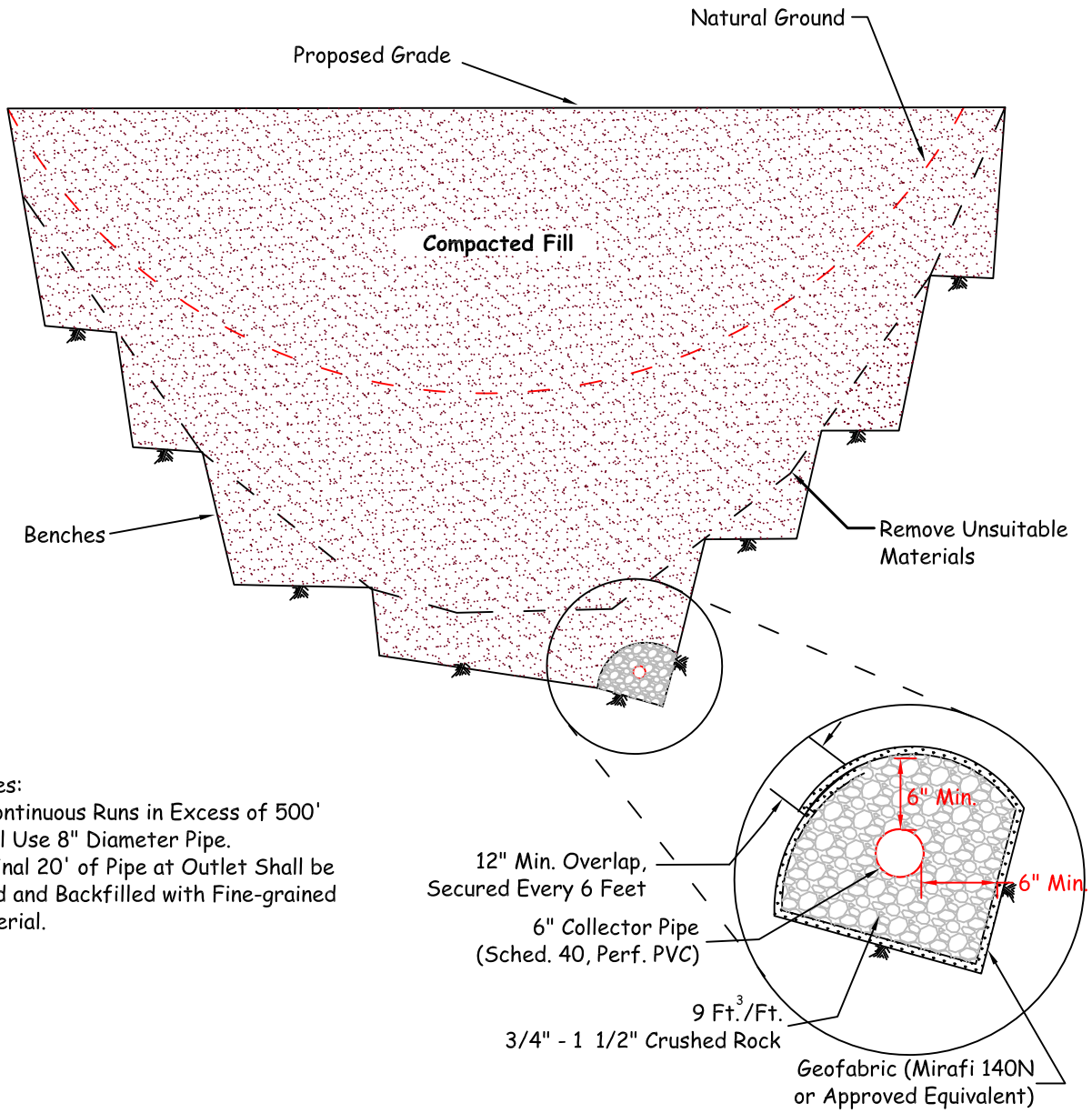
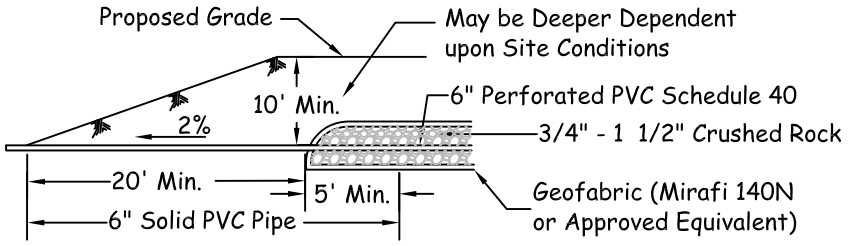
CUT AND TRANSITION LOT OVEREXCAVATION DETAIL



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

Proposed Outlet Detail



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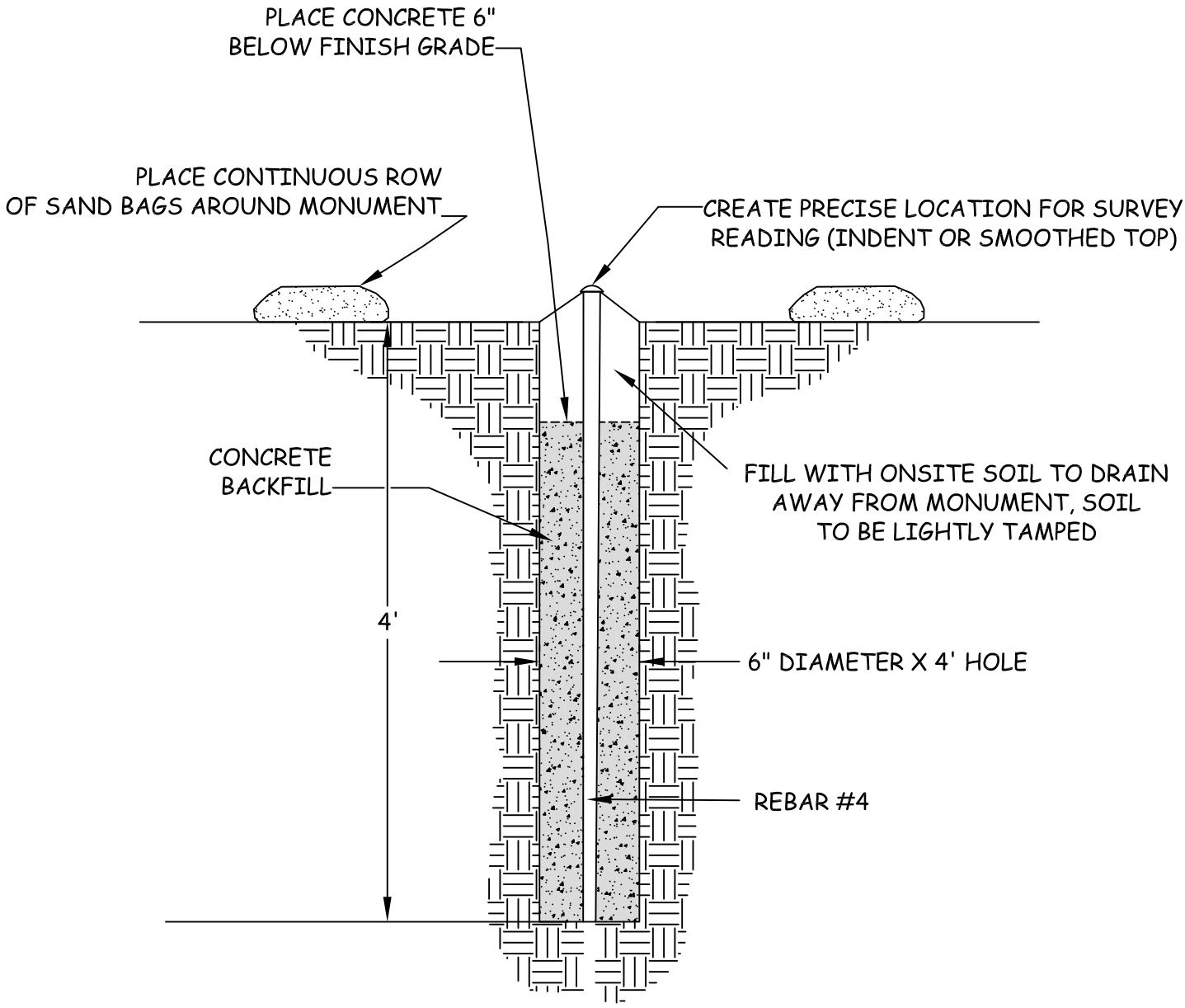
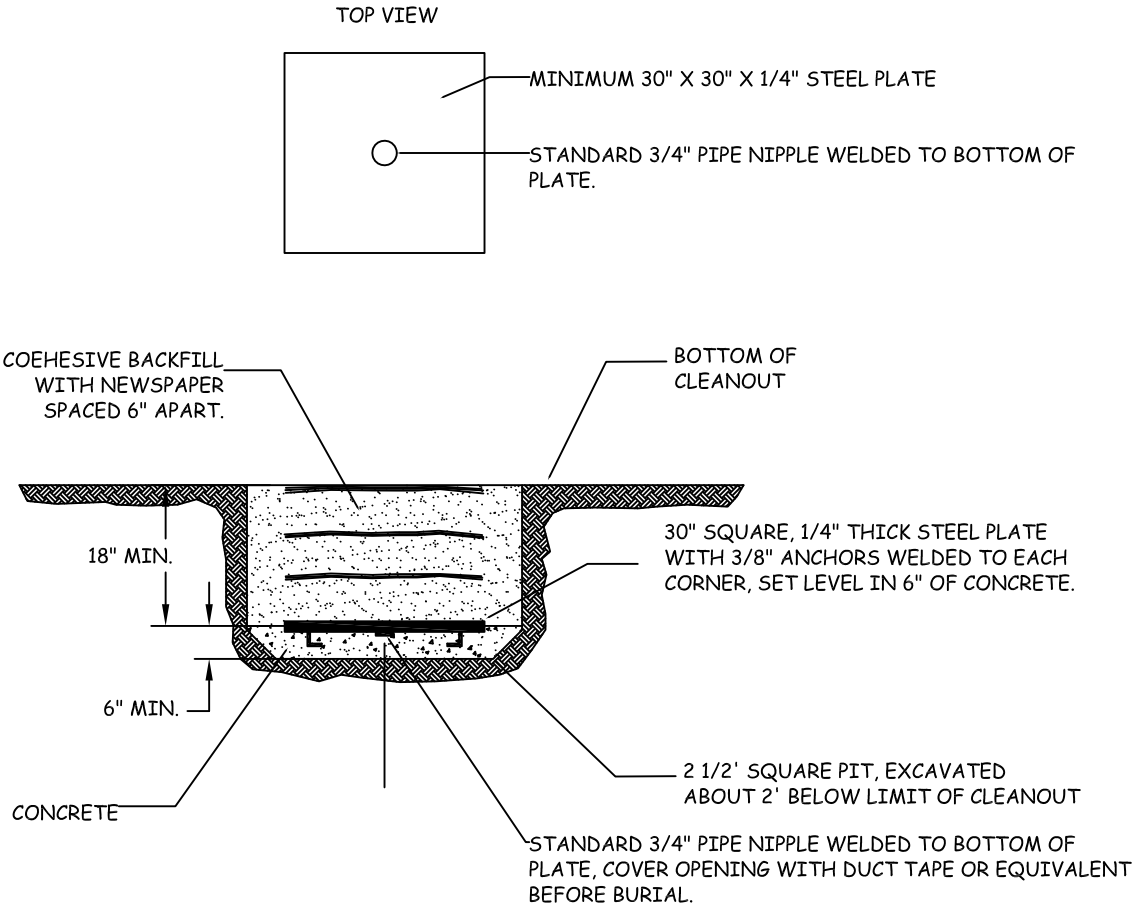
CANYON SUBDRAINS



NO CONSTRUCTION EQUIPMENT WITHIN 25 FEET
OF ANY INSTALLED SETTLEMENT MONUMENTS

LGC Geotechnical, Inc.

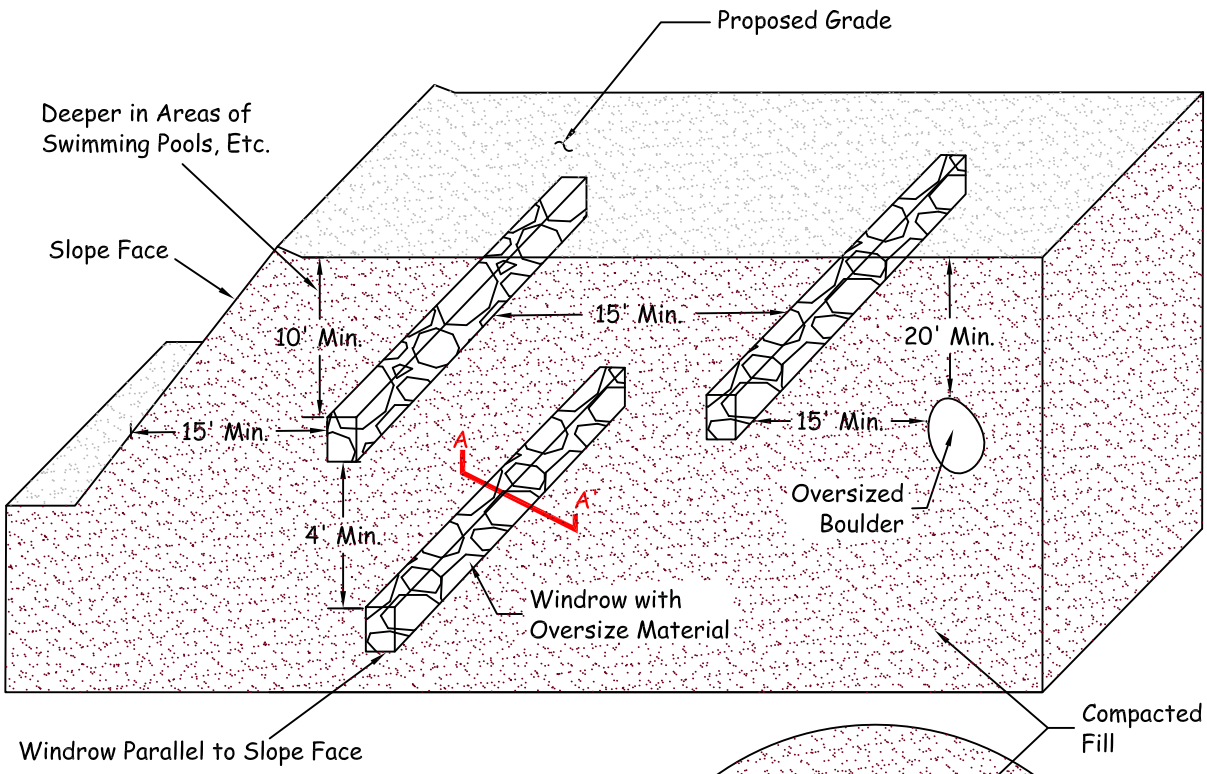
TYPICAL SURFACE SETTLEMENT MONUMENT

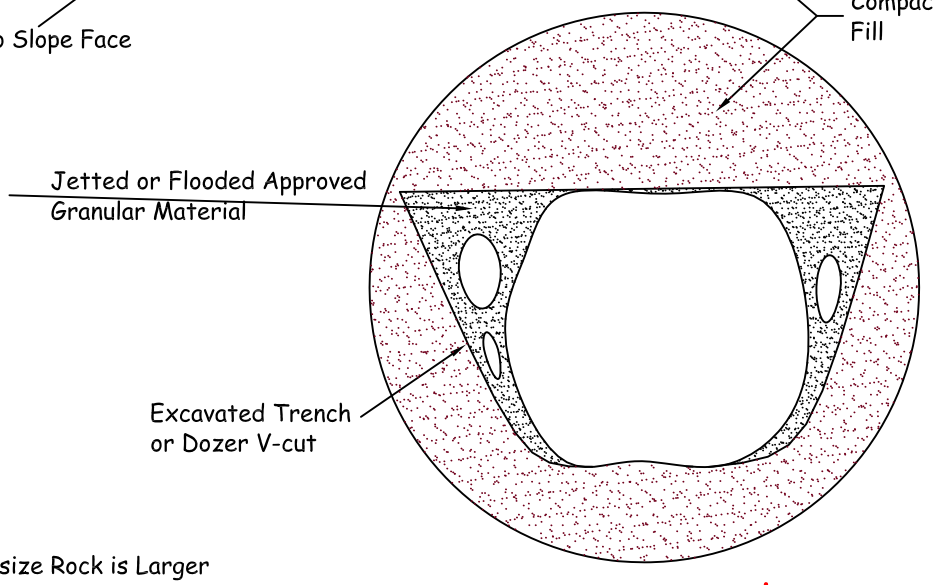


1. SURVEY FOR HORIZONTAL AND VERTICAL LOCATION TO NEAREST .01 INCH PRIOR TO BACKFILL USING KNOW LOCATIONS THAT WILL REMAIN INTACT DURING THE DURATION OF THE MONITORING PROGRAM. KNOW POINTS EXPLICITELY NOT ALLOWED ARE THOSE LOCATED ON FILL OR THAT WILL BE DESTROYED DURING GRADING.
2. IN THE EVENT OF DAMAGE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

LGC Geotechnical, Inc.

TYPICAL SETTLEMENT PLATE AND RISER





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

Section A-A'

LGC Geotechnical, Inc.

OVERSIZE ROCK DISPOSAL DETAIL

Appendix H:
Educational Materials

Storm Drains are for Rain...

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

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

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

...not automotive fluids.

Car Care Tips:

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

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

PROJECT Pollution PREVENTION

Printed on recycled paper

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PROJECT Pollution PREVENTION

Printed on recycled paper

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

Take our quiz!

Have you ever...

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

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

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

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

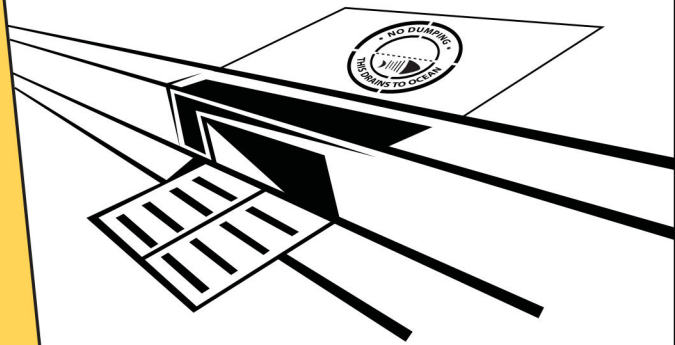
For more information, call or visit:

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

PROJECT Pollution PREVENTION

Follow these simple steps to prevent stormwater pollution:

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



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

Don't Paint the Town Red!

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

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

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

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

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

Tips for Paint Clean-Up:

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

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

PROJECT Pollution PREVENTION

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

Storm Drains are for Rain...

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

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

...not pesticides.

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

Pesticide Tips:

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

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

PROJECT Pollution PREVENTION

Printed on recycled paper

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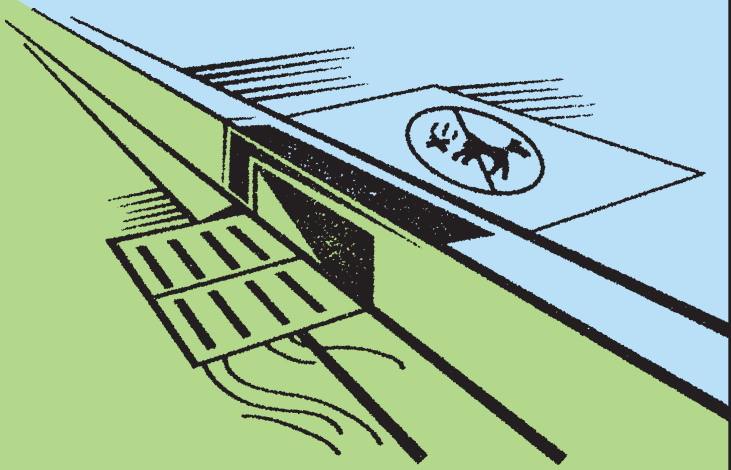
PROJECT Pollution PREVENTION

Printed on recycled paper

Pick Up After Your Pooch!



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

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

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

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

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

Tips for Dog Owners:

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

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

PROJECT Pollution PREVENTION

Storm Drains are for Rain...

Stormdrains take runoff directly to creeks and the ocean without treatment. Pool chemicals can harm our natural creeks and waterways. Anything going into our stormdrains that isn't rainwater contributes to stormwater pollution, which contaminates our creeks and ocean, kills marine life and causes beach closures.

...not pool chemicals

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

Swimming Pool Tips

Follow these simple steps to prevent stormwater pollution...

- Make sure all chemicals are dissipated before draining a pool or spa
- Do not drain pools within 5 days of adding chemicals
- Never backwash a filter into the street or stormdrain
- Cleanup chemical spills with absorbent, don't wash it down the drain
- Dispose of leftover chemicals and paints through a licensed hazardous waste disposal provider

PROJECT Pollution PREVENTION

Storm Drains are for Rain...

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

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

...they're not recycling centers.

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

Recycling Tips:

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

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

Printed on recycled paper

PROJECT Pollution PREVENTION

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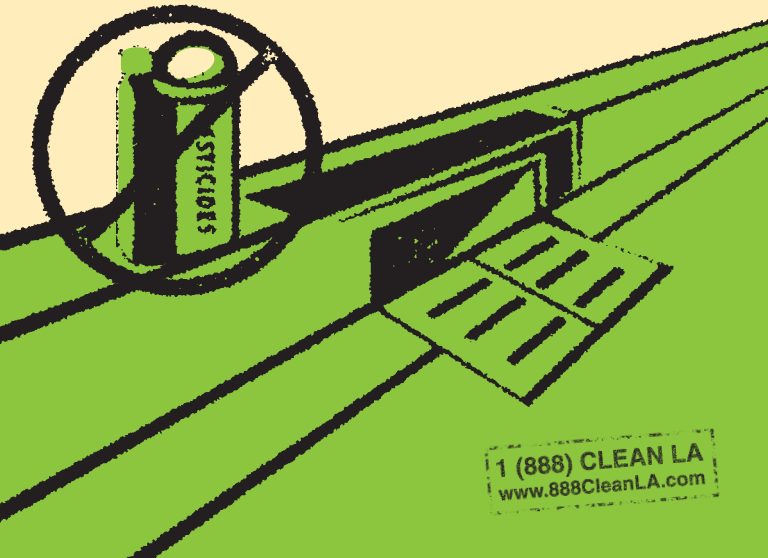
A Yard is a Terrible Thing to Waste!

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

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

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

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



Tips For Yard Care:

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

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

PROJECT Pollution PREVENTION

A message from the County of Los Angeles Department of Public Works.
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