Appendix I
Utilities Memorandum

ESA

Carson Self-Storage
Preliminary Utilities Technical Memorandum
21611 South Perry St.
Carson, CA 90745

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1.0 OVERVIEW

The Carson Self-Storage project, herein known as the Project, involves the development of multiple self-storage buildings with a café, and office space on the 2.80-acre site. The Project site currently consists of a vacant lot that was previously occupied by an 60,000 SF industrial building until approximately 2009. The development site is located at 21611 S. Perry Street and is bounded by E. Carson Street to the south, Dominguez Channel to the west, single-family residences to the north, and commercial and residential properties to the east.

2.0 SCOPE OF ANALYSIS

This analysis provides supporting information for the Project's environmental review pursuant to the California Environmental Quality Act (CEQA) and documents research regarding existing and proposed utility infrastructure for the Project. Both the existing conditions and previous development condition shave been analyzed.

3.0 EXISTING UTILITES AND REGULATORY FRAMEWORK

3.1 Existing Utility Providers

The following is a list of existing utilities and their service providers that are within the proximity of the Project Site.

- Storm Drain – Los Angeles County Flood Control District
- Sanitary Sewer – Los Angeles County Department of Public Works
- Water – California Water Service Company
- Electricity – Southern California Edison
- Natural Gas – Southern California Gas Company
- Telecommunications –
    - AT&T Distribution South
    - Charter Communications

3.2 Regulatory Framework

3.2.1 Water

The California Water Service Company is responsible for providing water supply to the City of Carson while complying with Local, State, and Federal regulations.

The proposed project does not meet or exceed the below specified thresholds requiring a WSA from California Water Service Company.

Below are the State and Regional water supply regulations:

California Code of Regulations, Title 20, Chapter 4, Article 4, Section 1605 establishes water efficiency standards for all new plumbing fixtures and Section 1608 prohibits the sale of fixtures that do not comply with the regulations.

2016 California Green Building Standards Code, CCR, Title 24, Part 11 (CALGreen), adopted on January 1, 2016, requires a water use reduction of 20 percent below the baseline cited in the CALGreen code book. The code applies to family homes, state buildings, health facilities, and commercial buildings.

California Urban Water Management Planning Act of 1984 requires water suppliers to adopt an Urban Water Management Plan (UWMP).

Metropolitan Water District (MWD) official reports and policies as outlined in its Regional UWMP, Water Surplus and Drought Management Plan, Water Supply Allocation Plan, and Integrated Resources Plan.

Los Angeles County Public Works' 2015 UWMP outlines the County's long-term water resources management strategy. The 2015 UWMP was approved by June 3, 2016.

Senate Bill 610, approved on October 9, 2001, requires land use agencies to perform a detailed analysis of available water supply when approving large developments. Historically, public water suppliers (PWS) simply provided a "will serve" letter to developers. For certain projects subject to CEQA review, SB 610 requires that urban water suppliers prepare a WSA to determine whether the project water demand is included as part of the most recently adopted UWMP. All projects that meet any of the following criteria require a WSA:

- o A proposed residential development of more than 500 dwelling units.
- o A proposed shopping center or business establishment of more than 500,000 square feet of floor space or employing more than 1,000 persons
- o A proposed commercial office building of more than 250,000 square feet of floor space or employing more than 1,000 persons
- o A proposed hotel or motel of more than 500 rooms
- o A proposed industrial, manufacturing, or processing plant or industrial park of more than 40 acres of land, more than 650,000 square feet of floor area, or employing more than 1,000 persons
- o A mixed-use project that falls in one or more of the above-identified categories
- o A project not falling in one of the above-identified categories but that would demand water equal or greater than the amount required by a 500-dwelling unit project.

3.2.2 Sewer

The County of Los Angeles includes regulations that allow the County to assure available sewer capacity for new projects and fees for improvements to the infrastructure system. The County requires that the applicant perform a sewer area study when any person seeks a sewer permit to connect a property to the County's sewer collection system, proposes additional discharge through their existing public sewer connection, or proposes a future sewer connection or future development. A sewer area study is an analysis of the existing sewer collection system to determine if there is adequate capacity existing in the sewer collection system to safely convey the newly generated sewage to the appropriate sewage treatment plant. The net increase in daily water demand is so small a sewer study should not be necessary.

The County of Los Angeles establishes design criteria for sewer systems to assure that new infrastructure provides sewer capacity and operating characteristics to meet standard practice for sewer design. Per County regulations, sewers will be designed so that the peak dry weather flow depth during their planning period shall not exceed one-half the pipe diameter.

3.2.3 Electricity

Title 24 of the California Code of Regulations regulates energy consumption in new construction. The standards regulate energy consumed in buildings for heating, cooling, ventilation and lighting. Title 24 is implemented through the local plan check and permit process. The current (2016) standards effective date is January 1, 2017 and it applies for new construction of both residential and non-residential buildings.

3.2.4 Natural Gas

As a public utility, the Southern California Gas Company (the Gas Co.) is under jurisdiction of the California Public Utilities Commission. As mentioned in section 3.2.3, Title 24 of the California Code of Regulations regulates energy consumption in new constructions. The standards regulate energy consumed in buildings for heating, cooling, ventilation and lighting. Title 24 is implemented through the local plan check and permit process. The Gas Co.'s 2018 Gas Report that commercial and industrial demand is expected to increase at an annual rate of 0.2 percent. This is mainly due to increased efficiency of power plants and the statewide efforts to use renewable sources of energy for electricity generation.

3.2.5 Telecommunications

As a private utility, telecommunications service providers operate jurisdiction of the California Public Utilities Commission. As mentioned in section 3.2.3, Title 24 of the California Code of Regulations regulates energy consumption in new constructions. The standards regulate energy consumed in buildings for heating, cooling, ventilation and lighting. Title 24 is implemented through the local plan check and permit process.

4.0 WATER

4.1 Existing Condition

Both the existing conditions and previous development conditions have been analyzed. California Water Service owns and operates a 12" water main in the east side of S Perry Street and a 12" branch off the main even further in the east side of S Perry Street, adjacent to the project. There is one fire hydrant on the east side of S Perry Street, adjacent to the project site. The previous condition of the currently vacant site was a 60,000 SF industrial building that covered most of the site and a parking lot. This information and historic data obtained from California Water Service Company was used to determine the existing site water usage.

4.2 Proposed Condition

The proposed project includes 3-Self Storage Buildings, a small café, & a small office space. Only the café & office space will contribute to the water demand, as the self-storage buildings will not contain and water fixtures.

Estimated Project Water Demand

Proposed Use	Average Generation Factor[(a)]	Square Footage	Average Daily Water Demand (GPD)	Estimated Water Use (AFY) 2045-Ultimate Condition
Café/Commercial	0.28 GPD/SQFT	4,675 SQFT	1,309	1.5
Landscaping/ Open Space	-	12,134 SQFT	254	0.29
System Water Losses (3.4%)			53	0.06
Existing Site Use	0	0	0	0
Previous Site Use	(*)	60,000	-3,740	-4.2
Proposed Total Demand	-	-	-2,137	1.85

a) All flows were calculated using historical data for the Dominguez District, as provided in the Cal Water WSA Water Factor Tool.
b) Estimates of landscape irrigation are based on MWELO ETWU calculations provided by Cal Water. Landscape irrigation estimates include all irrigated areas including public open space and private yards.

Domestic water is expected to be the main contributor of water consumption for the Project. The total water demand for the Project is conservatively estimated at 1.85 AFY at buildout. This culminates in a net 2.35 AFY decrease in water use when compared to the former industrial building, but an increase in water use when compared to current vacant condition. Fire water demands will create a greater immediate need on the water network, and therefore are the primary means for analyzing infrastructure capacity. A regional Fire Hydrant Flow Test has been received from California Water to confirm the pressure from the existing fire hydrant.

Due to size and area of the Project, LACFD will require onsite fire hydrants. Omega is coordinating with California Water Service Company and County of Los Angeles Fire Department to submit a Fire Hydrant Flow Test form for confirmation. The hydrant tested is on the west side of S Perry Street, within immediate vicinity of the Project site. The flow test demonstrated that the hydrant is capable of 4,144 gallons per minute.

4.3 Significance Thresholds – Water

In accordance with the State CEQA Guidelines Appendix G (Appendix G), the Project would have a significant impact related to water supply and infrastructure if it would:

- Require or result in the relocation or construction of new or expanded water facilities, the construction or relocation of which could cause significant environmental effects
- [Not] have enough water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years

The L.A. County CEQA Thresholds Guide identifies the following criteria to evaluate water supply and infrastructure:

- The total estimated water demand for the project;
- Whether enough capacity exists in the water infrastructure that would serve the project, taking into account the anticipated conditions at project buildout;
- The amount by which the project would cause the projected growth in population, housing or employment for the Community Plan area to be exceeded in the year of the project completion; and
- The degree to which scheduled water infrastructure improvements or project design features would reduce or offset service impacts.

In assessing impacts related to water supply and infrastructure, the County will use Appendix G as the thresholds of significance. The criteria identified above from the L.A. County CEQA Thresholds Guide will be used where applicable and relevant to assist in analyzing the Appendix G thresholds.

4.4 Project Impacts

The project will require the construction of new, water facilities to serve the new buildings. Construction impacts associated with the installation of water distribution lines would primarily involve trenching to place the water distribution lines below surface and would be limited to on-site water distribution, and minor off-site work associated with lateral connections to the public main. Prior to ground disturbance, Project contractors would coordinate with California Water Service Company to identify the locations and depths of all lines. Additionally, County of Los Angeles and California Water Service Company would be notified in advance of proposed ground disturbance activities to avoid water lines and disruption of water service. Therefore, Project impacts on water infrastructure associated with construction activities would be less than significant.

According to the 2019 California Fire Code Section 501.3, construction documents for proposed fire apparatus access, location of fire lanes, security gates across fire apparatus roads and construction documents and hydraulic calculations for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction. Referencing the California Fire Code Appendix B (Table B105.1) and Appendix C (Table C105.1) Omega has estimated the minimum requirements are that:

- The water system must deliver 2,500 GPM at 20 psi for 2 hours.
- The spacing between fire hydrants does not exceed 450 feet via vehicular access.
- The distance of proposed buildings must be within 225 feet of a vehicular access roadway that is a minimum of 20 feet wide, paved with concrete or asphalt and does not exceed 15% grade.

Omega has corresponded with California Water Service Company and has received final receipt of the Fire Hydrant Flow Test form results that indicate the available pressure and capacity meet the proposed demands.

The total water demand for the Project is 1.83 AFY. Fire water demands will create a much greater immediate need on the water network than that of the Project's domestic uses, and therefore are the primary

means for analyzing infrastructure capacity. All buildings will be sprinklered. However, water demands for the fire hydrants are fixed per a max flow allowed through the hydrant nozzle and building sprinkler demands will be less than the required 2,500 GPM for 2 hours. Cumulative demand from both the sprinkler system and fire hydrants flowing simultaneously will further reduce the pressure in the water system, the Fire Hydrant Flow Tests results have confirmed that available pressure and capacity meet the required 20 psi at the furthest hydrant.

5.0 SEWER

5.1 Existing Condition

Both the existing conditions and previous development conditions have been analyzed. The Project site is located within the Consolidated Sewer Maintenance District run by LACDPW. There is an existing 10" clay sewer main in the center of S Perry Street adjacent to the Project Site that is owned by LACDPW. The previous condition of the site was a 60,000 SF industrial building that covered most of the site and a parking lot. This information and the sewer generation factor for industrial buildings were used to generate the existing average daily water demand.

5.2 Proposed Condition

LACDPW's average wastewater generation factors were used to calculate the estimated demand of the proposed Project as follows:

Proposed Use	Average Generation Factor[(a)]	Proposed Number of Units	Average Daily Water Demand (GPD)
Office	200/1,000 GPD/SF	3,125 SF	625
Café/Restaurants	1,000/1,000 GPD/SF	1,550 SF	1,550
Storage	25/1,000 GPD/SF	109,039 SF	2,725
Proposed Total Demand	-	-	4,900
Proposed Total Demand With 2.5 Peaking Factor	-	-	12,250
Existing Condition	-	-	0
Previous Industrial	200/1,000 GPD/SF	60,000	-12,000

a) All flows were calculated using the County of Los Angeles sewer generation values. See appendix for entire sewer generation rates.

The proposed project will contribute 12,250 GPD or .02 cubic feet per second (cfs), when a peaking factor of 2.5 is factored in. This totals a net increase of 250 GPD when compared to the former industrial building located on the site and an increase of 12,250 GPD when compared to current vacant condition. It is anticipated that the project will flow 100% into the existing 10" diameter sewer through two separate sewer laterals on the project.

A will serve letter request was submitted to the LACSD for a 100% discharge of the project sewer that enters their system.

5.3 Significant Thresholds – Sewer

In accordance with State CEQA Guidelines Appendix G (Appendix G), the Project would have a significant impact related to wastewater if it would:

- Require or result in the construction or relocation of new or expanded wastewater treatment facilities, the construction, or relocation of which would cause significant environmental effects; or
- Result in a determination by the wastewater treatment provider, which serves or may serve

the project, that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

The County of Los Angeles CEQA Thresholds Guide identifies the following criteria to evaluate wastewater impacts:

- The project would cause a measurable increase in wastewater flows at a point where, and a time when, a sewer's capacity is already constrained or that would cause a sewer's capacity to become constrained; or
- The project's additional wastewater flows would substantially or incrementally exceed the future scheduled capacity of any one treatment plant by generating flows greater than those anticipated in the Wastewater Facilities Plan or General Plan and its elements.

In assessing impacts related to wastewater, the County will use Appendix G as the thresholds of significance. The criteria identified above from the L.A. CEQA Thresholds Guide will be used where applicable and relevant to assist in analyzing the Appendix G thresholds.

5.4 Project Impacts

Construction activities for the Project would not result in wastewater generation as construction workers would typically utilize portable restrooms, which would not contribute to wastewater flows to the local wastewater system. Thus, wastewater generation from Project construction activities is not anticipated to cause a measurable increase in wastewater flows. Therefore, the Project construction impacts to the wastewater system would be less than significant.

The Project will require construction of new wastewater infrastructure to serve the new buildings. Construction impacts associated with wastewater infrastructure would primarily be confined to trenching for miscellaneous utility lines and connections to public infrastructure. Installation of wastewater infrastructure will be limited to on-site wastewater distribution, and minor off-site work associated with connections to the public main. Overall, when considering impacts are of a relatively short-term duration (i.e., months) and would cease to occur once the installation is complete. Therefore, Project impacts on wastewater associated with construction activities would be less than significant.

6.0 STORMWATER

6.1 Existing Condition

Both the existing conditions and previous development conditions have been analyzed. The previous development conditions consisted of an industrial building that covered most of the site and a parking lot. The previously developed site was approximately 96.4% impervious and underlain by soil type # 3. The previous development surface drained to the west boundary of the site, to a drainage ditch that flows to a 60" levee drain to Dominguez channel. The commercial building and on-site surface improvements were completely removed approximately 10 years ago. All offsite drainage improvements adjacent to the site remain in place.

The site as it currently exists is the bare pad where the previous development stood. The surface cover consists of compacted fills, and base materials left by the previous development. The existing site is approximately 3.5% impervious and underlain by soil type #3. The existing site drains in the same manner as in the previous development conditions, and to the same offsite improvements.

6.2 Proposed Condition

The proposed development will re-grade the entire site but will keep the same discharge point as the existing and previous developed conditions. The proposed site will be 89.7% impervious.

The project will construct gutters that wrap around the self-storage facilities and direct the runoff generated from the site towards the westerly portion of the site. Runoff will then drain into a 10'x20' Modular Wetland System for treatment. Following treatment, the stormwater will drain out via pipe flow to a storm drain clean out structure thence to the existing 5' storm drain inlet and ultimately the Dominguez Channel. This point is referred to as Discharge Point # 1 in this report.

The discharge point will have a 50-year peak discharge that increases from the existing condition but decreases from the previous development. This is accomplished by reducing the impervious footprint of the proposed site compared to that of the previous development.

6.3 SURFACE WATER HYDROLOGY

6.3.1 General Approach

The project is located within the Los Angeles County Flood Control District (LACFD) jurisdiction therefore, the City of Carson has adopted the County Department of Public Works (LACDPW) Hydrology Manual as its basis of design for storm drainage facilities. The LACDPW Hydrology Manual requires runoff from a 25-year frequency design storm falling on a saturated watershed. A 25-year frequency design storm has a probability of 1/25 of being equaled or exceeded in any year. The County's CEQA Threshold Guide, however, establishes the 50-year frequency design storm event as the threshold to analyze potential impacts on surface water hydrology as a result of development. To provide a more conservative analysis, the 50-year frequency design storm event was analyzed.

6.3.2 Hydrology Results

Table 1 below summarizes the hydrology results demonstrating the peak flows for the 25-,50-, and 100-year storm events under previously developed, existing, and proposed project conditions:

Table 1. Previously Developed, Existing, and Proposed Peak Runoff Flows

	Previously Developed	Existing	Proposed		
Storm Event	Q_{Total} [cfs]	Q_{Total} [cfs]	Q_{Total} [cfs]	% Change from Existing	% Change from Prior Development
25-Yr	6.26	1.96	5.57	+64.8%	-11.0%
50-Yr	7.61	3.12	6.74	+53.7%	-11.4%
100-Yr	8.55	4.08	7.79	+47.6%	-8.8%

The review demonstrates that the project will exceed the existing stormwater flows. However, when compared to the previous development site flows the project would have a net decrease in stormwater flows. The proposed project will treat and convey stormwater runoff to the existing drainage infrastructure that the previous industrial site also drained to. The existing infrastructure includes a concrete brow ditch running parallel to the southwest property line of the site. This brow ditch flows into a 60" RCP levee drain that discharges to Dominguez Channel, a tidally influenced water body. This offsite drainage infrastructure appears to be unchanged since the previous industrial site was demolished 10 years ago.

The 60" RCP levee drain that accepts flow from the site was constructed in 1963. When it was designed, it accepted flow from a much larger area than it does in in the existing conditions. As the area surrounding the site was developed, separate offsite-storm drain systems with separate outfalls were constructed. These offsite MS4 systems intercept the majority of the runoff that was tributary to the levee drain. In the existing conditions, the land that drains to the levee drain has been greatly reduced. The area tributary to the drain consists of the project site and a thin strip of offsite land west of the site.

This means that the offsite drainage improvements between the project site and Dominguez Chanel are significantly larger than is required by the development.

The Project will include the installation of private roof downspouts, planter drains throughout the project site to collect roof and site runoff, and direct stormwater to the LID system through a series of gutters. This onsite stormwater conveyance system would serve to prevent onsite flooding and nuisance water build-up on the Project Site.

For additional information and detailing see the full Hydrology report in the Appendices.

6.4 SURFACE WATER QUALITY

6.4.1 General Approach

Construction Best Management Practices (BMP's) will be designed and maintained as part of the implementation of the SWPPP in compliance with the General Permit. The SWPPP shall begin when construction commences. Before any site clearing and grubbing of demolition activity. During construction, the SWPPP will be referred to regulatory standards, and amended as changes occur throughout the construction process. The Notice of Intent (NOI), Amendments to the SWPPP, Annual Reports, Rain Event Action Plans (REAPs), and Non-Compliance Reporting will be posted to the State's SMARTS website in compliance with the requirements of the General Permit.

The Project falls under the jurisdiction of the Los Angeles County Department of Public Works, which follows the 2009 Low Impact Development (LID) Manual design guidelines. The purpose of this structure water quality report is:

- To document that the Los Angeles County LID requirements will be met;
- To determine the proposed development's impact on existing hydrologic conditions;
- To identify the pollutants of concern and provide BMPs that will mitigate those pollutants of concern; and
- To provide sufficient detailed information to support detailed hydraulic design stormwater treatment systems.

The LID requirements, approved by the Regional Water Quality Control Board, call for the treatment of the peak mitigation flow rate or volume of runoff produced either by a 0.75" 24-hr rainfall event or the 85th percentile rainfall event, whichever is greater. Under section 3.1.2 of the LID Manual, this post-construction stormwater runoff from the new development shall be infiltrated, evapotranspirated, captured and used, and/or treated through high efficiency BMP's onsite. The rainfall intensity of the 85th percentile rainfall event governs.

Table 1 Summary LID Mitigation BMPs

Description	Area [ac]	Impervious Area [ac]	Required Flowrate (CFS)	BMP Type	Provided Flowrate (CFS)	% Treated	Impervious Area Untreated [ac]
DMA-1	2.77	2.49	0.702	20x10 Modular Wetland System	0.710	100	0
Total Percent Treatment						100 %	

For further information and detailing see LID Plan in the Appendices.

6.5 SIGNIFICANCE THRESHOLDS

6.5.1 Surface Water Hydrology

With respect to surface water hydrology, the State 2019 CEQA Guidelines (Appendix G) inquire whether
the Project would:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    - Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?
    - Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
        - Result in substantial erosion or siltation on- or off-site;
        - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
        - Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
        - Impede or redirect flood flows?
        - In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

6.5.2 Surface Water Quality

With respect to surface water quality, the State 2019 CEQA Guidelines (Appendix G) inquire whether the Project would:

- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The Appendix G of the CEQA Guidelines can be used to determine the significance of a project's impact on surface water quality. These are defined in Section 13050 of the California Water Code (CWC). Pollution, contamination, or nuisance may occur if regulatory standards are violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body. The CWC include the following definitions:

"Pollution" means an alteration of the quality of waters of the state to a degree which unreasonably affects either the following: 1) the waters for beneficial uses or 2) facilities which serve these beneficial uses. "Pollution" may include "Contamination".

"Contamination" means an impairment of the quality of the waters of the state by waste to a degree, which creates a hazard to the public health through poisoning or through the spread of disease. "Contamination" includes any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected.

"Nuisance" means anything which meets all of the following requirements: 1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property; 2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extend of the annoyance or damage inflicted upon individuals may be unequal; and 3) occurs during, or as a result of the treatment or disposal of wastes.

6.6 PROJECT STORMWATER IMPACT ANALYSIS

6.6.1 Surface Water Hydrology

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☑
b. Substantially alter the existing drainage pattern of the site or area including through the alteration of the course of a stream or river, in a manner which would:	☐	☐	☐	☑
i. Result in substantial erosion or siltation on or off-site;	☐	☐	☐	☑
ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off-site;	☐	☐	☐	☑

iii. Create or combine runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted; or	☐	☐	☐	☑
iv. Impede or redirect flood flows?	☐	☐	☐	☑
c. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☑
d. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☑

a. **Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?**

No Impact. Project is not located near ground recharge wells, and no groundwater recharge facilities exist downstream of the project between the project and its ultimate outfall to Dominguez Channel.

b. **Would the project substantially alter the existing drainage pattern of the site or area including through the alteration of the course of a stream or river, in a manner which would:**

i. **result in substantial erosion or siltation on or off-site;**

No Impact. The proposed site would be almost entirely impervious. Drainage conveyance from the site to Dominguez Channel is hardened. No areas will exist on or offsite produce silt, and no unhardened conveyances will exist to be eroded.

ii. **substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off-site**

No Impact. As previously discussed in section 6.3.2, while runoff will increase compared to existing conditions, it will not increase over the conditions for which the offsite drainage conveyances have been designed. All proposed onsite conveyances have been designed to safely convey the flowrates generated by the 100-year storm without negative impacts to the proposed buildings.

iii. **create or combine runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of pollution**

No Impact. As previously detailed, the planned onsite stormwater conveyances will be sized to safely convey the 100-year storm. The existing offsite conveyances were build to handle flow from a much larger area than currently drains to them.

iv. **impede or redirect flood flows?**

No Impact. There will be no impeded or redirected flood flows, as the site receives no stormwater from off-site areas.

c. **In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?**

Less Than Significant Impact. Per the Geotechnical report included as part of the LID plan in the Appendices, "The site is not located within a coastal area. Therefore, tsunamis are not considered a significant hazard at the site. Seiches are large waves generated in enclosed bodies of water in response to ground shaking. No major water-retaining structures are located immediately up gradient from the project site. Therefore, flooding resulting from a seismic-induced seiche is considered unlikely."

d. **Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?**

No Impact. The proposed project will not conflict or obstruct with implementation of a water quality control plan or sustainable groundwater management plan.

6.6.1 Surface Water Hydrology

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☑
b. Otherwise substantially degrade water quality?	☐	☐	☐	☑

a. **Violate any water quality standards or waste discharge requirements?**

No Impact. Project will comply with all water quality standards and waste discharge requirements.

b. **otherwise substantially degrade water quality??**

No Impact. Project does not propose a use that will substantially degrade water quality. Additionally, a compact biofiltration unit (Modular Wetland System) will be used to filter all runoff produced by the site for the 85th percentile storm.

7.0 ELECTRICTY

7.1 Existing Condition

The projects electric service provider will be Southern California Edison. There are no apparent existing electrical structures or equipment on the site, but this will be verified during the removal process.

7.2 Proposed Condition

Temporary Power: There is overhead power available from the pole at the south-east corner of the property which can be a potential source, given that the temporary power is no more than 200A-600A Single Phase.

Permanent Power: The proposed development would have Southern California Edison run a primary cable from the existing Edison manhole on South Perry Street to a proposed onsite 10' x 12' transformer pad approximately 175' away. Based off historical data provided to SCE, to service buildings of this size & expected usage in this climate zone, DUEX anticipates a single transformer to feed the entire site. All estimated kVA's per building can be found on the proposed utility exhibit in the Appendices.

7.3 Project Impacts

The project will require construction of a single 10' x 12' transformer pad. Additionally, during construction temporary power will need to be obtained via an overhead power available from the pole at the south-east corner of the property which can provide temporary power no more than 200A-600A Single Phase.

8.0 GAS

8.1 Existing Condition

The project gas service provider will be Southern California Gas Company. There are no apparent gas facilities on the existing site, but this will be verified during the removal process.

8.2 Proposed Condition

The proposed development would have the project connect to the existing gas mainline located in South Perry Street east of the property.

8.3 Project Impacts

Southern California Gas will need to obtain permits to conduct work in the public right of way. Additionally, note that gas meters must be 3' away from any doors and windows, if under an opening window must be minimum 10' above. Gas meters must be easily accessible for emergencies & maintenance.

9.0 TELECOMMUNICAIONS

9.1 Existing Condition

The project telecommunication provider will be AT&T. There are no apparent existing telephone structures or equipment on the site, but this will be verified during the removal process.

9.2 Proposed Condition

The proposed development would have the site tie in overhead at the existing overhead line on East Carson Street. AT&T would then run their services to the proposed pullbox location on Perry Street. The AT&T point of connection is pending confirmation.

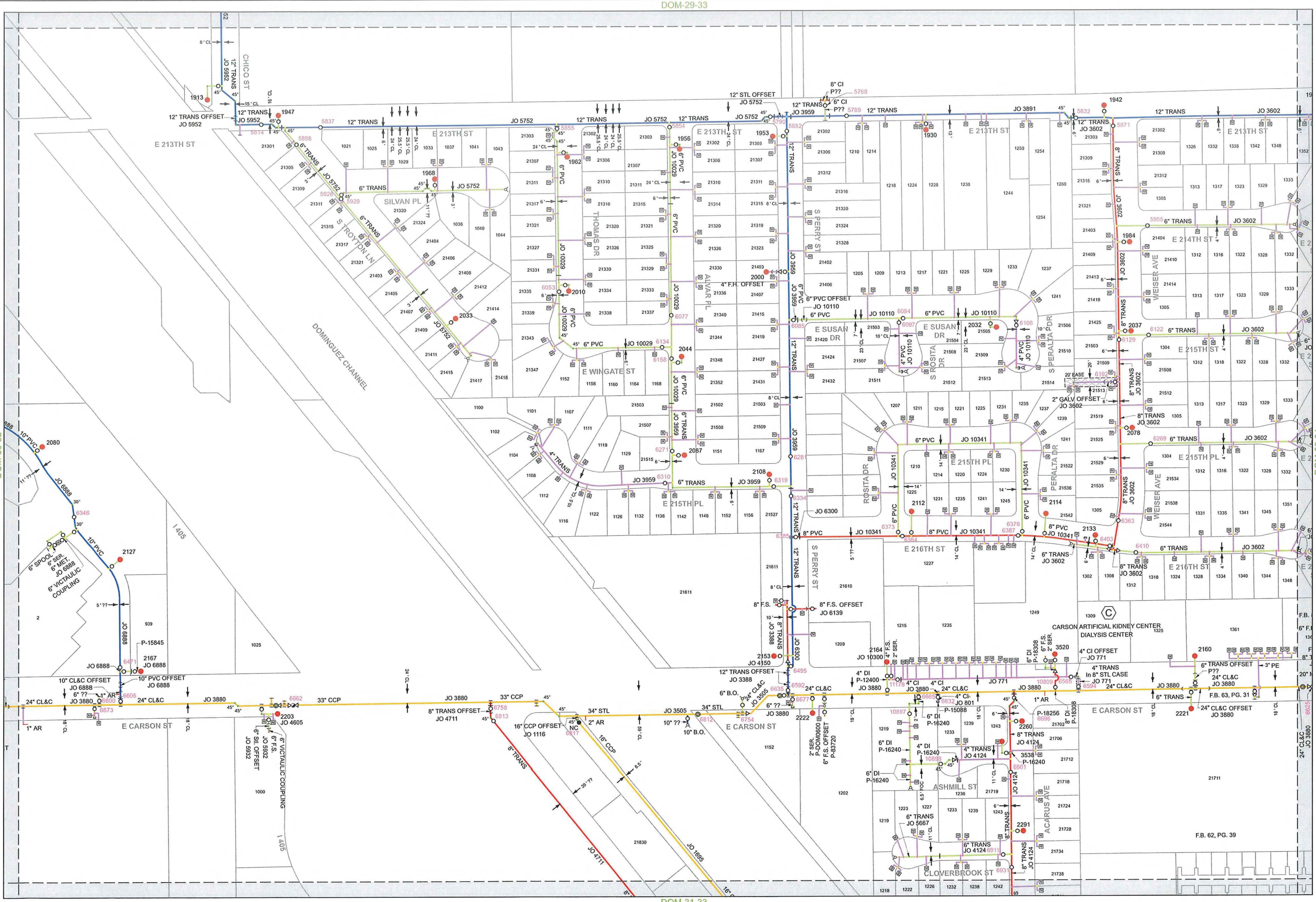
9.3 Project Impacts

AT&T will require a typical marketing agreement executed to bring fiber to the site. The location and installation of the AT&T facilities will require further coordination.

10.0 LEVEL OF SIGNIFICANCE

Based on the analysis of the proposed project, no significant impacts have been identified for water, sewer, stormwater, electrical, natural gas, or telecommunications facilities

11.0 APPENDICES



ENGINEERING DEPARTMENT

GIS

DOMINGUEZ DISTRICT WATER SYSTEM

CONFIDENTIAL: Applicant hereby agrees that any plans or markings made by California Water Service (Cal Water) showing the estimated location of its underground facilities is done solely as an accommodation and without any warranties, representations, or guaranties of completeness or accuracy. Applicant acknowledges that said information is a suggestion as to possible locations, as would be necessary to protect Cal Water's property. Applicant accepts full responsibility for any damage to Cal Water's facilities. Applicant agrees that Cal Water is not liable for any direct or indirect damages arising out of the use of said information.

N

SCALE:
1" = 200'

Issued:
October 2017

Plat Sheet:
DOM-30-33

CALIFORNIA WATER SERVICE

Rancho Dominguez District 2632 West 237th Street, Torrance, CA 90505
Tel: (310) 257-1400

November 15, 2021

21611 Perry Street, LLC
4132 Katella Avenue #205b
Los Alamitos, CA 90720
Attn: Darren Embry

Will Serve Letter
21611 Perry Street, Carson, CA
Requestor for Will Serve: Darren Embry

Dear Mr. Embry:

As a regulated utility, California Water Service Company Rancho Dominguez district ("Cal Water") has an obligation to provide water service in accordance with the rules and regulations of the California Public Utility Commission (CPUC). Assuming you receive all required permits from the city of Carson and / or the County of Los Angeles, Cal Water will provide water service to the above referenced project. Cal Water agrees to operate the water system and provide service in accordance with the rules and regulations of the California Public Utilities Commission (CPUC) and the company's approved tariffs on file with the CPUC. This will serve letter shall remain valid for **two years** from the date of this letter. If construction of the project has not commenced within this **two year** time frame, Cal Water will be under no further obligation to serve the project unless the developer receives an updated letter from Cal Water reconfirming our commitment to serve the above mentioned project. Additionally, Cal Water reserves the right to rescind this letter at any time in the event its water supply is severely reduced by legislative, regulatory or environmental actions.

Cal Water will provide such potable water at such pressure as may be available from time to time as a result of its normal operations per the company's tariffs on file with the CPUC. Installation of facilities through developer funding shall be made in accordance with the current rules and regulations of the CPUC including, among others, Tariff Rules 15 and 16 and General Order 103-A. In order for us to provide adequate water for domestic use as well as fire service protection, it may be necessary for the developer to fund the cost of special facilities, such as, but not limited to, booster pumps, storage tanks and/or water wells, in addition to the cost of mains and services. Cal Water will provide more specific information regarding special facilities and fees after you provide us with your improvement plans, fire department requirements, and engineering fees for this project.

This letter shall at all times be subject to such changes or modifications by the CPUC as said Commission may, from time to time, require in the exercise of its jurisdiction.

If you have any questions regarding the above, please call me at (310) 257-1400.

Sincerely,

Daniel Armendariz
District Manager

cc: Rashmi Kashyap – Cal Water Engineering Dept
Ralph Felix – Cal Water Operations Manager
Anthony Gonzalez – Cal Water Superintendent
File

California Water Service Company
Fire Flow Test

2/7/2022

Test Date: 02/04/2022 Time: 9:00

District DOMINGUEZ Zone: II Plat: 30-33

Address: 21611 S Perry ST

Cross Street: E Carson ST

Requested By: D. Embry

Conducted By: Evan G.

Purpose Of Test: Determine Flow Availability

Witnessed By: Calwater: Richard P.

Others: Chris

Outlet No.	Outlet Size	PITOT	Observed	Static Pressure	Residual Pressure	Flow Observed	Flow Avail. @20
Location 1 Hydrant No.: 2153			Address: 21611 Perry St				
1	4.00	35	2541	67	48	2541	4144
2							
3							
4							
Location 2 Hydrant No.: 2108			Address: 21527 E. 215th Pl				
1	4.00	22	2015			2015	3286
2							
3							
4							
Location 3 Hydrant No.			Address:				
1							
2							
3							
4							
			Total Flow Observed Available @20:			4556	7430

Remarks: Elevation Difference: 0'. Distance from Static/Residual to FH: 149' & 398'. Distance from FH to Street Address P/L: 84' & 321'.

Static/Residual Location: 1209 E Carson St

Note:

Regardless of the results of this test, California Water Service Company assumes no liability beyond that stated in the following excerpt from the P.U.C. Tarriff Schedule: "The utility (California Water Service Company) will supply only such water at such pressure as may be available from time to time as a result of its normal operation of the system."

PART II **INFORMATION ON FIRE FLOW AVAILABILITY**
(Part II to be completed by Water Purveyor)

Location of hydrant west side of S Perry St
north of E Carson St Hydrant Number 2153

Distance from Nearest Property Line 84' Size of Hydrant 6" Size of Water main 12"

Static PSI 67 Residual PSI 48 Orifice size 4" Pitot 35 PSI

Fire Flow at 20 PSI 4144 GPM Duration 2 Hours [x] Flow Test Date / Time 02/04/2022, 09:00am
[ ] Hydraulic model

Location of hydrant south side of E 215th Pl
west of S Perry St Hydrant Number 2108

Distance from Nearest Property Line 321' Size of Hydrant 6" Size of Water main 6"

Static PSI 67 Residual PSI 48 Orifice size 4" Pitot 22 PSI

Fire Flow at 20 PSI 3286 GPM Duration 2 hours [x] Flow Test Date / Time 02/04/2022, 09:00am
[ ] Hydraulic model

[x] (Check box if Simultaneous/ Dual flow test was performed) Combined flow at 20 psi 7430 GPM

Location of hydrant _____
_____ Hydrant Number _____

Distance from Nearest Property Line _____ Size of Hydrant _____ Size of Water main _____

Static PSI _____ Residual PSI _____ Orifice size _____ Pitot _____

Fire Flow at 20 PSI _____ Duration _____ [ ] Flow Test Date / Time _____
[ ] Hydraulic model

[ ] (Check box if Simultaneous/ Triple flow test was performed) Combined flow at 20 psi _____

California Water Service - Dominguez
Water Purveyor


Signature

310-257-1400 02/15/2022
Phone Number Date

Superintendent (Richard Garcia)
Title

This Information is Considered Valid for Twenty Four Months

Fire Department approval of building plans shall be required prior to the issuance of a Building Permit by the jurisdictional Building Department. Any deficiencies in water systems will need to be resolved by the Fire Prevention Division only prior to this department's approval of building plans.

SEE SHT. NO. S-1759

SEE SHT. NO. S-1705

SEE SHT. NO. S-1815

SEE SHT. NO. S-1761

C-34
C-35
C-36

THIS MAP IS INTENDED FOR USE ONLY AS OPERATIONS MAP BY LOS ANGELES COUNTY SEWER MAINTENANCE DISTRICTS. LOS ANGELES COUNTY EXPRESSLY DISCLAIMS ANY LIABILITY FOR ANY INACCURACIES WHICH MAY BE PRESENT IN THIS MAP.

AUTOMATED GRAPHICS

METERS
0 50 100 200 250
200 400 600 800
FEET

LEGEND

- CLAY SEWERS MAINTAINED BY SMD, 8" UNLESS OTHERWISE NOTED
- PLASTIC SEWERS
- CONCRETE SEWERS
- CLAY SEWERS, LINED
- CEMENT SEWERS, LINED
- FORCE MAINS
- SEWERS NOT MAINTAINED BY SMD
- TRUNK SEWERS
- CITY BOUNDARY
- STANDARD MANHOLE
- DROP MANHOLE
- SHALLOW MANHOLE
- TRAP MANHOLE
- WEIR MANHOLE
- C.O. CLEANOUT
- L.H. LAMP HOLE
- PUMP STATION

TOTAL MH'S THIS MAP: 615

MAP REV
05-19-16

DATA BASE REV
05-21-86

CONSOLIDATED S.M.D.

S-1760

T: 7S4 E-7

0219.0319.1760

LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

Robert C. Ferrante
Chief Engineer and General Manager

1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
(562) 699-7411 • www.lacsd.org

January 31, 2022

Ref. DOC 6440338

Mr. Darren Embry, Vice President
21611 Perry Street LLC
3430 Viewridge Avenue, Suite B
San Diego, CA 92123

Dear Mr. Embry:

Will Serve Letter for Perry Street Self-Storage

The Los Angeles County Sanitation Districts (Districts) received your will serve letter request for the subject project on January 20, 2022. The proposed project is located within the jurisdictional boundary of District No. 8. We offer the following comments regarding sewerage service:

1. The wastewater flow originating from the proposed project will discharge to a local sewer line, which is not maintained by the Districts, for conveyance to the Districts' Wilmington Avenue Trunk Sewer, located in Martin Street at Carson Street. The Districts' 27-inch diameter trunk sewer has a capacity of 6.9 million gallons per day (mgd) and conveyed a peak flow of 1 mgd when last measured in 2016.

2. The wastewater generated by the proposed project will be treated at the Joint Water Pollution Control Plant located in the City of Carson, which has a capacity of 400 mgd and currently processes an average flow of 249.8 mgd.

3. The expected increase in average wastewater flow from the project, described in the application as a 113,818 square-foot indoor self-storage facility with a 1,550 square-foot café and a 3,100 square-foot retail store, is 2,536 gallons per day, after all structures on the project site are demolished. For a copy of the Districts' average wastewater generation factors, go to www.lacsd.org, Wastewater & Sewer Systems, click on Will Serve Program, and click on the Table 1, Loadings for Each Class of Land Use link.

4. The Districts are empowered by the California Health and Safety Code to charge a fee to connect facilities (directly or indirectly) to the Districts' Sewerage System or to increase the strength or quantity of wastewater discharged from connected facilities. This connection fee is used by the Districts for its capital facilities. Payment of a connection fee may be required before this project is permitted to discharge to the Districts' Sewerage System. For more information and a copy of the Connection Fee Information Sheet, go to www.lacsd.org, under Services, then Wastewater (Sewage) and select Rates & Fees. In determining the impact to the Sewerage System and applicable connection fees, the Districts will determine the user category (e.g. Condominium, Single Family home, etc.) that best represents the actual or anticipated use of the parcel(s) or facilities on the parcel(s) in the development. For more specific information regarding the connection fee application procedure and fees, the developer should contact the Districts' Wastewater Fee Public Counter at (562) 908-4288, extension 2727.

5. In order for the Districts to conform to the requirements of the Federal Clean Air Act (CAA), the capacities of the Districts' wastewater treatment facilities are based on the regional growth forecast adopted by the Southern California Association of Governments (SCAG). Specific policies included in the development

of the SCAG regional growth forecast are incorporated into clean air plans, which are prepared by the South Coast and Antelope Valley Air Quality Management Districts in order to improve air quality in the South Coast and Mojave Desert Air Basins as mandated by the CAA. All expansions of Districts' facilities must be sized and service phased in a manner that will be consistent with the SCAG regional growth forecast for the counties of Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial. The available capacity of the Districts' treatment facilities will, therefore, be limited to levels associated with the approved growth identified by SCAG. As such, this letter does not constitute a guarantee of wastewater service, but is to advise the developer that the Districts intend to provide this service up to the levels that are legally permitted and to inform the developer of the currently existing capacity and any proposed expansion of the Districts' facilities.

If you have any questions, please contact the undersigned at (562) 908-4288, extension 2708 or at dcurry@lacsd.org.

Very truly yours,

Donna J. Curry

Donna J. Curry
Customer Service Specialist
Facilities Planning Department

DC:dc

Carson Self-Storage
Drainage Study

21611 South Perry St.
Carson, CA 90745

Date Prepared:
March 8, 2022

Prepared for:
21611 Perry Street, LLC
4132 Katella Avenue, #205B
Los Alamitos, CA 90720

Prepared By:

ΩMEGA
ENGINEERING CONSULTANTS
4340 Viewridge Ave, Suite B
San Diego, CA 92113
Ph: (858) 634-8620

Declaration of Responsible Charge:
I hereby declare that I am the engineer of work for this project, that I have exercised responsible charge over the design of the project as defined in section 6703 of the business and professions code, and that the design is consistent with current standards. I understand that the check of the project drawings and specifications by the City of Carson is confined to a review only and does not relieve me, as an engineer of work, of my responsibilities for project design.

Patric T. de Boer RCE 83583
Registration Expires 3-31-2023

Table of Contents

Appendices

Site & Project Description

This drainage study has been prepared for Carson Self-Storage located at 21611 South Perry Street in the City of Carson.

The project involves the construction of three two-story storage buildings with asphalt paving throughout the development. The total area of analysis is 2.77 acres.

See figure No.1 for a Vicinity Map. Figures 2, 3, & 4 show the existing and proposed drainage flow paths and basins.

Methodology

This drainage report has been prepared in accordance with current County of Los Angeles regulations and procedures.

The analysis of the previously developed, currently existing and proposed conditions were performed using HydroCalc (Version 1.02) to calculate runoff rates and volumes. Given the area, length of flow path, average slope, design storm depth, imperviousness, and soil type, HydroCalc generates a hydrograph for the existing and proposed conditions. Soil and rainfall input data was determined using the maps provided in the LA County Hydrology Manual.

This report analyzes the flow generated by the 50 and 100-year storm events for storm drain sizing and flood control purposes.

(1) Handbook of Hydraulics, E.F. Brater & H.W. King, 6th Ed., 1976.
(2) Los Angeles County Department of Public Works Hydrology Manual, 2006

Previously Developed Conditions

The previous developed conditions which consisted of an industrial building that covered most of the site and a parking lot have been analyzed. The previously developed site was approximately 96.4% impervious and underlain by soil type # 3. The site drained via surface flow from east to west to an existing 5' storm drain inlet that outlets to the Dominguez Channel, a concrete lined channel. This point is referred to as Discharge Point # 1 in this report.

Existing Conditions

The existing condition site is approximately 3.5% impervious and underlain by soil type #3. The site drains via surface flow from east to west to an existing 5' storm drain inlet that outlets to the Dominguez Channel, a concrete lined channel. This point is referred to as Discharge Point # 1 in this report.

Proposed Conditions

The proposed development will re-grade the entire site but will keep the same discharge point as the existing and previous developed conditions. The proposed site will be 89.7% impervious.

The project will construct gutters that wrap around the self-storage facilities and direct the runoff generated from the site towards the westerly portion of the site. Runoff will then drain into a 10'x20' Modular Wetland System for treatment. Following treatment, the stormwater will drain out via pipe flow to a storm drain clean out structure thence to the existing 5' storm drain inlet and ultimately the Dominguez Channel. This point is referred to as Discharge Point # 1 in this report.

The discharge point will have a 50-year peak discharge that increases from the existing condition but decreases from the previous development. This is accomplished by reducing the impervious footprint of the proposed site compared to that of the previous development.

Previous Development HydroCalc Analysis

The previous developed condition was modeled using HydroCalc. The area of analysis consists of one basin being E-1.1.

Below is a summary of the results of the HydroCalc Calculations for the previous development conditions (E-1.1).

Basin #	Area (ac)	Soil Type	Imperv. (%)	$T_{C\ 50}$ (min)	I_{50} (in/hr)	$T_{C\ 100}$ (min)	I_{100} (in/hr)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
E-1.1	2.77	3	96.4	10.0	3.11	9.0	3.49	6.26	7.61	8.55
							Total	6.26	7.61	8.55

Existing HydroCalc Analysis

The existing condition was modeled using HydroCalc. The area of analysis consists of one basin being A-1.1.

Below is a summary of the results of the HydroCalc Calculations for the existing conditions (A-1.1).

Basin #	Area (ac)	Soil Type	Imperv. (%)	$T_{C\ 50}$ (min)	I_{50} (in/hr)	$T_{C\ 100}$ (min)	I_{100} (in/hr)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
A-1.1	2.77	3	3.50	7.0	2.63	7.0	3.10	1.96	3.12	4.08
							Total	1.96	3.12	4.08

Proposed HydroCalc Analysis

The proposed site was modeled as two basins, referred to as P-1.1 and P-1.2 in this report.

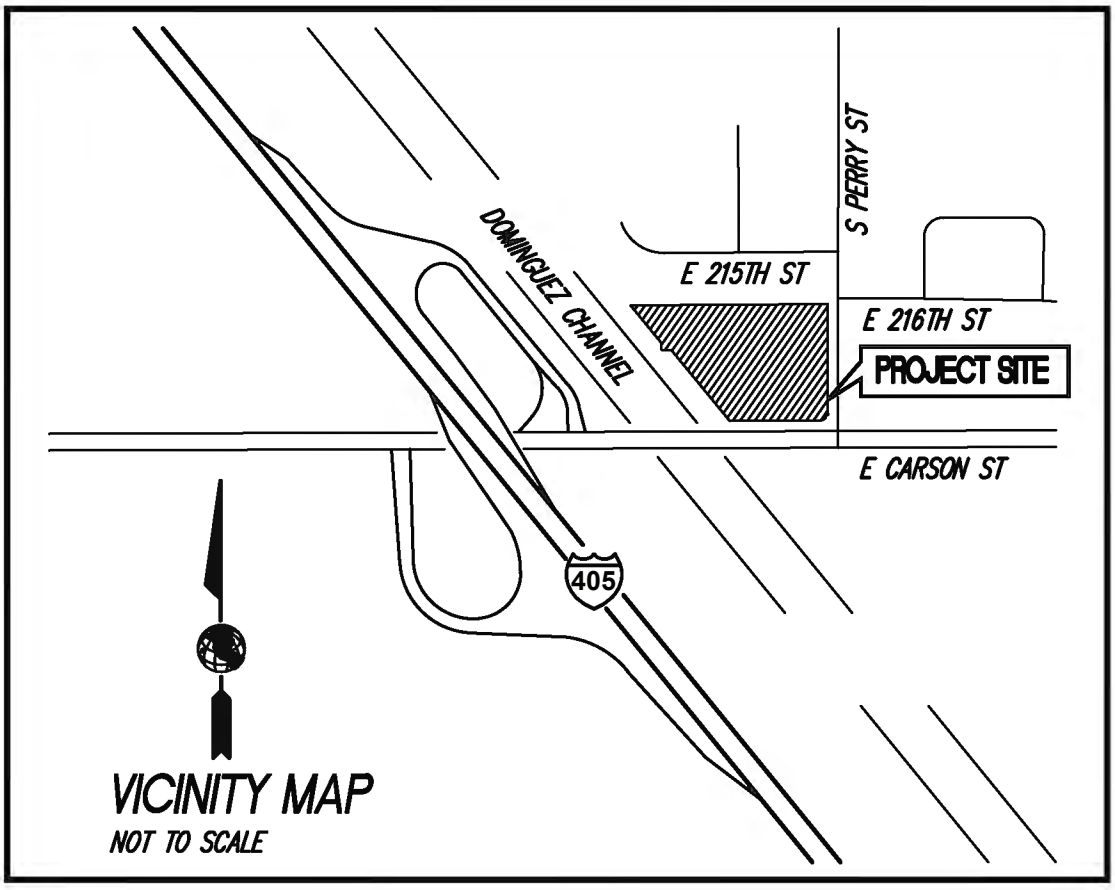
Below is a summary of the HydroCalc calculations for the proposed conditions.

Basin #	Area (ac)	Soil Type	Imperv. (%)	$T_{C\ 50}$ (min)	I_{50} (in/hr)	$T_{C\ 100}$ (min)	I_{100} (in/hr)	Q_{50} (cfs)	Q_{100} (cfs)
P-1.1	1.44	3	90.6	10.0	2.63	9.0	3.10	3.23	3.83
P-1.2	1.33	3	88.9	7.0	3.11	7.0	3.49	3.52	3.97
							Total	6.74	7.79

Results and Conclusions

The development of the project site will slightly modify the onsite drainage patterns; however, the existing and previous development point of discharge and the point of compliance remain the same.

The review demonstrates that the project will exceed the existing stormwater flows. However, when compared to the previous development site flows the project would have a net decrease in stormwater flows. The proposed project will treat and convey stormwater runoff to the existing drainage infrastructure that the previous industrial site also drained to. The existing infrastructure includes a concrete brow ditch running parallel to the southwest property line of the site. This brow ditch flows into a 60" RCP levee drain that discharges to Dominguez Channel, a tidally influenced water body. This offsite drainage infrastructure appears to be unchanged since the previous industrial site was demolished approximately 10 years ago.



VICINITY MAP

NOT TO SCALE

DRAINAGE BASIN DATA

BASIN #	AREA (AC)	SOIL TYPE	IMPERV. (%)	I_{25} (IN/HR)	I_{50} (IN/HR)	I_{100} (IN/HR)	Q_{25} (CFS)	Q_{50} (CFS)	Q_{100} (CFS)
A-1.1	2.77	3	3.5	2.04	2.63	3.10	1.96	3.12	4.08

LEGEND

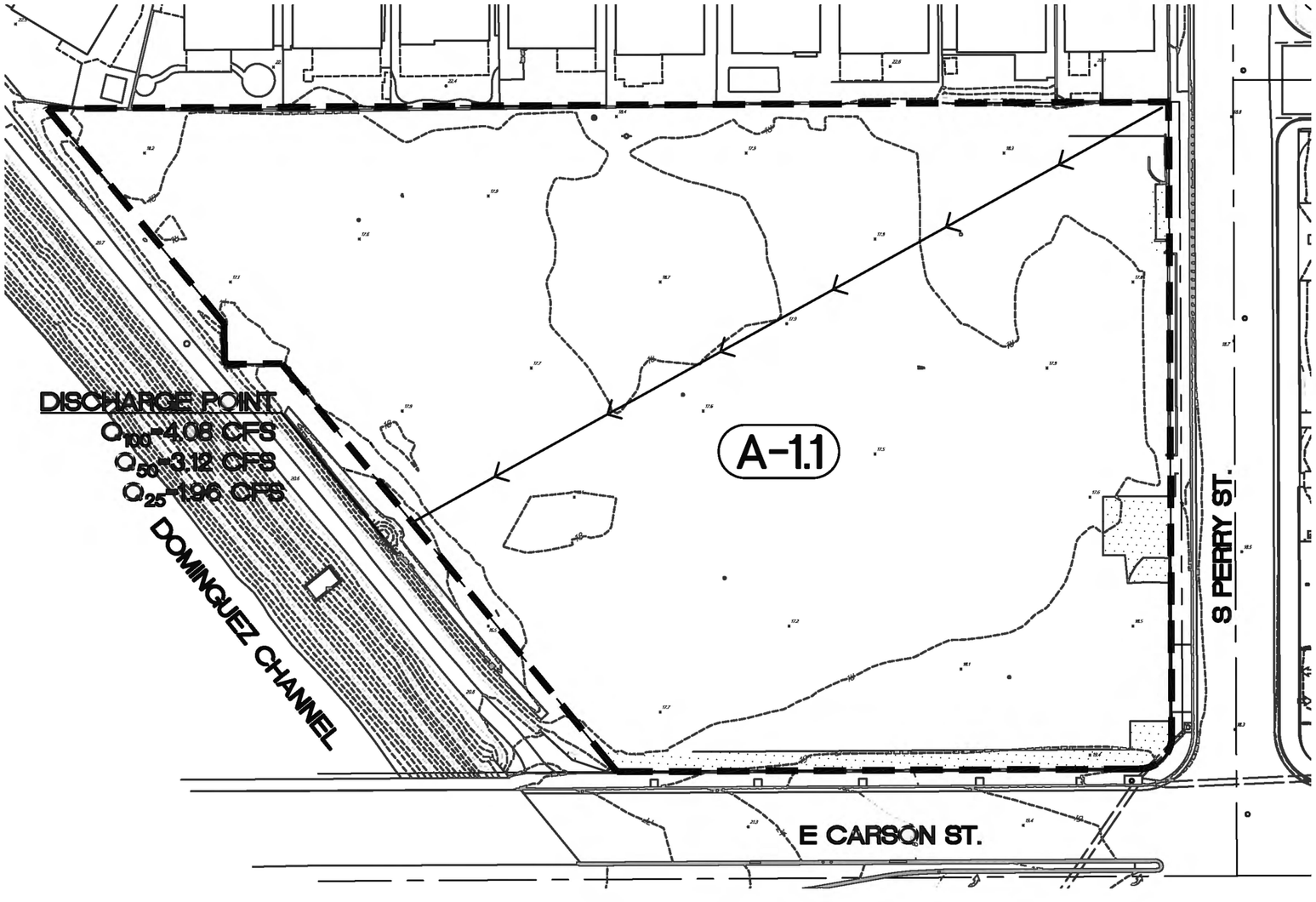
BASIN NUMBER ..... A-#.#

AREA LIMITS .....

DRAINAGE FLOW PATH .....

PAVEMENT AREA .....

PERVIOUS AREA .....



GRAPHICAL SCALE: 1" = 60'

0 30 60 120

CARSON SELF-STORAGE
EXISTING
HYDROLOGY EXHIBIT

OMEGA

EXISTING HYDROLOGY EXHIBIT

DRAINAGE BASIN DATA

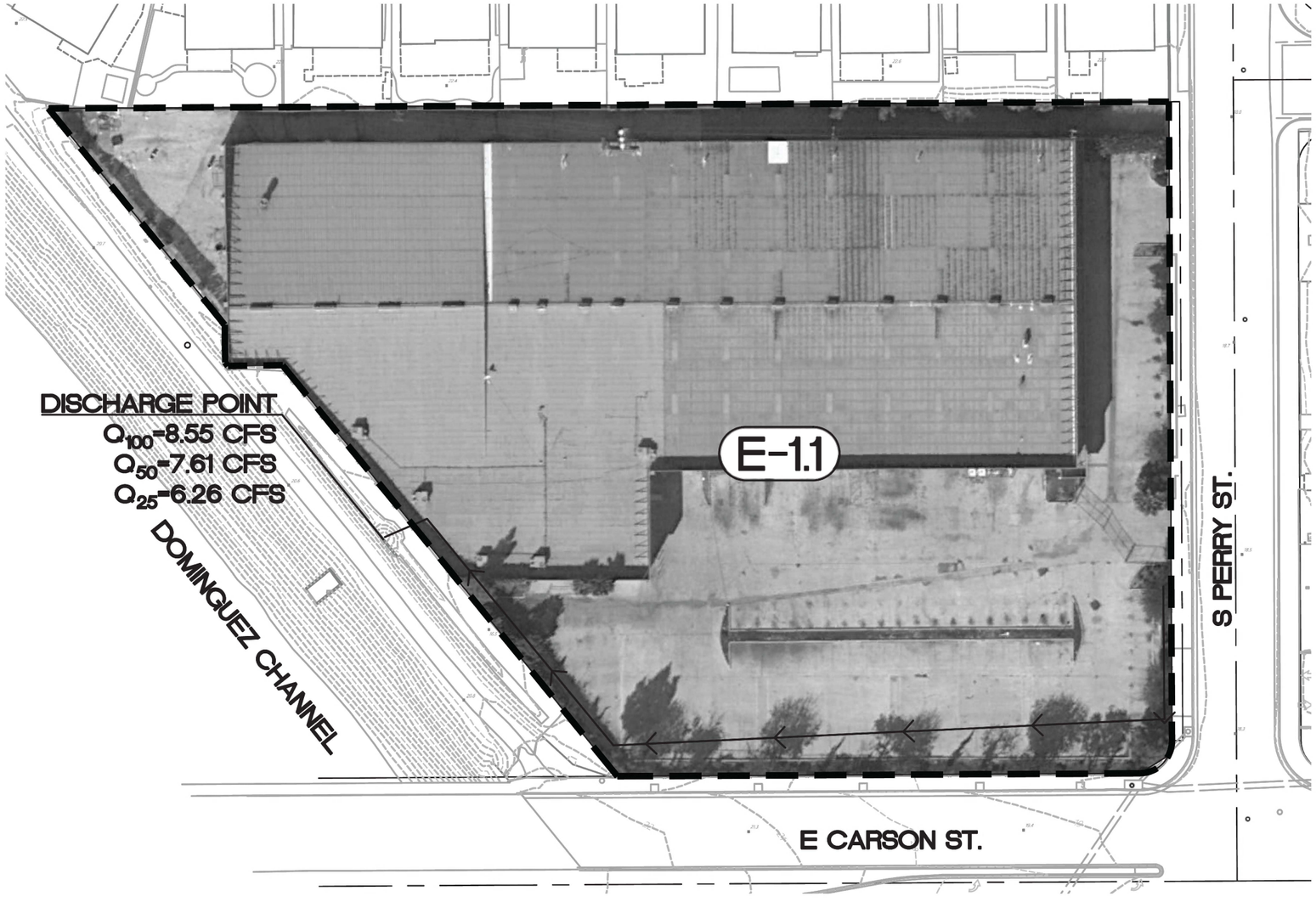
BASIN #	AREA (AC)	SOIL TYPE	IMPERV. (%)	I_{25} (IN/HR)	I_{50} (IN/HR)	I_{100} (IN/HR)	Q_{25} (CFS)	Q_{50} (CFS)	Q_{100} (CFS)
E-1.1	2.77	3	96.4	2.56	3.11	3.49	6.26	7.61	8.55

LEGEND

BASIN NUMBER ..... E-#.#

AREA LIMITS .....

DRAINAGE FLOW PATH .....



GRAPHICAL SCALE: 1" = 60'

0 30 60 120

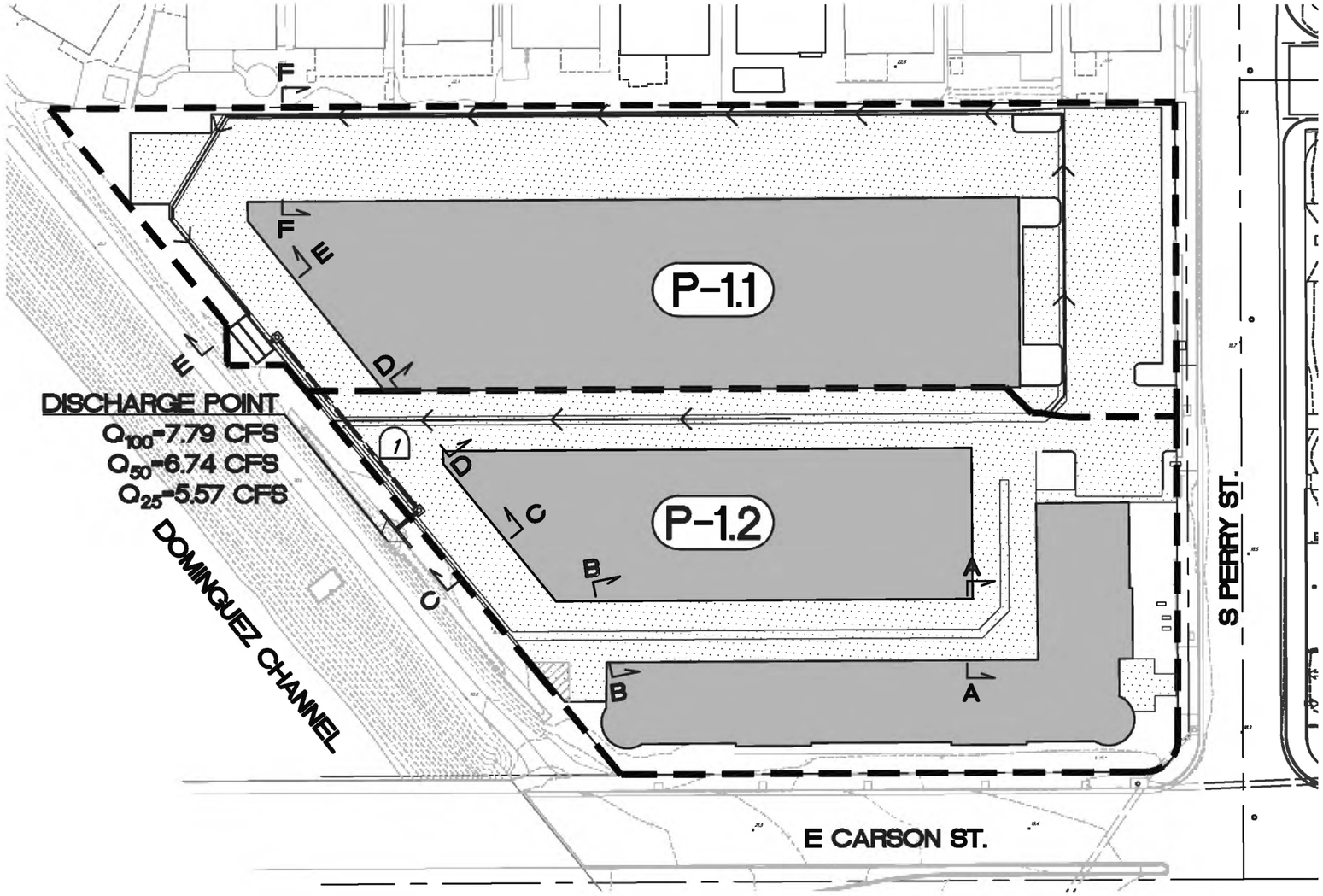
CARSON SELF-STORAGE PRE-DEVELOPED EXHIBIT

OMEGA

PRE-DEVELOPED HYDROLOGY EXHIBIT

DRAINAGE BASIN DATA

BASIN #	AREA (AC)	SOIL TYPE	IMPERV. (%)	I_{25} (IN/HR)	I_{50} (IN/HR)	I_{100} (IN/HR)	Q_{25} (CFS)	Q_{50} (CFS)	Q_{100} (CFS)
P-1.1	1.44	3	90.6	2.21	2.63	3.10	2.70	3.23	3.83
P-1.2	1.33	3	88.9	2.56	3.11	3.49	2.88	3.52	3.97



LEGEND

- BASIN NUMBER ..... P-#.#
- AREA LIMITS .....
- DRAINAGE FLOW PATH .....
- BUILDING AREA .....
- PAVEMENT AREA .....
- PERVIOUS AREA .....

(X) PIPE DATA

PIPE #	DIAMETER (INCHES)	SLOPE (%)	DEPTH /DIA	V_{100} (FPS)	Q_{100} (CFS)
1	18	1.0	0.64	6.52	7.79

NOTE: SEE APPENDIX 4 IN THE HYDROLOGY REPORT FOR GUTTER ANALYSIS SECTIONS

GRAPHICAL SCALE: 1" = 60'

0 30 60 120

CARSON SELF-STORAGE PROPOSED HYDROLOGY EXHIBIT

OMEGA

PROP. HYDROLOGY EXHIBIT

Peak Flow Hydrologic Analysis

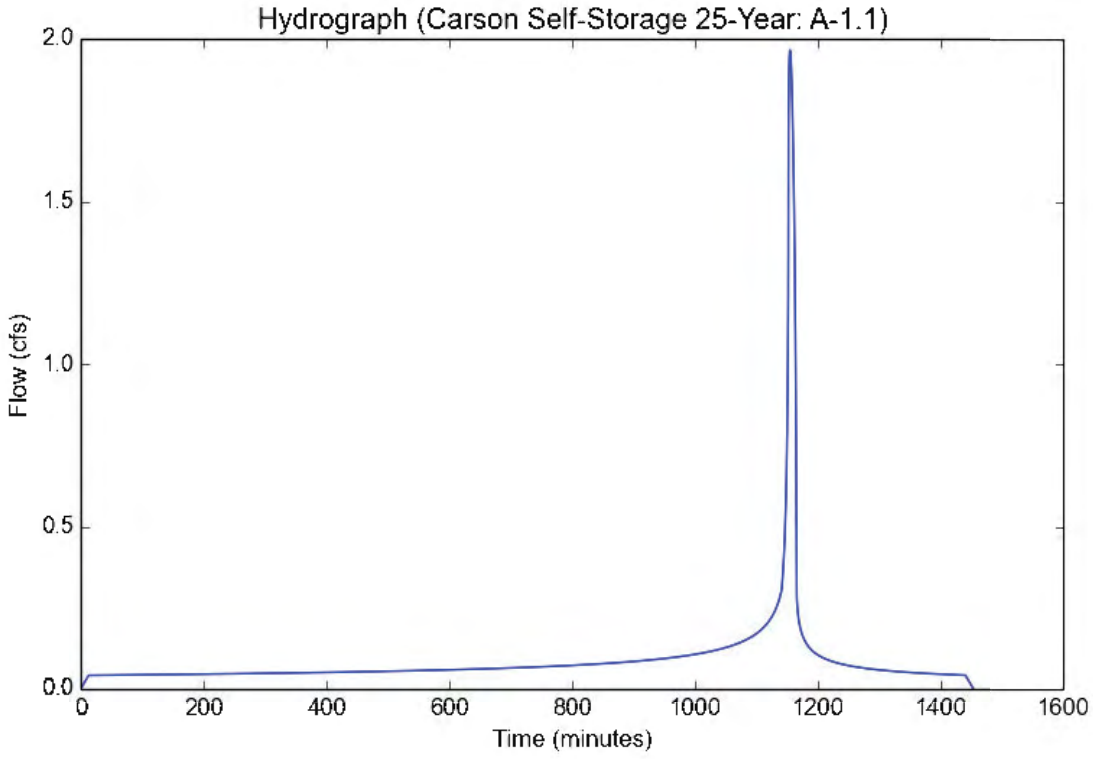
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/25-Year/Carson Self-Storage 25-Year - A-1
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self-Storage 25-Year
Subarea ID	A-1.1
Area (ac)	2.77
Flow Path Length (ft)	398.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.035
Soil Type	3
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.0393
Undeveloped Runoff Coefficient (Cu)	0.3278
Developed Runoff Coefficient (Cd)	0.3478
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	1.9646
Burned Peak Flow Rate (cfs)	1.9646
24-Hr Clear Runoff Volume (ac-ft)	0.1771
24-Hr Clear Runoff Volume (cu-ft)	7713.7249



Peak Flow Hydrologic Analysis

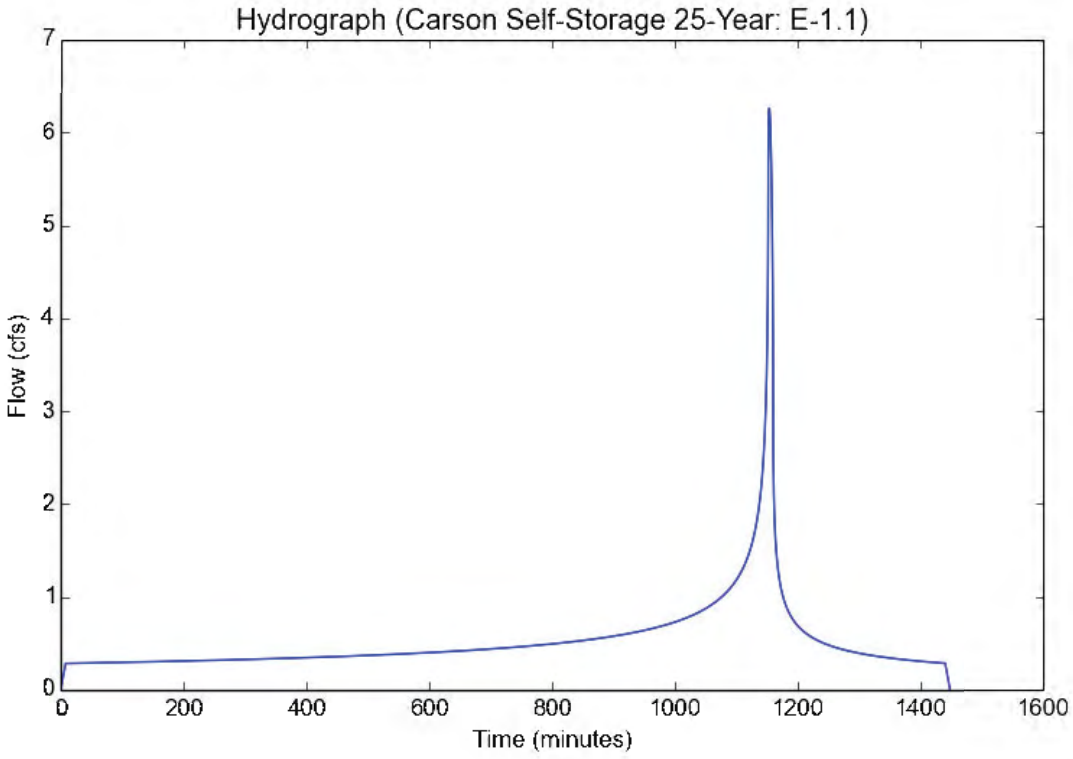
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/25-Year/Carson Self-Storage 25-Year - E-1
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self-Storage 25-Year
Subarea ID	E-1.1
Area (ac)	2.77
Flow Path Length (ft)	475.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.964
Soil Type	3
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.5621
Undeveloped Runoff Coefficient (Cu)	0.4041
Developed Runoff Coefficient (Cd)	0.8821
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	6.2605
Burned Peak Flow Rate (cfs)	6.2605
24-Hr Clear Runoff Volume (ac-ft)	1.069
24-Hr Clear Runoff Volume (cu-ft)	46566.8167



Peak Flow Hydrologic Analysis

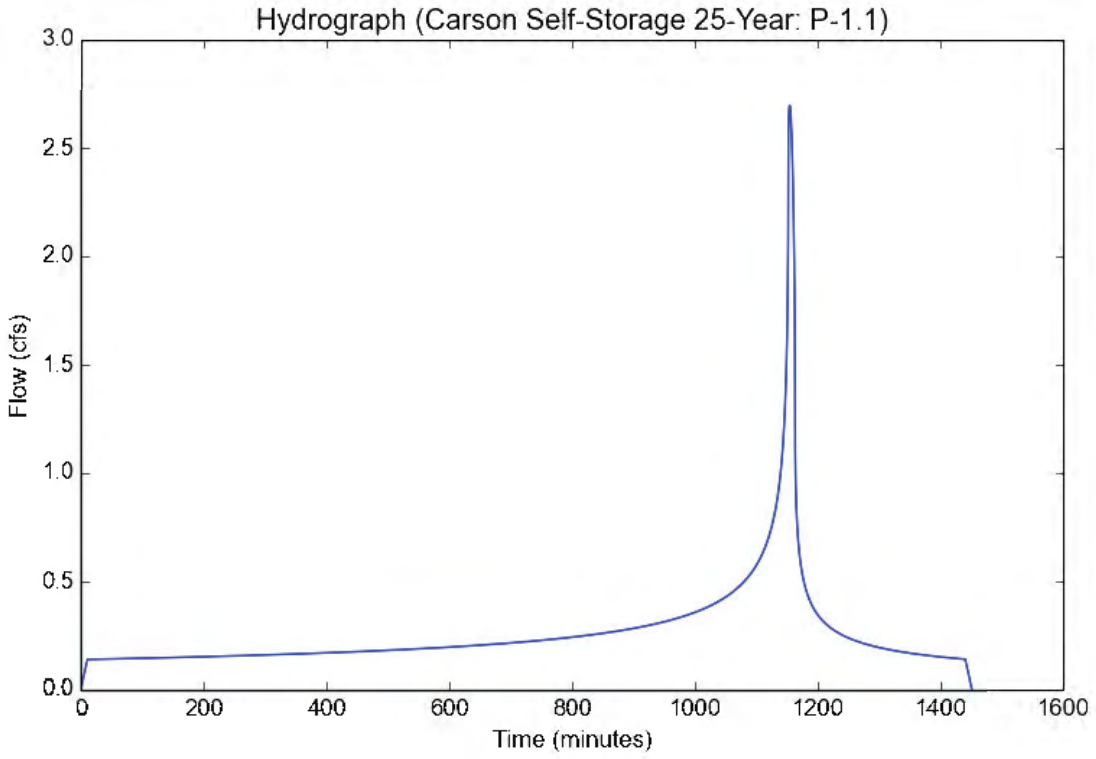
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/25-Year/Carson Self-Storage 25-Year - P-1
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self-Storage 25-Year
Subarea ID	P-1.1
Area (ac)	1.44
Flow Path Length (ft)	635.0
Flow Path Slope (vft/hft)	0.0036
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.906
Soil Type	3
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.2059
Undeveloped Runoff Coefficient (Cu)	0.353
Developed Runoff Coefficient (Cd)	0.8486
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	2.6955
Burned Peak Flow Rate (cfs)	2.6955
24-Hr Clear Runoff Volume (ac-ft)	0.5268
24-Hr Clear Runoff Volume (cu-ft)	22947.0155



Peak Flow Hydrologic Analysis

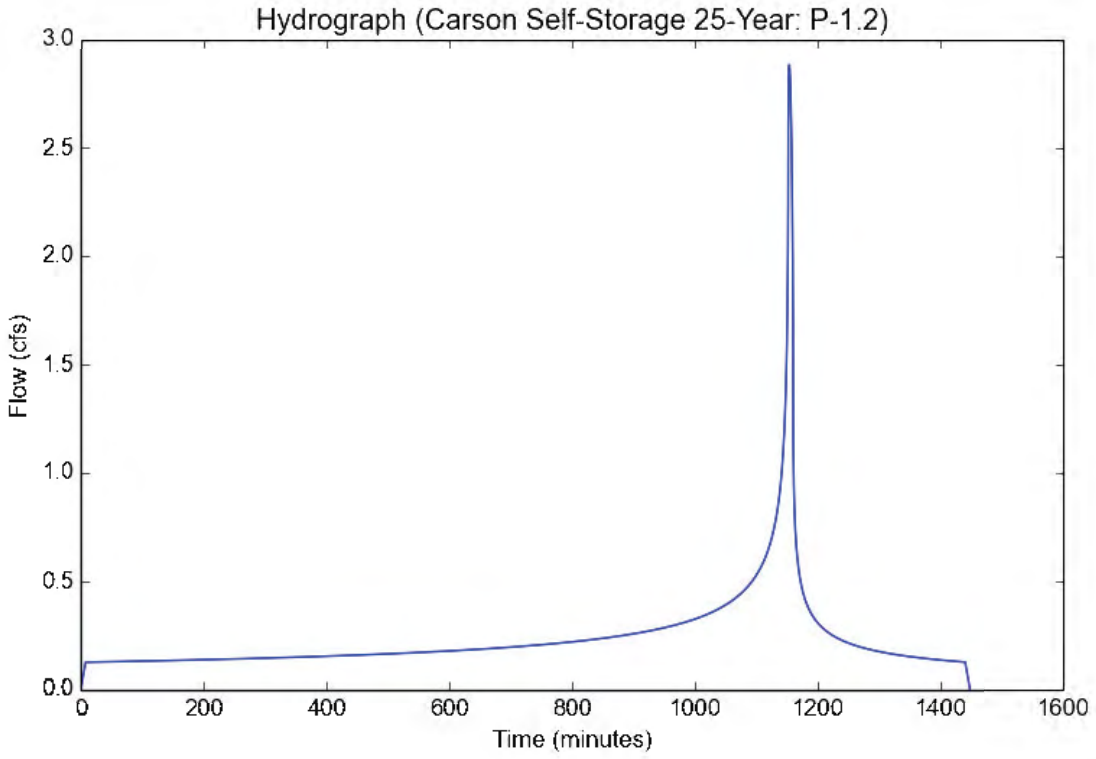
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/25-Year/Carson Self-Storage 25-Year - P-1
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self-Storage 25-Year
Subarea ID	P-1.2
Area (ac)	1.33
Flow Path Length (ft)	645.0
Flow Path Slope (vft/hft)	0.0177
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.889
Soil Type	3
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.3558
Peak Intensity (in/hr)	2.5621
Undeveloped Runoff Coefficient (Cu)	0.4041
Developed Runoff Coefficient (Cd)	0.845
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	2.8792
Burned Peak Flow Rate (cfs)	2.8792
24-Hr Clear Runoff Volume (ac-ft)	0.4788
24-Hr Clear Runoff Volume (cu-ft)	20857.8893



Peak Flow Hydrologic Analysis

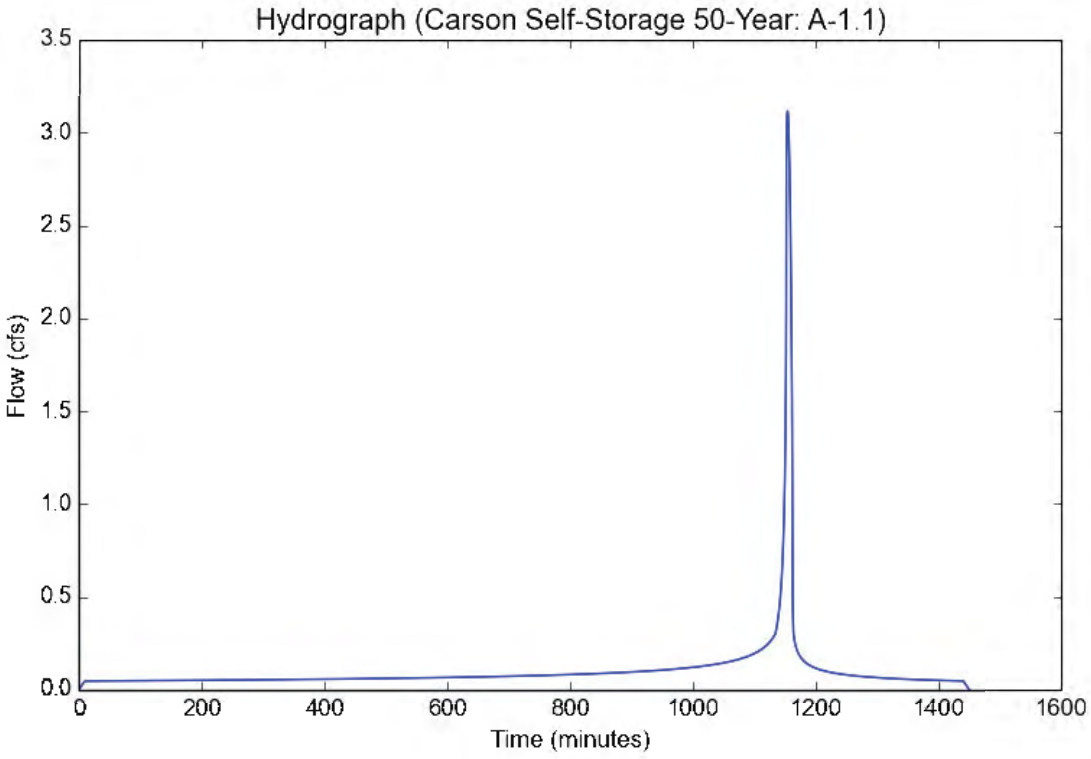
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/50-Year/Carson Self-Storage 50-Year - A-1
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self-Storage 50-Year
Subarea ID	A-1.1
Area (ac)	2.77
Flow Path Length (ft)	398.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.035
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	2.6275
Undeveloped Runoff Coefficient (Cu)	0.411
Developed Runoff Coefficient (Cd)	0.4281
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	3.1157
Burned Peak Flow Rate (cfs)	3.1157
24-Hr Clear Runoff Volume (ac-ft)	0.2097
24-Hr Clear Runoff Volume (cu-ft)	9133.0128



Peak Flow Hydrologic Analysis

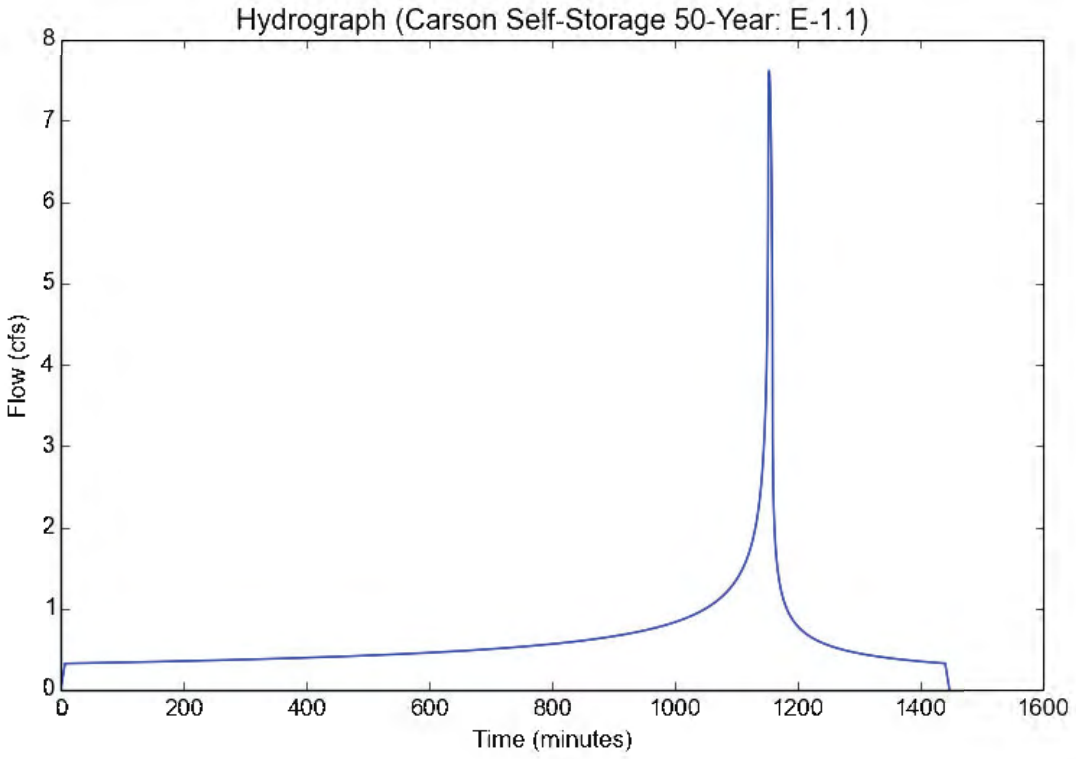
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/50-Year/Carson Self-Storage 50-Year - E-1
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self-Storage 50-Year
Subarea ID	E-1.1
Area (ac)	2.77
Flow Path Length (ft)	475.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.964
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.1071
Undeveloped Runoff Coefficient (Cu)	0.4613
Developed Runoff Coefficient (Cd)	0.8842
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	7.61
Burned Peak Flow Rate (cfs)	7.61
24-Hr Clear Runoff Volume (ac-ft)	1.2178
24-Hr Clear Runoff Volume (cu-ft)	53047.6479



Peak Flow Hydrologic Analysis

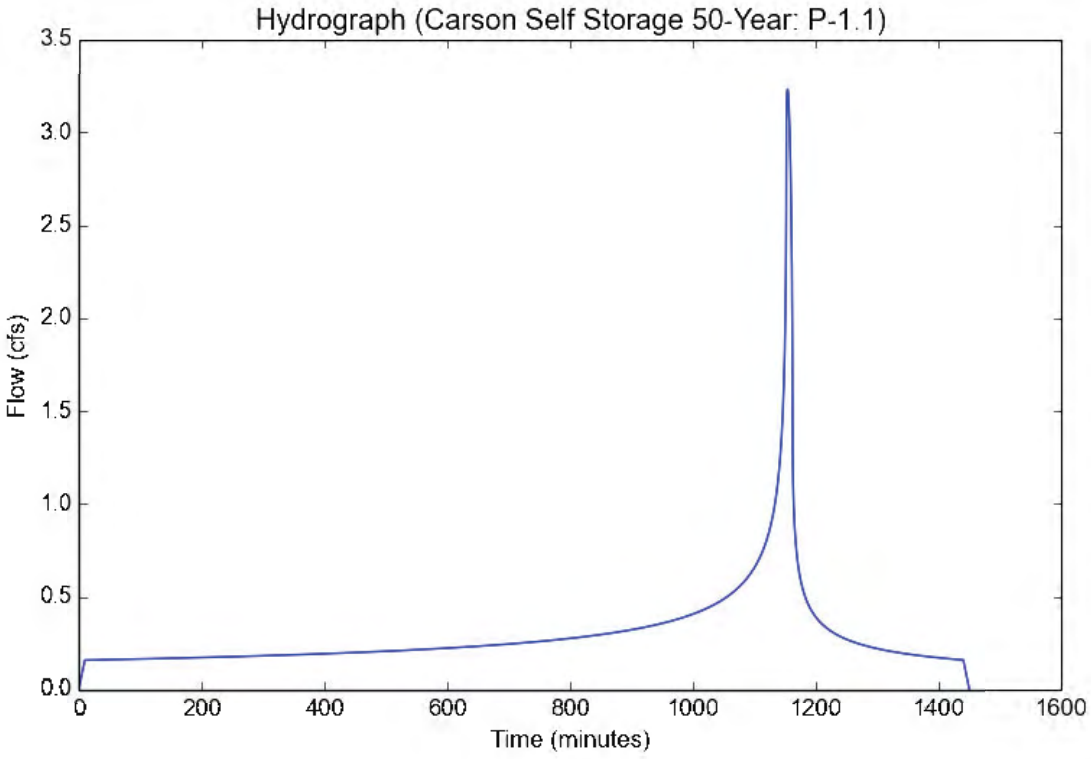
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/50-Year/Carson Self-Storage 50-Year - P-1
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self Storage 50-Year
Subarea ID	P-1.1
Area (ac)	1.44
Flow Path Length (ft)	635.0
Flow Path Slope (vft/hft)	0.0036
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.906
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	2.6275
Undeveloped Runoff Coefficient (Cu)	0.411
Developed Runoff Coefficient (Cd)	0.854
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	3.2314
Burned Peak Flow Rate (cfs)	3.2314
24-Hr Clear Runoff Volume (ac-ft)	0.6003
24-Hr Clear Runoff Volume (cu-ft)	26150.392



Peak Flow Hydrologic Analysis

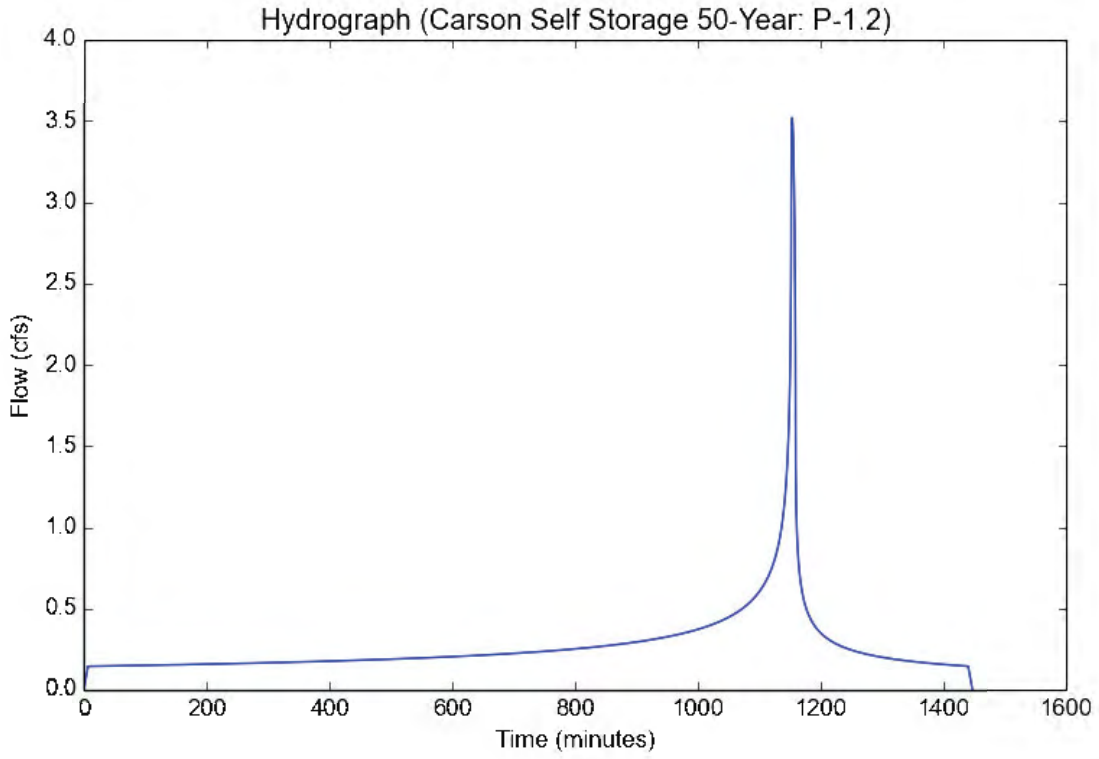
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/50-Year/Carson Self-Storage 50-Year - P-1
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self Storage 50-Year
Subarea ID	P-1.2
Area (ac)	1.33
Flow Path Length (ft)	645.0
Flow Path Slope (vft/hft)	0.0177
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.889
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.1
Peak Intensity (in/hr)	3.1071
Undeveloped Runoff Coefficient (Cu)	0.4613
Developed Runoff Coefficient (Cd)	0.8513
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	3.518
Burned Peak Flow Rate (cfs)	3.518
24-Hr Clear Runoff Volume (ac-ft)	0.5457
24-Hr Clear Runoff Volume (cu-ft)	23771.3544



Peak Flow Hydrologic Analysis

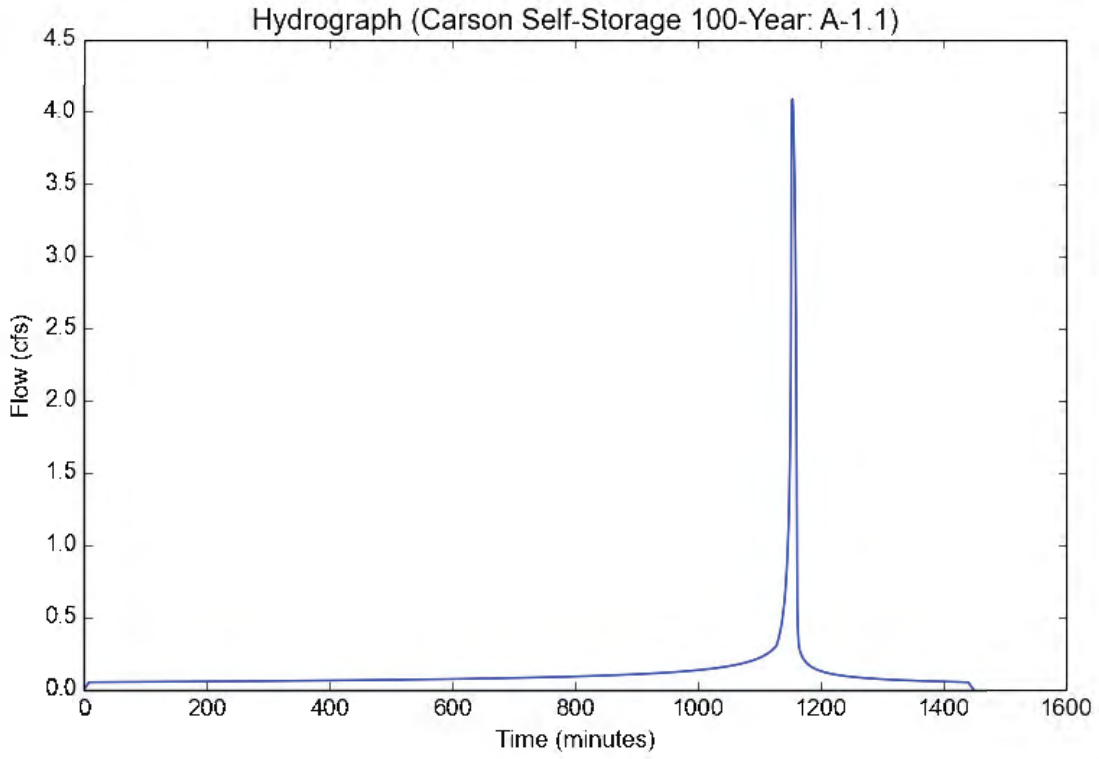
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/100-Year/Carson Self-Storage 100-Year - A
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self-Storage 100-Year
Subarea ID	A-1.1
Area (ac)	2.77
Flow Path Length (ft)	398.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.035
Soil Type	3
Design Storm Frequency	100-yr
Fire Factor	0
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	6.8442
Peak Intensity (in/hr)	3.0978
Undeveloped Runoff Coefficient (Cu)	0.4604
Developed Runoff Coefficient (Cd)	0.4757
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	4.0823
Burned Peak Flow Rate (cfs)	4.0823
24-Hr Clear Runoff Volume (ac-ft)	0.2423
24-Hr Clear Runoff Volume (cu-ft)	10556.6976



Peak Flow Hydrologic Analysis

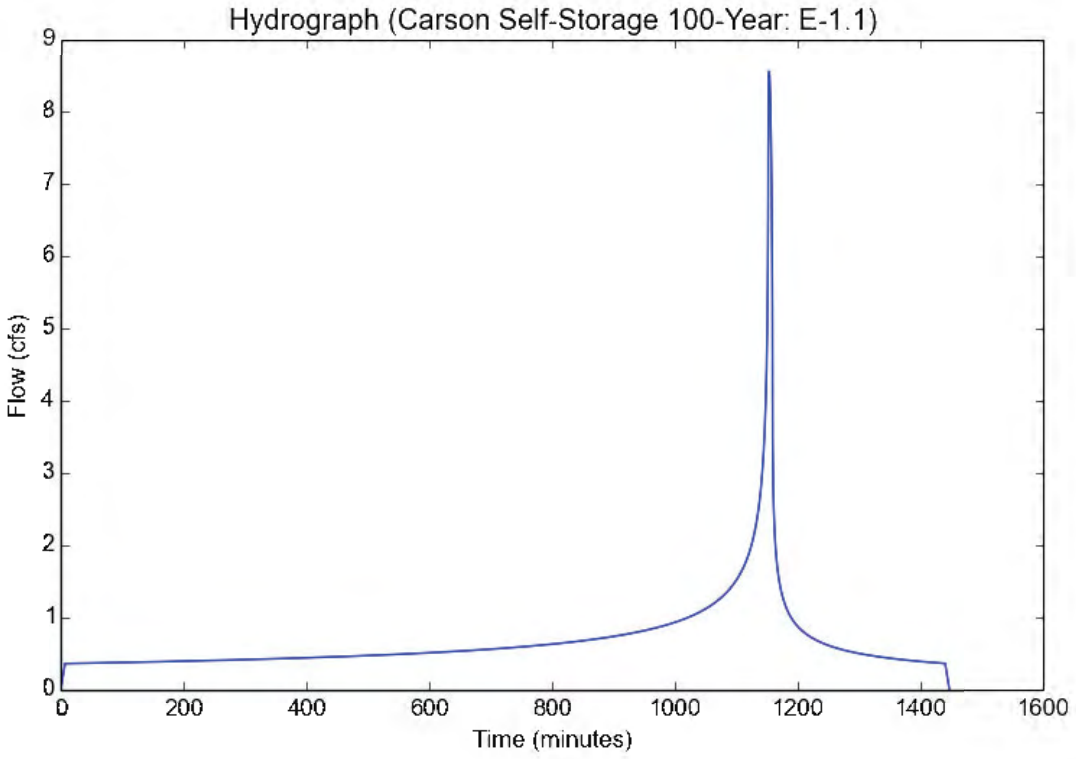
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/100-Year/Carson Self-Storage 100-Year - E
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self-Storage 100-Year
Subarea ID	E-1.1
Area (ac)	2.77
Flow Path Length (ft)	475.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.964
Soil Type	3
Design Storm Frequency	100-yr
Fire Factor	0
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	6.8442
Peak Intensity (in/hr)	3.4861
Undeveloped Runoff Coefficient (Cu)	0.5012
Developed Runoff Coefficient (Cd)	0.8856
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	8.5523
Burned Peak Flow Rate (cfs)	8.5523
24-Hr Clear Runoff Volume (ac-ft)	1.3666
24-Hr Clear Runoff Volume (cu-ft)	59530.2221



Peak Flow Hydrologic Analysis

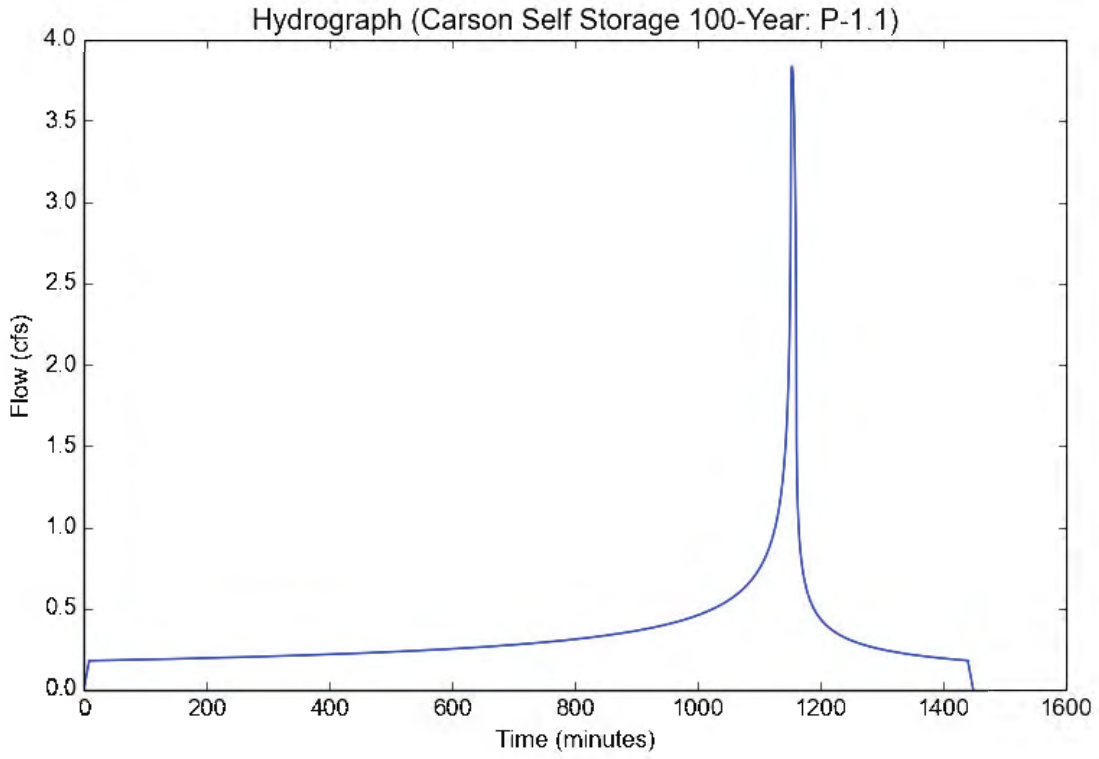
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/100-Year/Carson Self-Storage 100-Year - P
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self Storage 100-Year
Subarea ID	P-1.1
Area (ac)	1.44
Flow Path Length (ft)	635.0
Flow Path Slope (vft/hft)	0.0036
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.906
Soil Type	3
Design Storm Frequency	100-yr
Fire Factor	0
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	6.8442
Peak Intensity (in/hr)	3.0978
Undeveloped Runoff Coefficient (Cu)	0.4604
Developed Runoff Coefficient (Cd)	0.8587
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	3.8304
Burned Peak Flow Rate (cfs)	3.8304
24-Hr Clear Runoff Volume (ac-ft)	0.6739
24-Hr Clear Runoff Volume (cu-ft)	29356.4034



Peak Flow Hydrologic Analysis

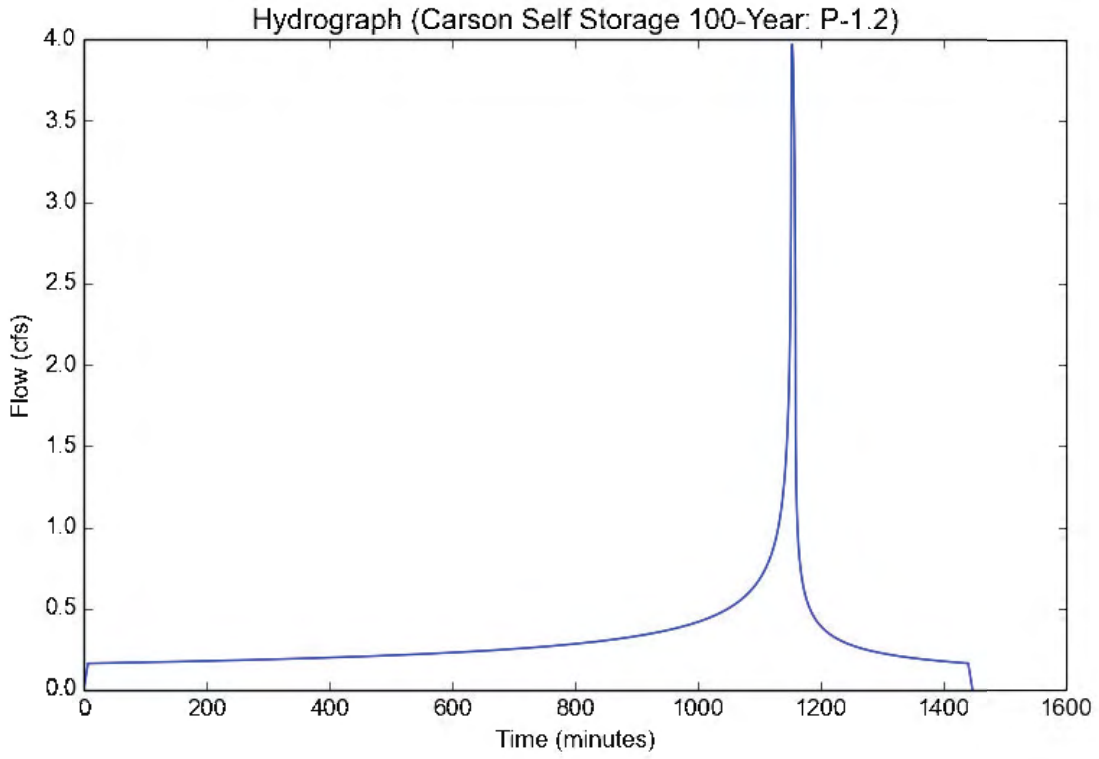
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/H&H/HydroCalc Exhibits/100-Year/Carson Self-Storage 100-Year - P
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self Storage 100-Year
Subarea ID	P-1.2
Area (ac)	1.33
Flow Path Length (ft)	645.0
Flow Path Slope (vft/hft)	0.0177
50-yr Rainfall Depth (in)	6.1
Percent Impervious	0.889
Soil Type	3
Design Storm Frequency	100-yr
Fire Factor	0
LID	False

Output Results

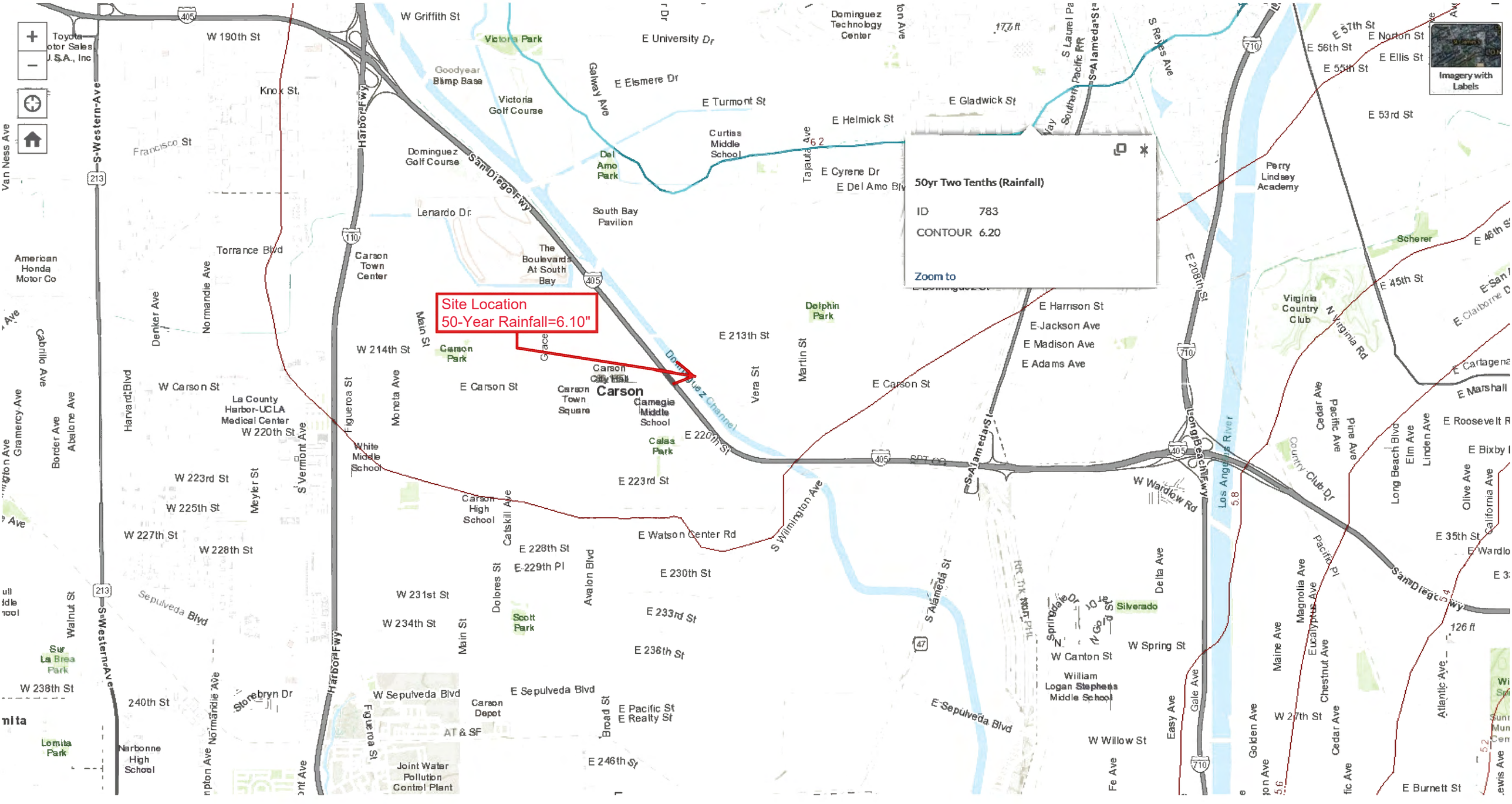
Modeled (100-yr) Rainfall Depth (in)	6.8442
Peak Intensity (in/hr)	3.4861
Undeveloped Runoff Coefficient (Cu)	0.5012
Developed Runoff Coefficient (Cd)	0.8557
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	3.9676
Burned Peak Flow Rate (cfs)	3.9676
24-Hr Clear Runoff Volume (ac-ft)	0.6127
24-Hr Clear Runoff Volume (cu-ft)	26687.391



Appendix 1

LA County Hydrology Map

Find address or place



Appendix 2

LA County Hydrology Map

Find address or place

Site Location
Soil Type: 003

Soils 2004

AREA	67,086,768.42
CLASS	003
AREA_ACRES	1,540

Zoom to

Imagery with Labels

E Dominguez St
E Balard St
E 213th St
E 214th St
E 215th Pl
E Albreda St
E Califon St
E 215th St
E Carson St
E 218th St
E Abila St
E 220th St
E Hadler St
E Fiat St
E Jay St
Jay St
220th St
218th St
Susan Dr
Civic Center
Carson
Carson Town Square
Colorado Cir
Carson City Hall
North Ln
Middle Ln
South Ln
Del Amo Elementary School
Dolphin Park
006
Carnegie Middle School
Bonita Street School
Calas Park
Northern Neighborhood
Go Kart World
Paradise Trailer
State Mobile Homes
Imperial-Avalon Mobile Est
San Diego Fwy
Recreation Rd
Avalon Blvd
Grace Ave
Harsom Ave
Newkirk Ave
Garston Ave
Selwyn Ave
Chico St
Vera
Alvar Pl
Perry St
Lostine Ave
Legend Ave
Martin St
Millpoint Ave
Pontine Ave
Water St
Oakfort Ave
Dablon Ave
Acanus Ave
S Wilmington Ave
Westward Ave
013
405
003
009
22 ft
28 ft

Appendix 3

CONDUIT SIZING CALCULATIONS

The following chart details the sizing parameters and for conduits that convey runoff on the site.
Flow parameters from *Handbook of Hydraulics, King & Brater* were used, see following page.

K'= Discharge factor	=	$(Q*n)/(d^{8/3}*s^{1/2})$
n= Mannings coefficient	=	0.013 for PVC & HDPE
d=diameter of conduit (ft)	=	per chart
Q= Discharge	=	based off portions of basins tributary to outlet
s=Minimum Pipe Slope (ft/ft)	=	per chart
D=depth of flow	=	From table 7-4 of the *Handbook of Hydraulics, King & Brater* See right
C_a= Flow factor	=	From table 7-14 of the *Handbook of Hydraulics, King & Brater* See right
A=Cross sectional area of flow	=	C_a*d^2
V=Velocity	=	Q/A

Pipe Flow

Pipe	Tributary Areas	Q (cfs)	S (%)	d (in)	K'	D/d	C_a	A (sf)	V (fps)
1	Entire Site	7.79	1	18	0.3435	0.64	0.531	1.195	6.52

Table 7-4. For Determining the Area a of the Cross Section of a Circular Conduit Flowing Part Full

Let $\frac{\text{depth of water}}{\text{diameter of channel}} = \frac{D}{d}$ and C_a = the tabulated value. Then $a = C_a d^2$.

$\frac{D}{d}$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0013	.0037	.0069	.0105	.0147	.0192	.0242	.0294	.0350
.1	.0409	.0470	.0534	.0600	.0668	.0739	.0811	.0885	.0961	.1039
.2	.1118	.1199	.1281	.1365	.1449	.1535	.1623	.1711	.1800	.1890
.3	.1982	.2074	.2167	.2260	.2355	.2450	.2546	.2642	.2739	.2836
.4	.2934	.3032	.3130	.3229	.3328	.3428	.3527	.3627	.3727	.3827
.5	.393	.403	.413	.423	.433	.443	.453	.462	.472	.482
.6	.492	.502	.512	.521	.531	.540	.550	.559	.569	.578
.7	.587	.596	.605	.614	.623	.632	.640	.649	.657	.666
.8	.674	.681	.689	.697	.704	.712	.719	.725	.732	.738
.9	.745	.750	.756	.761	.766	.771	.775	.779	.782	.784

Table 7-14. Values of K' for Circular Channels in the Formula

$$Q = \frac{K'}{n} d^{8/3} s^{1/2}$$

D = depth of water d = diameter of channel

$\frac{D}{d}$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0		.00007	.00031	.00074	.00138	.00222	.00328	.00455	.00604	.00775
.1	.00967	.0118	.0142	.0167	.0195	.0225	.0257	.0291	.0327	.0366
.2	.0406	.0448	.0492	.0537	.0585	.0634	.0686	.0738	.0793	.0849
.3	.0907	.0966	.1027	.1089	.1153	.1218	.1284	.1352	.1420	.1490
.4	.1561	.1633	.1705	.1779	.1854	.1929	.2005	.2082	.2160	.2238
.5	.232	.239	.247	.255	.263	.271	.279	.287	.295	.303
.6	.311	.319	.327	.335	.343	.350	.358	.366	.373	.380
.7	.388	.395	.402	.409	.416	.422	.429	.435	.441	.447
.8	.453	.458	.463	.468	.473	.477	.481	.485	.488	.491
.9	.494	.496	.497	.498	.498	.498	.496	.494	.489	.483
1.0	.463									

Appendix 4

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, May 20 2021

Section A-A Gutter Analysis

User-defined

Invert Elev (ft)	= 18.35
Slope (%)	= 4.00
N-Value	= 0.013

Calculations

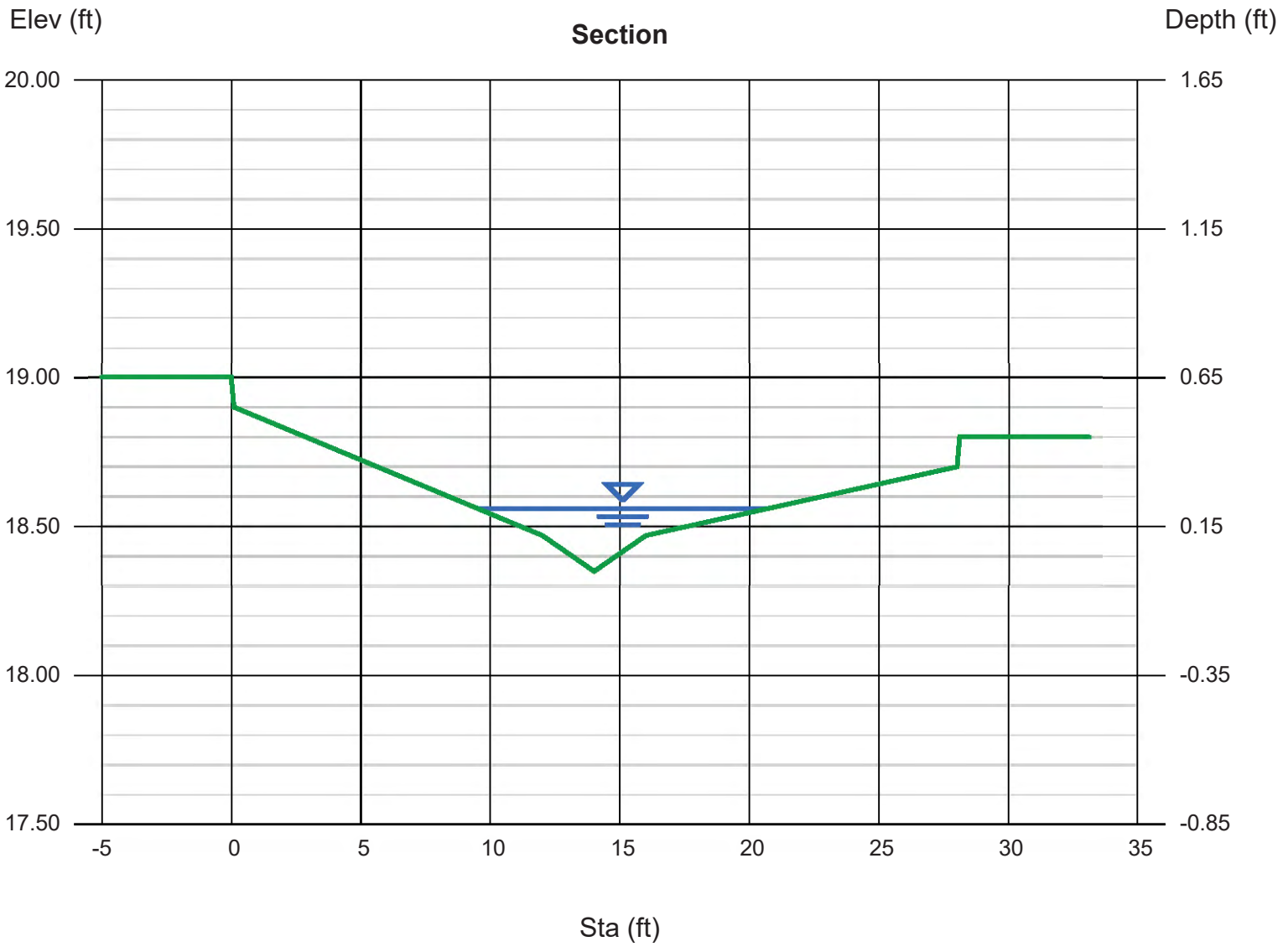
Compute by:	Known Q
Known Q (cfs)	= 3.93

Highlighted

Depth (ft)	= 0.21
Q (cfs)	= 3.930
Area (sqft)	= 0.92
Velocity (ft/s)	= 4.26
Wetted Perim (ft)	= 11.20
Crit Depth, Yc (ft)	= 0.29
Top Width (ft)	= 11.19
EGL (ft)	= 0.49

(Sta, El, n)-(Sta, El, n)...

(0.00, 19.00)-(0.10, 18.90, 0.013)-(12.00, 18.47, 0.013)-(14.00, 18.35, 0.013)-(16.00, 18.47, 0.013)-(28.00, 18.70, 0.013)-(28.10, 18.80, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, May 20 2021

Section B-B Gutter Analysis

User-defined

Invert Elev (ft)	= 17.66
Slope (%)	= 0.35
N-Value	= 0.013

Calculations

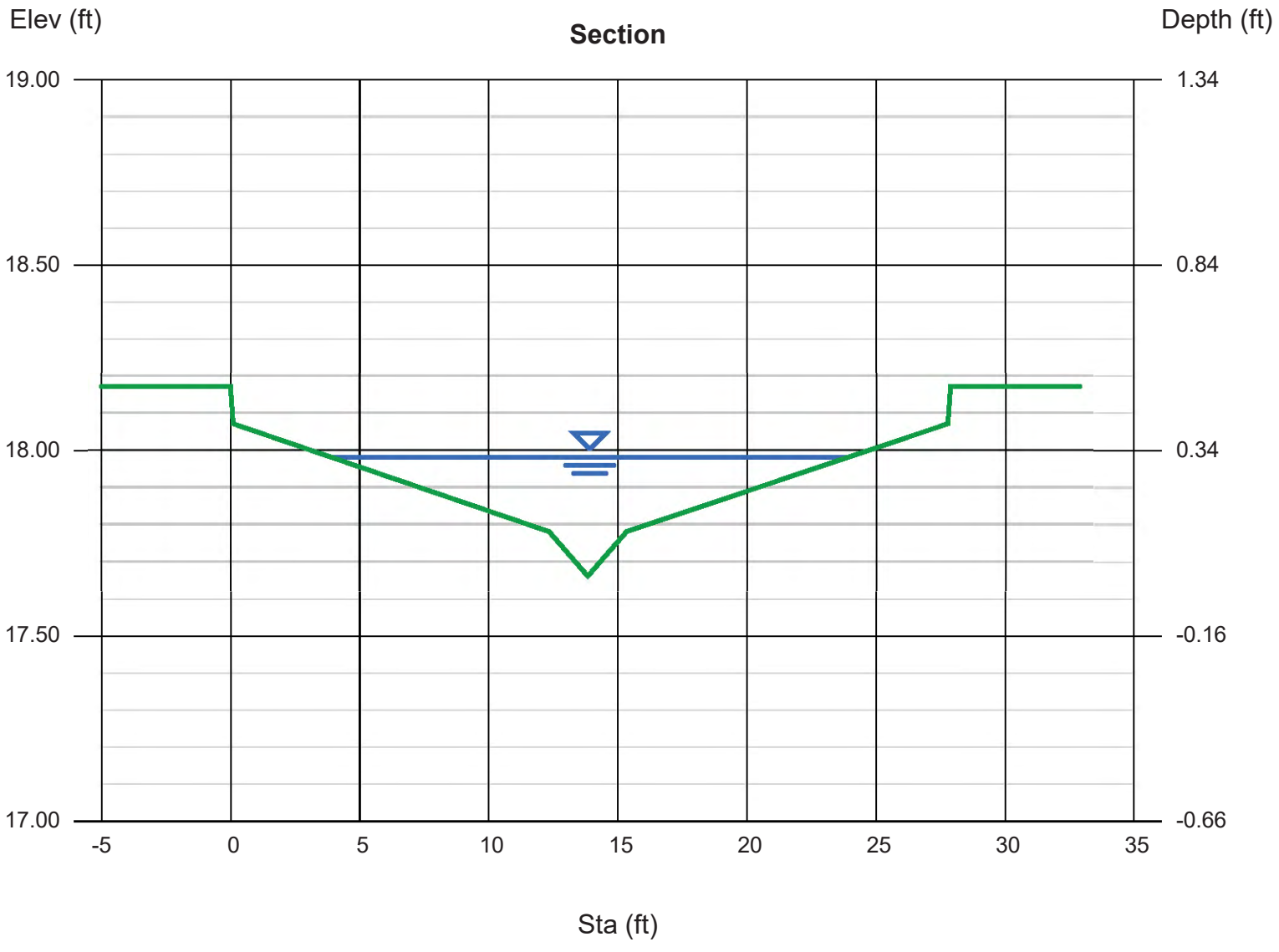
Compute by:	Known Q
Known Q (cfs)	= 3.93

Highlighted

Depth (ft)	= 0.32
Q (cfs)	= 3.930
Area (sqft)	= 2.48
Velocity (ft/s)	= 1.58
Wetted Perim (ft)	= 20.03
Crit Depth, Yc (ft)	= 0.30
Top Width (ft)	= 20.01
EGL (ft)	= 0.36

(Sta, El, n)-(Sta, El, n)...

(0.00, 18.17)-(0.10, 18.07, 0.013)-(12.33, 17.78, 0.013)-(13.83, 17.66, 0.013)-(15.33, 17.78, 0.013)-(27.77, 18.07, 0.013)-(27.87, 18.17, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, May 20 2021

Section C-C Gutter Analysis

User-defined

Invert Elev (ft)	= 17.32
Slope (%)	= 0.55
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.93

Highlighted

Depth (ft)	= 0.35
Q (cfs)	= 3.930
Area (sqft)	= 1.81
Velocity (ft/s)	= 2.18
Wetted Perim (ft)	= 13.18
Crit Depth, Yc (ft)	= 0.36
Top Width (ft)	= 13.03
EGL (ft)	= 0.42

(Sta, El, n)-(Sta, El, n)...

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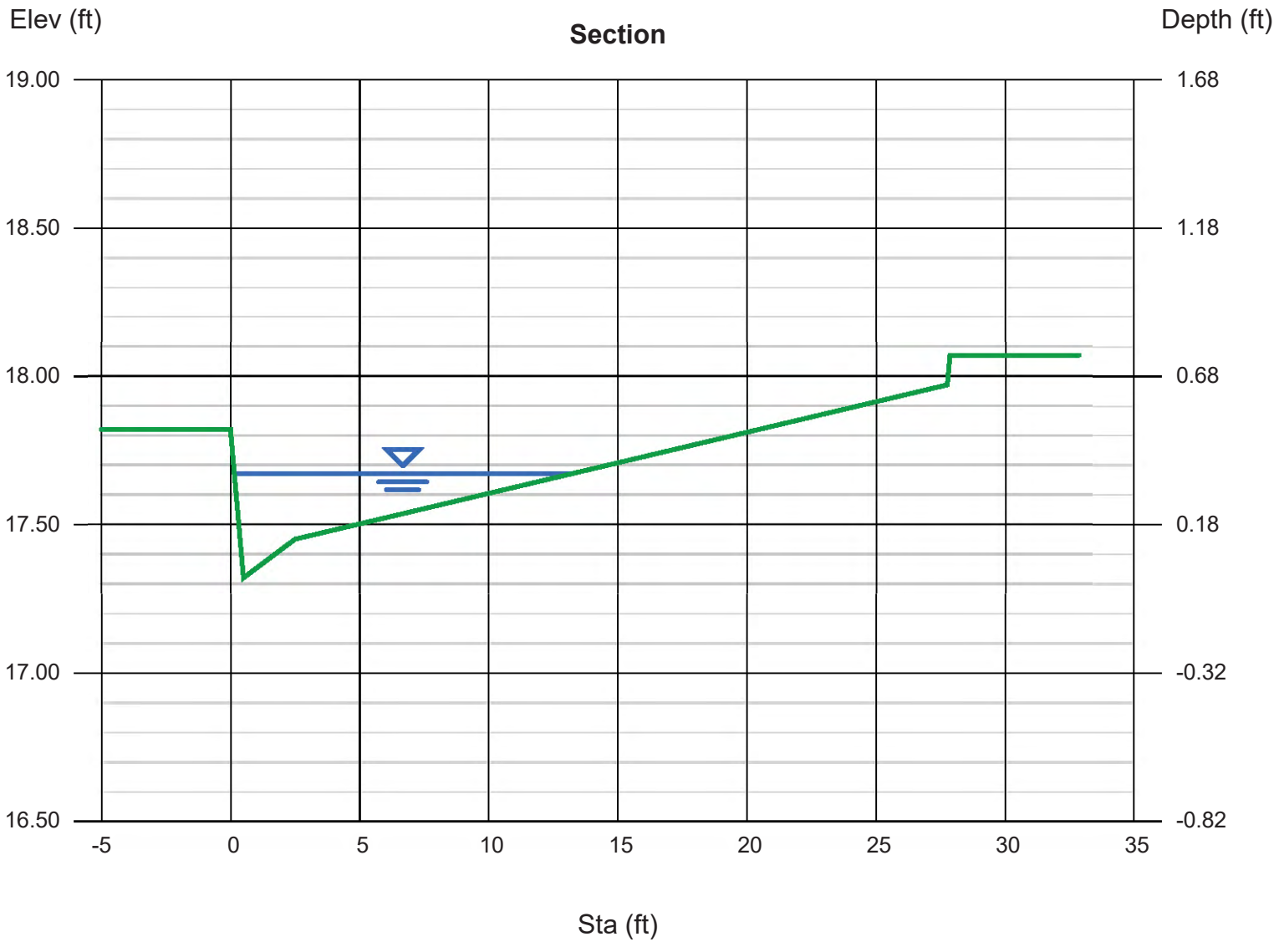


Channel Report

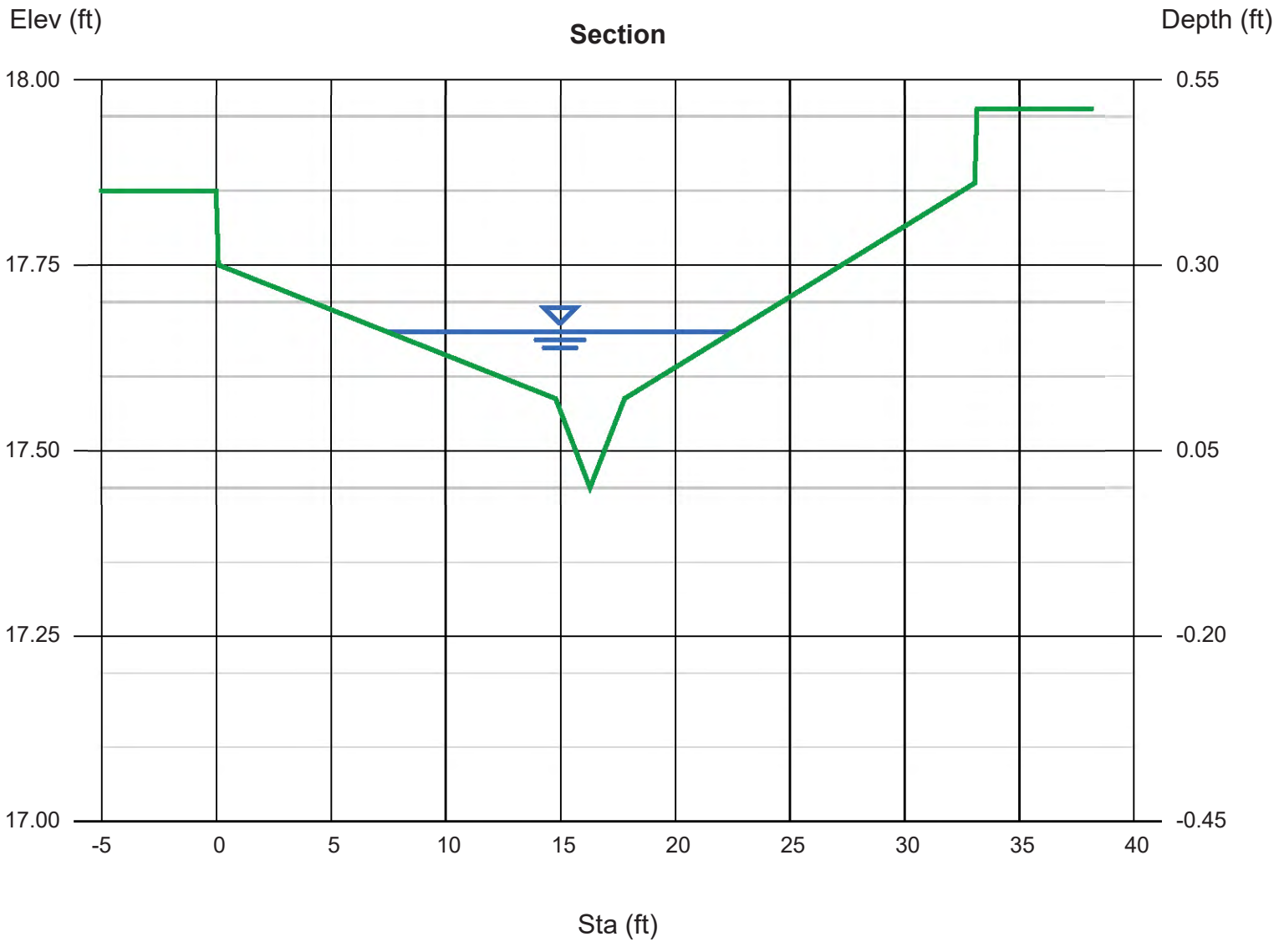
Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, May 20 2021

Section D-D Gutter Analysis

User-defined		Highlighted	
Invert Elev (ft)	= 17.45	Depth (ft)	= 0.21
Slope (%)	= 5.40	Q (cfs)	= 3.930
N-Value	= 0.013	Area (sqft)	= 0.99
		Velocity (ft/s)	= 3.96
Calculations		Wetted Perim (ft)	= 15.09
Compute by:	Known Q	Crit Depth, Yc (ft)	= 0.28
Known Q (cfs)	= 3.93	Top Width (ft)	= 15.08
		EGL (ft)	= 0.45

(Sta, El, n)-(Sta, El, n)...

(0.00, 17.85)-(0.10, 17.75, 0.013)-(14.79, 17.57, 0.013)-(16.29, 17.45, 0.013)-(17.79, 17.57, 0.013)-(33.05, 17.86, 0.013)-(33.15, 17.96, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, May 20 2021

Section E-E Gutter Analysis

User-defined

Invert Elev (ft)	= 16.45
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

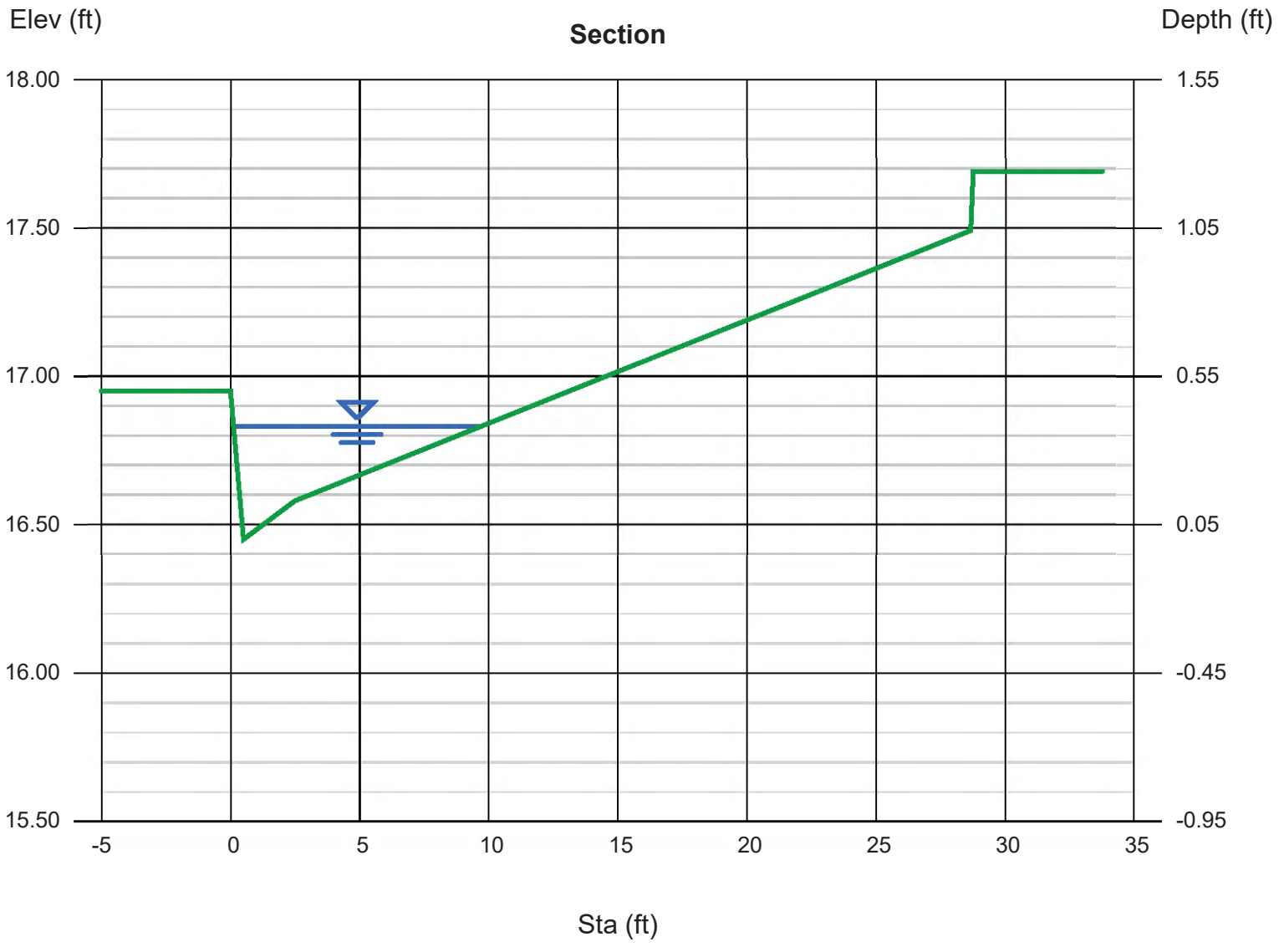
Compute by:	Known Q
Known Q (cfs)	= 3.85

Highlighted

Depth (ft)	= 0.38
Q (cfs)	= 3.850
Area (sqft)	= 1.60
Velocity (ft/s)	= 2.41
Wetted Perim (ft)	= 9.73
Crit Depth, Yc (ft)	= 0.39
Top Width (ft)	= 9.56
EGL (ft)	= 0.47

(Sta, El, n)-(Sta, El, n)...

(0.00, 16.95)-(0.50, 16.45, 0.013)-(2.50, 16.58, 0.013)-(28.65, 17.49, 0.013)-(28.75, 17.69, 0.013)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, May 20 2021

Section F-F Gutter Analysis

User-defined

Invert Elev (ft)	= 17.02
Slope (%)	= 0.35
N-Value	= 0.013

Calculations

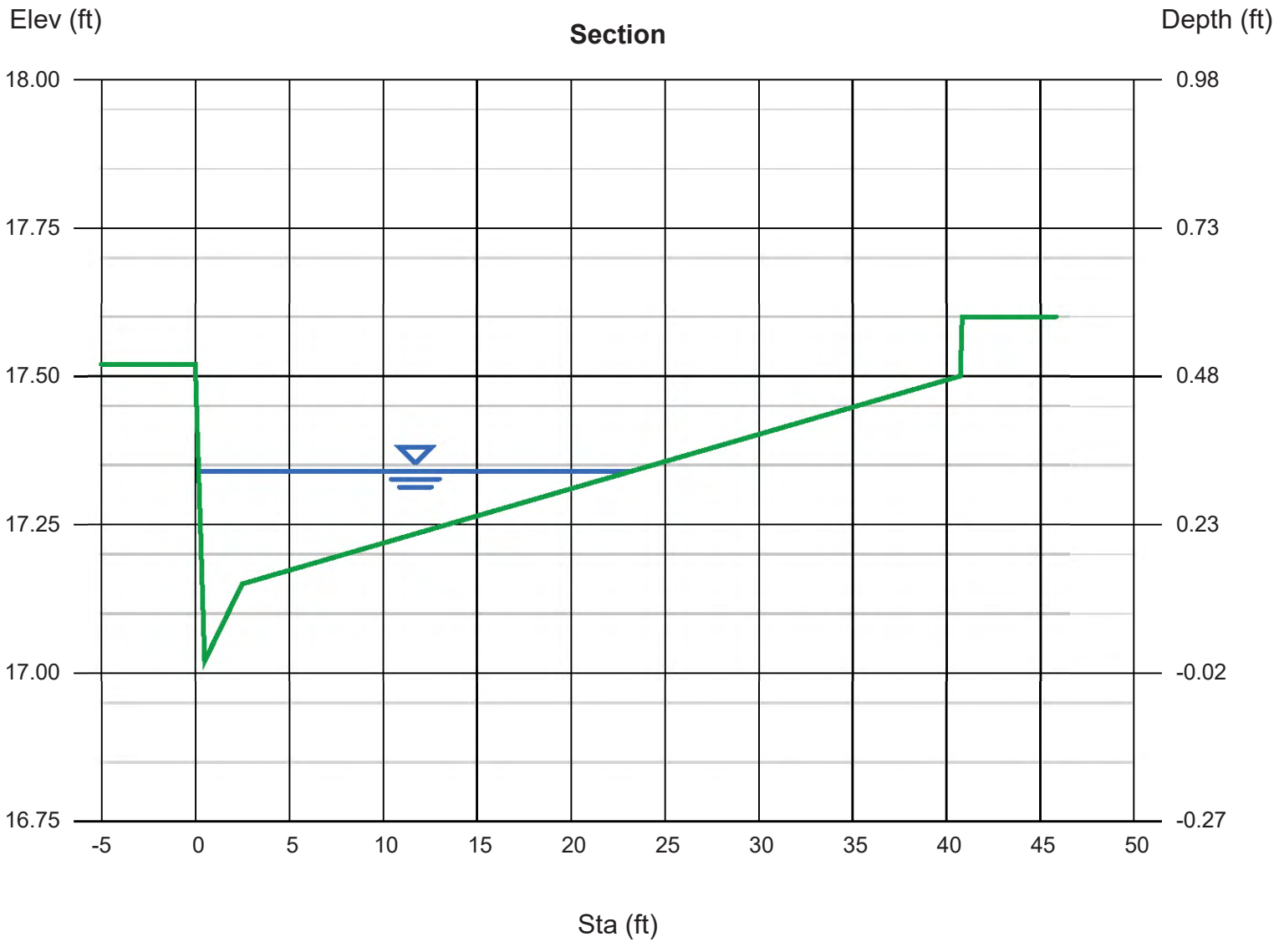
Compute by:	Known Q
Known Q (cfs)	= 3.85

Highlighted

Depth (ft)	= 0.32
Q (cfs)	= 3.850
Area (sqft)	= 2.53
Velocity (ft/s)	= 1.52
Wetted Perim (ft)	= 23.21
Crit Depth, Yc (ft)	= 0.31
Top Width (ft)	= 23.07
EGL (ft)	= 0.36

(Sta, El, n)-(Sta, El, n)...

(0.00, 17.52)-(0.50, 17.02, 0.013)-(2.50, 17.15, 0.013)-(40.73, 17.50, 0.013)-(40.83, 17.60, 0.013)



Low Impact Development Plan
(LID Plan)

Project Name:

Carson Self-Storage

21611 South Perry St.

Carson, CA 90745

Prepared for:

21611 PERRY STREET LLC

4132 Katella Avenue, #205b

Los Alamitos, Ca 90720

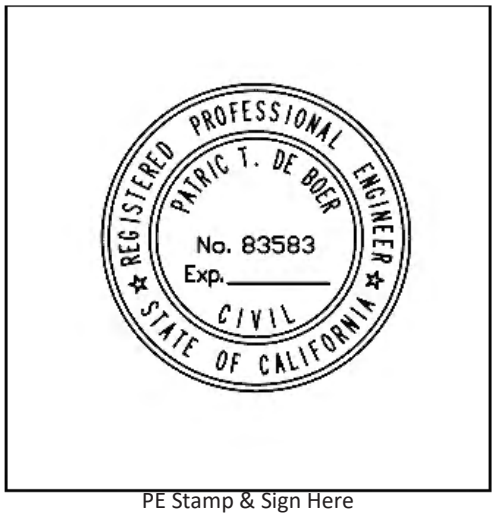
Prepared by:

Omega Engineering Consultants

4340 Viewridge Avenue, Suite B

San Diego, Ca 92123

(858) 634-8620

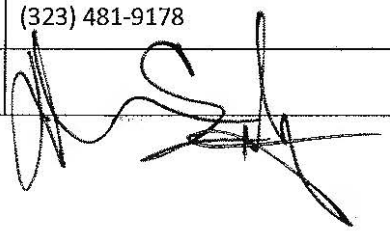


PE Stamp & Sign Here

October 5, 2021

Project Owner's Certification

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 gathered 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.

Applicant's Name:	Darren Embry		
Applicant's Title:	VP of Community Development		
Company:	21611 Perry Street, LLC		
Address:	4132 Katella Avenue, #205B Los Alamitos, CA 90720		
Email:	darren@faring.com		
Telephone No:	(323) 481-9178		
Signature:		Date:	10/12/21

Preparer (Engineer) Certification

Engineer's Name:	Patric de Boer
Engineer's Title:	Project Engineer
Company:	Omega Engineering Consultants
Address:	4340 Viewridge Avenue, Suite B, San Diego, CA 90069
Email:	patric@omega-consultants.com
Telephone No:	(858) 634-8620

I hereby certify that this Low Impact Development Plan is in compliance with, and meets the requirements set forth in, Order No. R4-2012-0175, of the Los Angeles Regional Water Quality Control Board.

Engineer's Signature		Date	5/20/2021
Place Stamp Here			

Table of Contents

Attachments

1. PROJECT DESCRIPTION

1.1. PROJECT CATEGORY

Category	YES	NO
1. Development [a] of a new project equal to 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious area [b]	☒	☐
2. Development [a] of a new industrial park with 10,000 square feet or more of surface area [c]	☐	☒
3. Development [a] of a new commercial mall with 10,000 square feet or more surface area [c]	☐	☒
4. Development [a] of a new retail gasoline outlet with 5,000 square feet or more of surface area [c]	☐	☒
5. Development [a] of a new restaurant (SIC 5812) with 5,000 square feet or more of surface area [c]	☐	☒
6. Development [a] of a new parking lot with either 5,000 ft^2 or more of impervious area [b] or with 25 or more parking spaces	☐	☒
7. Development [a] of a new automotive service facility (SIC 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) with 5,000 square feet or more of surface area [c]	☐	☒
8. Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA),[d] where the development will: a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and b. Create 2,500 square feet or more of impervious area [b]	☐	☒
9. Redevelopment [e] of 5,000 square feet or more in one of the categories listed above **If yes, list redevelopment category here:**	☐	☒
10. Redevelopment [e] of 10,000 square feet or more to a Single Family Home, without a change in landuse.	☐	☒

a Development includes any construction or demolition activity, clearing, grading, grubbing, or excavation or any other activity that results in land disturbance.

b Surfaces that do not allow stormwater runoff to percolate into the ground. Typical impervious surfaces include: concrete, asphalt, roofing materials, etc.

c The surface area is the total footprint of an area. Not to include the cumulative area above or below the ground surface.

d An area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and would be disturbed or degraded by human activities and developments. Also, an area designated by the City as approved by the Regional Water Quality Control Board.

e Land-disturbing activities that result in the creation, addition, or replacement of a certain amount of impervious surface area on an already developed site. If the activity results in an alteration to more than 50% of the impervious surface area on the already developed site and the existing site was not subject to post-construction storm water quality control requirements, then the entire site must be mitigated.

1.2. PROJECT DESCRIPTION

Total Project Area (ft^2): 120,644

Total Project Area (Ac): 2.77

EXISTING CONDITIONS

Condition	Area (ft^2)	Percentage (%)
Pervious Area:	4,322	3.6
Impervious Area:	116,322	96.4

PROPOSED CONDITIONS

Condition	Area (ft^2)	Percentage (%)
Pervious Area:	12,134	10.2
Impervious Area:	108,285	89.8

SITE CHARACTERISTICS

DRAINAGE PATTERNS/CONNECTIONS	Existing: The site is currently a vacant, mass graded lot. The site is relatively level with drainage consisting of surface flow. The site drains towards the west to an existing 5' storm drain inlet that outlets directly to the Dominguez Channel thence to Long Beach Harbor and ultimately to the Pacific Ocean.
	Proposed: The site will drain from east to west via gutters that wrap around the proposed self-storage facilities. The runoff generated from the entire site will be treated by a proposed 10'x20' Modular Wetland System that will discharge via an 18" pipe to the existing 5' storm drain inlet. The discharge point will remain the same as the existing conditions.
NARRATIVE PROJECT DESCRIPTION:	The project consists of the construction of a two-story self-storage facility with asphalt drive aisles. The site address is 21611 South Perry St. in Carson, CA 90745.

OFFSITE RUNON	No off-site run-on is anticipated to be received by the site.
UTILITY AND INFRASTRUCTURE INFORMATION	Site is currenly a vacant lot. No utilities are anticipated on-site.
SIGNIFICANT ECOLOGICAL AREAS (SEAS)	N/A

1.3. HYDROMODIFICATION ANALYSIS

DOES THE PROPOSED PROJECT FALL INTO ONE OF THE FOLLOWING CATEGORIES? CHECK YES/NO.	YES	NO
1. *Project is a redevelopment that decreases the effective impervious area compared to the pre-project conditions.*	☐	☒
Describe:		
2. *Project is a redevelopment that increases the infiltration capacity of pervious areas compared to the pre-project conditions.*	☐	☒
Describe:		
3. *Project discharges directly or via a storm drain to a sump, lake, area under tidal influence, into a waterway that has a 100-year peak flow (Q_{100}) of 25,000 cfs or more.*	☒	☐
Describe:		
4. *Project discharges directly or via a storm drain into concrete or otherwise engineered (not natural) channels (e.g., channelized or armored with rip rap, shotcrete, etc.), which, in turn, discharge into receiving water that is not susceptible to hydromodification impacts.*	☒	☐
Describe: Project discharges directly to the Dominguez channel, a concrete-lined channel.		

HYDROMODIFICATION ANALYSIS

Project is hydromodification exempt.

1.4. PROPERTY OWNERSHIP/MANAGEMENT

	21611 Perry Street LLC 4132 Katella Avenue, #205B Los Alamitos, CA 90720

2. BEST MANAGEMENT PRACTICES (BMPS)

2.1. SITE DESIGN

85TH PERCENTILE, 24-HOUR STORM DEPTH	0.80"
SITE DESIGN	The project proposes a 10'x20' Modular Wetland System to treat the entire site prior to discharging to the Dominguez Channel.

BMP LIST

DMA DESIGNATION	SQUARE FOOTAGE (SF)	ACREAGE (AC)	STORM WATER QUALITY DESIGN FLOWRATE (SWQDQ, CFS)	BMP TYPE	BMP PROVIDED FLOWRATE (CFS)	GPS COORDINATES
DMA-1	120,644	2.77	0.702	10'X20' MWS	0.710	33°49'56.58"N 118°15'15.60"W

2.2. BMP SELECTION

2.2.1. INFILTRATION BMPS

NAME	INCLUDED
Bioretention without underdrains	☐
Infiltration Trench	☐
Infiltration Basin	☐
Drywell	☐
Proprietary Subsurface Infiltration Gallery	☐
Permeable Pavement (concrete, asphalt, pavers)	☐
Other:	☐
Other:	☐

DESCRIPTION	Per the Geotechnical Report, "Based on the shallow groundwater and impermeable nature of the fine grained soils which underly the site, infiltration of stormwater at this site is not considered feasible. Infiltration of stormwater at this site would be considered detrimental to the project."
CALCULATIONS	N/A

2.2.2. RAINWATER HARVEST AND USE BMPS

NAME	INCLUDED
Above-ground cisterns and basins	☐
Underground detention	☐
Other:	☐
Other:	☐
Other:	☐

DESCRIPTION	The proposed site has a low demand for harvested rainwater…
CALCULATIONS	N/A

2.2.3. ALTERNATIVE COMPLIANCE BMPS

BIOFILTRATION BMPS

(If Infiltration BMPs and Rainwater Harvest and Use BMPs are Infeasible)

NAME	INCLUDED
Bioretention with underdrains (i.e. planter box, rain garden, etc.)	☐
Constructed Wetland	☐
Vegetated Swale	☐
Vegetated Filter Strip	☐
Tree-Well Filter	☐
Other:	☐
Other:	☐

DESCRIPTION	N/A
CALCULATIONS	N/A

OFFSITE BMPS

(If Infiltration BMPs, Rainwater Harvest and Use BMPs, and Biofiltration BMPs are Infeasible)

NAME	INCLUDED
Offsite Infiltration	☐
Ground Water Replenishment Projects	☐
Offsite Project - Retrofit Existing Development	☐
Regional Storm Water Mitigation Program	☐
Other:	☐
Other:	☐

DESCRIPTION	N/A
CALCULATIONS	N/A

2.2.4. TREATMENT CONTROL BMPS

NAME	INCLUDED
Media Filter	☐
Filter Insert	☐
CDS Unit	☐
Other: Flow-through modular treatment system	☒
Other:	☐

DESCRIPTION	Project proposes a 10'x20' Modular Wetland System to treat the entire site. See below for calculations regarding the sizing of the Modular Wetland System. BMP Sizing Calculations: Tributary Area: 2.77 acres Intensity$_{1yr, 1hr}$: 0.31" Runoff Coefficient: 0.818 Required Flowrate/Discharge rate: Q=C*I*A = 0.702 cfs BMP Flowrate: 0.710 cfs

2.2.5. HYDROMODIFICATION CONTROL BMPS

NAME	INCLUDED
Infiltration System	☐
Above-ground Cistern	☐
Above-ground Basin	☐
Underground Detention	☐
Other:	☐
Other:	☐

DESCRIPTION	N/A
CALCULATIONS	N/A

2.2.6. NON-STRUCTURAL SOURCE CONTROL BMPS

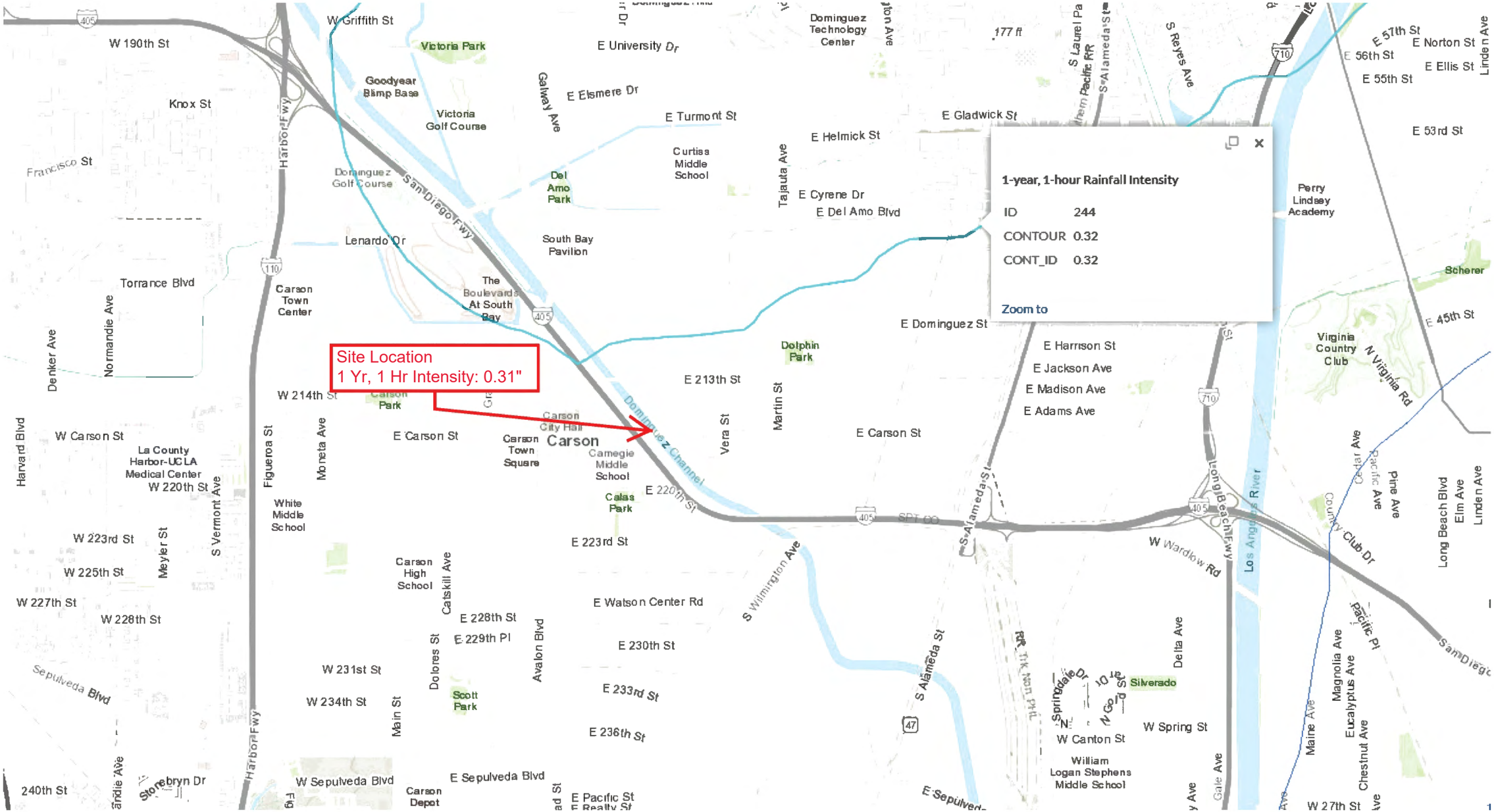
NAME	CHECK ONE	
	Included	**Not Applicable**
Education for Property Owners, Tenants and Occupants	☒	☐
Activity Restrictions	☒	☐
Common Area Landscape Management	☒	☐
Common Area Litter Control	☒	☐
Housekeeping of Loading Docks	☐	☒
Common Area Catch Basin Inspection	☒	☐
Street Sweeping Private Streets and Parking Lots	☒	☐

2.2.7. STRUCTURAL SOURCE CONTROL BMPS

NAME	CHECK ONE	
	Included	**Not Applicable**
Provide storm drain system stenciling and signage	☒	☐
Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒
Design and construct trash and waste storage areas to reduce pollution introduction	☒	☐
Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐
Protect slopes and channels and provide energy dissipation	☐	☒
Loading docks	☐	☒
Maintenance bays	☐	☒
Vehicle wash areas	☐	☒
Outdoor processing areas	☐	☒
Equipment wash areas/racks	☐	☒
Fueling areas	☐	☒
Hillside landscaping	☐	☒

Attachment A

Calculations


Site Location
1 Yr, 1 Hr Intensity: 0.31"
1-year, 1-hour Rainfall Intensity
ID 244
CONTOUR 0.32
CONT_ID 0.32
Zoom to
W 190th St
Knox St
Francisco St
W Griffith St
Victoria Park
Goodyear Blimp Base
Victoria Golf Course
Dominguez Golf Course
Harbor Fwy
San Diego Fwy
E University Dr
Galway Ave
E Elsmere Dr
E Turmont St
Del Amo Park
Curtiss Middle School
Dominguez Technology Center
E Helmick St
E Gladwick St
Tajauta Ave
E Cyrene Dr
E Del Amo Blvd
Lenardo Dr
South Bay Pavilion
Torrance Blvd
Carson Town Center
The Boulevards At South Bay
Normandie Ave
Denker Ave
W 214th St
Carson Park
E 213th St
Dolphin Park
Martin St
E Dominguez St
E Harrison St
E Jackson Ave
E Madison Ave
E Adams Ave
E Carson St
Carson City Hall
Carson
Carson Town Square
Dominguez Channel
Vera St
Camegie Middle School
Calas Park
E 220th St
E 223rd St
W Carson St
La County Harbor-UCLA Medical Center
W 220th St
Harvard Blvd
Figueroa St
Moneta Ave
S Vermont Ave
White Middle School
W 223rd St
Meyler St
W 225th St
W 227th St
W 228th St
Carson High School
Catskill Ave
E 228th St
E 229th Pl
E 230th St
E 233rd St
E 236th St
Dolores St
Avalon Blvd
Scott Park
W 231st St
W 234th St
Main St
Sepulveda Blvd
240th St
Stonebryn Dr
W Sepulveda Blvd
E Sepulveda Blvd
Carson Depot
E Pacific St
S Wilmington Ave
S Alameda St
SPT CO
Long Beach Fwy
W Wardlow Rd
Los Angeles River
Perry Lindsey Academy
E 57th St
E 56th St
E 55th St
E 53rd St
E Norton St
E Ellis St
Linden Ave
Scherer
E 45th St
Virginia Country Club
N Virginia Rd
Cedar Ave
Pacific Ave
Pine Ave
Country Club Dr
Long Beach Blvd
Elm Ave
Linden Ave
Delta Ave
Silverado
W Spring St
W Canton St
William Logan Stephens Middle School
Magnolia Ave
Eucalyptus Ave
Chestnut Ave
Maine Ave
Gale Ave
W 27th St
177 ft

LA County Hydrology Map

Find address or place

Site Location
85th Percentile: 0.80"

Final 85th Percentile, 24-hr Rainfall

ID 34

CONTOUR 0.80

Zoom to

Imagery with Labels

28 ft

22 ft

0.8

E Dominguez St

E Balard St

E 213th St

E 214th St

E 215th St

E 215th Pl

E Albreda St

E Califon St

E Carson St

E 218th St

E Abila St

E 220th St

E 221st St

Avalon Blvd

Imperial-Avalon Mobile Est

San Diego Fwy

405

Chico St

Vera

Grace Ave

Garston Ave

Selwyn Ave

Thomas Dr

Alvar Pl

S Perry St

Susan Dr

S Troylon Ln

Lostine Ave

Legend Ave

Martin St

Millpoint Ave

Oakfort Ave

S Wilmington Ave

Water St

Dolphin Park

Del Amo Elementary School

Perry St Mini Park

North Ln

Middle Ln

South Ln

Carson City Hall

Civic Center Dr

Carson

Carson Town Square

Colorado Cir

Civic Center

Carnegie Middle School

Bonita Street School

Hansom Ave

Newkirk Ave

E Calbas St

E Hadler St

E Fiat St

E Jay St

Jay St

Calas Park

Northern Neighborhood

S Edgar St

Recreation Rd

Go Kart World

Acacia Ave

Dalton Ave

E Bach St

Pontine Ave

Paradise

Trailer

Mobile Homes

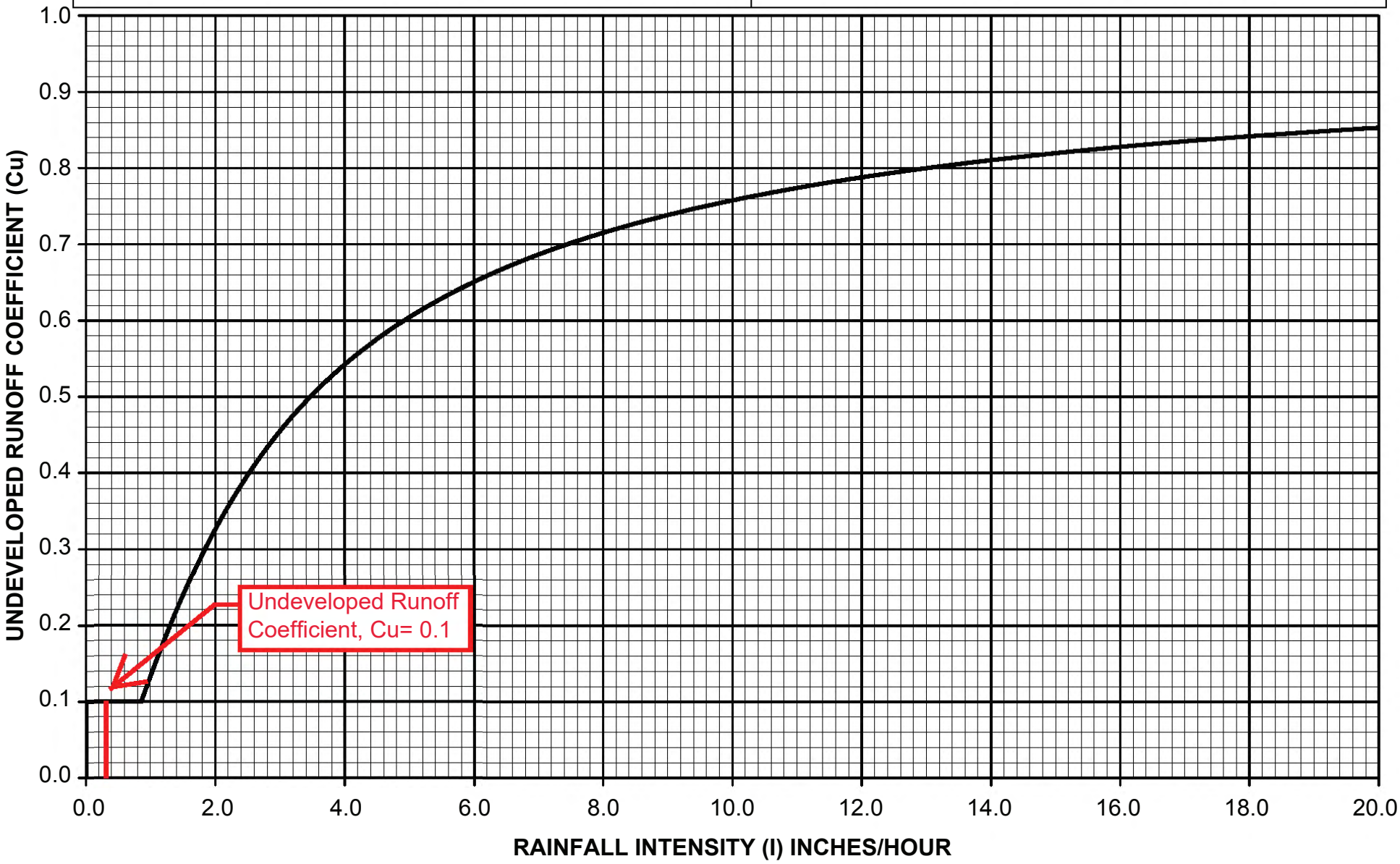
S Westward Ave

$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

Where: C_D = Developed Runoff Coefficient
IMP = Proportion Impervious
C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 003

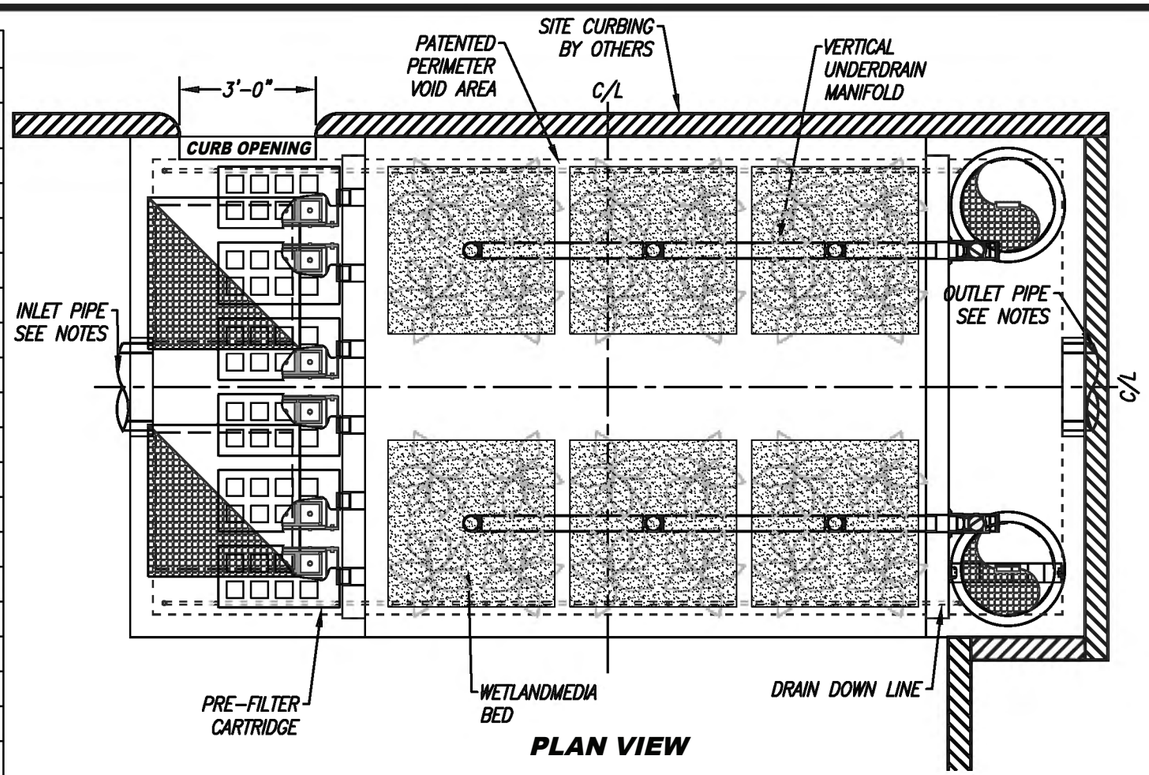


Flow Based BMP's

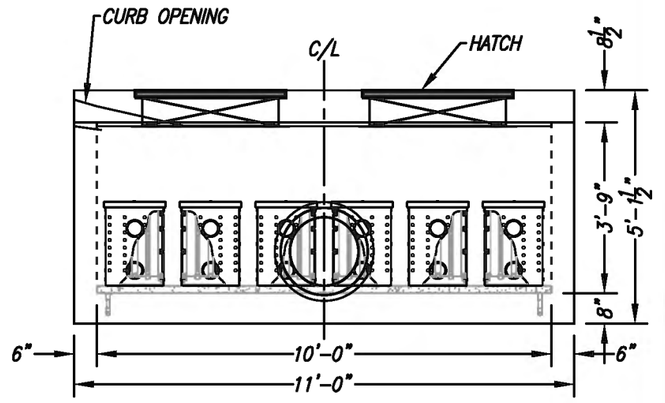
BMP-#	BMP type	BMP size	Tributary Area (ac)	Intensity (in/hr)	Runoff Coefficient (c)	Req'd flowrate/Discharge rate (cfs) Q=C*I*A	BMP Flowrate (cfs)	Notes
BMP-1	Modular wetland	10'x20'	2.77	0.31	0.818	0.702	0.710	BMP flowrate given by mfr

BASIN	AREA (SF)	AREA (AC)	% Imp	"C" Value
DMA-1	120,644	2.77	89.8%	0.818

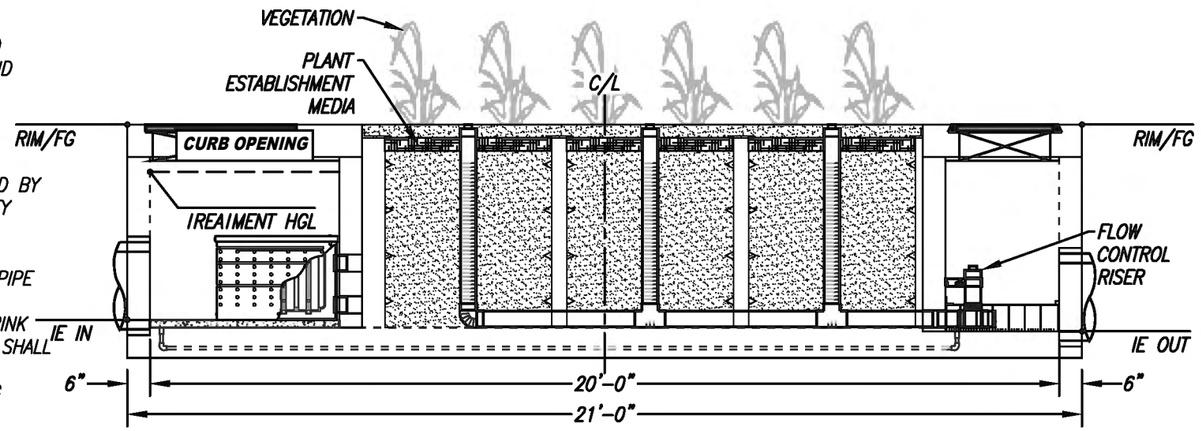
SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.710	
TREATMENT HGL AVAILABLE (FT)			N/K
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			FLOW BY
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESIRIAN	OPEN PLANIER	PEDESTRIAN
FRAME & COVER	2 EA 36" X 36"	N/A	2 EA ø24"
WETLANDMEDIA VOLUME (CY)			
ORIFICE SIZE (DIA. INCHES)			2 EA ø2.67"
NOTES: PRELIMINARY. NOT FOR CONSTRUCTION.			



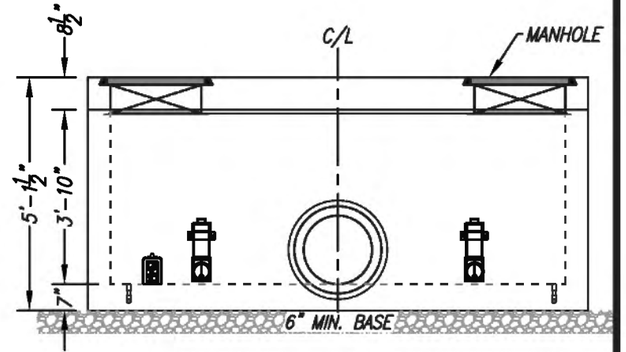
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

INSTALLATION NOTES

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

GENERAL NOTES

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

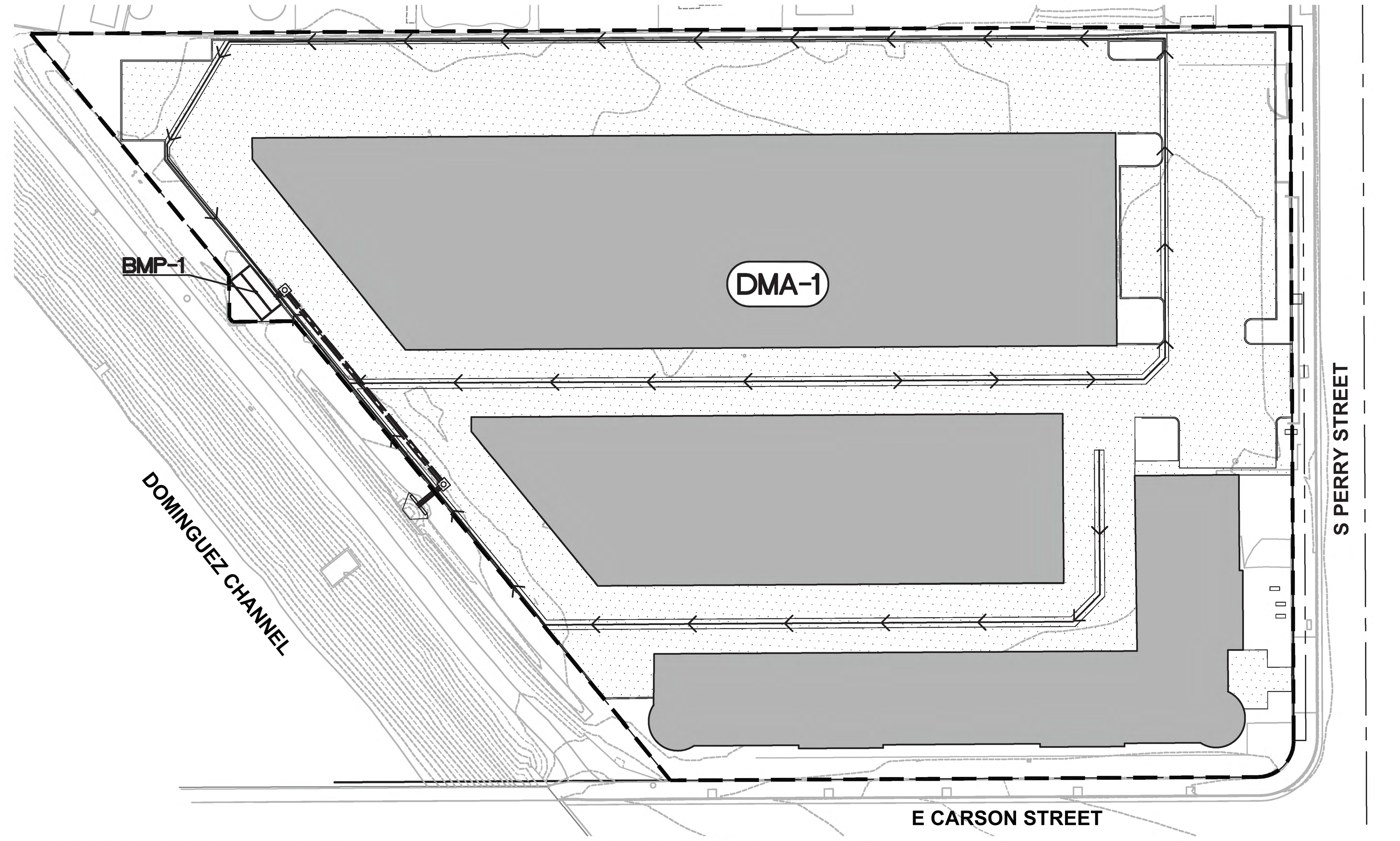
LOW INFLOW PIPE DISCLOSURE:

IT IS RECOMMENDED THAT A SUFFICIENT VARIATION IN ELEVATION BETWEEN THE INLET AND OUTLET BE PROVIDED TO ALLOW FOR ACCUMULATION OF SEDIMENT IN THE PRE-TREATMENT CHAMBER. FAILURE TO DO SO MAY RESULT IN BLOCKAGE AT INFLOW POINT(S) WHICH MAY CAUSE UPSTREAM FLOODING.

TREATMENT FLOW (CFS)	0.710
OPERATING HEAD (FT)	3.5
PRETREATMENT LOADING RATE (GPM/SF)	2.1
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

Bio Clean
A Forterra Company

MWS-L-10-20-4'-5.5"-C-HC
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL



LEGEND

AREA LIMITS	dashed line
FLOW ARROWS	arrow
BUILDING AREA	grey fill
PAVEMENT AREA	dotted fill
DRAINAGE MGMT AREA (DMA) NUMBER	DMA-1

DMA DATA TABLE

DMA-NO.	TOT. AREA (SF)	IMPERVIOUS (%)	REQ'D FLOWRATE (CFS)	BMP FLOWRATE (CFS)	TYPE/TREATED BY
DMA-1	120,644	89.8	0.702	0.710	BMP-1/MODULAR WETLAND

GENERAL STORM WATER NOTES

1. GROUNDWATER IS ANTICIPATED AT APPROXIMATELY 12.5 FEET BELOW EXISTING GRADE ON SITE.
2. NO EXISTING NATURAL HYDROLOGIC FEATURES
3. NO SIGNIFICANT ECOLOGICAL AREAS ON SITE
4. ALL APPLICABLE SOURCE CONTROL BMPS SHALL BE IMPLEMENTED
   5A. SOURCE CONTROL NOTES TO COME IN MINISTERIAL REVIEW

Peak Flow Hydrologic Analysis

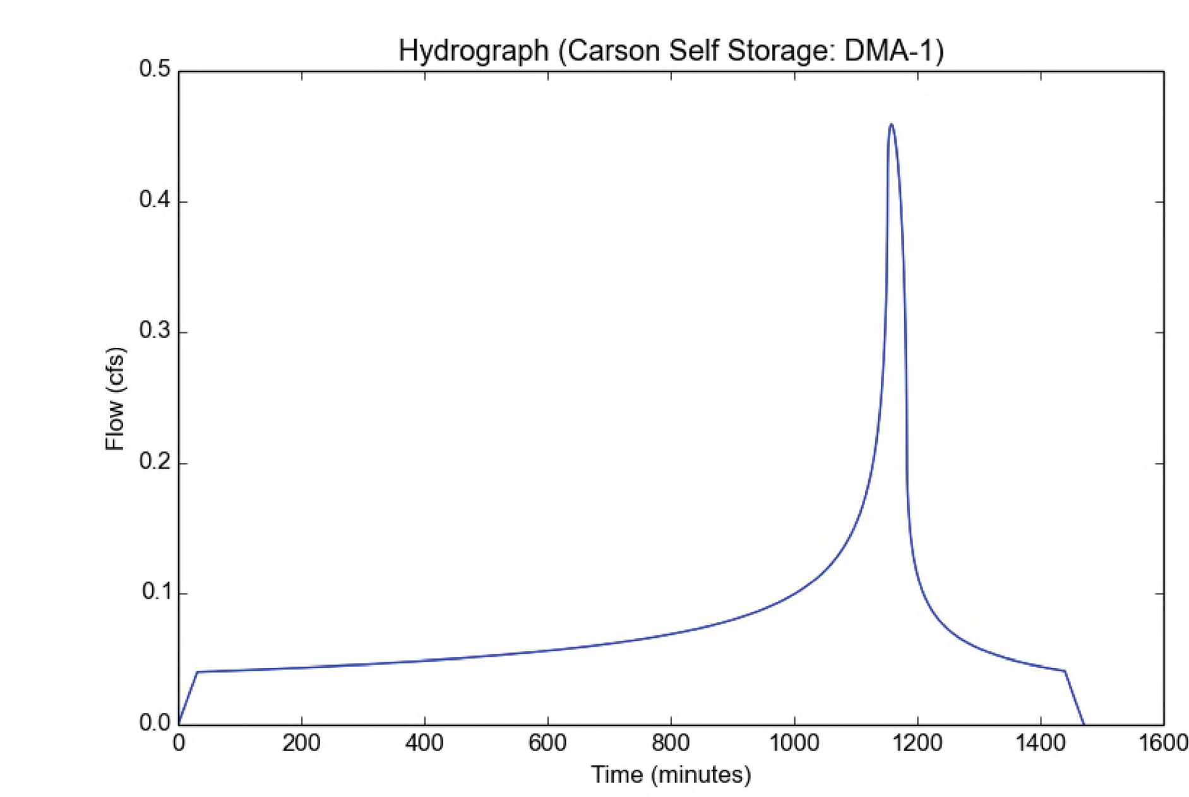
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/Water Quality/ATTACHMENTS/85th Percentile Hydro(
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self Storage
Subarea ID	DMA-1
Area (ac)	2.77
Flow Path Length (ft)	475.0
Flow Path Slope (vft/hft)	0.006
85th Percentile Rainfall Depth (in)	0.8
Percent Impervious	0.898
Soil Type	3
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.8
Peak Intensity (in/hr)	0.2025
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.8184
Time of Concentration (min)	31.0
Clear Peak Flow Rate (cfs)	0.459
Burned Peak Flow Rate (cfs)	0.459
24-Hr Clear Runoff Volume (ac-ft)	0.1499
24-Hr Clear Runoff Volume (cu-ft)	6528.9479

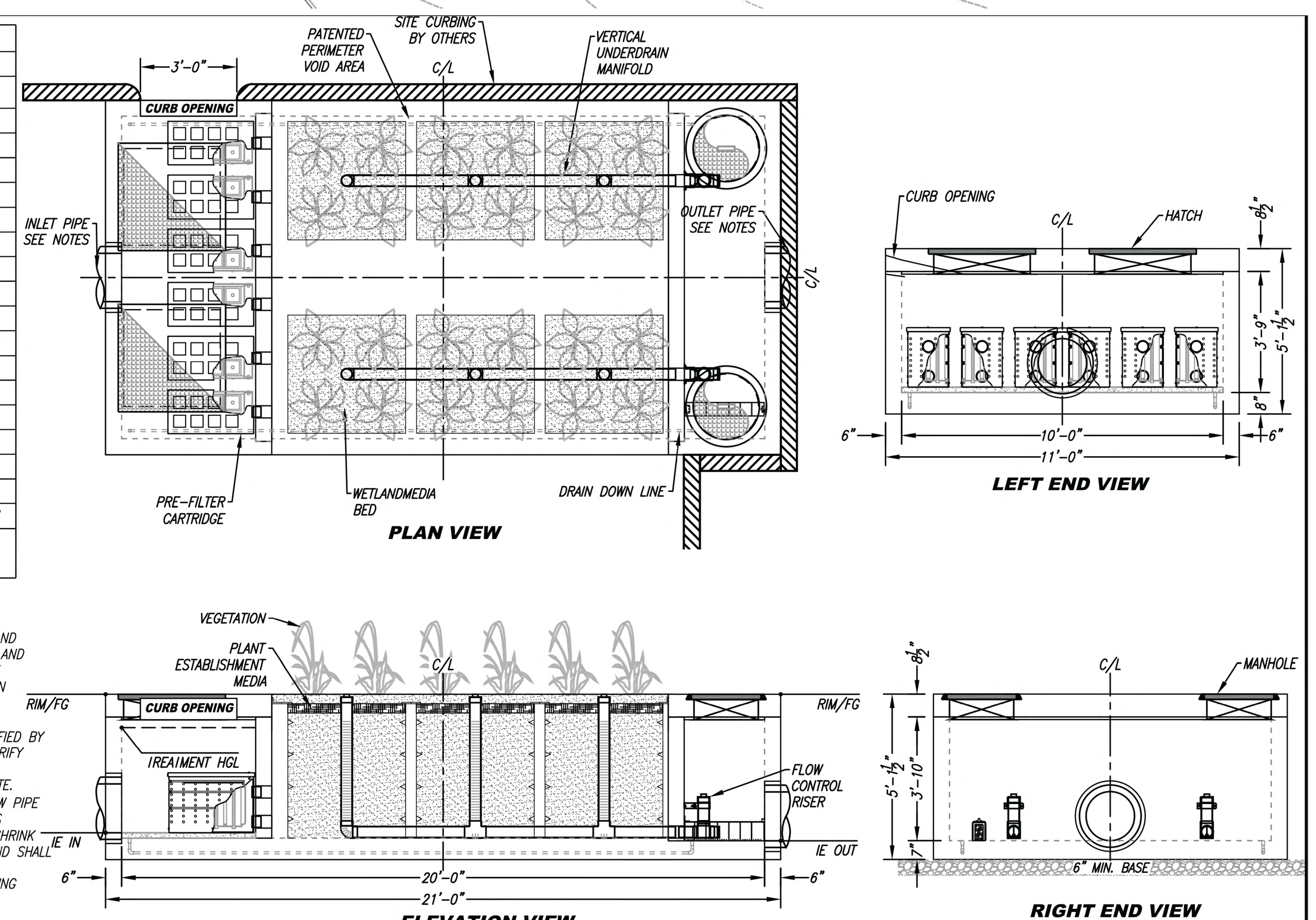


PROJECT HYDROGRAPH

SITE SPECIFIC DATA

PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.710	
TREATMENT HGL AVAILABLE (FT)			N/K
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			FLOW BY
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESIRIAN	OPEN PLANIER	PEDESTRIAN
FRAME & COVER	2 EA 36" X 36"	N/A	2 EA ø24"
WETLANDMEDIA VOLUME (CY)			
ORIFICE SIZE (DIA. INCHES)			2 EA ø2.67"

NOTES: PRELIMINARY. NOT FOR CONSTRUCTION.



INSTALLATION NOTES

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

GENERAL NOTES

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

LOW INFLOW PIPE DISCLOSURE:

IT IS RECOMMENDED THAT A SUFFICIENT VARIATION IN ELEVATION BETWEEN THE INLET AND OUTLET BE PROVIDED TO ALLOW FOR ACCUMULATION OF SEDIMENT IN THE PRE-TREATMENT CHAMBER. FAILURE TO DO SO MAY RESULT IN BLOCKAGE AT INFLOW POINT(S) WHICH MAY CAUSE UPSTREAM FLOODING.

TREATMENT FLOW (CFS)	0.710
OPERATING HEAD (FT)	3.5
PRETREATMENT LOADING RATE (GPM/SF)	2.1
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

Bio Clean
A Forterra Company

MWS-L-10-20-4'-5.5"-C-HC
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

MODULAR WETLAND DETAIL
NOT TO SCALE

GRAPHICAL SCALE: 1" = 40'
0 20 40 80 120

PLAN PREPARED BY:
OMEGA
ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE. SUITE B
SAN DIEGO, CA 92123
PH:(858) 634-8620 FAX:(858)-634-8627

REGISTERED PROFESSIONAL ENGINEER
SEAN M. SAVAGE
No. 75677
CIVIL
STATE OF CALIFORNIA

FOR PLAN CHECK ONLY
SEAN M. SAVAGE R.C.E. 75677 DATE

PERRY STREET
CARSON STREET SS
CARSON, CA

JOB NUMBER: 20-817

DATE: 10/05/2021

JORDAN ARCHITECTS
131 CALLE IGLESIA, SUITE 100
SAN CLEMENTE, CA 92672
949.388.8090

DATE: 5/14/2021 11:41:32 AM
FILENAME: P:\DWG OMEGA\0633 FARING SS CARSON\ACAD\DISCRETIONARY\0633-CGP-03-DMA.DWG

Attachment B

Geotechnical Investigation

GEOTECHNICAL INVESTIGATION

PROPOSED COMMERCIAL DEVELOPMENT
21611 SOUTH PERRY STREET
CARSON, CALIFORNIA
APN: 7327-010-014

PREPARED FOR
FARING CAPITAL, LLC
WEST HOLLYWOOD, CALIFORNIA

PROJECT NO. W1301-06-01

APRIL 23, 2021

GEOCON
WEST, INC.
GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

GEOCON
WEST, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. W1301-06-01
April 23, 2021

Faring Capital, LLC
659 North Robertson Boulevard,
West Hollywood, California 90069

Attention: Mr. Darren Embry

Subject: GEOTECHNICAL INVESTIGATION
PROPOSED COMMERCIAL DEVELOPMENT
21611 SOUTH PERRY STREET
CARSON, CALIFORNIA
APN: 7327-010-014

Dear Mr. Embry:

In accordance with your authorization of our proposal dated December 11, 2020, we have prepared this geotechnical investigation report for the proposed commercial development located at 21611 South Perry Street in the City of Carson, California. The accompanying report presents the findings of our study, and our conclusions and recommendations pertaining to the geotechnical aspects of proposed design and construction. Based on the results of our investigation, it is our opinion that the site can be developed as proposed, provided the recommendations of this report are followed and implemented during design and construction.

If you have any questions regarding this report, or if we may be of further service, please contact the undersigned.

Very truly yours,

GEOCON WEST, INC.

REGISTERED PROFESSIONAL ENGINEER
JELISA THOMAS ADAMS
GE3092
GEOTECHNICAL
STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST
SUSAN FRANZEN KIRKGARD
No. 1754
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Joe Hicks	Jelisa Thomas Adams	Susan F. Kirkgard
Staff Engineer	GE 3092	CEG 1754

(EMAIL) Addressee

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of a geotechnical investigation for the proposed commercial development located at 21611 South Perry Street in the City of Carson, California (see Vicinity Map, Figure 1). The purpose of the investigation was to evaluate subsurface soil and geologic conditions underlying the site and, based on conditions encountered, to provide conclusions and recommendations pertaining to the geotechnical aspects of design and construction.

The scope of this investigation included a review of prior environmental reports for the site provided by the client, a site reconnaissance, field exploration, laboratory testing, engineering analysis, and the preparation of this report. The site was explored on February 9, 2021 by drilling five 8-inch diameter borings using a truck-mounted hollow-stem auger drilling machine and advancing five cone penetrometer tests (CPTs). The borings were excavated to depths between approximately 20½ and 51 feet beneath the existing ground surface. The CPTs were advanced to depths of approximately 60 feet below existing ground surface. The approximate locations of the exploratory borings and CPTs are depicted on the Site Plan (see Figure 2). A detailed discussion of the field investigation, including the boring and CPT logs, is presented in Appendix A.

Laboratory tests were performed on selected soil samples obtained during the investigation to determine pertinent physical and chemical soil properties. Appendix B presents a summary of the laboratory test results.

The recommendations presented herein are based on analysis of the data obtained during the investigation and our experience with similar soil and geologic conditions. References reviewed to prepare this report are provided in the *List of References* section.

If project details vary significantly from those described herein, Geocon should be contacted to determine the necessity for review and possible revision of this report.

2. SITE AND PROJECT DESCRIPTION

The subject site is an approximately 2.6-acre irregularly shaped parcel located at 21611 South Perry Street in the City of Carson, California. The site is currently vacant. The site is bounded by South Perry Street on the east, by the Dominguez Channel to the west, by one- to two-story single-family homes to the north, and by East Carson Street to the south. The site is relatively level, with no pronounced highs or lows. Surface water drainage at the site appears to be by sheet flow along the existing ground contours to the city streets.

Based on the information provided by the Client, it is our understanding that the proposed development will consist of three 2-story self-storage structures. Based on preliminary plans it is anticipated that the development will be approximately 25 feet in height and will be constructed at or near present grade (see Figure 2).

Based on the preliminary nature of the design at this time, wall and column loads were not available. It is anticipated that column loads for the proposed structures will be up to 300 kips, and wall loads will be up to 3 kips per linear foot.

Once the design phase and foundation loading configuration proceeds to a more finalized plan, the recommendations within this report should be reviewed and revised, if necessary. Any changes in the design, location or elevation of any structure, as outlined in this report, should be reviewed by this office. Geocon should be contacted to determine the necessity for review and possible revision of this report.

3. BACKGROUND

Prior environmental reports were prepared for the site and provided for our review, and include the following:

Phase 1 Environmental Site Assessment, 21611 S. Perry Street, Carson, CA. 90745-1613, Prepared by Weis Environmental, dated January 25, 2021.

2020 First Semi-Annual Groundwater Monitoring Report, January Through June 2020, Dominguez Channel Release, Carson, California, Prepared by AECOM, dated July 14, 2020.

Based on the prior reports, petroleum hydrocarbon impacted soil and groundwater were previously identified at the site that originated from on-site underground storage tanks (USTs) and migration of contaminants from off-site sources. AECOM (formerly URS) developed a workplan that developed cleanup goals and excavation limits to remove impacted soils that was approved by the LARWQCB. In 2014, approximately 4,800 cubic yards of impacted soils were excavated from four areas and removed from the site. The excavations were approximately 5 to 8 feet deep and were backfilled with clean import soils (Weis Environmental, 2021). The approximate locations and depths of these areas are indicated on the Site Plan (see Figure 2). The backfill was reportedly placed, compacted, and tested as a certified backfill material; however, a copy of the compaction report was not included as an exhibit. Therefore, for the purposes of this report, the backfill is considered to be uncertified fill.

Also, as part of the prior site remediation, groundwater monitoring wells were installed at the site and the immediately surrounding area. The monitoring wells present at the site are limited to the eastern, western, and southern property boundaries. Groundwater monitoring is ongoing in these wells in compliance with a semi-annual groundwater monitoring program required by the LARWQCB.

Based on documents included in the referenced environmental reports, the known soil and groundwater impacts are within acceptable levels for commercial use and further assessment or remediation is not required. However, a soil management plan (SMP) is anticipated required for further development of the site. Development of a soil management plan is beyond the scope of the Geotechnical Investigation.

4. GEOLOGIC SETTING

The site is located in the southern portion of the Los Angeles Basin, a coastal plain bounded by the Santa Monica Mountains on the north, the Elysian Hills and Repetto Hills on the northeast, the Puente Hills and the Whittier Fault on the east, the Palos Verdes Peninsula and Pacific Ocean on the west and south, and the Santa Ana Mountains and San Joaquin Hills on the southeast. The basin is underlain by a deep structural depression which has been filled by both marine and continental sedimentary deposits underlain by a basement complex of igneous and metamorphic composition. Regionally, the site is located within the northern portion of the Peninsular Ranges geomorphic province. This geomorphic province is characterized by northwest-trending physiographic and geologic features such as the nearby Newport-Inglewood Fault Zone located approximately 2.7 miles to the east-northeast.

5. SOIL AND GEOLOGIC CONDITIONS

Based on our field investigation and published geologic maps of the area, the site is underlain by artificial fill and Holocene age alluvium consisting sand, silt, and clay (California Geological Survey, 2010). Detailed stratigraphic profiles of the materials encountered at the site are provided on the boring logs in Appendix A.

5.1 Artificial Fill

Artificial fill was encountered in our explorations to depths ranging from 3 to 9 feet below existing ground surface. The deep fill, observed in boring B3, is associated with an area of a former UST removal. The artificial generally consists of light brown to brown or grayish brown sand and silty sand. The artificial fill is characterized as fine-grained with some medium-grained, moist, and loose to dense. The fill is likely the result of past grading, UST removal and environmental remediation, and past construction activities at the site. Deeper fill may exist between excavations and in other portions of the site that were not directly explored.

5.2 Alluvium

Holocene age alluvium was encountered beneath the fill to the maximum depth explored (51 feet below the ground surface). The alluvium generally consists of light brown to brown, olive brown, or gray to dark gray interbedded clay, sandy clay, silt, sandy silt, silty sand and clayey sand. The alluvial soils are characterized as primarily fine-grained, moist to wet, and loose to dense or soft to stiff.

6. GROUNDWATER

A review of the Seismic Hazard Zone Report for the Torrance Quadrangle (California Division of Mines and Geology [CDMG], 1998) indicates the historically highest groundwater level in the area is approximately 9 feet beneath the ground surface. Groundwater information presented in this document is generated from data collected in the early 1900's to the late 1990s. Based on current groundwater basin management practices, it is unlikely that groundwater levels will ever exceed the historic high levels.

Groundwater was encountered in borings B1 and B3 at depths of 12.5 feet and 17.6 feet beneath the existing ground surface, respectively. Additionally, readings from groundwater monitoring wells established on the site were taken on February 23, 2021. The locations of the accessible monitoring wells are indicated on the site plan (see Figure 2) and a summary of groundwater levels at the time of the investigation is provided in the table below.

Monitoring Well Readings

Well ID	MW-3	MW-4	MW-5	MW-7A	MW-8A	MW-9B
Depth to GW (Below Ground Surface)	12.0'	13.17'	12.25'	12.33'	12.67'	14.67'

Based on the depth to groundwater and the on-grade nature of the development, groundwater is not expected to have a detrimental effect on the project. Groundwater may be encountered during construction in deep drilled excavations, such as for ground improvement or elevator pistons. It is not uncommon for groundwater levels to vary seasonally or for groundwater seepage conditions to develop where none previously existed, especially in impermeable fine-grained soils which are heavily irrigated or after seasonal rainfall. In addition, recent requirements for stormwater infiltration could result in shallower seepage conditions in the immediate site vicinity. Proper surface drainage of irrigation and precipitation will be critical for future performance of the project. Recommendations for drainage are provided in the S*urface Drainage* section of this report (see Section 8.20).

7. GEOLOGIC HAZARDS

7.1 Surface Fault Rupture

The numerous faults in Southern California include Holocene-active, pre-Holocene, and inactive faults. The criteria for these major groups are based on criteria developed by the California Geological Survey (CGS, formerly known as CDMG) for the Alquist-Priolo Earthquake Fault Zone Program (CGS, 2018). By definition, a Holocene-active fault is one that has had surface displacement within Holocene time (about the last 11,700 years). A pre-Holocene fault has demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years) but has had no known Holocene movement. Faults that have not moved in the last 1.6 million years are considered inactive.

The site is not within a state-designated Alquist-Priolo Earthquake Fault Zone for surface fault rupture hazards (CGS, 2021a; CGS, 2021b; CDMG 1986). No Holocene-active or pre-Holocene active faults with the potential for surface fault rupture are known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low. However, the site is located in the seismically active Southern California region, and could be subjected to moderate to strong ground shaking in the event of an earthquake on one of the many active Southern California faults. The faults in the vicinity of the site are shown in Figure 3, Regional Fault Map.

The closest surface trace of an active fault to the site is the Newport-Inglewood Fault Zone located approximately 2.7 miles to the east-northeast (USGS, 2006; CDMG, 1986). Other nearby active faults are the Palos Verdes Fault, the Cabrillo Fault, and the Whittier Fault located approximately 4.2 miles south-southwest, 8.2 miles south, and 16 miles northeast of the site, respectively. The active San Andreas Fault Zone is located approximately 48 miles northeast of the site.

Several buried thrust faults, commonly referred to as blind thrusts, underlie the Los Angeles Basin at depth. These faults are not exposed at the ground surface and are typically identified at depths greater than 3.0 kilometers. The October 1, 1987, M_w 5.9 Whittier Narrows earthquake and the January 17, 1994, M_w 6.7 Northridge earthquake were a result of movement on the Puente Hills Blind Thrust and the Northridge Thrust, respectively. These thrust faults and others in the Los Angeles area are not exposed at the surface and do not present a potential surface fault rupture hazard at the site; however, these deep thrust faults are considered active features capable of generating future earthquakes that could result in moderate to significant ground shaking at the site.

7.2 Seismicity

As with all of Southern California, the site has experienced historic earthquakes from various regional faults. The seismicity of the region surrounding the site was formulated based on research of an electronic database of earthquake data. The epicenters of recorded earthquakes with magnitudes equal to or greater than 5.0 in the site vicinity are depicted on Figure 4, Regional Seismicity Map. A partial list of moderate to major magnitude earthquakes that have occurred in the Southern California area within the last 100 years is included in the following table.

LIST OF HISTORIC EARTHQUAKES

Earthquake (Oldest to Youngest)	Date of Earthquake	Magnitude	Distance to Epicenter (Miles)	Direction to Epicenter
Near Redlands	July 23, 1923	6.3	59	E
Long Beach	March 10, 1933	6.4	22	SE
Tehachapi	July 21, 1952	7.5	91	NW
San Fernando	February 9, 1971	6.6	41	NNW
Whittier Narrows	October 1, 1987	5.9	19	NE
Sierra Madre	June 28, 1991	5.8	33	NE
Landers	June 28, 1992	7.3	107	ENE
Big Bear	June 28, 1992	6.4	85	ENE
Northridge	January 17, 1994	6.7	31	NW
Hector Mine	October 16, 1999	7.1	125	ENE
Ridgecrest	July 5, 2019	7.1	138	NNE

The site could be subjected to strong ground shaking in the event of an earthquake. However, this hazard is common in Southern California and the effects of ground shaking can be mitigated if the proposed structures are designed and constructed in conformance with current building codes and engineering practices.

7.3 Seismic Design Criteria

The following table summarizes the site-specific design criteria obtained from the 2019 California Building Code (CBC; Based on the 2018 International Building Code [IBC] and NEHRP-2015), Chapter 16 Structural Design, Section 1613, Earthquake Loads. The data was calculated using the online application *Seismic Design Maps*, provided by OSHPD. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2019 CBC and Section 11.4.3 of NEHRP-2015. The values presented on the following page are for the risk-targeted maximum considered earthquake (MCE_R).

2019 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2019 CBC Reference
Site Class	D	Section 1613.2.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.711g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.618g	Figure 1613.2.1(2)
Site Coefficient, F_A	1	Table 1613.2.3(1)
Site Coefficient, F_V	1.7*	Table 1613.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.711g	Section 1613.2.3 (Eqn 16-36)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	1.05g*	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	1.141g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.7g*	Section 1613.2.4 (Eqn 16-39)
Note: *Per Section 11.4.8 of ASCE/SEI 7-16, a ground motion hazard analysis shall be performed for projects for Site Class "E" sites with Ss greater than or equal to 1.0g and for Site Class "D" and "E" sites with S1 greater than 0.2g. Section 11.4.8 also provides exceptions which indicates that the ground motion hazard analysis may be waived provided the exceptions are followed. Using the code based values presented in the table above, in lieu of a performing a ground motion hazard analysis, requires the exceptions outlined in ASCE 7-16 Section 11.4.8 be followed.		

The table below presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with NEHRP-2015.

ASCE 7-16 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-16 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.748g	Figure 22-7
Site Coefficient, F_{PGA}	1.1	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.823g	Section 11.8.3 (Eqn 11.8-1)

The Maximum Considered Earthquake Ground Motion (MCE) is the level of ground motion that has a 2 percent chance of exceedance in 50 years, with a statistical return period of 2,475 years. According to the 2019 California Building Code and ASCE 7-16, the MCE is to be utilized for the evaluation of liquefaction, lateral spreading, seismic settlements, and it is our understanding that the intent of the Building code is to maintain "Life Safety" during a MCE event. The Design Earthquake Ground Motion (DE) is the level of ground motion that has a 10 percent chance of exceedance in 50 years, with a statistical return period of 475 years.

Deaggregation of the MCE peak ground acceleration was performed using the USGS online Unified Hazard Tool, 2014 Conterminous U.S. Dynamic edition (v4.2.0). The result of the deaggregation analysis indicates that the predominant earthquake contributing to the MCE peak ground acceleration is characterized as a 6.87 magnitude event occurring at a hypocentral distance of 8.35 kilometers from the site.

Deaggregation was also performed for the Design Earthquake (DE) peak ground acceleration, and the result of the analysis indicates that the predominant earthquake contributing to the DE peak ground acceleration is characterized as a 6.68 magnitude occurring at a hypocentral distance of 13.48 kilometers from the site.

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

7.4 Liquefaction Potential

Liquefaction is a phenomenon in which loose, saturated, relatively cohesionless soil deposits lose shear strength during strong ground motions. Primary factors controlling liquefaction include intensity and duration of ground motion, gradation characteristics of the subsurface soils, in-situ stress conditions, and the depth to groundwater. Liquefaction is typified by a loss of shear strength in the liquefied layers due to rapid increases in pore water pressure generated by earthquake accelerations.

The current standard of practice, as outlined in the "Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California" and "Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California" requires liquefaction analysis to a depth of 50 feet below the lowest portion of the proposed structure. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to induce liquefaction.

A review of the State of California Seismic Hazard Zone Map for the Torrance Quadrangle (CDMG, 1999) indicates that the site is located in an area designated as having a potential for liquefaction. Also, the City of Carson (2002) indicates the site is located within an area that has a potential for liquefaction.

The Standard Penetration Test (SPT) blow counts obtained from boring B3 were compared with the blow counts estimated from the CPT soundings. SPTs were performed in boring B3 at intervals of approximately 5 feet. In order to supplement the SPT blow count data, select California Modified Sampler blow count data were converted to equivalent SPT blow counts based on a correlation factor of 0.55 (Rogers, 2006). The field collected blow counts were corrected for hammer efficiency to N60 blow count values. The boring N60 values were compared with the N60 values generated by the program CpetIT (Version 3.2.1.7). The comparison of CPT-3 and boring B3 are shown as Figure 5. It is our opinion that the boring and CPT N60 values show a very reasonable correlation and that analysis of the liquefaction potential may be based on the CPT data.

Liquefaction analyses of the CPT soundings were performed using the program CLiq (Version 3.0.3.2). This program utilizes the 2001 NCEER method of analysis. This semi-empirical method is based on correlations with the data collected from the CPT soundings.

The liquefaction analysis was performed for a Design Earthquake level by using a historic groundwater level of 9 feet below the ground surface, a magnitude 6.68 earthquake, and a peak horizontal acceleration of 0.549g (⅔PGAM). The results of the enclosed liquefaction analyses included herein for CPTs 1 through 5 indicate that the alluvial soils below the design groundwater level could be susceptible to the liquefaction induced settlements summarized in the table below during Design Earthquake ground motion. A summary of the anticipated liquefaction induced settlements is provided as Figure 6; calculations and output from CLiq are provided as Appendix C.

Liquefaction Induced Settlements (Design Earthquake)

CPT Number	CPT-1	CPT-2	CPT-3	CPT-4	CPT-5
Liquefaction Settlement (in)	0.43	0.11	0.20	0.00	0.28

It is our understanding that the intent of the Building Code is to maintain "Life Safety" during Maximum Considered Earthquake level events. Therefore, additional analysis was performed to evaluate the potential for liquefaction during a MCE event. The structural engineer should evaluate the proposed structure for the anticipated MCE liquefaction induced settlements and verify that anticipated deformations would not cause the foundation system to lose the ability to support the gravity loads and/or cause collapse of the structure.

The liquefaction analysis performed for the Maximum Considered Earthquake level by using a historic groundwater level of 9 feet below the ground surface, a magnitude 6.87 earthquake, and a peak horizontal acceleration of 0.823g (PGAM). The results of the enclosed liquefaction analyses included herein for CPTs 1 through 5 indicate that the alluvial soils below the design groundwater level could be susceptible to the liquefaction induced settlements summarized in the table below during Maximum Considered Earthquake ground motion. A summary of the anticipated liquefaction induced settlements is provided as Figure 7.

Liquefaction Induced Settlements (Maximum Considered Earthquake)

CPT Number	CPT-1	CPT-2	CPT-3	CPT-4	CPT-4
Liquefaction Settlement (in)	0.80	0.19	0.33	0.00	0.41

7.5 Seismically Induced Settlement

Dynamic compaction of dry and loose sands may occur during a major earthquake. Typically, settlements occur in thick beds of such soils. The seismically induced settlement calculations were performed in accordance with the American Society of Civil Engineers, Technical Engineering and Design Guides as adapted from the US Army Corps of Engineers, No. 9.

The calculations provided herein in Figures 8 and 9 indicate that the soil above the historic high groundwater level of 9 feet would not be susceptible to significant settlement as a result of the Design Earthquake peak ground acceleration ($\frac{2}{3}PGA_M$).

7.6 Lateral Spreading

Due to the presence of the Dominguez Channel located to the west of the site, the potential for lateral spread was evaluated. Lateral spread occurs as a result of liquefaction induced lateral ground movement and typically occurs due to the presence of a slope comprised of and/or underlain by liquefiable soils.

Analysis of the potential for lateral spread was performed using the program CLiq (Version 1.7). The program utilizes the method proposed by Zhang et. al. (2004) to evaluate the potential for lateral spread and the resulting lateral displacements.

This method of analysis recommends evaluating the potential for lateral displacements to a distance of 50H from the slope, where H is the height of the slope. Beyond a horizontal distance of 50H lateral displacements due to the presence of a slope are not anticipated to occur. This method of analysis considers soils to a depth of twice the total slope height as potentially subject to lateral spread, up to a distance of 50H away from the toe of the slope.

The drainage channel is trapezoidal in shape and consists of two slopes approximately 12 feet in height inclined at a gradient of approximately 2:1 (estimated via satellite images). The proposed improvements have a minimum setback of 90 feet from the toe of the drainage channel. Therefore, lateral displacements using a horizontal setback of 90 feet was utilized.

Based on the results of the analyses it is anticipated that up to 10 inches of lateral displacements towards the drainage channel could occur during a Design Earthquake ground motion. The lateral displacements are anticipated to occur between depths of 10 and 15 feet below the ground surface. Calculations and output from CLiq are provided as Appendix C.

The grading and foundation design recommendations presented in this report are intended to minimize the effects of lateral spread on the proposed improvements.

7.7 Slope Stability

The topography at the site is relatively level and the topography in the immediate site vicinity slopes gently to the west-southwest. The County of Los Angeles Safety Element (Leighton, 1990) indicates the site is not located within an area identified as a "hillside area" or having a potential for slope instability. Additionally, the site is not within an area identified as having a potential for seismic slope instability (CDMG, 1999). There are no known landslides near the site, nor is the site in the path of any known or potential landslides. Therefore, the potential for slope stability hazards to adversely affect the proposed development is considered low.

7.8 Earthquake-Induced Flooding

Earthquake-induced flooding is inundation caused by failure of dams or other water-retaining structures due to earthquakes. Based on a review of the County of Los Angeles Safety Element (Leighton, 1990), the site is not located within a potential inundation area for an earthquake-induced dam failure. Therefore, the probability of earthquake-induced flooding is considered very low.

7.9 Tsunamis, Seiches, and Flooding

The site is not located within a coastal area. Therefore, tsunamis are not considered a significant hazard at the site.

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. No major water-retaining structures are located immediately up gradient from the project site. Therefore, flooding resulting from a seismic-induced seiche is considered unlikely.

The site is within an area of minimal flooding (Zone X) as defined by the Federal Emergency Management Agency (FEMA, 2021; LACDPW, 2021).

7.10 Oil Fields & Methane Potential

Based on a review of the California Geologic Energy Management Division (CalGEM) Well Finder Website, the site is not located within an oil field and oil or gas wells are not documented in the immediate site vicinity (CalGEM, 2021). However, due to the voluntary nature of record reporting by the oil well drilling companies, wells may be improperly located or not shown on the location map and undocumented wells could be encountered during construction. Any wells encountered during construction will need to be properly abandoned in accordance with the current requirements of the CalGEM.

Since the site is not located within an oil field, the potential for methane or other volatile gases associated with oil and gas fields to be present at the site is considered low. However, as discussed in the Background section of this report (see Section 3), due to the site history there is a potential for low levels of volatile gases to be present, particularly during site grading. Should it be determined that a methane study or further environmental studies are required for the proposed development, it is recommended that a qualified methane or environmental consultant be retained to perform the study and provide mitigation measures as necessary.

7.11 Subsidence

Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas. Soils that are particularly subject to subsidence include those with high silt or clay content. The site is not located within an area of known ground subsidence. No large-scale extraction of groundwater, gas, oil, or geothermal energy is occurring or planned at the site or in the general site vicinity. There appears to be little or no potential for ground subsidence due to withdrawal of fluids or gases at the site.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 General

8.1.1 It is our opinion that neither soil nor geologic conditions were encountered during the investigation that would preclude construction of the proposed development provided the recommendations presented herein are followed and implemented during design and construction.

8.1.2 Up to 5 feet of existing artificial fill was encountered during the site investigation with localized areas of deeper fill of to 9 feet in depth. The existing fill encountered is believed to be the result of past grading and construction activities at the site. Deeper fill may exist in other areas of the site that were not directly explored. It is our opinion that the existing fill, in its present condition, is not suitable for direct support of proposed foundations or slabs. The existing fill and site soils are suitable for re-use as engineered fill provided the recommendations in the Grading section of this report are followed (see Section 8.4).

8.1.3 The enclosed liquefaction and seismically-induced settlement analyses indicate that the site soils could be susceptible to approximately ½ inch of total settlement as a result of the Design Earthquake peak ground acceleration ($\frac{2}{3}PGA_M$). Differential settlement at the foundation level is anticipated to be less than ¼ inch over a distance of 20 feet.

8.1.4 The results of the field data and laboratory testing indicate that the upper alluvial soils are relatively soft and compressible in their current condition (see Figure B5 thru B17) and could yield excessive static and differential settlements upon application of foundation loads.

8.1.5 The foundation design recommendations presented herein are intended to minimize the effects of settlement from liquefaction and consolidation on the proposed improvements. Based on our discussions with you, we understand that the preferred foundation system is a reinforced concrete mat foundation deriving support in newly placed engineered fill. Recommendations for a reinforced mat foundation system is provided in Sections 8.7 of this report.

8.1.6 For support of a mat foundation, it is recommended that the upper 6 feet of existing earth materials within the proposed building footprint areas be excavated and properly compacted for foundation and slab support. Deeper excavations should be conducted as necessary to remove deeper artificial fill or soft alluvial soil at the direction of the Geotechnical Engineer (a representative of Geocon). Proposed building foundations should be underlain by a minimum of 4 feet of newly placed engineered fill. The excavation should extend laterally a minimum distance of 3 feet beyond the building footprint area, including building appurtenances, or a distance equal to the depth of fill below the foundation, whichever is greater. The contractor should be aware that up to 9 feet of artificial fill was encountered in Boring B3. The limits of existing fill and/or soft alluvial soils removal will be verified by the Geocon representative during site grading activities. All excavations must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon).

8.1.7 It is anticipated that the recommended grading can be achieved with sloping measures. However, if excavations in close proximity to an adjacent property line and/or structure are required, special excavation measures in order to maintain lateral support of existing adjacent improvements will be required. Excavation recommendations are provided in the *Temporary Excavations* section of this report (Section 8.18).

8.1.8 Based on the relatively shallow groundwater table, the upper alluvial soils have the potential to be very moist and the grading contractor should be aware that the soils may be above optimum moisture content. If the soils are more than 3 percent above the optimum moisture content at the time of construction the soils will likely require some spreading and drying activities in order to achieve proper compaction. Bottom stabilization may also be necessary. Recommendations for bottom stabilization and earthwork are provided in the *Grading* section of this report (see Section 8.4).

8.1.9 Foundations for small outlying structures, such as block walls up to 6 feet in height, planter walls or trash enclosures, which will not be tied to the proposed structure, may be supported on conventional foundations deriving support on a minimum of 12 inches of newly placed engineered fill which extends laterally at least 12 inches beyond the foundation area. Where excavation and compaction cannot be performed or is undesirable, foundations may derive support directly in the competent undisturbed alluvial soils and should be deepened as necessary to maintain a minimum 12 inch embedment into the recommended bearing materials. If the soils exposed in the excavation bottom are soft or loose, compaction of the soils will be required prior to placing steel or concrete. Compaction of the foundation excavation bottom is typically accomplished with a compaction wheel or mechanical whacker and must be observed and approved in writing by a Geocon representative.

8.1.10 Where new paving is to be placed, it is recommended that all existing fill and soft alluvial soils be excavated and properly compacted for paving support. The client should be aware that excavation and compaction of all existing fill and soft alluvial soils in the area of new paving is not required; however, paving constructed over existing uncertified fill or unsuitable alluvial soil may experience increased settlement and/or cracking, and may therefore have a shorter design life and increased maintenance costs. As a minimum, the upper 12 inches of subgrade soil should be scarified and properly compacted for paving support. Paving recommendations are provided in *Preliminary Pavement Recommendations* section of this report (see Section 8.13).

8.1.11 Based on the shallow groundwater and impermeable nature of the fine grained soils which underly the site, infiltration of stormwater at this site is not considered feasible. Infiltration of stormwater at this site would be considered detrimental to the project. It is recommended that stormwater be retained, filtered, and discharged in accordance with the requirements of the local governing agency.

8.1.12 It should be noted that implementation of the recommendations presented herein is not intended to completely prevent damage to the structure during the occurrence of strong ground shaking as a result of nearby earthquakes. It is intended that the structure be designed in such a way that the amount of damage incurred as a result of strong ground shaking be minimized.

8.1.13 It is recommended that flexible utility connections be utilized for all rigid utilities to minimize or prevent damage to utilities from minor differential movements.

8.1.14 Once the design and foundation loading configuration for the proposed structure proceeds to a more finalized plan, the recommendations within this report should be reviewed and revised, if necessary. Based on the final foundation loading configurations, the potential for settlement should be reevaluated by this office.

8.1.15 Any changes in the design, location or elevation of improvements, as outlined in this report, should be reviewed by this office. Geocon should be contacted to determine the necessity for review and possible revision of this report.

8.2 Soil and Excavation Characteristics

8.2.1 The in-situ soils can be excavated with moderate effort using conventional excavation equipment. Some caving should be anticipated in unshored excavations, especially where granular soils are encountered.

8.2.2 It is the responsibility of the contractor to ensure that all excavations and trenches are properly shored and maintained in accordance with applicable OSHA rules and regulations to maintain safety and maintain the stability of existing adjacent improvements.

8.2.3 All onsite excavations must be conducted in such a manner that potential surcharges from existing structures, construction equipment, and vehicle loads are resisted. The surcharge area may be defined by a 1:1 projection down and away from the bottom of an existing foundation or vehicle load. Penetrations below this 1:1 projection will require special excavation measures such as sloping or shoring. Excavation recommendations are provided in the *Temporary Excavations* section of this report (see Section 8.18).

8.2.4 The upper 5 feet of existing site soils encountered during the investigation are considered to have a "medium" expansive potential (EI = 63) and are classified as "expansive" in accordance with the 2019 California Building Code (CBC) Section 1803.5.3. The recommendations presented herein assume that the building foundations and slabs will derive support in these materials.

8.3 Minimum Resistivity, pH, and Water-Soluble Sulfate

8.3.1 Potential of Hydrogen (pH) and resistivity testing, as well as chloride content testing, were performed on representative samples of on-site material to generally evaluate the corrosion potential to surface utilities. The tests were performed in accordance with California Test Method Nos. 643 and 422 and indicate that the soils are considered "moderately corrosive" to "severely corrosive" with respect to corrosion of buried ferrous metals on site. The results are presented in Appendix B (Figure B23) and should be considered for design of underground structures. Due to the corrosive potential of the soils, it is suggested that ABS pipes be considered in lieu of cast-iron for subdrains and retaining wall drains beneath the structure.

8.3.2 Laboratory tests were performed on representative samples of the site materials to measure the percentage of water-soluble sulfate content. Results from the laboratory water-soluble sulfate tests are presented in Appendix B (Figure B23) and indicate that the on-site materials possess a sulfate exposure class of "S0" to concrete structures as defined by 2019 CBC Section 1904 and ACI 318-14 Table 19.3.1.1.

8.3.3 Geocon West, Inc. does not practice in the field of corrosion engineering and mitigation. If corrosion sensitive improvements are planned, it is recommended that a corrosion engineer be retained to evaluate corrosion test results and incorporate the necessary precautions to avoid premature corrosion of buried metal pipes and concrete structures in direct contact with the soils.

8.4 Grading

8.4.1 Grading is anticipated to include preparation of building pads and paving subgrade, excavation of site soils for proposed foundations and utility trenches, as well as placement of backfill for utility trenches.

8.4.2 A preconstruction conference should be held at the site prior to the beginning of grading operations with the owner, contractor, civil engineer and soil engineer in attendance. Special soil handling requirements can be discussed at that time.

8.4.3 Earthwork should be observed, and compacted fill tested by representatives of Geocon West, Inc. The existing fill and alluvial soils encountered during exploration are suitable for reuse as engineered fill, provided any encountered oversize material (greater than 6 inches) and any encountered deleterious debris is removed.

8.4.4 Grading should commence with the removal of all existing vegetation and existing improvements from the area to be graded. Deleterious debris such as wood and root structures should be exported from the site and should not be mixed with the fill soils. Asphalt and concrete should not be mixed with the fill soils unless approved by the Geotechnical Engineer. All existing underground improvements planned for removal should be completely excavated and the resulting depressions properly backfilled in accordance with the procedures described herein. Once a clean excavation bottom has been established it must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon West, Inc.).

8.4.5 For support of a mat foundation, it is recommended that the upper 6 feet of existing earth materials within the proposed building footprint areas be excavated and properly compacted for foundation and slab support. Deeper excavations should be conducted as necessary to remove deeper artificial fill or soft alluvial soil at the direction of the Geotechnical Engineer (a representative of Geocon). Proposed building foundations should be underlain by a minimum of 4 feet of newly placed engineered fill. The excavation should extend laterally a minimum distance of 3 feet beyond the building footprint area, including building appurtenances, or a distance equal to the depth of fill below the foundation, whichever is greater. The contractor should be aware that up to 9 feet of artificial fill was encountered in Boring B3. The limits of existing fill and/or soft alluvial soils removal will be verified by the Geocon representative during site grading activities.

8.4.6 All excavations must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon). If determined to be excessively soft, stabilization of the bottom of the excavation may be required in order to provide a firm working surface upon which engineered fill can be placed and heavy equipment can operate.

8.4.7 Prior to placing fill or constructing proposed improvements, a stable excavation bottom must be established. In areas where the subgrade is saturated or soft, proper compaction will likely not be possible or achieved in a timely manner without introducing stabilization measures. If subgrade stabilization is required at the excavation bottom, rubber tire equipment should not be allowed in the excavation bottom until it is stabilized or extensive soil disturbance could result. It is suggested that excavation and grading be performed during the summer season to promote moisture control of the soils. In addition, the use of track equipment should be used to minimize disturbance to the soils at the excavation bottom.

8.4.8 Bottom stabilization, if necessary, may be achieved placing a thin lift of 3- to 6-inch-diameter crushed angular rock into the soft excavation bottom. The use of crushed concrete will also be acceptable. The crushed rock should be spread thinly across the excavation bottom and pressed into the soils by track rolling or wheel rolling with heavy equipment. It is very important that voids between the rock fragments are not created so the rock must be thoroughly pressed or blended into the soils. All subgrade soils must be properly compacted and proof-rolled in the presence of the Geotechnical Engineer (a representative of Geocon West, Inc.).

8.4.9 An alternative method of subgrade stabilization may be accomplished by placing a one-foot-thick layer of washed, angular 3/4-inch gravel atop a stabilization fabric (Mirafi 500X or equivalent) subsequent to subgrade approval. Stabilization fabric should also be placed over the top of the gravel. This procedure should be conducted in sections until the entire excavation bottom has been blanketed by fabric and gravel. Heavy equipment may operate on the gravel once it has been placed. The gravel should be compacted to a dense state using a vibratory drum roller. It is recommended that the contractor meet with the Geotechnical Engineer to discuss this procedure in more detail.

8.4.10 The upper soils encountered during site exploration were moist to wet and the grading contractor should be aware that the existing soils are currently above optimum moisture content. Conditions could change seasonally. If the soils are more than 3 percent above the optimum moisture content at the time of construction the soils will likely require spreading, processing, and drying activities in order to achieve proper compaction.

8.4.11 All fill and backfill soils should be placed in horizontal loose layers approximately 6 to 8 inches thick, moisture conditioned to near 2 percent above optimum moisture content, and properly compacted to a minimum of 90 percent of the maximum dry density per ASTM D 1557 (latest edition).

8.4.12 It is anticipated that stable excavations for the recommended grading can be achieved with sloping measures. However, if excavations in close proximity to an adjacent property line and/or structure are required, special excavation measures may be necessary in order to maintain lateral support of offsite improvements. Excavation recommendations are provided in the *Temporary Excavations* section of this report (see Section 8.18).

8.4.13 Although not anticipated for this project, all imported fill shall be observed, tested, and approved by Geocon West, Inc. prior to bringing soil to the site. Rocks larger than 6 inches in diameter shall not be used in the fill. If necessary, import soils used as structural fill should have an expansion index less than 50 and corrosivity properties that are equally or less detrimental to that of the existing onsite soils (see Figure B23).

8.4.14. Where new paving is to be placed, it is recommended that all existing fill and soft alluvium be excavated and properly compacted for paving support. As a minimum, the upper 12 inches of soil should be scarified, moisture conditioned to near two percent over optimum moisture content, and compacted to at least 92 percent relative compaction, as determined by ASTM Test Method D 1557 (latest edition). Paving recommendations are provided in *Preliminary Pavement Recommendations* section of this report (see Section 8.13).

8.4.15 Foundations for small outlying structures, such as block walls up to 6 feet in height, planter walls or trash enclosures, which will not be tied to the proposed structure, may be supported on conventional foundations deriving support on a minimum of 12 inches of newly placed engineered fill which extends laterally at least 12 inches beyond the foundation area. Where excavation and compaction cannot be performed or is undesirable, foundations may derive support directly in the competent undisturbed alluvial soils and should be deepened as necessary to maintain a minimum 12 inch embedment into the recommended bearing materials. If the soils exposed in the excavation bottom are soft or loose, compaction of the soils will be required prior to placing steel or concrete. Compaction of the foundation excavation bottom is typically accomplished with a compaction wheel or mechanical whacker and must be observed and approved by a Geocon representative.

8.4.16 It is recommended that flexible utility connections be utilized for all rigid utilities to minimize or prevent damage to utilities from minor differential movements. Utility trenches should be properly backfilled in accordance with the requirements of the Green Book (latest edition). The pipe should be bedded with clean sands (Sand Equivalent greater than 30) to a depth of at least 1 foot over the pipe, and the bedding material must be inspected and approved in writing by the Geotechnical Engineer (a representative of Geocon). The use of gravel is not acceptable unless used in conjunction with filter fabric to prevent the gravel from having direct contact with soil. The remainder of the trench backfill may be derived from onsite soil or approved import soil, compacted as necessary, until the required compaction is obtained. The use of minimum 2-sack slurry as backfill is also acceptable. Prior to placing any bedding materials or pipes, the trench excavation bottom must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon).

8.4.17 All trench and foundation excavation bottoms must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon), prior to placing bedding sands, fill, steel, gravel, or concrete.

8.5 Shrinkage

8.5.1 Shrinkage results when a volume of material removed at one density is compacted to a higher density. A shrinkage factor between 10 and 15 percent should be anticipated when excavating and compacting the upper 5 feet of existing earth materials on the site to an average relative compaction of 92 percent.

8.5.2 If import soils will be utilized in the building pad, the soils must be placed uniformly and at equal thickness at the direction of the Geotechnical Engineer (a representative of Geocon West, Inc.). Soils can be borrowed from non-building pad areas and later replaced with imported soils.

8.6 Mat Foundation Design

8.6.1 Subsequent to the recommended grading, a reinforced concrete mat foundation may be utilized for support of the proposed structures. The reinforced concrete mat foundation should derive support in the newly placed engineered fill and be underlain by at least 4 feet of newly placed engineered fill.

8.6.2 Foundation excavations should be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon West, Inc.), prior to the placement of reinforcing steel and concrete to verify that the excavations and exposed soil conditions are consistent with those anticipated. If unanticipated soil conditions are encountered, foundation modifications may be required.

8.6.3 It is anticipated that the mat foundation constructed for the on-grade structure will impart an average pressure between 2,000 psf to 3,500 psf. The recommended maximum allowable bearing value is 3,500 psf. The allowable bearing pressure may be increased by up to one-third for transient loads due to wind or seismic forces.

8.6.4 A vertical modulus of subgrade reaction of 100 pci may be used in the design of mat foundations deriving support in competent alluvial soils. This value is a unit value for use with a 1-foot square footing. The modulus should be reduced in accordance with the following equation when used with larger foundations:

$$K_R = K\left[\frac{B+1}{2B}\right]^2$$

where: K_R = reduced subgrade modulus
K = unit subgrade modulus
B = foundation width (in feet)

8.6.5 The thickness of and reinforcement for the mat foundation should be designed by the project structural engineer.

8.6.6 For seismic design purposes, a coefficient of friction of 0.35 may be utilized between the concrete mat and newly placed engineered fill without a moisture barrier, and 0.15 for slabs underlain by a moisture barrier.

8.6.7 The enclosed liquefaction settlement analyses indicate that the site soils could be susceptible to less than ½ inch of total seismic settlement as a result of the Design Earthquake peak ground acceleration ($⅔PGA_M$). Differential settlement at the foundation level is anticipated to be less than ¼ inches over a distance of 20 feet. The foundation design recommendations presented herein are intended to minimize the effects of settlement on proposed improvements.

8.6.8 The maximum expected total settlement for a structure support on a mat foundation system designed with the maximum allowable bearing value of 3,500 psf and deriving support in the recommended bearing materials is estimated to be approximately 2 inches and occur below the heaviest loaded structural element. A majority of the settlement of the foundation system is expected to occur on initial application of loading; however, additional settlements are expected within the first twelve months. Differential settlement is not expected to exceed 1 inch over a distance of 20 feet.

8.6.9 Based on these considerations is it recommended that the proposed structure, designed with a maximum allowable bearing value of 3,500 psf, be designed for a combined static and seismically induced differential settlement of 1 ½ inch over a distance of 20 feet.

8.6.10 This office should be provided a copy of the final construction plans so that the excavation recommendations presented herein could be properly reviewed and revised if necessary.

8.6.11 Once the design and foundation loading configurations for the proposed structures proceeds to a more finalized plan, the estimated settlements presented in this report should be reviewed and revised, if necessary. If the final foundation loading configurations are greater than the assumed loading conditions, the potential for settlement should be reevaluated by this office.

8.7 Miscellaneous Foundations

8.7.1 Foundations for small outlying structures, such as block walls up to 6 feet in height, planter walls or trash enclosures, which will not be tied to the proposed structure, may be supported on conventional foundations deriving support on a minimum of 12 inches of newly placed engineered fill which extends laterally at least 12 inches beyond the foundation area. Where excavation and compaction cannot be performed or is undesirable, foundations may derive support directly in the competent undisturbed alluvial soils, and should be deepened as necessary to maintain a minimum 12 inch embedment into the recommended bearing materials.

8.7.2 If the soils exposed in the excavation bottom are soft, compaction of the soft soils will be required prior to placing steel or concrete. Compaction of the foundation excavation bottom is typically accomplished with a compaction wheel or mechanical whacker and must be observed and approved by a Geocon representative. Miscellaneous foundations may be designed for a bearing value of 1,500 psf, and should be a minimum of 12 inches in width, 24 ,inches in depth below the lowest adjacent grade and 12 inches into the recommended bearing material. The allowable bearing pressure may be increased by up to one-third for transient loads due to wind or seismic forces.

8.7.3 Foundation excavations should be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon West, Inc.), prior to the placement of reinforcing steel and concrete to verify that the excavations and exposed soil conditions are consistent with those anticipated.

8.8 Lateral Design

8.8.1 Resistance to lateral loading may be provided by friction acting at the base of foundations, slabs and by passive earth pressure. An allowable coefficient of friction of 0.35 may be used with the dead load forces in the undisturbed alluvial soils and newly placed engineered fill.

8.8.2 Passive earth pressure for the sides of foundations and slabs poured against newly placed engineered fill or undisturbed alluvial soils may be computed as an equivalent fluid having a density of 230 pounds per cubic foot (pcf) with a maximum earth pressure of 2,300 psf. When combining passive and friction for lateral resistance, the passive component should be reduced by one-third. A one-third increase in the passive value may be used for wind or seismic loads.

8.9 Concrete Slabs-on-Grade

8.9.1 Exterior concrete slabs-on-grade subject to vehicle loading should be designed in accordance with the recommendations in the *Preliminary Pavement Recommendations* section of this report (Section 8.10).

8.9.2 Slabs-on-grade at the ground surface that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder placed directly beneath the slab. The vapor retarder and acceptable permeance should be specified by the project architect or developer based on the type of floor covering that will be installed. The vapor retarder design should be consistent with the guidelines presented in Section 9.3 of the American Concrete Institute's (ACI) Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials (ACI 302.2R-06) and should be installed in general conformance with ASTM E 1643 (latest edition) and the manufacturer's recommendations. A minimum thickness of 15 mils extruded polyolefin plastic is recommended; vapor retarders which contain recycled content or woven materials are not recommended. The vapor retarder should have a permeance of less than 0.01 perms demonstrated by testing before and after mandatory conditioning. The vapor retarder should be installed in direct contact with the concrete slab with proper perimeter seal. If the Los Angeles Green Building Code requirements apply to this project, the vapor retarder should be underlain by 4 inches of clean aggregate. It is important that the vapor retarder be puncture resistant since it will be in direct contact with angular gravel. As an alternative to the clean aggregate suggested in the Los Angeles Green Building Code, it is our opinion that the concrete slab-on-grade may be underlain by a vapor retarder over 4 inches of clean sand (sand equivalent greater than 30), since the sand will serve a capillary break and will minimize the potential for punctures and damage to the vapor barrier.

8.9.3 For seismic design purposes, a coefficient of friction of 0.35 may be utilized between concrete slabs and subgrade soils without a moisture barrier, and 0.15 for slabs underlain by a moisture barrier.

8.9.4 Exterior slabs, not subject to traffic loads, should be at least 4 inches thick and reinforced with No. 3 steel reinforcing bars placed 18 inches on center in both horizontal directions, positioned near the slab midpoint. Prior to construction of slabs, the upper 12 inches of subgrade should be moistened to optimum moisture content and properly compacted to at least 92 percent relative compaction, as determined by ASTM Test Method D 1557 (latest edition). Crack control joints should be spaced at intervals not greater than 10 feet and should be constructed using saw-cuts or other methods as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. The project structural engineer should design construction joints as necessary.

8.9.5 Due to the expansive potential of the anticipated subgrade soils, the moisture content of the slab subgrade should be maintained and sprinkled as necessary to maintain a moist condition as would be expected in any concrete placement. Furthermore, consideration should be given to doweling slabs into adjacent curbs and foundations to minimize movements and offsets which could lead to a potential tripping hazard.

8.9.6 The recommendations of this report are intended to reduce the potential for cracking of slabs due to settlement. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade may exhibit some cracking due to minor soil movement and/or concrete shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

8.10 Preliminary Paving Design

8.10.1 Where new paving is to be placed, it is recommended that all existing fill and soft alluvium materials be excavated and properly compacted for paving support. The client should be aware that excavation and compaction of all existing artificial fill and soft alluvium in the area of new paving is not required; however, paving constructed over existing uncertified fill or unsuitable alluvium material may experience increased settlement and/or cracking, and may therefore have a shorter design life and increased maintenance costs. As a minimum, the upper 12 inches of paving subgrade should be scarified, moisture conditioned to at least 2 percent above optimum moisture content, and properly compacted to at least 92 percent relative compaction, as determined by ASTM Test Method D 1557 (latest edition).

8.10.2 The following pavement sections are based on an assumed R-Value of 20. Once site grading activities are complete an R-Value should be obtained by laboratory testing to confirm the properties of the soils serving as paving subgrade, prior to placing pavement.

8.10.3 The Traffic Indices listed below are estimates. Geocon does not practice in the field of traffic engineering. The actual Traffic Index for each area should be determined by the project civil engineer. If pavement sections for Traffic Indices other than those listed below are required, Geocon should be contacted to provide additional recommendations. Pavement thicknesses were determined following procedures outlined in the *California Highway Design Manual* (Caltrans). It is anticipated that the majority of traffic will consist of automobile and large truck traffic.

PRELIMINARY PAVEMENT DESIGN SECTIONS

Location	Estimated Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base (inches)
Automobile Parking and Driveways	4.0	3.0	4.0
Trash Truck & Fire Lanes	7.0	4.0	12.0

8.10.4 Asphalt concrete should conform to Section 203-6 of the "*Standard Specifications for Public Works Construction"* (Green Book). Class 2 aggregate base materials should conform to Section 26-1.02A of the "*Standard Specifications of the State of California, Department of Transportation"* (Caltrans). The use of Crushed Miscellaneous Base (CMB) in lieu of Class 2 aggregate base is acceptable. Crushed Miscellaneous Base should conform to Section 200-2.4 of the "*Standard Specifications for Public Works Construction"* (Green Book).

8.10.5 Unless specifically designed and evaluated by the project structural engineer, where exterior concrete paving will be utilized for support of vehicles, it is recommended that the concrete be a minimum of 6 inches of concrete reinforced with No. 3 steel reinforcing bars placed 18 inches on center in both horizontal directions. Concrete paving supporting vehicular traffic should be underlain by a minimum of 4 inches of aggregate base and a properly compacted subgrade. As a minimum, the upper 12 inches of paving subgrade should be scarified, moisture conditioned to 2 percent above optimum moisture content, and properly compacted to at least 92 percent relative compaction, as determined by ASTM Test Method D 1557 (latest edition). The base material should be compacted to 95 percent relative compaction as determined by ASTM Test Method D 1557 (latest edition).

8.10.6 The performance of pavements is highly dependent upon providing positive surface drainage away from the edge of pavements. Ponding of water on or adjacent to the pavement will likely result in saturation of the subgrade materials and subsequent cracking, subsidence and pavement distress. If planters are planned adjacent to paving, it is recommended that the perimeter curb be extended at least 12 inches below the bottom of the aggregate base to minimize the introduction of water beneath the paving.

8.11 Retaining Wall Design

8.11.1 The recommendations presented below are generally applicable to the design of rigid concrete or masonry retaining walls having a maximum height of 5 feet. In the event that walls significantly higher than 5 feet are planned, Geocon should be contacted for additional recommendations.

8.11.2 Retaining wall foundations should be designed in accordance with the recommendations provided in the *Foundation Design* section of this report (see Sections 8.6 through 8.9).

8.11.3 Retaining walls with a level backfill surface that are not restrained at the top should be designed utilizing a triangular distribution of pressure (active pressure). Restrained walls are those that are not allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall in feet) at the top of the wall. Where walls are restrained from movement at the top, walls may be designed utilizing a triangular distribution of pressure (at-rest pressure). The table on the following page presents recommended pressures to be used in retaining wall design.

RETAINING WALL WITH LEVEL BACKFILL SURFACE

HEIGHT OF RETAINING WALL (Feet)	ACTIVE PRESSURE EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot)	AT-REST PRESSURE EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot)
Up to 5	30	74

8.11.4 The wall pressures provided above assume that the proposed retaining walls will support a wedge of engineered fill derived from onsite soils. If import soil will be used to backfill proposed retaining walls, revised earth pressures may be required to account for the geotechnical properties of the import soil used as engineered fill. This should be evaluated once the use of import soil is established. All imported fill shall be observed, tested, and approved by Geocon West, Inc. prior to bringing soil to the site.

8.11.5 The wall pressures provided above assume that the retaining wall will be properly drained preventing the buildup of hydrostatic pressure. If retaining wall drainage is not implemented, the equivalent fluid pressure to be used in design of undrained walls is 100 pcf. The value includes hydrostatic pressures plus buoyant lateral earth pressures.

8.11.6 Additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures and should be designed for each condition as the project progresses. Surcharges may be evaluated using Section 8.19 of this report. Once the design becomes more finalized, an addendum letter can be prepared revising recommendations and addressing specific surcharge conditions throughout the project, if necessary.

8.12 Retaining Wall Drainage

8.12.1 Where not designed for hydrostatic pressure, retaining walls should be provided with a drainage system. At the base of the drain system, a subdrain covered with a minimum of 12 inches of gravel should be installed, and a compacted fill blanket or other seal placed at the surface (see Figure 10). The clean bottom and subdrain pipe, behind a retaining wall, should be observed by the Geotechnical Engineer (a representative of Geocon), prior to placement of gravel or compacting backfill.

8.12.2 As an alternative, a plastic drainage composite such as Miradrain or equivalent may be installed in continuous, 4-foot-wide columns along the entire back face of the wall, at 8 feet on center. The top of these drainage composite columns should terminate approximately 18 inches below the ground surface, where either hardscape or a minimum of 18 inches of relatively cohesive material should be placed as a cap (see Figure 11). These vertical columns of drainage material would then be connected at the bottom of the wall to a collection panel or a 1-cubic-foot rock pocket drained by a 4-inch subdrain pipe.

8.12.3 Subdrainage pipes at the base of the retaining wall drainage system should outlet to an acceptable location via controlled drainage structures.

8.12.4 Moisture affecting below grade walls is one of the most common post-construction complaints. Poorly applied or omitted waterproofing can lead to efflorescence or standing water. Particular care should be taken in the design and installation of waterproofing to avoid moisture problems, or actual water seepage into the structure through any normal shrinkage cracks which may develop in the concrete walls, floor slab, foundations and/or construction joints. The design and inspection of the waterproofing is not the responsibility of the geotechnical engineer. A waterproofing consultant should be retained in order to recommend a product or method, which would provide protection to subterranean walls, floor slabs and foundations.

8.13 Elevator Pit Design

8.13.1 The elevator pit slab and retaining wall should be designed by the project structural engineer. Elevator pit walls may be designed in accordance with the recommendations in the *Retaining Wall Design* section of this report (see Section 8.14).

8.13.2 Additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent foundations and should be designed for each condition as the project progresses.

8.13.3 If retaining wall drainage is to be provided, the drainage system should be designed in accordance with the *Retaining Wall Drainage* section of this report (see Section 8.15).

8.13.4 It is suggested that the exterior walls and slab be waterproofed to prevent excessive moisture inside of the elevator pit. Waterproofing design and installation is not the responsibility of the geotechnical engineer.

8.14 Elevator Piston

8.14.1 If a plunger-type elevator piston is installed for this project, a deep drilled excavation will be required. It is important to verify that the drilled excavation is not situated immediately adjacent to a foundation, or the drilled excavation could compromise the existing foundation support, especially if the drilling is performed subsequent to the foundation construction.

8.14.2 Due to the preliminary nature of the project at this time, it is unknown if a plunger-type elevator piston will be included for this project. If in the future it is determined that a plunger-type elevator piston will be constructed, the location of the proposed elevator should be reviewed by the Geotechnical Engineer to evaluate the setback from foundations. Additional recommendations will be provided as necessary.

8.14.3 Some caving is anticipated in the granular soils below a depth of 20 feet. The contractor should be prepared to use casing and should have it readily available at the commencement of drilling activities. Continuous observation of the drilling and installation of the elevator piston by the Geotechnical Engineer (a representative of Geocon West, Inc.) is required.

8.14.4 The annular space between the piston casing and drilled excavation wall should be filled with a minimum of 1½-sack slurry pumped from the bottom up. As an alternative, pea gravel may be utilized. The use of soil to backfill the annular space is not acceptable.

8.15 Temporary Excavations

8.15.1 Excavations on the order of 6 feet in height are generally anticipated during grading activities, and isolated excavations up to 9 feet in height may also be required. The excavations are expected to expose artificial fill and alluvial soils, which may be subject to some caving where granular soils are exposed. Temporary vertical excavations up to 5 feet in height may be attempted where not surcharged by adjacent traffic or structures.

8.15.2 Vertical excavations greater than 5 feet or where surcharged by existing structures will require sloping or shoring measures in order to provide a stable excavation. Where sufficient space is available, temporary unsurcharged embankments could be sloped back at a uniform 1:1 slope gradient or flatter up to a maximum of 9 feet in height. A uniform slope does not have a vertical portion. Where space is limited, shoring measures will be required. *Shoring* recommendations can be provided under separate cover if necessary.

8.15.3 If excavations in close proximity to an adjacent property line and/or structure are required, special excavation measures such as slot-cutting or shoring may be necessary in order to maintain lateral support of offsite improvements. Recommendations for slot-cutting and shoring can be provided under separate cover.

8.15.4 Where sloped embankments are utilized, the top of the slope should be barricaded to prevent vehicles and storage loads at the top of the slope within a horizontal distance equal to the height of the slope. If the temporary construction embankments are to be maintained during the rainy season, berms are suggested along the tops of the slopes where necessary to prevent runoff water from entering the excavation and eroding the slope faces. Geocon personnel should inspect the soils exposed in the cut slopes during excavation so that modifications of the slopes can be made if variations in the soil conditions occur. All excavations should be stabilized within 30 days of initial excavation.

8.16 Surcharge from Adjacent Structures and Improvements

8.16.1 Additional pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures and should be designed for each condition as the project progresses.

8.16.2 It is recommended that line-load surcharges from adjacent wall footings, use horizontal pressures generated from NAV-FAC DM 7.2. The governing equations are:

$$For\ {}^{x}/_{H} \leq 0.4$$

$$\sigma_H(z) = \frac{0.20 \times \left(\frac{z}{H}\right)}{\left[0.16 + \left(\frac{z}{H}\right)^2\right]^2} \times \frac{Q_L}{H}$$

and

$$For\ {}^{x}/_{H} > 0.4$$

$$\sigma_H(z) = \frac{1.28 \times \left(\frac{x}{H}\right)^2 \times \left(\frac{z}{H}\right)}{\left[\left(\frac{x}{H}\right)^2 + \left(\frac{z}{H}\right)^2\right]^2} \times \frac{Q_L}{H}$$

where x is the distance from the face of the excavation or wall to the vertical line-load, H is the distance from the bottom of the footing to the bottom of excavation or wall, z is the depth at which the horizontal pressure is desired, Q_L is the vertical line-load and $\sigma_H(z)$ is the horizontal pressure at depth z.

8.16.3 It is recommended that vertical point-loads, from construction equipment outriggers or adjacent building columns use horizontal pressures generated from NAV-FAC DM 7.2. The governing equations are:

$$For\ {}^{x}/_{H} \leq 0.4$$

$$\sigma_H(z) = \frac{0.28 \times \left(\frac{z}{H}\right)^2}{\left[0.16 + \left(\frac{z}{H}\right)^2\right]^3} \times \frac{Q_P}{H^2}$$

and

$$For\ {}^{x}/_{H} > 0.4$$

$$\sigma_H(z) = \frac{1.77 \times \left(\frac{x}{H}\right)^2 \times \left(\frac{z}{H}\right)^2}{\left[\left(\frac{x}{H}\right)^2 + \left(\frac{z}{H}\right)^2\right]^3} \times \frac{Q_P}{H^2}$$

then

$$\sigma'_H(z) = \sigma_H(z) cos^2(1.1\theta)$$

where x is the distance from the face of the excavation/wall to the vertical point-load, H is distance from the outrigger/bottom of column footing to the bottom of excavation, z is the depth at which the horizontal pressure is desired, Qp is the vertical point-load, $\sigma_H(z)$ is the horizontal pressure at depth z, θ is the angle between a line perpendicular to the excavation/wall and a line from the point-load to location on the excavation/wall where the surcharge is being evaluated, and $\sigma_H(z)$ is the horizontal pressure at depth z.

8.17 Surface Drainage

8.17.1 Proper surface drainage is critical to the future performance of the project. Uncontrolled infiltration of irrigation excess and storm runoff into the soils can adversely affect the performance of the planned improvements. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the original designed engineering properties. Proper drainage should be maintained at all times.

8.17.2 All site drainage should be collected and controlled in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2019 CBC 1804.4 or other applicable standards. In addition, drainage should not be allowed to flow uncontrolled over any descending slope. Discharge from downspouts, roof drains and scuppers are not recommended onto unprotected soils within 5 feet of the building perimeter. Planters which are located adjacent to foundations should be sealed to prevent moisture intrusion into the soils providing foundation support. Landscape irrigation is not recommended within 5 feet of the building perimeter footings except when enclosed in protected planters.

8.17.3 Positive site drainage should be provided away from structures, pavement, and the tops of slopes to swales or other controlled drainage structures. The building pad and pavement areas should be fine graded such that water is not allowed to pond.

8.17.4 Landscaping planters immediately adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. Either a subdrain, which collects excess irrigation water and transmits it to drainage structures, or impervious above-grade planter boxes should be used. In addition, where landscaping is planned adjacent to the pavement, it is recommended that consideration be given to providing a cutoff wall along the edge of the pavement that extends at least 12 inches below the base material.

8.18 Plan Review

8.18.1 Grading, foundation, and shoring plans should be reviewed by the Geotechnical Engineer (a representative of Geocon West, Inc.), prior to finalization to verify that the plans have been prepared in substantial conformance with the recommendations of this report and to provide additional analyses or recommendations.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

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

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

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

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

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U.S. Geological Survey and California Geological Survey, 2006, *Quaternary Fault and Fold Database for the United States,* accessed March 4, 2021 from USGS web site: http//earthquake.usgs.gov/hazards/qfaults/.

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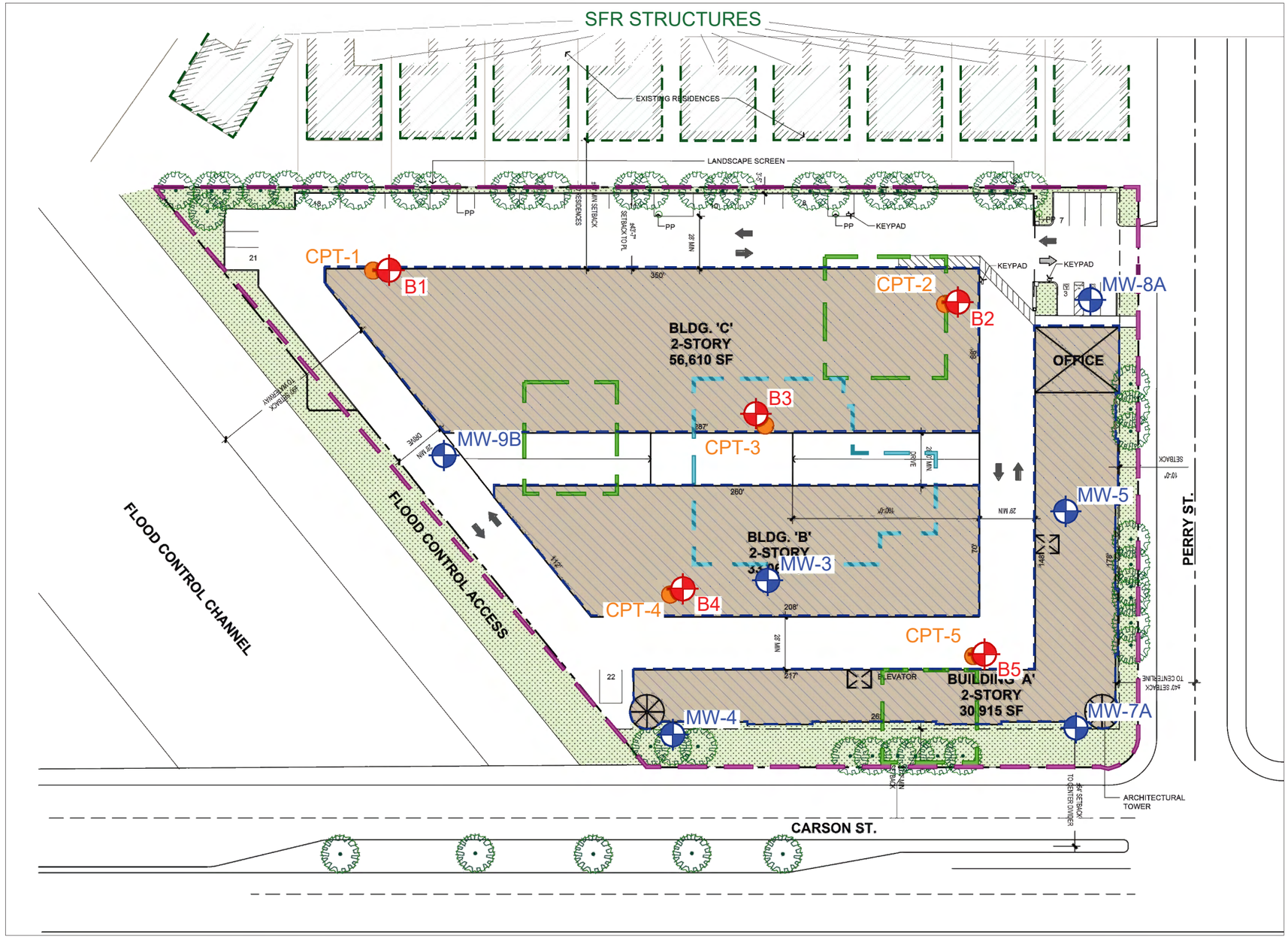
Ziony, J. I., and Jones, L. M., 1989, *Map Showing Late Quaternary Faults and 1978–1984 Seismicity of the Los Angeles Region, California*, U.S. Geological Survey Miscellaneous Field Studies Map MF-1964.



LEGEND

- B5 — Approximate Location of Boring
- CPT-5 — Approximate Location of CPT
- MW-9B — Approximate Location of Monitoring Well
- Property Limits
- Existing Off-Site Structures
- Proposed New Medical Office Building
- Extent of URS Removal and Recompaction (5 FT BGS)
- Extent of URS Removal and Recompaction (8 FT BGS)

North

0 60' 120'

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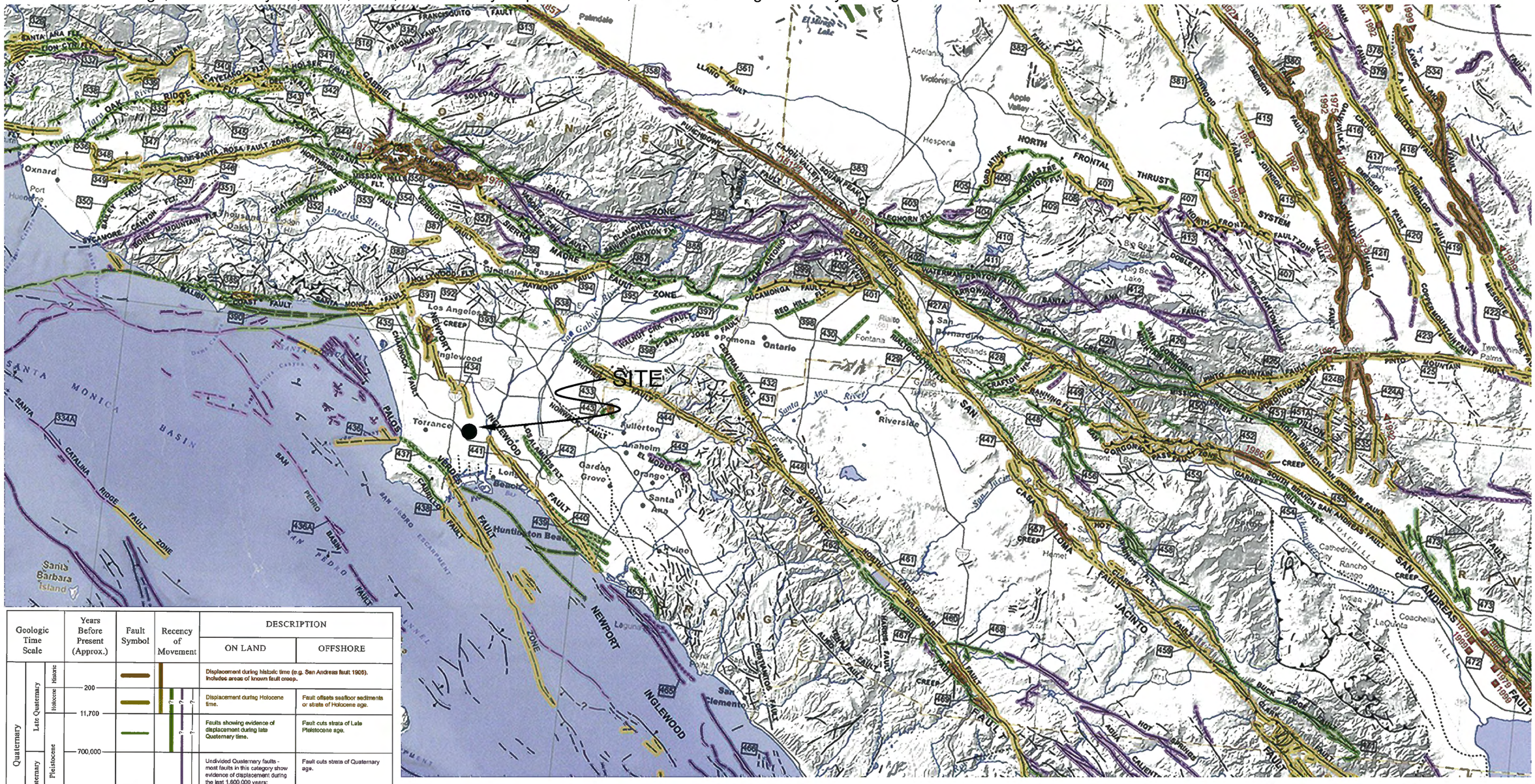
DRAFTED BY: JMH	CHECKED BY: JTA

SITE PLAN

21611 S PERRY STREET
CARSON, CALIFORNIA

APRIL 2021	PROJECT NO. W1301-06-01	FIG. 2

Reference: Jennings, C.W. and Bryant, W. A., 2010, Fault Activity Map of California, California Geological Survey Geologic Data Map No. 6.



Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	
						ON LAND	OFFSHORE
Quaternary	Late Quaternary	Historic				Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	200			Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
			11,700			Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary	Pleistocene	700,000			Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			1,600,000*			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.
			4.5 billion (Age of Earth)				

* Quaternary now recognized as extending to 2.6 Ma (Walker and Geissman, 2009). Quaternary faults in this map were established using the previous 1.8 Ma criterion.

0 12 24 Miles

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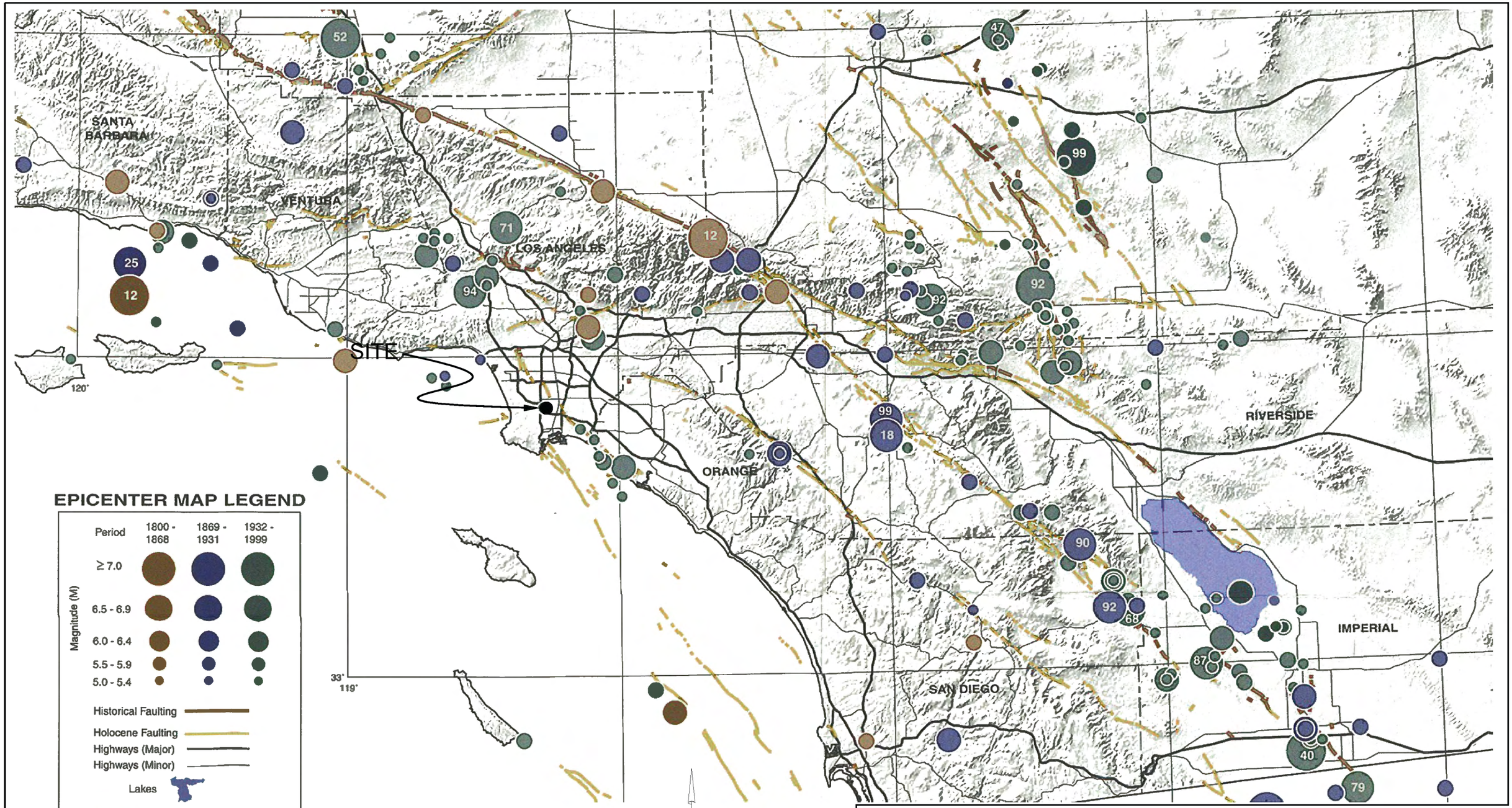
REGIONAL FAULT MAP

21611 SOUTH PERRY STREET
CARSON, CALIFORNIA

APRIL 2021 | PROJECT NO. W1301-06-01 | FIG. 3



EPICENTER MAP LEGEND

Period	1800 - 1868	1869 - 1931	1932 - 1999
≥ 7.0			
6.5 - 6.9			
6.0 - 6.4			
5.5 - 5.9			
5.0 - 5.4			

Magnitude (M)

- Historical Faulting
- Holocene Faulting
- Highways (Major)
- Highways (Minor)
- Lakes
- 65 — Last two digits of M ≥ 6.5 earthquake year

Reference: Toppozada, T., Branum, D., Petersen, M., Hallstrom, C., Cramer, C., and Reichle, M., 2000, Epicenters and Areas Damaged by M≥5 California Earthquakes, 1800 - 1999, California Geological Survey, Map Sheet 49.

0 20 40 Miles

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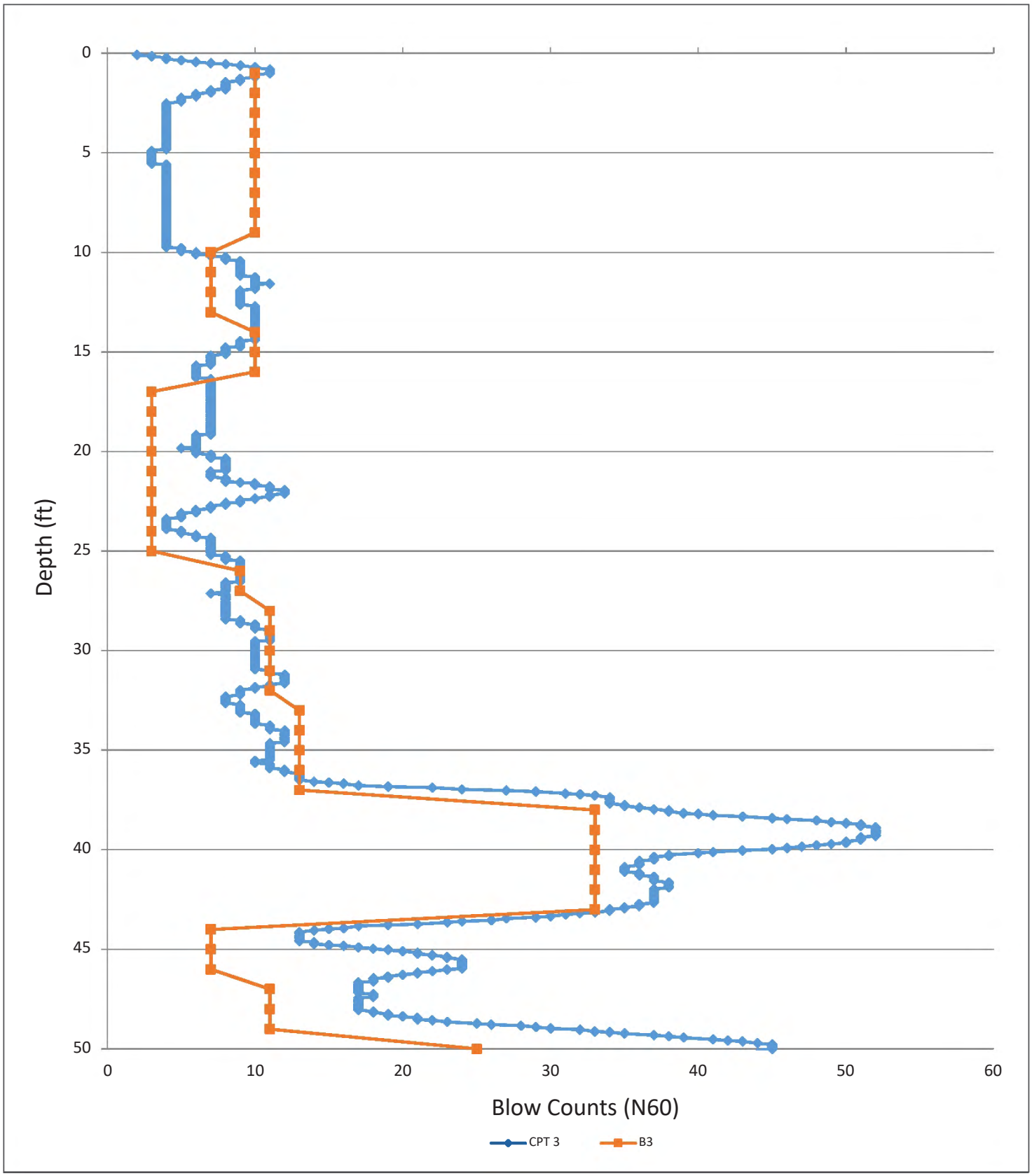
REGIONAL SEISMICITY MAP

21611 SOUTH PERRY STREET
CARSON, CALIFORNIA

APRIL 2021 | PROJECT NO. W1301-06-01 | FIG.4



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JMH		

CORRELATION OF BORING & CPT N60

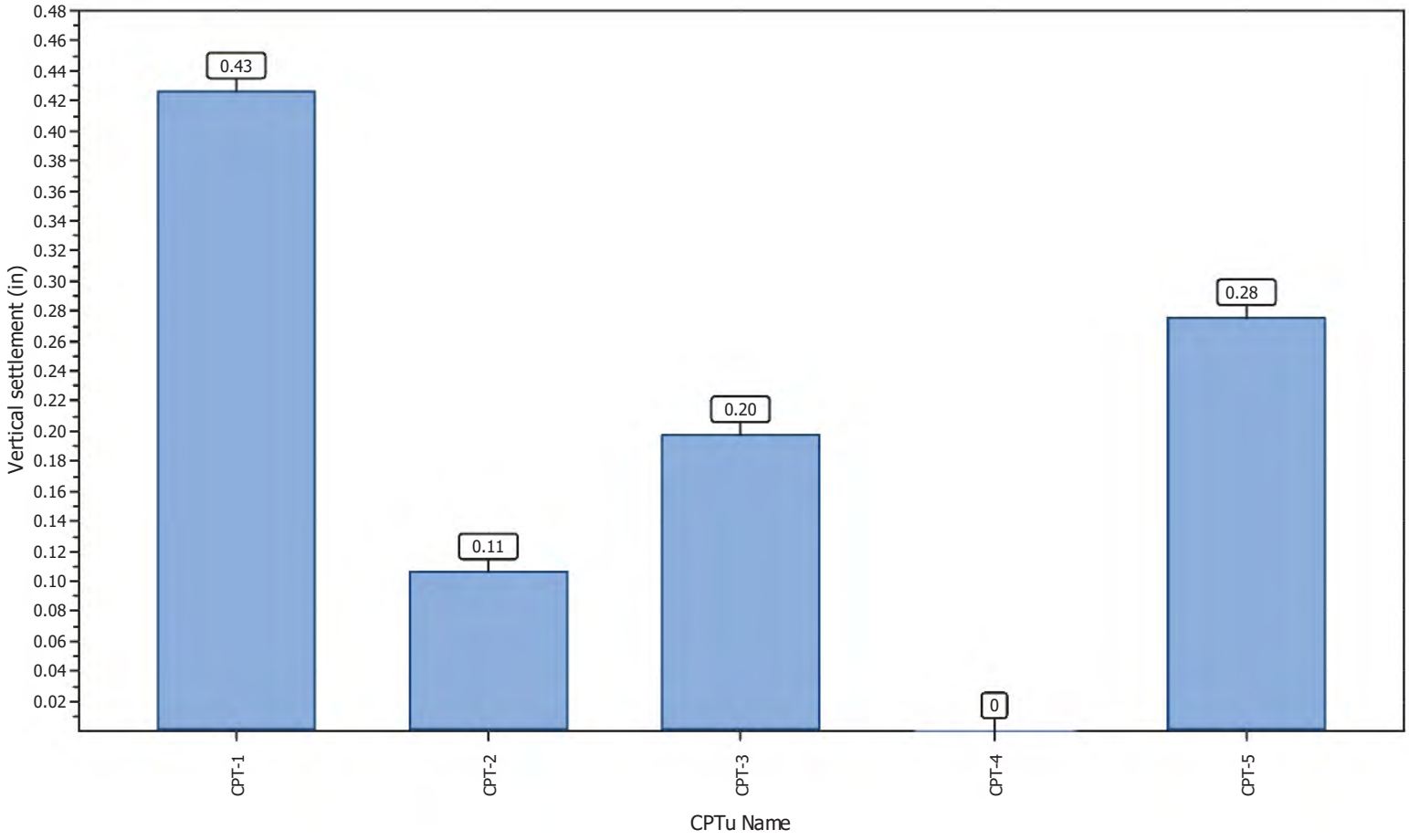
21611 SOUTH PERRY STREET
CARSON, CA

APRIL 2021	PROJECT NO. W1301-06-01	FIG.5

Project title : W1301-06-01

Location : Perry Street

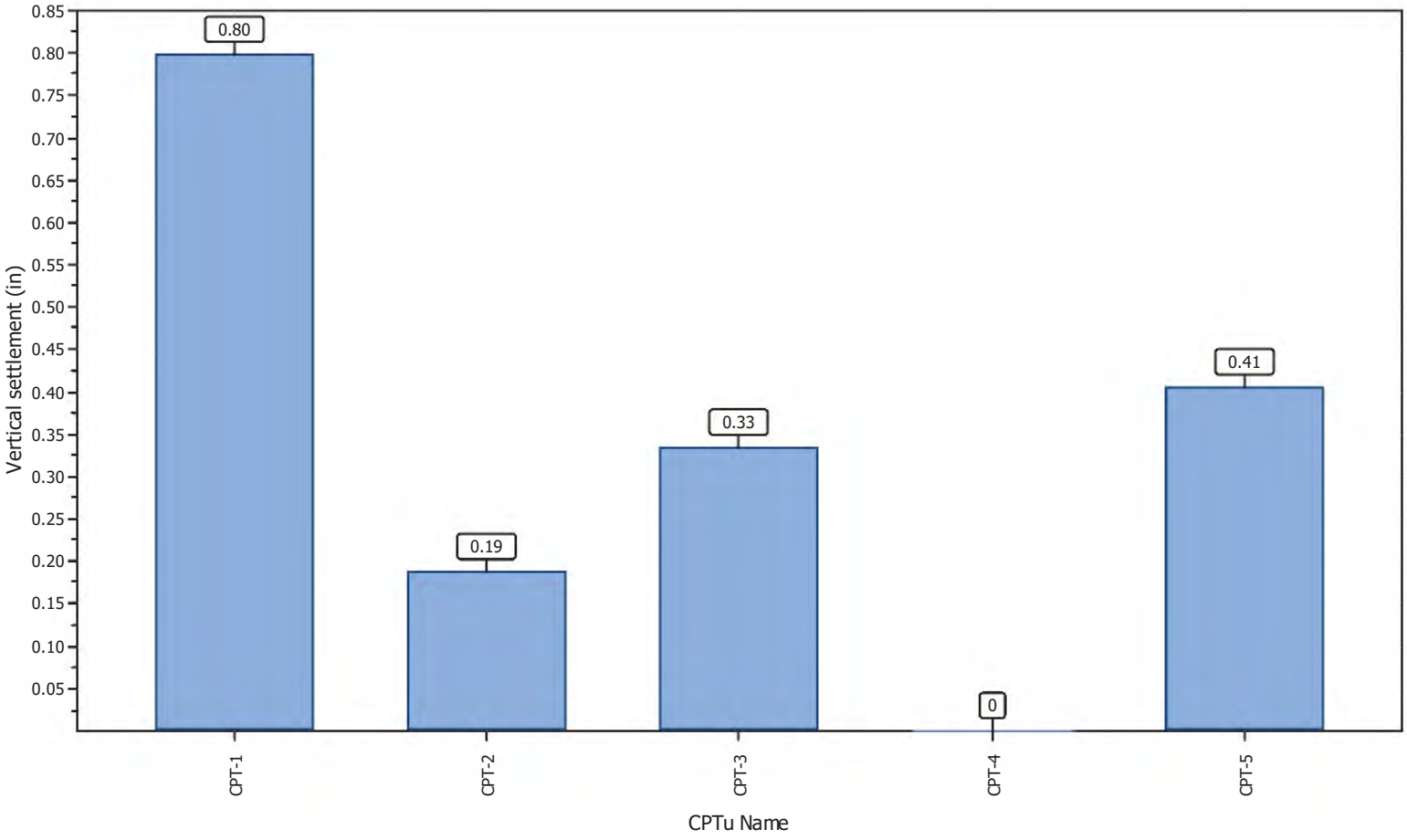
Overall vertical settlements report



Project title : W1301-06-01

Location : Perry Street

Overall vertical settlements report



GEOCON

Client : Perry Street
File No. : W1301-06-01
Boring : 3

TECHNICAL ENGINEERING AND DESIGN GUIDES AS ADAPTED FROM THE US ARMY CORPS OF ENGINEERS, NO. 9
EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS IN DRY SANDY SOILS
DESIGN EARTHQUAKE

DE EARTHQUAKE INFORMATION:

Earthquake Magnitude:	6.68
Peak Horiz. Acceleration (g):	0.549

Fig 4.1 Fig 4.2 Fig 4.4

Depth of Base of Strata (ft)	Thickness of Layer (ft)	Depth of Mid-point of Layer (ft)	Soil Unit Weight (pcf)	Overburden Pressure at Mid-point (tsf)	Mean Effective Pressure at Mid-point (tsf)	Average Cyclic Shear Stress [Tav]	Field SPT [N]	Correction Factor [Cer]	Relative Density [Dr] (%)	Correction Factor [Cn]	Corrected [N1]60	rd Factor	Maximum Shear Mod. [Gmax] (tsf)	[yeff]*[Geff] [Gmax]	yeff Shear Strain	[yeff]*100%	Volumetric Strain M7.5 [E15] (%)	Number of Strain Cycles [Nc]	Corrected Vol. Strains [Ec]	Estimated Settlement [S] (inches)
1.0	1.0	0.5	120.0	0.03	0.02	0.011	10	1.25	76.6	1.7	19.1	1.0	169.475	6.25E-05	1.00E-04	0.010	1.06E-02	8.4928	8.17E-03	0.00
2.0	1.0	1.5	120.0	0.09	0.06	0.032	10	1.25	74.4	1.7	19.1	1.0	293.540	1.06E-04	2.30E-04	0.023	2.43E-02	8.4928	1.88E-02	0.00
3.0	1.0	2.5	120.0	0.15	0.10	0.053	10	1.25	72.5	1.7	19.1	1.0	378.958	1.34E-04	1.70E-04	0.017	1.79E-02	8.4928	1.39E-02	0.00
4.0	1.0	3.5	120.0	0.21	0.14	0.075	10	1.25	70.7	1.7	19.1	1.0	448.389	1.56E-04	1.70E-04	0.017	1.79E-02	8.4928	1.39E-02	0.00
5.0	1.0	4.5	120.0	0.27	0.18	0.096	10	1.25	69.0	1.7	19.1	1.0	508.425	1.74E-04	1.70E-04	0.017	1.79E-02	8.4928	1.39E-02	0.00
6.0	1.0	5.5	120.0	0.33	0.22	0.117	10	1.25	67.4	1.7	19.1	1.0	562.085	1.88E-04	1.50E-04	0.015	1.58E-02	8.4928	1.23E-02	0.00
7.0	1.0	6.5	120.0	0.39	0.26	0.139	10	1.25	65.9	1.6	18.4	1.0	603.301	2.03E-04	4.50E-04	0.045	4.97E-02	8.4928	3.85E-02	0.01
8.0	1.0	7.5	120.0	0.45	0.30	0.160	10	1.25	64.5	1.5	17.1	1.0	632.776	2.20E-04	4.50E-04	0.045	5.42E-02	8.4928	4.19E-02	0.01
9.0	1.0	8.5	120.0	0.51	0.34	0.181	10	1.25	63.3	1.4	16.1	1.0	659.735	2.34E-04	4.50E-04	0.045	5.84E-02	8.4928	4.52E-02	0.01
10.0	1.0	9.5	120.0	0.57	0.38	0.202	7	1.25	52.2	1.4	10.7	1.0	607.907	2.79E-04	4.50E-04	0.045	9.58E-02	8.4928	7.41E-02	0.00
11.0	1.0	10.5	120.0	0.63	0.42	0.222	7	1.25	52.2	1.3	10.1	1.0	628.529	2.93E-04	4.50E-04	0.045	1.02E-01	8.4928	7.87E-02	0.00
12.0	1.0	11.5	120.0	0.69	0.46	0.243	7	1.25	52.2	1.2	9.8	0.9	650.354	3.05E-04	1.00E-03	0.100	2.35E-01	8.4928	1.82E-01	0.00
13.0	1.0	12.5	120.0	0.75	0.50	0.263	7	1.25	52.2	1.2	9.6	0.9	673.332	3.14E-04	7.10E-04	0.071	1.71E-01	8.4928	1.33E-01	0.00
14.0	1.0	13.5	120.0	0.81	0.54	0.284	10	1.25	59.6	1.2	14.4	0.9	802.030	2.80E-04	3.70E-04	0.037	5.47E-02	8.4928	4.23E-02	0.00
15.0	1.0	14.5	120.0	0.87	0.58	0.304	10	1.25	59.6	1.2	14.2	0.9	825.875	2.87E-04	3.70E-04	0.037	5.59E-02	8.4928	4.33E-02	0.00
16.0	1.0	15.5	120.0	0.93	0.62	0.324	10	1.25	59.6	1.1	13.9	0.9	848.608	2.93E-04	3.70E-04	0.037	5.72E-02	8.4928	4.43E-02	0.00
17.0	1.0	16.5	120.0	0.99	0.66	0.344	3	1.25	31.4	1.1	4.5	0.9	603.195	4.31E-04	1.20E-03	0.120	7.10E-01	8.4928	5.49E-01	0.00
18.0	1.0	17.5	120.0	1.05	0.70	0.364	3	1.25	31.4	1.1	4.5	0.9	617.634	4.39E-04	1.20E-03	0.120	7.24E-01	8.4928	5.61E-01	0.00
19.0	1.0	18.5	120.0	1.11	0.74	0.383	3	1.25	31.4	1.1	4.4	0.9	631.508	4.47E-04	1.20E-03	0.120	7.39E-01	8.4928	5.72E-01	0.00
20.0	1.0	19.5	120.0	1.17	0.78	0.402	3	1.25	31.4	1.1	4.3	0.9	644.865	4.53E-04	1.20E-03	0.120	7.54E-01	8.4928	5.83E-01	0.00
21.0	1.0	20.5	120.0	1.23	0.82	0.421	3	1.25	31.4	1.1	4.3	0.9	657.749	4.60E-04	1.20E-03	0.120	7.68E-01	8.4928	5.94E-01	0.00
22.0	1.0	21.5	120.0	1.29	0.86	0.440	3	1.25	31.4	1.0	4.2	0.9	670.198	4.65E-04	1.20E-03	0.120	7.82E-01	8.4928	6.05E-01	0.00
23.0	1.0	22.5	120.0	1.35	0.90	0.458	3	1.25	31.4	1.0	4.1	0.9	682.246	4.70E-04	1.20E-03	0.120	7.96E-01	8.4928	6.16E-01	0.00
24.0	1.0	23.5	120.0	1.41	0.94	0.477	3	1.25	31.4	1.0	4.1	0.9	693.922	4.75E-04	1.20E-03	0.120	8.10E-01	8.4928	6.27E-01	0.00
25.0	1.0	24.5	120.0	1.47	0.98	0.495	3	1.25	31.4	1.0	4.0	0.9	705.252	4.80E-04	1.20E-03	0.120	8.23E-01	8.4928	6.37E-01	0.00
26.0	1.0	25.5	120.0	1.53	1.03	0.513	9	1.25	52.3	1.0	12.7	0.9	1055.741	3.28E-04	5.20E-04	0.052	8.97E-02	8.4928	6.95E-02	0.00
27.0	1.0	26.5	120.0	1.59	1.07	0.530	9	1.25	52.3	1.0	12.5	0.9	1071.522	3.31E-04	5.20E-04	0.052	9.12E-02	8.4928	7.06E-02	0.00
28.0	1.0	27.5	120.0	1.65	1.11	0.547	11	1.25	55.9	1.0	15.8	0.9	1179.921	3.07E-04	5.20E-04	0.052	6.89E-02	8.4928	5.33E-02	0.00
29.0	1.0	28.5	120.0	1.71	1.15	0.564	11	1.25	55.9	0.9	15.6	0.9	1196.177	3.09E-04	5.20E-04	0.052	6.99E-02	8.4928	5.41E-02	0.00
30.0	1.0	29.5	120.0	1.77	1.19	0.581	11	1.25	55.9	0.9	15.4	0.9	1212.035	3.11E-04	5.20E-04	0.052	7.10E-02	8.4928	5.49E-02	0.00
31.0	1.0	30.5	120.0	1.83	1.23	0.597	11	1.25	55.9	0.9	15.3	0.9	1227.516	3.12E-04	5.20E-04	0.052	7.20E-02	8.4928	5.57E-02	0.00
32.0	1.0	31.5	120.0	1.89	1.27	0.613	11	1.25	55.9	0.9	15.1	0.9	1242.641	3.14E-04	5.20E-04	0.052	7.30E-02	8.4928	5.65E-02	0.00
33.0	1.0	32.5	120.0	1.95	1.31	0.629	13	1.25	58.8	0.9	17.6	0.9	1329.436	2.98E-04	3.00E-04	0.030	3.49E-02	8.4928	2.70E-02	0.00
34.0	1.0	33.5	120.0	2.01	1.35	0.645	13	1.25	58.8	0.9	17.4	0.8	1344.735	2.99E-04	3.00E-04	0.030	3.54E-02	8.4928	2.74E-02	0.00
35.0	1.0	34.5	120.0	2.07	1.39	0.660	13	1.25	58.8	0.9	17.2	0.8	1359.713	3.00E-04	5.20E-04	0.052	6.22E-02	8.4928	4.81E-02	0.00
36.0	1.0	35.5	120.0	2.13	1.43	0.675	13	1.25	58.8	0.9	17.0	0.8	1374.387	3.01E-04	5.20E-04	0.052	6.30E-02	8.4928	4.88E-02	0.00
37.0	1.0	36.5	120.0	2.19	1.47	0.690	13	1.25	58.8	0.9	16.9	0.8	1388.771	3.02E-04	5.20E-04	0.052	6.38E-02	8.4928	4.94E-02	0.00
38.0	1.0	37.5	120.0	2.25	1.51	0.704	33	1.25	90.8	0.9	42.4	0.8	1913.714	2.22E-04	3.00E-04	0.030	1.22E-02	8.4928	9.43E-03	0.00
39.0	1.0	38.5	120.0	2.31	1.55	0.718	33	1.25	90.8	0.8	42.0	0.8	1932.598	2.22E-04	3.00E-04	0.030	1.23E-02	8.4928	9.54E-03	0.00
40.0	1.0	39.5	120.0	2.37	1.59	0.732	33	1.25	90.8	0.8	41.6	0.8	1951.139	2.23E-04	3.00E-04	0.030	1.25E-02	8.4928	9.65E-03	0.00
41.0	1.0	40.5	120.0	2.43	1.63	0.745	33	1.25	90.8	0.8	41.2	0.8	1969.350	2.23E-04	3.00E-04	0.030	1.26E-02	8.4928	9.77E-03	0.00
42.0	1.0	41.5	120.0	2.49	1.67	0.758	33	1.25	90.8	0.8	40.8	0.8	1987.246	2.23E-04	3.00E-04	0.030	1.28E-02	8.4928	9.88E-03	0.00
43.0	1.0	42.5	120.0	2.55	1.71	0.771	33	1.25	90.8	0.8	40.4	0.8	2004.839	2.23E-04	3.00E-04	0.030	1.29E-02	8.4928	9.99E-03	0.00
44.0	1.0	43.5	120.0	2.61	1.75	0.783	7	1.25	40.6	0.8	15.5	0.8	1473.568	3.07E-04	5.20E-04	0.052	7.06E-02	8.4928	5.47E-02	0.00
45.0	1.0	44.5	120.0	2.67	1.79	0.795	7	1.25	40.6	0.8	15.4	0.8	1487.981	3.07E-04	5.20E-04	0.052	7.11E-02	8.4928	5.50E-02	0.00
46.0	1.0	45.5	120.0	2.73	1.83	0.807	7	1.25	40.6	0.8	15.3	0.8	1502.208	3.06E-04	5.20E-04	0.052	7.15E-02	8.4928	5.53E-02	0.00
47.0	1.0	46.5	120.0	2.79	1.87	0.819	11	1.25	50.1	0.8	13.0	0.8	1436.934	3.23E-04	5.20E-04	0.052	8.72E-02	8.4928	6.75E-02	0.00
48.0	1.0	47.5	120.0	2.85	1.91	0.830	11	1.25	50.1	0.8	12.9	0.8	1448.200	3.23E-04	5.20E-04	0.052	8.81E-02	8.4928	6.82E-02	0.00
49.0	1.0	48.5	120.0	2.91	1.95	0.841	11	1.25	50.1	0.8	12.8	0.8	1459.300	3.23E-04	5.20E-04	0.052	8.90E-02	8.4928	6.89E-02	0.00
50.0	1.0	49.5	120.0	2.97	1.99	0.851	25	1.25	74.5	0.8	34.0	0.8	2042.085	2.32E-04	3.00E-04	0.030	1.59E-02	8.4928	1.23E-02	0.00

TOTAL SETTLEMENT = **0.05**

Figure 9

GEOCON

Client : Perry Street
File No. : W1301-06-01
Boring : 3

TECHNICAL ENGINEERING AND DESIGN GUIDES AS ADAPTED FROM THE US ARMY CORPS OF ENGINEERS, NO. 9
EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS IN DRY SANDY SOILS
MAXIMUM CONSIDERED EARTHQUAKE

MCE EARTHQUAKE INFORMATION:

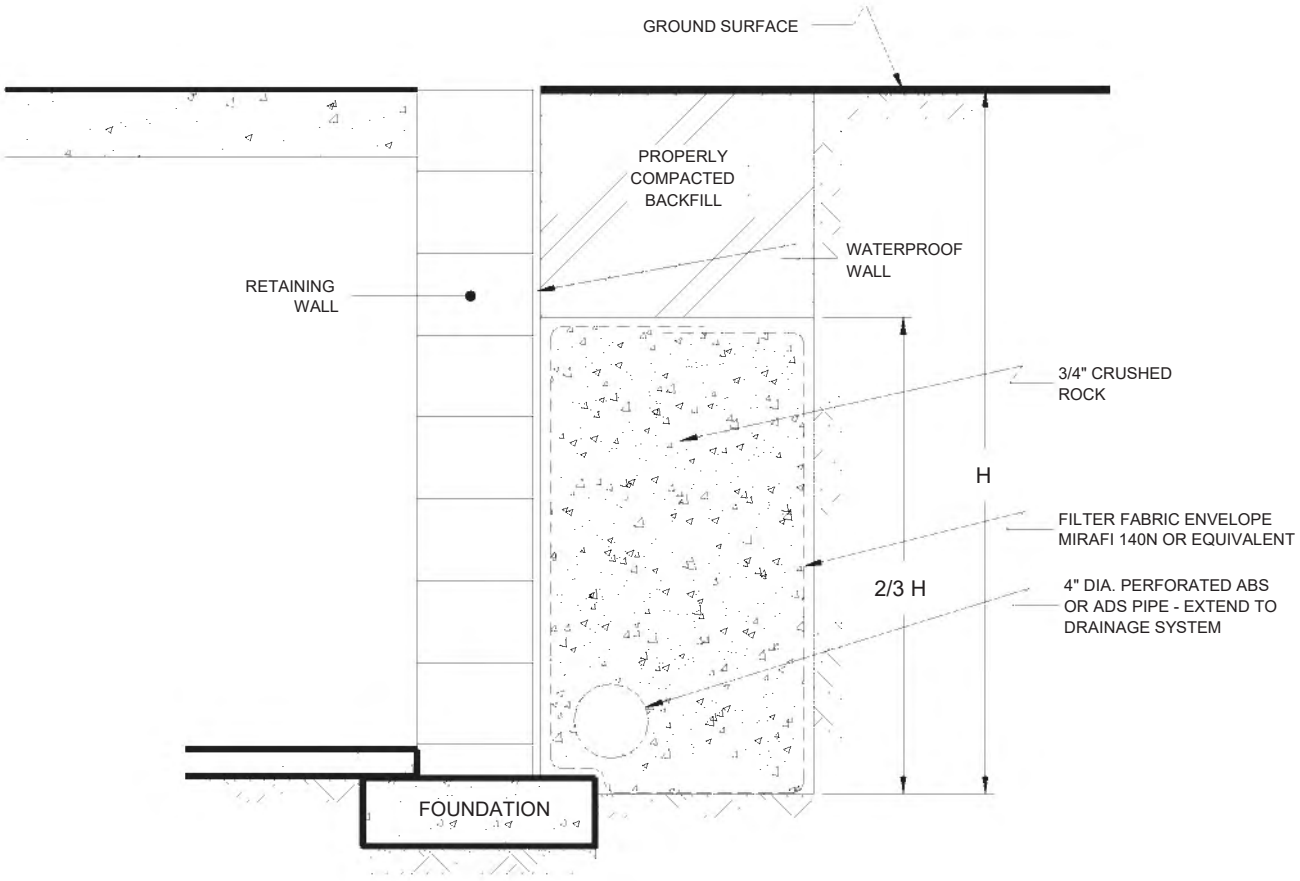
Earthquake Magnitude:	6.87
Peak Horiz. Acceleration (g):	0.823

Fig 4.1 Fig 4.2 Fig 4.4

Depth of Base of Strata (ft)	Thickness of Layer (ft)	Depth of Mid-point of Layer (ft)	Soil Unit Weight (pcf)	Overburden Pressure at Mid-point (tsf)	Mean Effective Pressure at Mid-point (tsf)	Average Cyclic Shear Stress [Tav]	Field SPT [N]	Correction Factor [Cer]	Relative Density [Dr] (%)	Correction Factor [Cn]	Corrected [N1]60	rd Factor	Maximum Shear Mod. [Gmax] (tsf)	[yeff]*[Geff] [Gmax]	yeff Shear Strain	[yeff]*100%	Volumetric Strain M7.5 [E15] (%)	Number of Strain Cycles [Nc]	Corrected Vol. Strains [Ec]	Estimated Settlement [S] (inches)
1.0	1.0	0.5	120.0	0.03	0.02	0.016	10	1.25	76.6	1.7	19.1	1.0	169.475	9.38E-05	1.90E-04	0.019	2.00E-02	9.8538	1.66E-02	0.00
2.0	1.0	1.5	120.0	0.09	0.06	0.048	10	1.25	74.4	1.7	19.1	1.0	293.540	1.59E-04	2.30E-04	0.023	2.43E-02	9.8538	2.01E-02	0.00
3.0	1.0	2.5	120.0	0.15	0.10	0.080	10	1.25	72.5	1.7	19.1	1.0	378.958	2.02E-04	8.10E-04	0.081	8.55E-02	9.8538	7.07E-02	0.02
4.0	1.0	3.5	120.0	0.21	0.14	0.112	10	1.25	70.7	1.7	19.1	1.0	448.389	2.34E-04	8.10E-04	0.081	8.55E-02	9.8538	7.07E-02	0.02
5.0	1.0	4.5	120.0	0.27	0.18	0.144	10	1.25	69.0	1.7	19.1	1.0	508.425	2.60E-04	8.10E-04	0.081	8.55E-02	9.8538	7.07E-02	0.02
6.0	1.0	5.5	120.0	0.33	0.22	0.176	10	1.25	67.4	1.7	19.1	1.0	562.085	2.82E-04	4.50E-04	0.045	4.75E-02	9.8538	3.93E-02	0.01
7.0	1.0	6.5	120.0	0.39	0.26	0.208	10	1.25	65.9	1.6	18.4	1.0	603.301	3.05E-04	1.00E-03	0.100	1.10E-01	9.8538	9.14E-02	0.02
8.0	1.0	7.5	120.0	0.45	0.30	0.239	10	1.25	64.5	1.5	17.1	1.0	632.776	3.29E-04	1.00E-03	0.100	1.20E-01	9.8538	9.96E-02	0.02
9.0	1.0	8.5	120.0	0.51	0.34	0.271	10	1.25	63.3	1.4	16.1	1.0	659.735	3.51E-04	1.00E-03	0.100	1.30E-01	9.8538	1.07E-01	0.03
10.0	1.0	9.5	120.0	0.57	0.38	0.302	7	1.25	52.2	1.4	10.7	1.0	607.907	4.18E-04	2.70E-03	0.270	5.75E-01	9.8538	4.76E-01	0.00
11.0	1.0	10.5	120.0	0.63	0.42	0.333	7	1.25	52.2	1.3	10.1	1.0	628.529	4.39E-04	2.70E-03	0.270	6.10E-01	9.8538	5.05E-01	0.00
12.0	1.0	11.5	120.0	0.69	0.46	0.364	7	1.25	52.2	1.2	9.8	0.9	650.354	4.57E-04	2.70E-03	0.270	6.36E-01	9.8538	5.26E-01	0.00
13.0	1.0	12.5	120.0	0.75	0.50	0.395	7	1.25	52.2	1.2	9.6	0.9	673.332	4.71E-04	1.20E-03	0.120	2.90E-01	9.8538	2.40E-01	0.00
14.0	1.0	13.5	120.0	0.81	0.54	0.426	10	1.25	59.6	1.2	14.4	0.9	802.030	4.19E-04	1.20E-03	0.120	1.77E-01	9.8538	1.47E-01	0.00
15.0	1.0	14.5	120.0	0.87	0.58	0.456	10	1.25	59.6	1.2	14.2	0.9	825.875	4.30E-04	1.20E-03	0.120	1.81E-01	9.8538	1.50E-01	0.00
16.0	1.0	15.5	120.0	0.93	0.62	0.486	10	1.25	59.6	1.1	13.9	0.9	848.608	4.39E-04	1.20E-03	0.120	1.86E-01	9.8538	1.54E-01	0.00
17.0	1.0	16.5	120.0	0.99	0.66	0.516	3	1.25	31.4	1.1	4.5	0.9	603.195	6.47E-04	4.10E-03	0.410	2.42E+00	9.8538	2.01E+00	0.00
18.0	1.0	17.5	120.0	1.05	0.70	0.545	3	1.25	31.4	1.1	4.5	0.9	617.634	6.59E-04	4.10E-03	0.410	2.47E+00	9.8538	2.05E+00	0.00
19.0	1.0	18.5	120.0	1.11	0.74	0.574	3	1.25	31.4	1.1	4.4	0.9	631.508	6.70E-04	4.10E-03	0.410	2.53E+00	9.8538	2.09E+00	0.00
20.0	1.0	19.5	120.0	1.17	0.78	0.603	3	1.25	31.4	1.1	4.3	0.9	644.865	6.80E-04	4.10E-03	0.410	2.57E+00	9.8538	2.13E+00	0.00
21.0	1.0	20.5	120.0	1.23	0.82	0.631	3	1.25	31.4	1.1	4.3	0.9	657.749	6.89E-04	4.10E-03	0.410	2.62E+00	9.8538	2.17E+00	0.00
22.0	1.0	21.5	120.0	1.29	0.86	0.660	3	1.25	31.4	1.0	4.2	0.9	670.198	6.98E-04	4.10E-03	0.410	2.67E+00	9.8538	2.21E+00	0.00
23.0	1.0	22.5	120.0	1.35	0.90	0.687	3	1.25	31.4	1.0	4.1	0.9	682.246	7.05E-04	1.00E-02	1.000	6.63E+00	9.8538	5.49E+00	0.00
24.0	1.0	23.5	120.0	1.41	0.94	0.715	3	1.25	31.4	1.0	4.1	0.9	693.922	7.13E-04	1.00E-02	1.000	6.75E+00	9.8538	5.59E+00	0.00
25.0	1.0	24.5	120.0	1.47	0.98	0.742	3	1.25	31.4	1.0	4.0	0.9	705.252	7.19E-04	1.00E-02	1.000	6.86E+00	9.8538	5.68E+00	0.00
26.0	1.0	25.5	120.0	1.53	1.03	0.769	9	1.25	52.3	1.0	12.7	0.9	1055.741	4.92E-04	8.10E-04	0.081	1.40E-01	9.8538	1.16E-01	0.00
27.0	1.0	26.5	120.0	1.59	1.07	0.795	9	1.25	52.3	1.0	12.5	0.9	1071.522	4.96E-04	8.10E-04	0.081	1.42E-01	9.8538	1.18E-01	0.00
28.0	1.0	27.5	120.0	1.65	1.11	0.821	11	1.25	55.9	1.0	15.8	0.9	1179.921	4.60E-04	8.10E-04	0.081	1.07E-01	9.8538	8.88E-02	0.00
29.0	1.0	28.5	120.0	1.71	1.15	0.846	11	1.25	55.9	0.9	15.6	0.9	1196.177	4.63E-04	8.10E-04	0.081	1.09E-01	9.8538	9.02E-02	0.00
30.0	1.0	29.5	120.0	1.77	1.19	0.871	11	1.25	55.9	0.9	15.4	0.9	1212.035	4.66E-04	8.10E-04	0.081	1.11E-01	9.8538	9.15E-02	0.00
31.0	1.0	30.5	120.0	1.83	1.23	0.896	11	1.25	55.9	0.9	15.3	0.9	1227.516	4.68E-04	8.10E-04	0.081	1.12E-01	9.8538	9.28E-02	0.00
32.0	1.0	31.5	120.0	1.89	1.27	0.920	11	1.25	55.9	0.9	15.1	0.9	1242.641	4.71E-04	8.10E-04	0.081	1.14E-01	9.8538	9.41E-02	0.00
33.0	1.0	32.5	120.0	1.95	1.31	0.943	13	1.25	58.8	0.9	17.6	0.9	1329.436	4.47E-04	8.10E-04	0.081	9.43E-02	9.8538	7.81E-02	0.00
34.0	1.0	33.5	120.0	2.01	1.35	0.967	13	1.25	58.8	0.9	17.4	0.8	1344.735	4.49E-04	8.10E-04	0.081	9.56E-02	9.8538	7.91E-02	0.00
35.0	1.0	34.5	120.0	2.07	1.39	0.990	13	1.25	58.8	0.9	17.2	0.8	1359.713	4.50E-04	8.10E-04	0.081	9.68E-02	9.8538	8.02E-02	0.00
36.0	1.0	35.5	120.0	2.13	1.43	1.012	13	1.25	58.8	0.9	17.0	0.8	1374.387	4.52E-04	8.10E-04	0.081	9.81E-02	9.8538	8.12E-02	0.00
37.0	1.0	36.5	120.0	2.19	1.47	1.034	13	1.25	58.8	0.9	16.9	0.8	1388.771	4.53E-04	8.10E-04	0.081	9.93E-02	9.8538	8.22E-02	0.00
38.0	1.0	37.5	120.0	2.25	1.51	1.055	33	1.25	90.8	0.9	42.4	0.8	1913.714	3.33E-04	5.20E-04	0.052	2.11E-02	9.8538	1.75E-02	0.00
39.0	1.0	38.5	120.0	2.31	1.55	1.076	33	1.25	90.8	0.8	42.0	0.8	1932.598	3.33E-04	5.20E-04	0.052	2.14E-02	9.8538	1.77E-02	0.00
40.0	1.0	39.5	120.0	2.37	1.59	1.097	33	1.25	90.8	0.8	41.6	0.8	1951.139	3.34E-04	5.20E-04	0.052	2.16E-02	9.8538	1.79E-02	0.00
41.0	1.0	40.5	120.0	2.43	1.63	1.117	33	1.25	90.8	0.8	41.2	0.8	1969.350	3.34E-04	5.20E-04	0.052	2.19E-02	9.8538	1.81E-02	0.00
42.0	1.0	41.5	120.0	2.49	1.67	1.136	33	1.25	90.8	0.8	40.8	0.8	1987.246	3.35E-04	5.20E-04	0.052	2.21E-02	9.8538	1.83E-02	0.00
43.0	1.0	42.5	120.0	2.55	1.71	1.155	33	1.25	90.8	0.8	40.4	0.8	2004.839	3.35E-04	5.20E-04	0.052	2.24E-02	9.8538	1.85E-02	0.00
44.0	1.0	43.5	120.0	2.61	1.75	1.174	7	1.25	40.6	0.8	15.5	0.8	1473.568	4.60E-04	8.10E-04	0.081	1.10E-01	9.8538	9.11E-02	0.00
45.0	1.0	44.5	120.0	2.67	1.79	1.192	7	1.25	40.6	0.8	15.4	0.8	1487.981	4.60E-04	8.10E-04	0.081	1.11E-01	9.8538	9.16E-02	0.00
46.0	1.0	45.5	120.0	2.73	1.83	1.210	7	1.25	40.6	0.8	15.3	0.8	1502.208	4.59E-04	8.10E-04	0.081	1.11E-01	9.8538	9.22E-02	0.00
47.0	1.0	46.5	120.0	2.79	1.87	1.227	11	1.25	50.1	0.8	13.0	0.8	1436.934	4.84E-04	8.10E-04	0.081	1.36E-01	9.8538	1.12E-01	0.00
48.0	1.0	47.5	120.0	2.85	1.91	1.244	11	1.25	50.1	0.8	12.9	0.8	1448.200	4.84E-04	8.10E-04	0.081	1.37E-01	9.8538	1.14E-01	0.00
49.0	1.0	48.5	120.0	2.91	1.95	1.260	11	1.25	50.1	0.8	12.8	0.8	1459.300	4.84E-04	8.10E-04	0.081	1.39E-01	9.8538	1.15E-01	0.00
50.0	1.0	49.5	120.0	2.97	1.99	1.276	25	1.25	74.5	0.8	34.0	0.8	2042.085	3.48E-04	5.20E-04	0.052	2.75E-02	9.8538	2.28E-02	0.00

TOTAL SETTLEMENT = **0.14**

Figure 10



NO SCALE

GEOCON
W E S T, I N C.

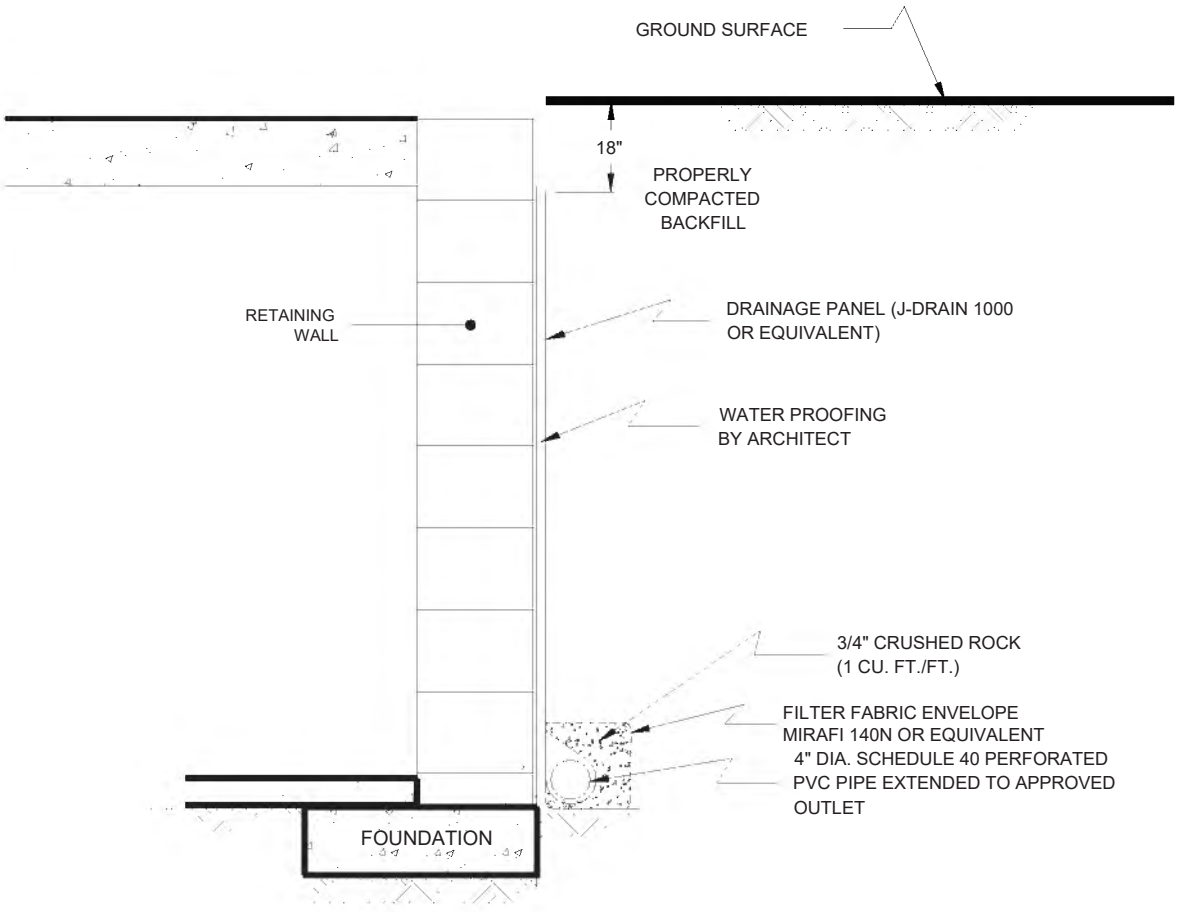
ENVIRONMENTAL GEOTECHNICAL MATERIALS
3303 N. SAN FERNANDO BLVD. - SUITE 100 - BURBANK, CA 91504
PHONE (818) 841-8388 - FAX (818) 841-1704

DRAFTED BY: JMH	CHECKED BY: JTA

RETAINING WALL DRAIN DETAIL

21611 SOUTH PERRY STREET
CARSON, CALIFORNIA

APRIL 2021	NO. W1301-06-01	FIG. 10



NO SCALE

GEOCON
W E S T, I N C.

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RETAINING WALL DRAIN DETAIL

21611 SOUTH PERRY STREET
CARSON, CALIFORNIA

APRIL 2021	NO. W1301-06-01	FIG. 11

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

The site was explored on February 9, 2021 by drilling five 8-inch diameter borings using a truck-mounted hollow-stem auger drilling machine and advancing five cone penetrometer tests (CPTs). The borings were excavated to depths between approximately 20½ and 51 feet beneath the existing ground surface. The CPTs were advanced to depths of approximately 60 feet below existing ground surface. Representative and relatively undisturbed samples were obtained by driving a 4 inch, O. D., California Modified Sampler into the "undisturbed" soil mass with blows from a 140 pound hammer falling 30 inches. Bulk samples were also obtained. Standard Penetration Tests were performed in boring B3.

The soil conditions encountered in the borings were visually examined, classified and logged in general accordance with the Unified Soil Classification System (USCS). Logs of the borings are presented on Figures A1 through A5. The CPT data is presented as Figures A6 through A10. The logs depict the soil and geologic conditions encountered and the depth at which samples were obtained. The logs also include our interpretation of the conditions between sampling intervals. Therefore, the logs contain both observed and interpreted data. We determined the lines designating the interface between soil materials on the logs using visual observations, penetration rates, excavation characteristics and other factors. The transition between materials may be abrupt or gradual. Where applicable, the boring logs were revised based on subsequent laboratory testing. The approximate locations of the borings and CPTs are depicted on the Site Plan (see Figure 2)

PROJECT NO. W1301-06-01

BORING 1

ELEV. (MSL.) -- DATE COMPLETED **2/9/2021**

EQUIPMENT **HOLLOW STEM AUGER** BY: **JMH**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	BULK 0-5'				**ARTIFICIAL FILL** Silty Sand, poorly graded, dense, moist, light brown, fine-grained, some medium-grained, some gravel.			
2								
4								
6	B1@5'			CH	**ALLUVIUM** Clay, firm, moist, dark gray, high plasticity.	19	105.0	24.0
8	B1@7.5'				- some sand	13	106.1	19.7
10	B1@10'				- olive brown mottles	21	103.7	22.0
12			▼					
14					Clayey Sand, poorly graded, loose, saturated, brown, fine-grained.			
16	B1@15'			SC		10	111.6	19.8
18					Silty Sand, poorly graded, medium dense, saturated, brown, fine-grained.			
20	B1@20'			SM		22	114.5	19.2
					Total depth of boring: 20.5 feet Fill to 4.5 feet. Groundwater encountered at 12.5 feet. Backfilled with grout. *Penetration resistance for 140-pound hammer falling 30 inches by auto-hammer. NOTE: The stratification lines presented herein represent the approximate boundary between earth types; the transitions may be gradual.			

W1301-06-01 BORING LOGS.GPJ

Figure A1,
Log of Boring 1, Page 1 of 1

SAMPLE SYMBOLS

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

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

GEOCON

PROJECT NO. W1301-06-01

BORING 2

ELEV. (MSL.) -- DATE COMPLETED **2/9/2021**

EQUIPMENT **HOLLOW STEM AUGER** BY: **JMH**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	BULK 0-5'				**ARTIFICIAL FILL** Silty Sand, poorly graded, loose, moist, brown, fine-grained.			
2								
4	B2@3'			ML	**ALLUVIUM** Sandy Silt, firm, moist, dark gray.	14	73.4	29.6
6	B2@6'				Clay, soft, wet, gray, high plasticity.	10	29.3	32.0
8								
10	B2@9'			CH	- firm, dark gray	15	73.9	49.8
12	B2@12'					15	87.2	35.9
14								
16	B2@15'				- soft	8	75.1	45.2
18								
20	B2@20'				- firm	17	101.7	27.4

Total depth of boring: 20.5 feet
Fill to 3 feet.
No groundwater encountered.
Backfilled with grout.

*Penetration resistance for 140-pound hammer falling 30 inches by auto-hammer.
NOTE: The stratification lines presented herein represent the approximate boundary between earth types; the transitions may be gradual.

W1301-06-01 BORING LOGS.GPJ

Figure A2,
Log of Boring 2, Page 1 of 1

SAMPLE SYMBOLS

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

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

GEOCON

PROJECT NO. W1301-06-01

BORING 3

ELEV. (MSL.) -- DATE COMPLETED **2/9/2021**

EQUIPMENT **HOLLOW STEM AUGER** BY: **JMH**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	BULK 0-5'				**ARTIFICIAL FILL** Sand, poorly graded, dense, moist, light brown, fine-grained, some medium-grained.			
2	B3@1.5'					50 (6")	107.1	4.0
4								
6	B3@5'					50 (6")		
8	B3@7'				- grayish brown, some fine gravel	50 (3")	103.4	8.7
10	B3@10'			MH	**ALLUVIUM** Silt, soft, moist, dark gray, high plasticity, some sand.	7		
12	B3@12.5'			CH	Clay, firm, moist, dark gray, high plasticity.	21	91.7	31.6
14								
16	B3@15'					10		
18	B3@17.5'		▼		Clay, firm, moist, dark gray.	14	103.7	26.1
20	B3@20'			CL	- soft, wet	3		
22	B3@22.5'				- firm, light brown	11	105.7	27.3
24								
26	B3@25'			CH	Clay, firm, moist, olive brown, some sand, trace gravel, high plasticity.	9		
28	B3@27.5'				- mottled calcium deposits, increase in sand	21	89.9	32.6

W1301-06-01 BORING LOGS.GPJ

Figure A3,
Log of Boring 3, Page 1 of 2

SAMPLE SYMBOLS

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

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

GEOCON

PROJECT NO. W1301-06-01

BORING 3

ELEV. (MSL.) -- DATE COMPLETED **2/9/2021**

EQUIPMENT **HOLLOW STEM AUGER** BY: **JMH**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B3@30'				- decrease in sand	11		
32	B3@32.5'			CH	- stiff	22	98.4	27.3
34	B3@35'				- firm, increase in sand	13		
36								
38	B3@37.5'				Silty Sand, poorly graded, dense, wet, olive brown, fine-grained.	67	117.6	16.4
40	B3@40'			SM		33		
42	B3@42.5'				- medium dense, trace shells	36	101.9	25.0
44				CL	Sandy Clay, soft, wet, olive brown.			
46	B3@45'					7		
48	B3@47.5'			SC	Clayey Sand, poorly graded, medium dense, saturated, olive brown with oxidation mottles, fine-grained.	20	100.0	25.4
50	B3@50'			SM	Silty Sand, poorly graded, medium dense, saturated, olive brown.	25		

Total depth of boring: 51 feet
Fill to 9 feet.
Groundwater encountered at 17.6 feet.
Backfilled with grout.

*Penetration resistance for 140-pound hammer falling 30 inches by auto-hammer.
NOTE: The stratification lines presented herein represent the approximate boundary between earth types; the transitions may be gradual.

W1301-06-01 BORING LOGS.GPJ

Figure A3,
Log of Boring 3, Page 2 of 2

SAMPLE SYMBOLS

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

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

PROJECT NO. W1301-06-01

BORING 4

ELEV. (MSL.) -- DATE COMPLETED 2/9/2021

EQUIPMENT HOLLOW STEM AUGER BY: JMH

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	BULK 0-5'				**ARTIFICIAL FILL** Silty Sand, poorly graded, dense, moist, brown, fine-grained, some medium-grained, some gravel.			
2								
4	B4@3'					50 (6")		
6	B4@5'			ML	**ALLUVIUM** Sandy Silt, soft, moist, dark gray.	10	78.1	31.1
8	B4@7.5'				Clay, soft, wet, dark gray, high plasticity.	10	80.7	38.9
10	B4@10'					8	77.8	42.4
12				CH				
14								
16	B4@15'					10	85.0	38.5
18								
20	B4@20'					4	80.0	42.3

Total depth of boring: 20.5 feet
Fill to 5 feet.
No groundwater encountered.
Backfilled with grout.

*Penetration resistance for 140-pound hammer falling 30 inches by auto-hammer.
NOTE: The stratification lines presented herein represent the approximate boundary between earth types; the transitions may be gradual.

W1301-06-01 BORING LOGS.GPJ

Figure A4,
Log of Boring 4, Page 1 of 1

SAMPLE SYMBOLS

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

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

GEOCON

PROJECT NO. W1301-06-01

BORING 5

ELEV. (MSL.) -- DATE COMPLETED **2/9/2021**

EQUIPMENT **HOLLOW STEM AUGER** BY: **JMH**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT*)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**ARTIFICIAL FILL** Silty Sand, poorly graded, loose, moist, brown, fine-grained, some medium-grained.			
2								
4								
6	B5@5'				**ALLUVIUM** Clay, soft, moist, dark gray, high plasticity.	11	79.5	42.3
8	B5@7.5'				- wet	10	82.2	38.4
10	B5@10'			CH		7	74.1	37.5
12								
14								
16	B5@15'				- saturated	11	97.9	47.5
18								
20	B5@20'				- firm, no recovery	17		

Total depth of boring: 20.5 feet
Fill to 5 feet.
No groundwater encountered.
Backfilled with grout.

*Penetration resistance for 140-pound hammer falling 30 inches by auto-hammer.
NOTE: The stratification lines presented herein represent the approx

W1301-06-01 BORING LOGS.GPJ

Figure A5,
Log of Boring 5, Page 1 of 1

SAMPLE SYMBOLS

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

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

Shear-Induced Building Settlement (Ds) calculation procedure

The shear-induced building settlement (Ds) due to liquefaction below the building can be estimated using the relationship developed by Bray and Macedo (2017):

$$Ln(Ds) = c1 + c2 * LBS + 0.58 * Ln\left(Tanh\left(\frac{HL}{6}\right)\right) + 4.59 * Ln(Q) - 0.42 * Ln(Q)^2 - 0.02 * B + 0.84 * Ln(CAVdp) + 0.41 * Ln(Sa1) + \varepsilon$$

where Ds is in the units of mm, c1= -8.35 and c2= 0.072 for LBS ≤ 16, and c1= -7.48 and c2= 0.014 otherwise. Q is the building contact pressure in units of kPa, HL is the cumulative thickness of the liquefiable layers in the units of m, B is the building width in the units of m, CAVdp is a standardized version of the cumulative absolute velocity in the units of g-s, Sa1 is 5%-damped pseudo-acceleration response spectral value at a period of 1 s in the units of g, and ε is a normal random variable with zero mean and 0.50 standard deviation in Ln units. The liquefaction-induced building settlement index (LBS) is:

$$LBS = \sum W * \frac{\varepsilon_{shear}}{z} dz$$

where z (m) is the depth measured from the ground surface > 0, W is a foundation-weighting factor wherein W = 0.0 for z less than Df, which is the embedment depth of the foundation, and W = 1.0 otherwise. The shear strain parameter (ε_shear) is the liquefaction-induced free-field shear strain (in %) estimated using Zhang et al. (2004). It is calculated based on the estimated Dr of the liquefied soil layer and the calculated safety factor against liquefaction triggering (FSL).

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Attachment C

City Forms

Attachment D

Master Covenant Agreement (MCA)

MCA will be provided in ministerial Review

Attachment E

Operations and Maintenance (O&M) Plan

Carson Self-Storage

21611 South Perry St., Carson, Ca 90745

Grading Plan Permit No.: Tbd

Apn: 7327-010-014

Required Permits

This section must list any permits required for the implementation, operation, and maintenance of the BMPs. Possible examples are:

- Permits for connection to sanitary sewer
- Permits from California Department of Fish and Game
- Encroachment permits

If no permits are required, a statement to that effect should be made.

Recordkeeping

All records must be made available for review upon request.

Responsible Party

The owner is aware of the maintenance responsibilities of the proposed BMPs. A funding mechanism is in place to maintain the BMPs at the frequency stated in the LID Plan. The contact information for the entity responsible is below:

Name:	
Company:	Faring Capital, LLC
Title:	
Address 1:	
Address 2:	
Phone Number:	
Email:	

BMP Name	BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Non-Structural Source Control BMPs			
Education for Property Owners, Tenants and Occupants	Practical informational materials will be provided to 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. Faring Capital, LLC will provide these materials through an education program. This program must be maintained, enforced, and updated periodically by Faring Capital, LLC. Educational materials including, but not limited to, the materials included in Section VII of this plan will be made available to the employees, members and occupants periodically thereafter	On-going	Owner
Activity Restriction	Activities on this site will be limited to activities related to the transfer of solid waste.	On-going	Owner

BMP Name	BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Common Area Landscape Management	Management programs will be designed and established by Faring Capital, LLC 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.	On-going	Owner
Common Area Litter Control	Faring Capital, LLC will be required to implement waste management and litter control procedures in the common areas aimed at reducing pollution of surface runoff. Faring Capital, LLC may also contract with their landscape maintenance firm to provide this service during regularly scheduled maintenance, which should consist of litter patrol, to prevent emptying of waste receptacles in common areas, and noting waste disposal violations and reporting the violations to Faring Capital, LLC for investigation	Inspected on a monthly basis	Owner

BMP Name	BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Common Area Catch Basin Inspection	Faring Capital, LLC will be required to have at least 80 percent of the catch basins and inlets inspected, cleaned and maintained on an annual basis and 100 percent of the basins and inlets included in a two-year period. Cleaning should take place in the late summer/early fall prior to the start of the rainy season	Prior to August 31 each year and weekly during rainy season or within 24 hours prior to rain forecasts.	Owner
Street Sweeping Private Streets and Parking Lots	Faring Capital, LLC shall have parking lots swept prior to the storm season, in late summer and early fall, prior to the start of the rainy season, as defined by the City of Carson	Prior to the storm season, in late summer and early fall, prior to the start of the rainy season	Owner
Structural Source Control BMPs			
Provide Storm Drain System Stenciling and Signage	All proposed catch basins and inlets will have either a stencil and/or placard with verbiage conforming to City of Carson requirements. Faring Capital, LLC will maintain the stenciling and labels.	Semi-annually, Prior to August 31 each year & monthly during rainy season. Repaint stenciling and/or replace signs Prior to August 31	Owner
Design and Construct Trash and Waste Storage Areas to Reduce Pollutant Introduction	The proposed Waste Management Areas will be within the building footprint	Inspected on a monthly basis	Owner

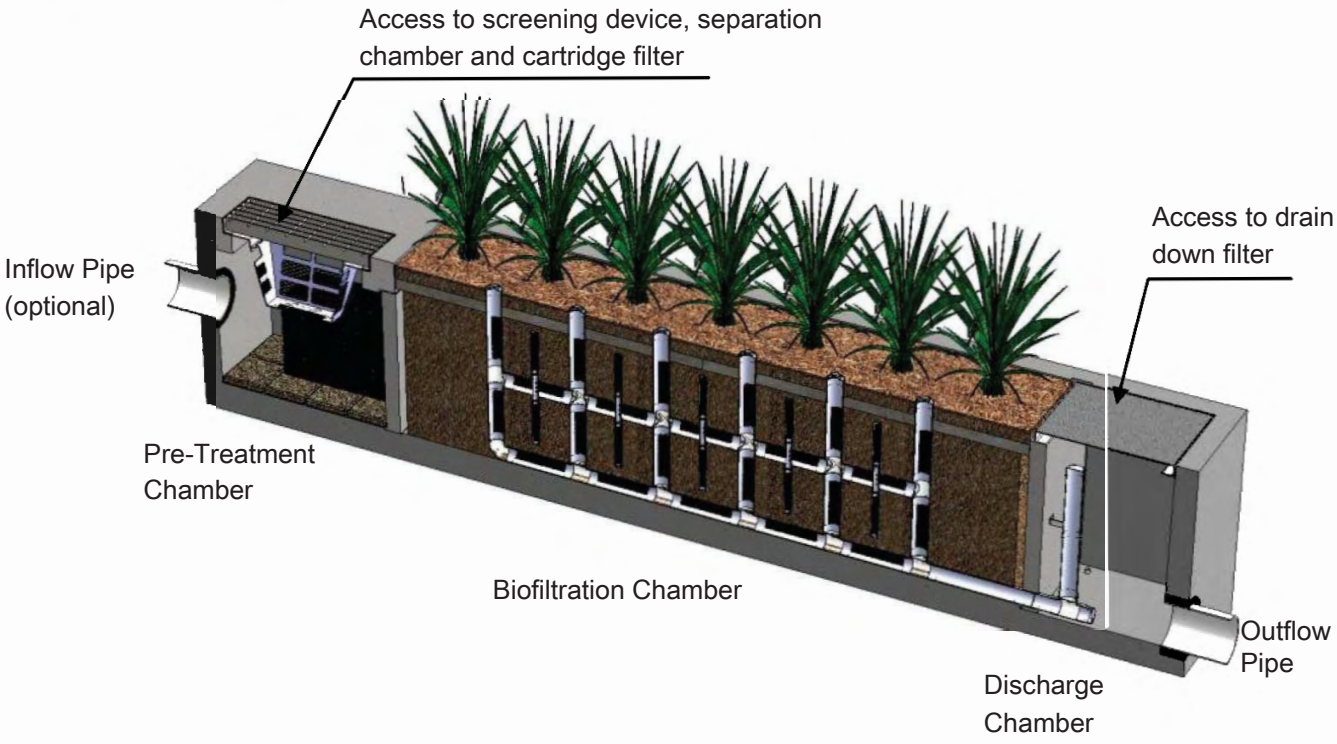
BMP Name	BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Use Efficient Irrigation Systems & Landscape Design	**Design of an effective irrigation system will reduce the amount of runoff from excess irrigation water into the storm drain system. The system design will incorporate the use of a centralized evapotranspiration-based irrigation controllers, rain shutdown devices, master valves, and low precipitation spray heads. The system will have the ability to run multiple programs with cycle and soak to prevent run-off, and emergency shut-off devices for excessive flow conditions to minimize water waste. The design will comply with the State Ordinance AB325 and City of Carson requirements for water conservation**	**Prior to August 31 each year and once during the rainy season (Prior to August 31st)**	**Owner**
Treatment Control BMPs			
10'20' Modular Wetland System	**Modular Wetland System – Linear Maintenance:** - **Removed trash from screening device.** - **Removed sediment from separation chamber.** - **Replace cartridge filter media.** - **Replace drain down filter media.** - **Trim vegetation.**	**As needed**	**Owner**

Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
  - (*5 minute average service time*).
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
  - (*10 minute average service time*).
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
  - (*10-15 minute per cartridge average service time*).
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
  - (*5 minute average service time*).
- Trim Vegetation – average maintenance interval is 6 to 12 months.
  - (*Service time varies*).

System Diagram



Maintenance Procedures

Screening Device

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

Separation Chamber

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

Cartridge Filters

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

Drain Down Filter

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

Maintenance Notes

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

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

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

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

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

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

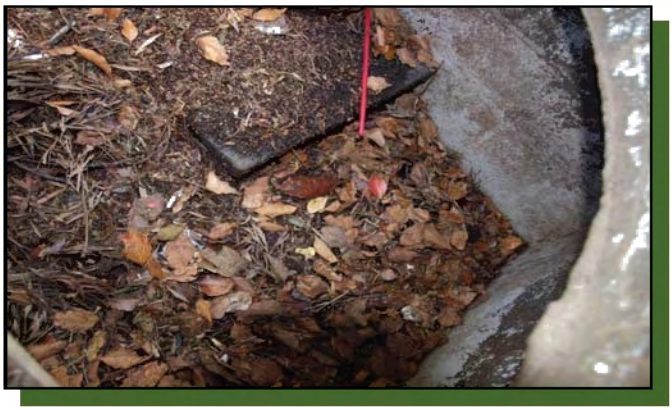
Maintenance Procedure Illustration

Screening Device

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

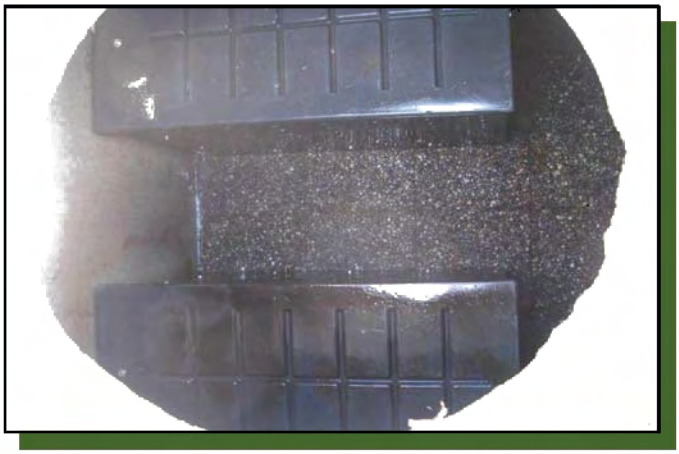
Separation Chamber

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



Cartridge Filters

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

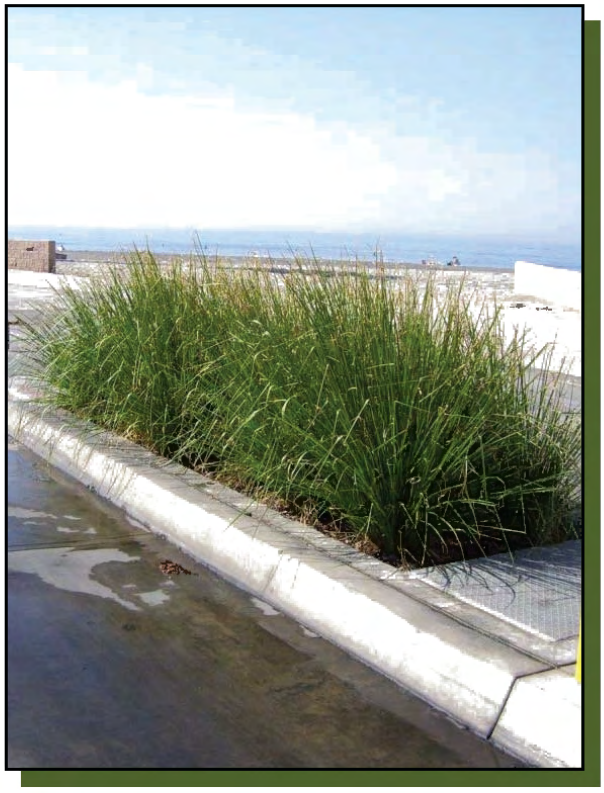


Drain Down Filter

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

Trim Vegetation

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



Inspection Form

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

www.modularwetlands.com

Inspection Report
Modular Wetlands System

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

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

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

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

Weather Condition _____ Additional Notes _____

Inspection Checklist

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

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

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

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

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes:

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

Maintenance Report

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

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

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

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

Weather Condition _____ Additional Notes _____

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

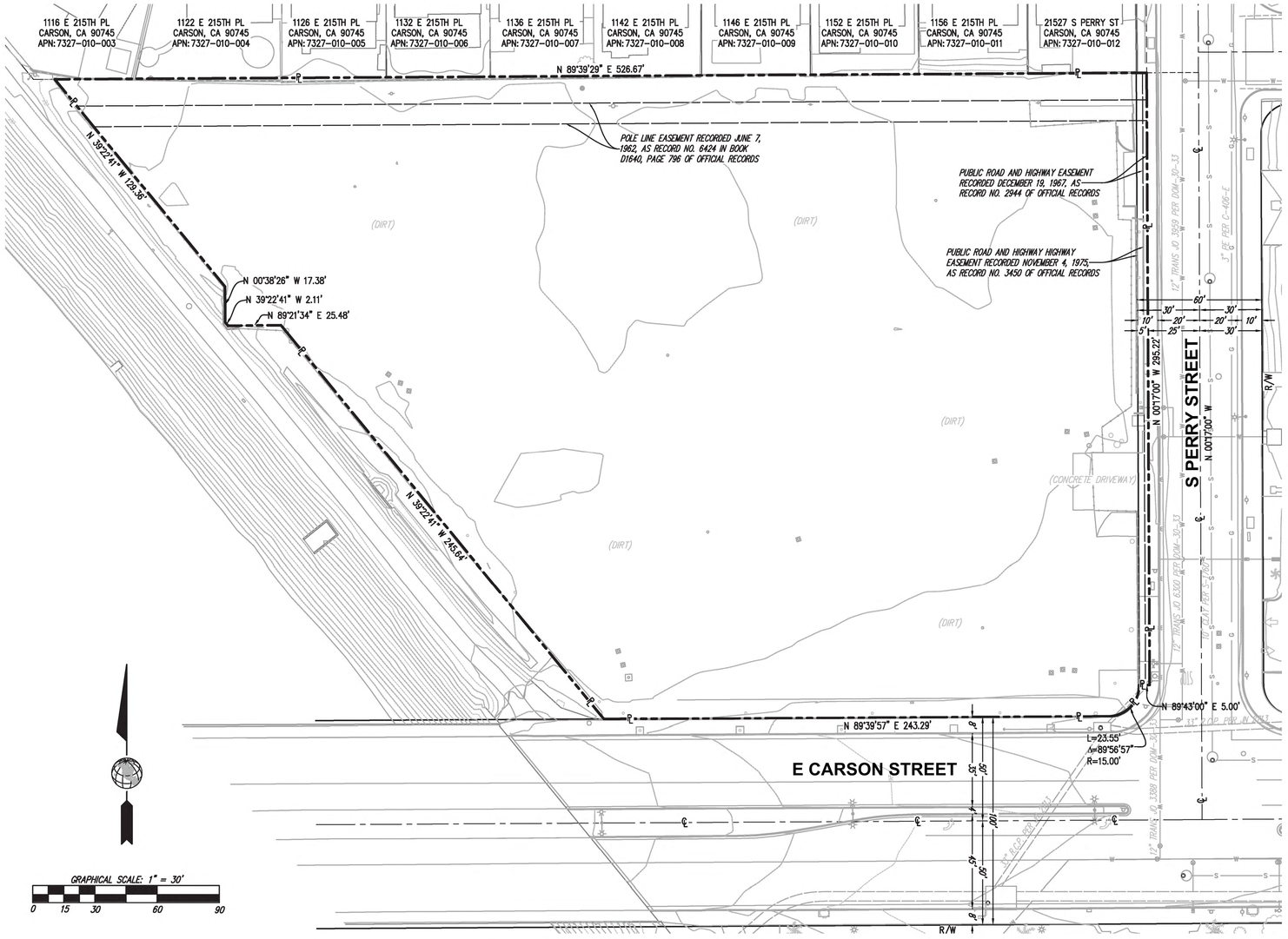
Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins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

Comments:

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

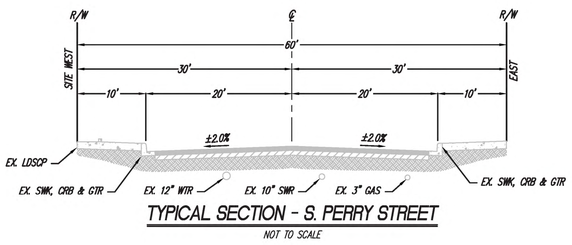
Attachment F

Plans



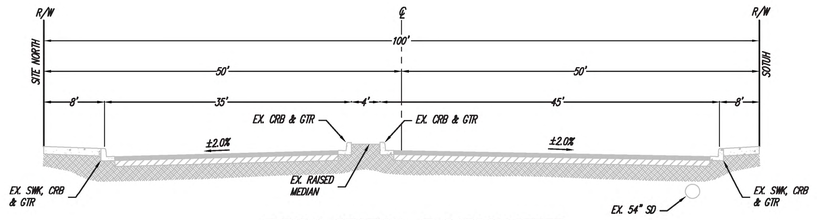
GRAPHICAL SCALE: 1" = 30'

0 15 30 60 90



TYPICAL SECTION - S. PERRY STREET

NOT TO SCALE



TYPICAL SECTION - E. CARSON STEET

NOT TO SCALE

EXISTING LEGEND:

ITEM	SYMBOL
PROPERTY LINE	
CENTERLINE	
RIGHT-OF-WAY	
EASEMENT	
EX. CONTOUR	552
EX. CURB & GUTTER	

OWNER:

RECREATION ROAD LLC

SITE ADDRESS:

21611 SOUTH PERRY STREET
CARSON, CA 90745

ASSESSOR'S PARCEL NUMBER:

7327-010-014 & 7327-010-015

TITLE INFORMATION:

TITLE INFORMATION FOR THIS SURVEY BASED ON A PRELIMINARY REPORT PREPARED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY AS ORDER NO. 09174014-917-EQ., DATED: AUGUST 4, 2020.

LEGAL DESCRIPTION:

THAT PORTION OF LOT 15 OF TRACT NO. 4054, IN THE CITY OF CARSON, COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 44, PAGES 39 THROUGH 41 INCLUSIVE OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE NORTHERLY LINE OF THE SOUTHERLY 20 FEET OF SAID LOT WITH A LINE PARALLEL WITH AND NORTHEASTERLY 27 FEET, MEASURED AT RIGHT ANGLES, FROM THE SOUTHWESTERLY LINE OF SAID LOT; THENCE ALONG SAID PARALLEL LINE NORTH 39°21'48" WEST 245.64 FEET; THENCE SOUTH 89°22'27" WEST 25.48 FEET; THENCE NORTH 39°21'48" WEST 2.11 FEET; THENCE NORTH 00°37'33" WEST 17.38 FEET TO A LINE PARALLEL WITH AND NORTHEASTERLY 18 FEET, MEASURED AT RIGHT ANGLES, FROM SAID SOUTHWESTERLY LINE; THENCE ALONG SAID LAST MENTIONED PARALLEL LINE NORTH 39°21'48" WEST TO THE SOUTHERLY LINE OF TRACT NO. 29360, AS PER MAP RECORDED IN BOOK 734, PAGES 45 AND 46 OF MAPS; THENCE EASTERLY ALONG SAID SOUTHERLY LINE TO THE EASTERLY LINE OF SAID LOT 15; THENCE SOUTHERLY ALONG SAID EASTERLY LINE TO SAID NORTHERLY LINE; THENCE WESTERLY ALONG SAID NORTHERLY LINE TO THE POINT OF BEGINNING.

EXCEPT THEREFROM THAT PORTION OF SAID LAND DESIGNATED AS PARCELS 2-36 INCLUSIVE IN THE FINAL DECREE OF CONDEMNATION ENTERED IN SUPERIOR COURT, LOS ANGELES COUNTY, CASE NO. 909,461, A CERTIFIED COPY OF WHICH WAS RECORDED AUGUST 26, 1969 AS INSTRUMENT NO. 2734, IN BOOK D-4478, PAGE 350 OF OFFICIAL RECORDS OF SAID COUNTY AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE EASTERLY LINE OF SAID LOT WITH THE NORTHERLY LINE OF THE SOUTHERLY 20 FEET OF SAID LOT; THENCE WESTERLY ALONG SAID NORTHERLY LINE 19.99 FEET TO THE BEGINNING OF A CURVE CONCAVE TO THE NORTHWEST, HAVING A RADIUS OF 15 FEET, TANGENT TO SAID NORTHERLY LINE AND TANGENT TO THE WESTERLY LINE OF THE EASTERLY 5 FEET OF SAID LOT; THENCE NORTHEASTERLY ALONG SAID CURVE 23.55 FEET TO SAID WESTERLY LINE; THENCE EASTERLY AT RIGHT ANGLES FROM SAID WESTERLY LINE 5 FEET TO SAID EASTERLY LINE; THENCE SOUTHERLY ALONG SAID EASTERLY LINE 14.99 FEET TO THE POINT OF BEGINNING.

VERTICAL BENCHMARK:

DESCRIPTION: LOS ANGELES COUNTY PUBLIC WORKS BENCHMARK NUMBER "Y 10545" IN TOP OF CURB ON SOUTH SIDE OF E 213TH STREET APPROXIMATELY 40 FEET WEST OF THE CENTERLINE OF PERRY STREET (APPROXIMATELY 1,010' NORTH OF SITE)

ELEVATION: 18.248' (NAVD88)

SOURCE OF TOPOGRAPHY:

TOPOGRAPHY SHOWN HEREON IS BASED ON AERIAL PHOTOGRAMMETRIC MAPPING CONDUCTED BY PRECISION UAV. HORIZONTAL AND VERTICAL GROUND CONTROL WERE ESTABLISHED BY OMEGA LAND SURVEYING, INC. ON FEBRUARY 01, 2021 WITH SUPPLEMENTAL DATA COLLECTED ON FEBRUARY 03, 2021.

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CENTERLINE OF PERRY STREET AS SHOWN ON SUBDIVISION MAP FOR TRACT NO. 29360 FILED IN BOOK 734, PAGE 46-47, OF MAP RECORDS, SAID BEARING BEING "N 00°17' W".

AREA SUMMARY:

TOTAL PARCEL AREA (NET)	110,643	SF
TOTAL PARCEL AREA (GROSS)	112,119	SF

GRADING INFORMATION:

CUT (TO FINISH SURFACE)	357	CY
FILL (TO FINISH SURFACE)	4,199	CY
UNDERCUTS	4,281	CY
REMEDIAL GRADING	15,037	CY
EXPORT (IMBALANCE)	725	CY

EASEMENTS:

(4) POLE LINE EASEMENT RECORDED JUNE 7, 1962, AS RECORD NO. 6424 IN BOOK D1640, PAGE 796 OF OFFICIAL RECORDS.

(5) PUBLIC ROAD AND HIGHWAY EASEMENT RECORDED DECEMBER 19, 1967, AS RECORD NO. 2944 OF OFFICIAL RECORDS.

(7) PUBLIC STREET OR HIGHWAY EASEMENT RECORDED NOVEMBER 4, 1975, AS RECORD NO. 3450 OF OFFICIAL RECORDS.

PLAN PREPARED BY:

OMEGA
ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE. SUITE B
SAN DIEGO, CA 92123
PH:(858) 634-8620 FAX:(858)-634-8627

FILENAME: P:\DWG OMEGA\0633 PARING SS CARSON\ACAD\DISCRETIONARY\0633-CDP-01-CONSTRAINTS.DWG DATE: 10/5/2021 11:20:02 AM

PERRY STREET
CARSON STREET SS
CARSON, CA

REGISTERED PROFESSIONAL ENGINEER SEAN M. SAVAGE No.75677 CIVIL STATE OF CALIFORNIA

FOR PLAN CHECK ONLY

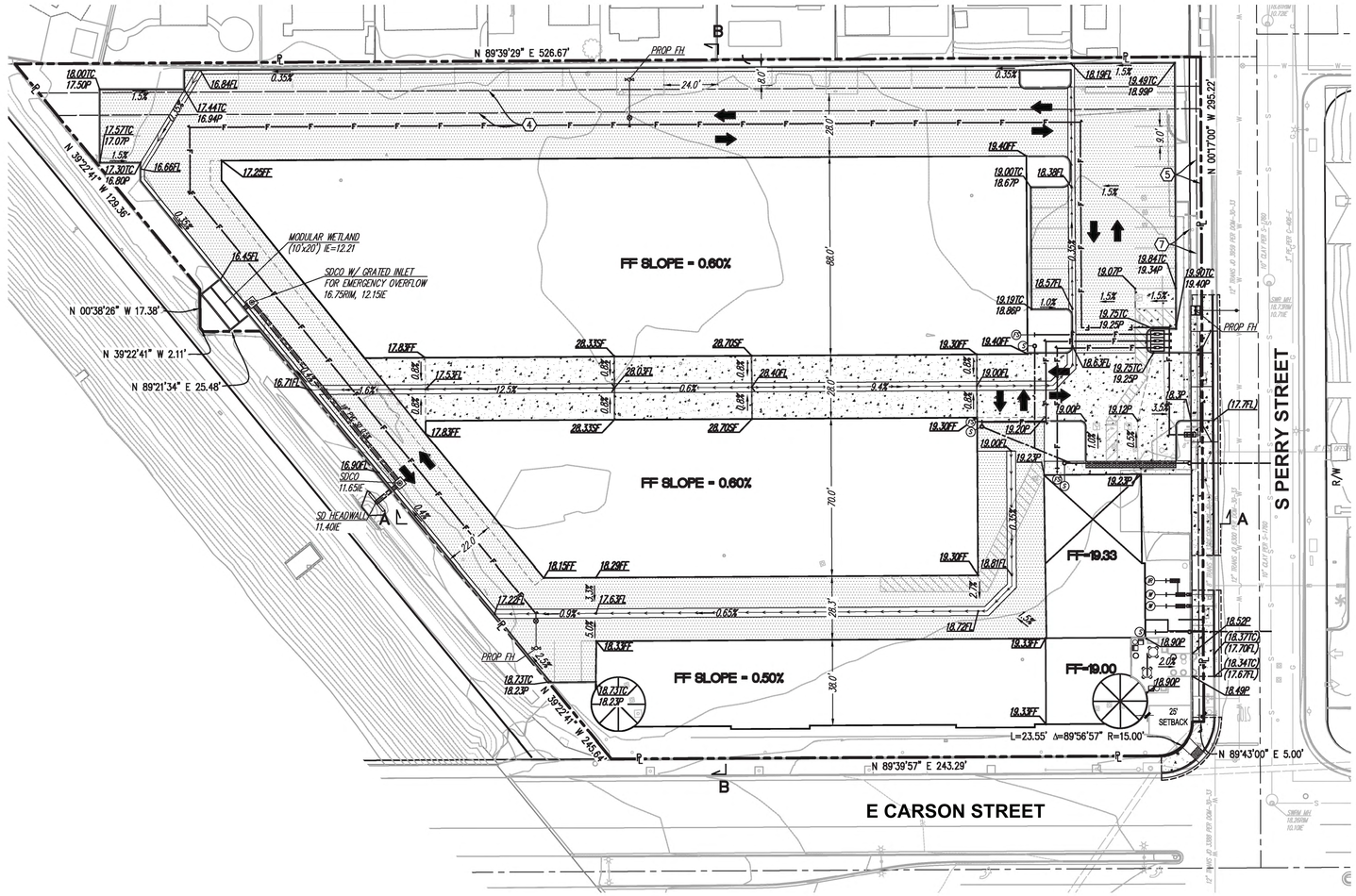
SEAN M. SAVAGE R.C.E. 75677 DATE

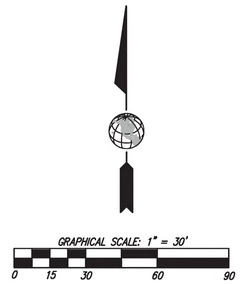
JOB NUMBER: 20-817

DATE: 10/05/2021

J. ORDAN ARCHITECTS
131 CALLE IGLESIA, SUITE 100
SAN CLEMENTE, CA 92672
949.388.8090

PRELIMINARY GRADING PLAN





PLAN PREPARED BY:

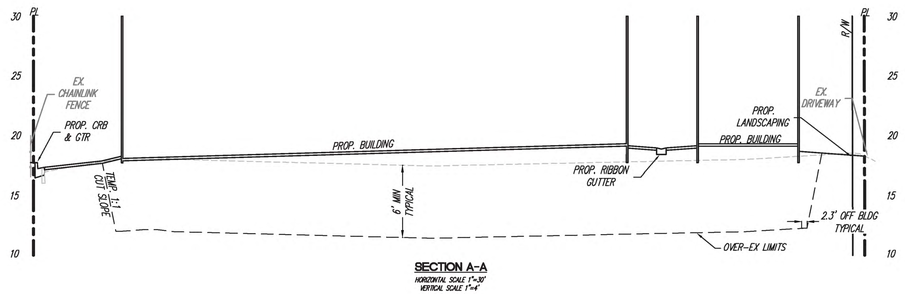
OMEGA
ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE, SUITE B
SAN DIEGO, CA 92123
PH:(858) 634-8620 FAX:(858)-634-8627

EXISTING LEGEND

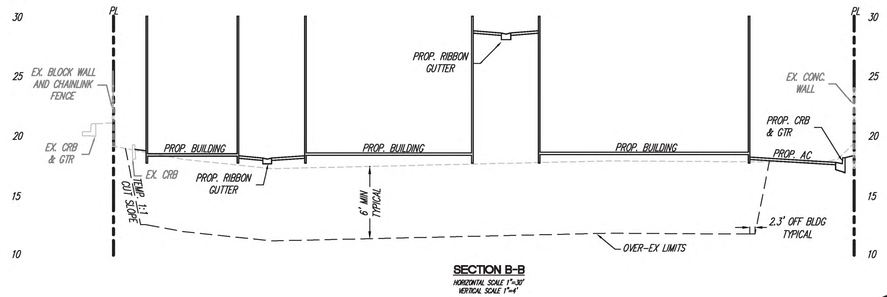
ITEM	SYMBOL
PROPERTY LINE	
CENTERLINE	
RIGHT-OF-WAY	
EX. CONTOUR	552
EX. CURB & GUTTER	

PROPOSED LEGEND

ITEM	SYMBOL
PROPOSED GRADE BREAK	
PROPOSED FINISH FLOOR SLOPE	FF SLOPE =0.5%
PROPOSED FINISH FLOOR ELEVATION	374.00FF
PROPOSED PAVEMENT ELEVATION	374.00P
PROPOSED FLOWLINE ELEVATION	374.00FL
PROPOSED GRADIANT	1.1%
PROPOSED 6" PCC CURB	
PROPOSED 6" PCC CURB & GUTTER	
PROPOSED FLOW LINE	
PROPOSED BUILDING	
PROPOSED PARKING STALL STRIPING	
PROPOSED HANDICAP STRIPING	
PROPOSED PVT. STORM DRAIN (SIZE PER PLAN)	
PROPOSED PVT. FIRE SERVICE LATERAL	
PROPOSED PVT. SEWER LATERAL	
PROPOSED SEWER POINT OF CONNECTION	S
PROPOSED FIRE POINT OF CONNECTION	FS
PROPOSED FIRE SERVICE BACKFLOW	DCDA
PROPOSED FDC/PIV	
PROPOSED FIRE HYDRANT	
PROPOSED PVT. STORM DRAIN CLEAN OUT/CONNECTION (SIZE AND TYPE PER PLAN)	
PROPOSED PVT. PCC PAVEMENT WALK	
PROPOSED PVT. ADA RAMP	
PROPOSED PVT. AC PAVEMENT HEAVY DRIVE AISLE	
PROPOSED PVT. MODULAR WETLAND	



SECTION A-A
HORIZONTAL SCALE 1"=30'
VERTICAL SCALE 1"=4'



SECTION B-B
HORIZONTAL SCALE 1"=30'
VERTICAL SCALE 1"=4'

PERRY STREET
CARSON STREET SS
CARSON, CA

REGISTERED PROFESSIONAL ENGINEER
SEAN M. SAVAGE
No.75677
CIVIL
STATE OF CALIFORNIA

FOR PLAN CHECK ONLY

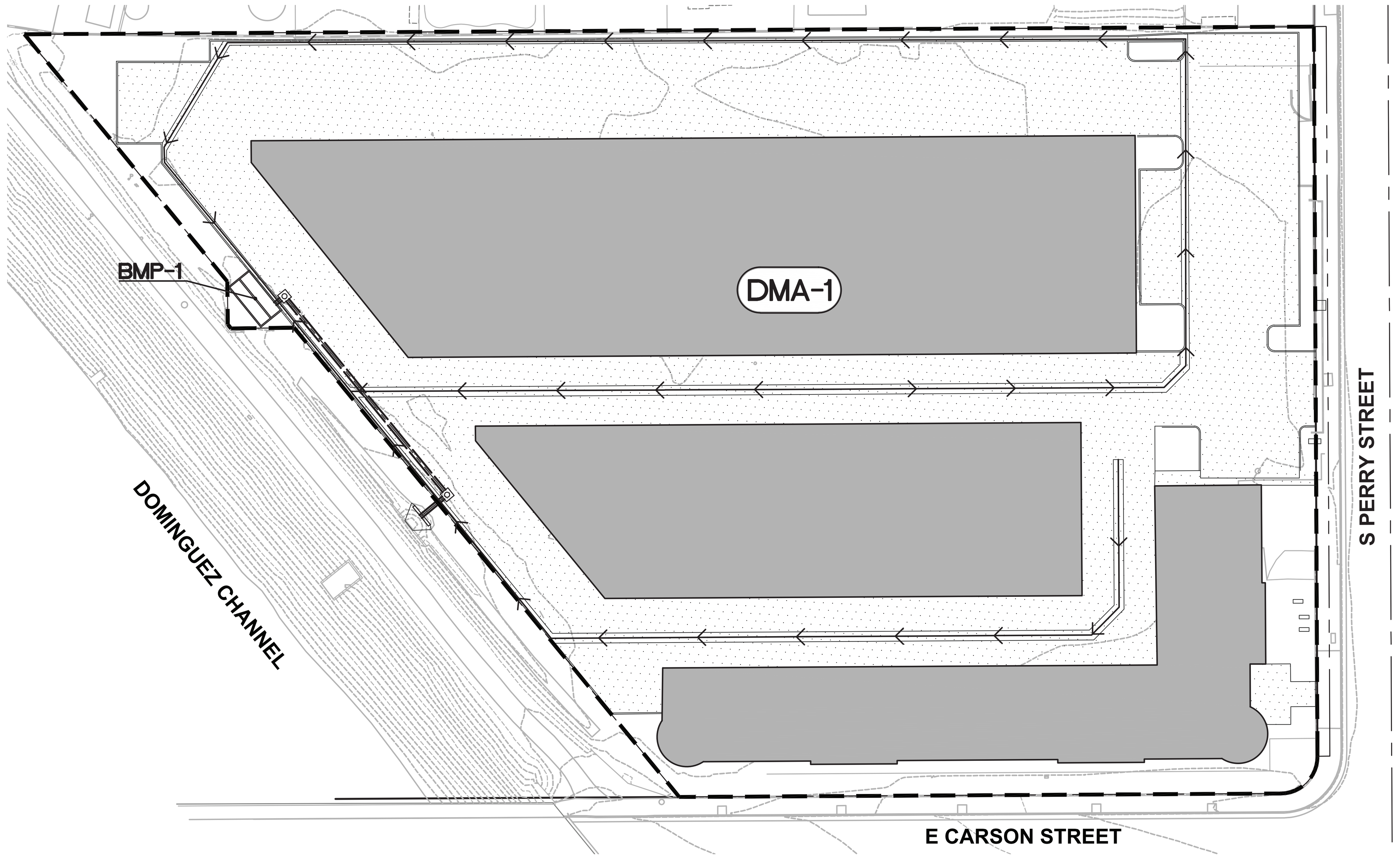
SEAN M. SAVAGE R.C.E. 75677 _____ DATE

JOB NUMBER: 20-817

DATE: 10/05/2021

J. ORDAN
ARCHITECTS
131 CALLE IGLESIA, SUITE 100
SAN CLEMENTE, CA 92672
949.388.8090

FILENAME: P:\DWG OMEGA\0633 FABRIC SS CARSON\ACAD\DISCRETIONARY\0633-GDP-02-GDP.DWG DATE:10/5/2021 12:24:33 PM



LEGEND

- AREA LIMITS
- FLOW ARROWS
- BUILDING AREA
- PAVEMENT AREA
- DRAINAGE MGMT AREA (DMA) NUMBER — DMA-1

PLAN PREPARED BY:

OMEGA ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE. SUITE B
SAN DIEGO, CA 92123
PH:(858) 634-8620 FAX:(858)-634-8627

DMA DATA TABLE

DMA-NO.	TOT. AREA (SF)	IMPERVIOUS (%)	REQ'D FLOWRATE (CFS)	BMP FLOWRATE (CFS)	TYPE/TREATED BY
DMA-1	120,644	89.8	0.702	0.710	BMP-1/MODULAR WETLAND

GENERAL STORM WATER NOTES

1. GROUNDWATER IS ANTICIPATED AT APPROXIMATELY 12.5 FEET BELOW EXISTING GRADE ON SITE.
2. NO EXISTING NATURAL HYDROLOGIC FEATURES
3. NO SIGNIFICANT ECOLOGICAL AREAS ON SITE
4. ALL APPLICABLE SOURCE CONTROL BMPS SHALL BE IMPLEMENTED
   5A. SOURCE CONTROL NOTES TO COME IN MINISTERIAL REVIEW

Peak Flow Hydrologic Analysis

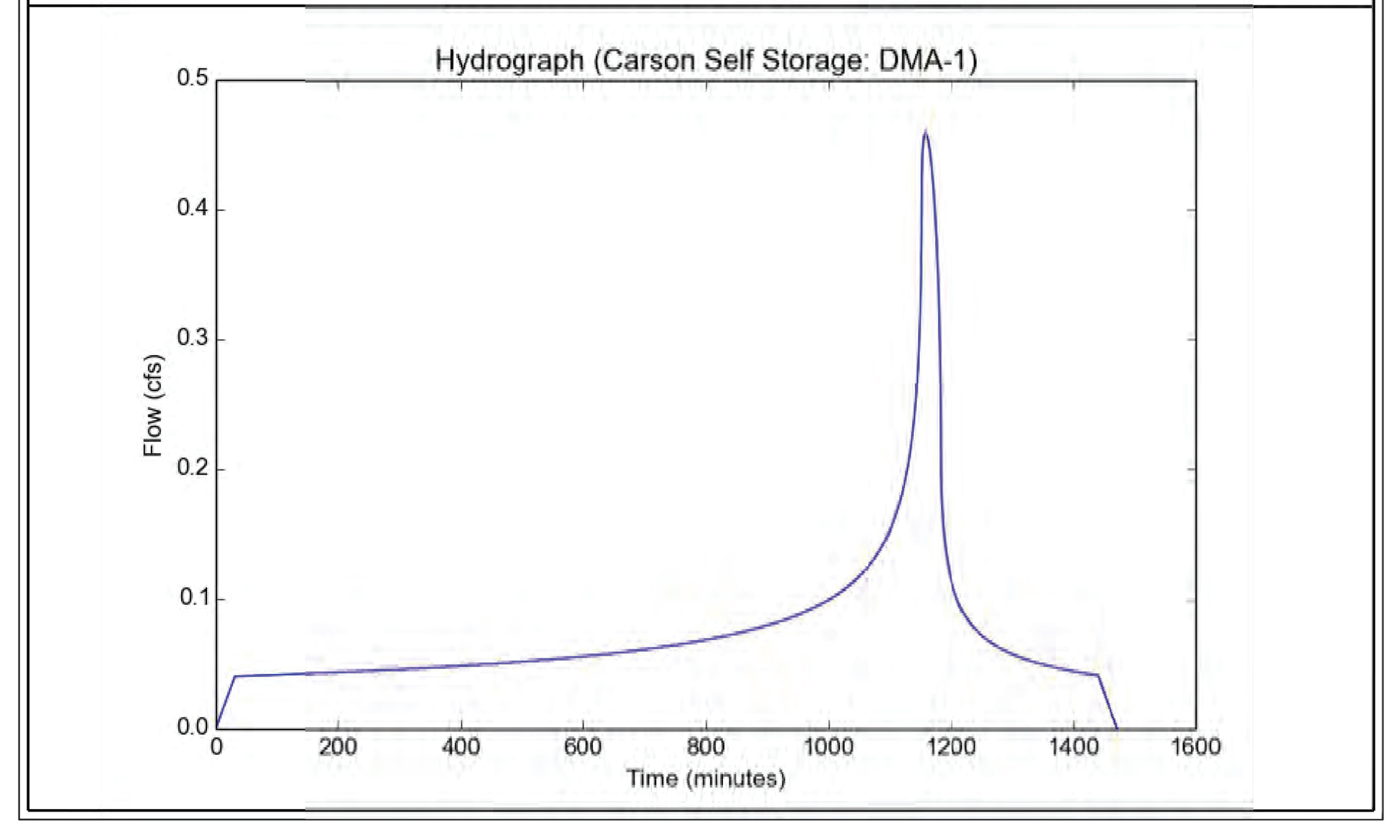
File location: P:/DWG OMEGA/0633 Faring SS Carson/STORMWATER REPORTS/Water Quality/ATTACHMENTS/85th Percentile Hydro
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carson Self Storage
Subarea ID	DMA-1
Area (ac)	2.77
Flow Path Length (ft)	475.0
Flow Path Slope (vft/hft)	0.006
85th Percentile Rainfall Depth (in)	0.8
Percent Impervious	0.898
Soil Type	3
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.8
Peak Intensity (in/hr)	0.2025
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.8184
Time of Concentration (min)	31.0
Clear Peak Flow Rate (cfs)	0.459
Burned Peak Flow Rate (cfs)	0.459
24-Hr Clear Runoff Volume (ac-ft)	0.1499
24-Hr Clear Runoff Volume (cu-ft)	6528.9479



PROJECT HYDROGRAPH

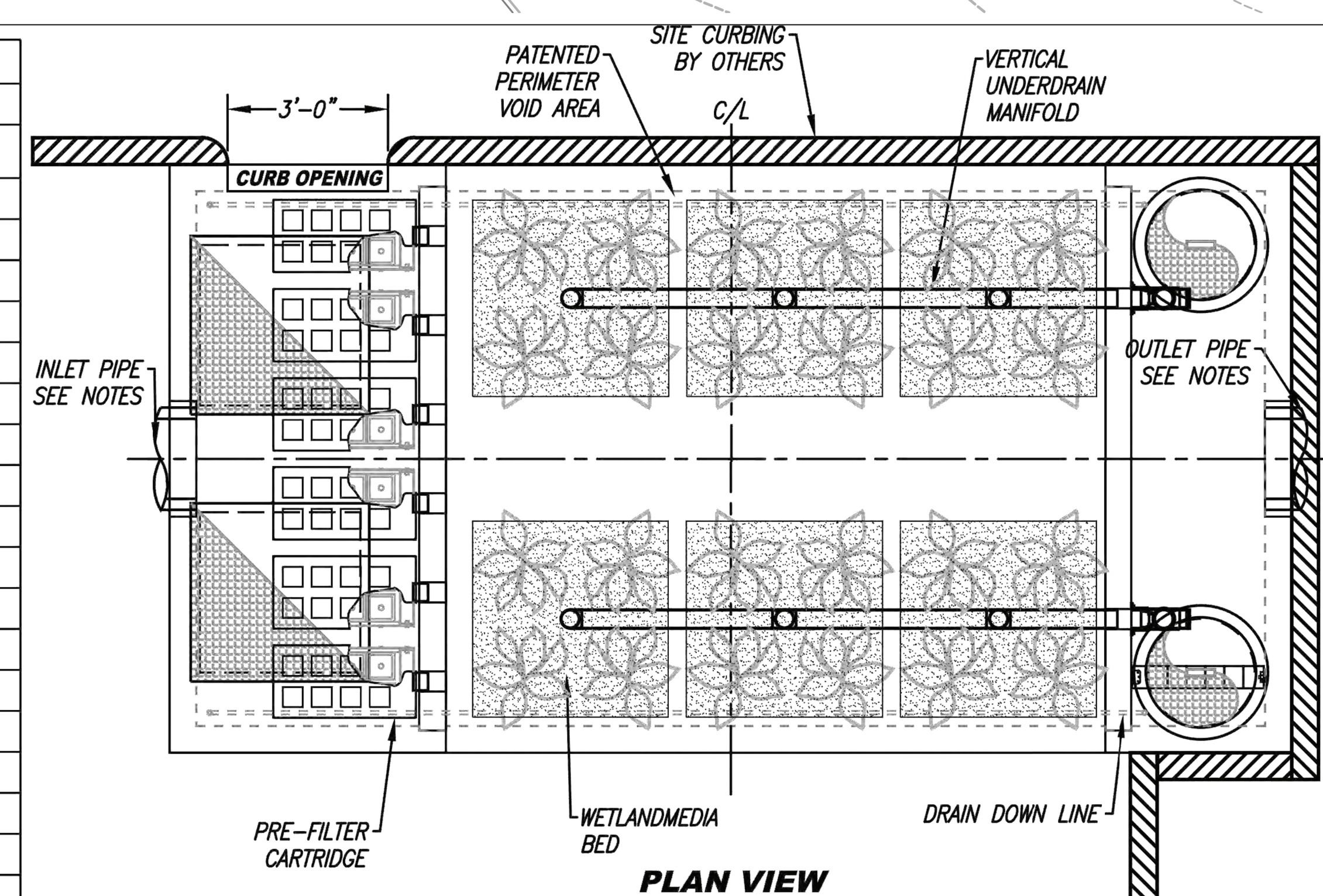
GRAPHICAL SCALE: 1" = 40'

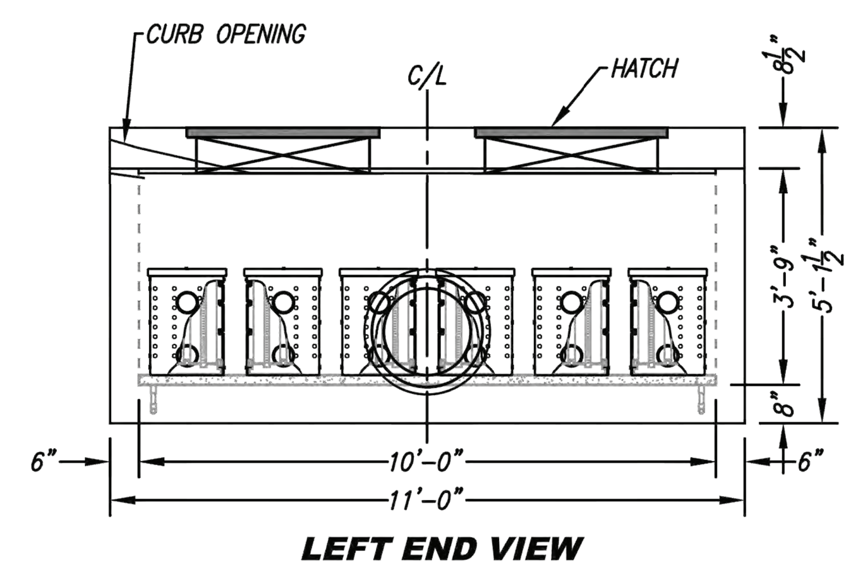
0 20 40 80 120

SITE SPECIFIC DATA

PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.710	
TREATMENT HGL AVAILABLE (FT)			N/K
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			FLOW BY
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESIRIAN	OPEN PLANIER	PEDESTRIAN
FRAME & COVER	2 EA 36" X 36"	N/A	2 EA ø24"
WETLANDMEDIA VOLUME (CY)			
ORIFICE SIZE (DIA. INCHES)			2 EA ø2.67"

NOTES: PRELIMINARY. NOT FOR CONSTRUCTION.



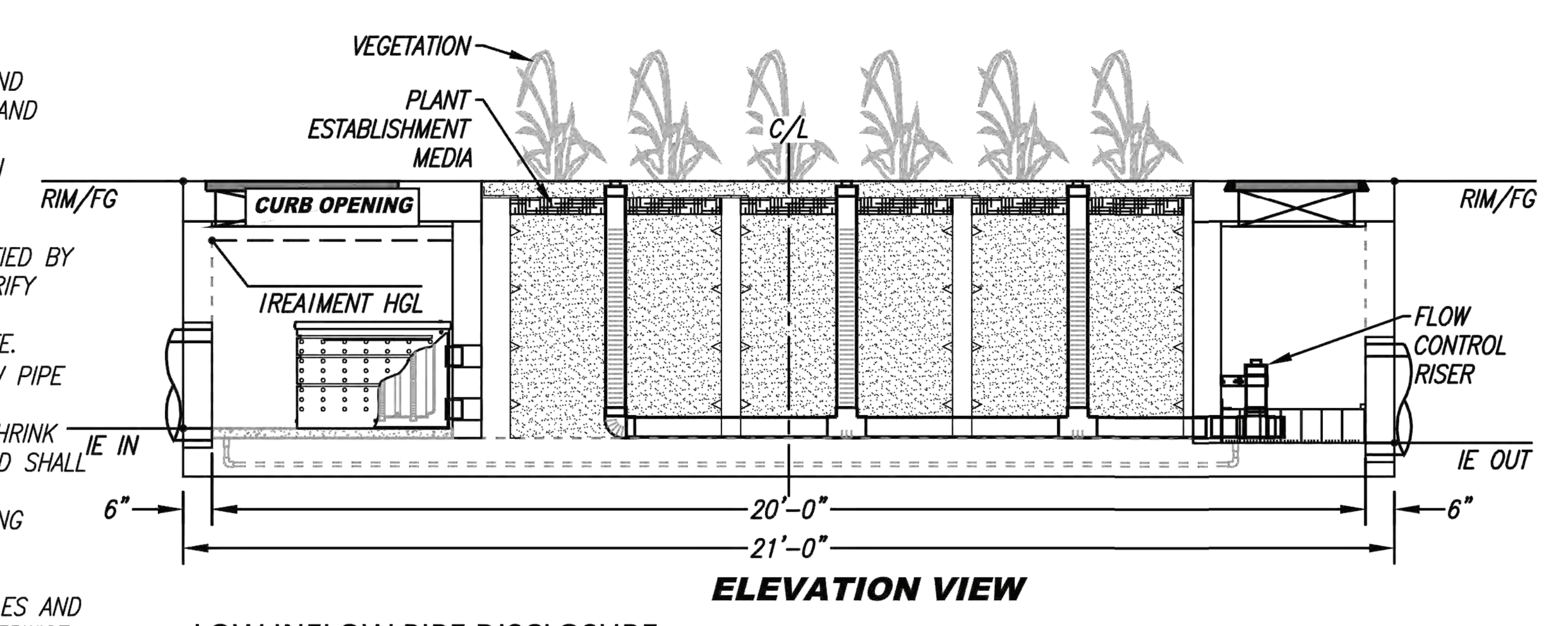


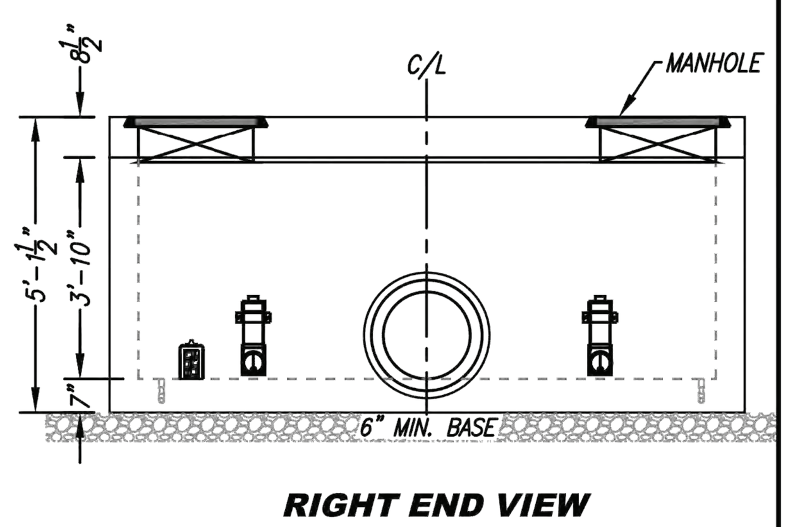
INSTALLATION NOTES

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

GENERAL NOTES

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





LOW INFLOW PIPE DISCLOSURE:

IT IS RECOMMENDED THAT A SUFFICIENT VARIATION IN ELEVATION BETWEEN THE INLET AND OUTLET BE PROVIDED TO ALLOW FOR ACCUMULATION OF SEDIMENT IN THE PRE-TREATMENT CHAMBER. FAILURE TO DO SO MAY RESULT IN BLOCKAGE AT INFLOW POINT(S) WHICH MAY CAUSE UPSTREAM FLOODING.

TREATMENT FLOW (CFS)	0.710
OPERATING HEAD (FT)	3.5
PRETREATMENT LOADING RATE (GPM/SF)	2.1
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

Bio Clean
A Forterra Company

MWS-L-10-20-4'-5.5"-C-HC
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

MODULAR WETLAND DETAIL

NOT TO SCALE

PERRY STREET
CARSON STREET SS
CARSON, CA

REGISTERED PROFESSIONAL ENGINEER
SEAN M. SAVAGE
No.75677
CIVIL
STATE OF CALIFORNIA

FOR PLAN CHECK ONLY

SEAN M. SAVAGE R.C.E. 75677 DATE

JOB NUMBER: 20-817

DATE: 10/05/2021

JORDAN ARCHITECTS
131 CALLE IGLESIA, SUITE 100
SAN CLEMENTE, CA 92672
949.388.8090

SEE DETAIL CROSS SECTION TYPE 3, SH. 17

SEE DETAIL CROSS SECTION-TYPE 4, SH. 18

SEE DETAIL CROSS SECTION-TYPE 5, SH. 18

Clay lining on side slopes

Clay lining not required

Clay lining on lower side slopes

Proposed relocation 33" steel water pipe Dominguez Water Co.

Gaging Station

Sta. 349+30

Sta. 350+19.55 ℄ Carson St.

Carson St. bridge

Sta. 351+29

Sta. 352+00

Sta. 352+30

Sta. 352+50

Sta. 351+61

Sta. 358+45

Sta. 359+75

El. 17.86

Top of access road surfacing.

Top of Levee

Water Surface

S=.00016836

Q=16,590 c.f.s.

Q=16,340 c.f.s.

S=.00022440

S=.00022637

El. 18.06

El. 11.41

El. 11.60

29.48'

29.27'

SEE SH. 6

SEE SH. 8

STA. 348+00

STA. 359+00

MATCH LINE

24" C.M.P.

Conc. pile Bent No. 3

Reconst. 42" R.C.P. Outlet (N.E. Levee) Plan 8, Sh. 23

60" R.C.P. Levee drain S.W. Levee, see Sh. 28

33" Steel Water pipe Dominguez Water Co.

Bond Issue Project No. 540

60" R.C.P. Levee drain N.E. Levee, see Sh. 28

12" pipe line Cheviot Hills Pipeline Co.

2-(8'ϕ10") pipe lines Richfield Oil Corp.

Existing ground line along ℄ of Construction

18" R.C.P. - Vertical drain N.E. Levee

60" R.C.P. Levee drain N.E. Levee, see Sh. 28

℄ Subdrainage Outlet Both Levees, see Sh. 19 ℄ 21

℄ Subdrainage Outlet S.W. Levee, see Sh. 19 ℄ 21

℄ Subdrainage Outlet N.E. Levee, see Sh. 19 ℄ 21

℄ Grade Line

12" pipe line Cheviot Hills Pipeline Co.

4-(8",10",12"ϕ12") pipe lines Shell Oil Co.

2-(8'ϕ10") pipe lines Richfield Oil Corp.

12" pipe line Cheviot Hills Pipeline Co.

2-(8'ϕ10") pipe lines Richfield Oil Corp.

348+62.10 Back Equation 348+63.91 Ahead

PROFILE

SCALES: HOR. 1"=40'
VERT. 1"= 8'

PROPOSALS 1 AND 2

348+00 349+00 350+00 351+00 352+00 353+00 354+00 355+00 356+00 357+00 358+00 359+00

Storm Drain B1 Project No. 540 Unit 1 - Line B, to be constructed under this contract for details, see Dwgs. 275-340-D1 to 3

Const. Type 1 R/W fence (2-D178)

16" Dominguez Water Co.

2-8" Amine lines Mobil Oil Co.

R/W

Sta. 349+80 60" R.C.P. Levee drain. See Sh. 28.

Sta. 350+19

11" pipe ℄ gate valve

33" Steel water pipe Dominguez Water Co.

Conc. block

36" R.C.P.

Sta. 350+19.55 ℄ Carson St.

Carson St. bridge

Install 12' double drive gate

Const. Type 1 R/W fence (2-D178)

EDGAR ST.

Sta. 352+67.71

Exist. State R/W fence (6'%)

3-30" Mg. Anodes 10' deep - Shell Oil Co.

352+67-358+19 Retaining wall weep holes modified to conform to C.O. #2

Freeway retaining wall to remain in place

NO. 4054

Freeway ramp

Freeway R/W

F.C. R/W

Access road

Sta. 358+19.76

Fence along toe of freeway fill.

Relocate State R/W fence.

Sta. 348+91.20 ℄ Dominguez Water Co. Project No. 540

Sta. 349+43

Conc. pier

No. 1 Abut.

No. 2

T.W. No. 846 F

12" Side sub-drainage pipe

Sta. 351+60

Sta. 352+50

Sta. 352+00 ℄ Subdrain manhole. See Sh. 19 ℄ 21

Sta. 358+45 ℄ Subdrain manhole See Sh. 19 ℄ 21.

Stone revetment

Existing State R/W fence. (6'%)

BORING NO. 213 B

BORING NO. 214 A

BORING NO. 215

Toe of slope

2-(8'ϕ10") pipe lines. Richfield Oil Corp.

12" pipe line. Cheviot Hills Pipeline Co.

FLOW

Sta. 355+10±

Sta. 353+58±

Wood piling

12" pipe line Cheviot Hills Pipeline Co.

Remove portions of 7' board fence within R/W

Proposed relocation, ℄ 33" steel water pipe Dominguez Water Co. (By others)

24" C.M.P. - F.C.

Gaging Station See note to right

Conc. pier

Bents

No. 3

Sta. 350+19.55 ℄ Carson St.

4-(8",10",12"ϕ12") pipe lines. Shell Oil Co. (See specs.)

Sta. 348+61.18 Reconst. 42" R.C.P. Outlet, Plan 8, Sh. 23.

Sta. 348+68

Sta. 349+30

Sta. 349+95

Sta. 350+20

No. 4

No. 5 Abut.

Wooden Bulkhead

Sta. 350+95

Sta. 352+50 ℄ Subdrain manhole. See Sheets 19 ℄ 21

Const. retaining wall. For details, see Sh. 45.

12" Side subdrainage pipe

8" Redwood pipe. Dominguez Water Corp.

Valve box Richfield Oil Corp.

Delete 425'± R/W fence C.O. #16

Stone revetment

Access road

Install 12' double drive gate

6" Transite pipe Dominguez Water Corp.

4'x6' Redwood vault - Dominguez Water Co. To be raised by others.

Const. Type 1 R/W fence (2-D178)

3-30" Mg. Anodes 10' deep - Shell Oil Co.

Sta. 351+25 60" R.C.P. Levee drain. See Sh. 28.

Note: For details of access roads @ Carson St., see Sh. 33.

Plan Hold Corp.

TRACT

CARSON

PLAN

SCALE: 1"=40'

25 0 50 100

18" R.C.P. drain (2-D182)

2-(8'ϕ10") pipe lines Richfield Oil Corp.

12" pipe line Cheviot Hills Pipeline Co.

12" pipe line Cheviot Hills Pipeline Co.

2-(8'ϕ10") pipe lines Richfield Oil Corp.

Const. Type 1 R/W fence (2-D178)

Sta. 358+75 60" R.C.P. levee drain. See Sh. 28.

Note: Utilize existing 60" RCP storm drain located at Sta. 351+25.00 to discharge into Dominguez Channel.

Varies

Varies Varies

℄ Const.

Exist. ground line

20 Stone revetment

Grade line

Filter blanket 19

Clay lining (where req'd) not shown. See Sh. 17 ℄ 18.

2:1 2:1 2:1

2' 2' 15'

44' 44' 98'

Note: Base width varies thru Carson St. bridge. See Plan.

TYPICAL SECTION

STA. 348+00 TO STA. 359+00

SCALE: 1" = 40'

Note: Gaging Station will be removed by District forces, during construction in this area.

"AS BUILT" DRAWING

LAGUNA DOMINGUEZ FLOOD CONTROL SYSTEM

REVISIONS		
MARK	DATE	DESCRIPTION
△1	7-26-63	Relocated pipe lines-Richfield Oil Corp & Cheviot Hills Pipeline.
△2	7-26-63	Relocated subdrainage M.H.
3	12-21-66	Permit 64793-Dwg. 23-F897
■	8-28-67	"As Built" correction

DRAWN BY K.O. & N.B. DESIGNED BY

TRACED BY SUBMITTED BY D.N.M.

CHECKED BY G.J.M.

RECOMMENDED BY K.B. Keefer DIVISION ENGINEER (CORDON)

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

DOMINGUEZ CHANNEL

WILMINGTON AVE. TO AVALON BLVD.

CHANNEL EXCAVATION, CLAY LINING AND STONE REVETMENT

PLAN AND PROFILE

STA. 348+00 TO STA. 359+00

APPROVED BY

CHIEF ENGINEER

SCALE	DATE	NO. 28-D169.7
AS SHOWN	MAY 1963	SHEET 7 OF 50

"PD004788"

K-E 288HH IMPERIAL TRACING CLOTH—K. & E. CO., N. Y.—REG. U. S. PAT. OFF.

DUEx
DRY UTILITY EXPERTS

DUE DILIGENCE REPORT

Perry St Storage
21611 Perry St
Carson, CA 90745
21611 Perry Street LLC

21611 Perry St
Carson, CA 90745
Attn: Darren Embry

DUEx
17291 Irvine Blvd, Suite 206
Tustin, CA 92780
Tel: (626) 319-3590
www.duexperts.com

E006-2101
Gabriel Camacho
2/21/2022

TABLE OF CONTENTS

PROJECT CONTACTS

- **21611 Perry Street LLC**

  Darren Embry
  (323) 481.9178
  E: Darren@faring.com

- **DUEx**

  17291 Irvine Blvd, Suite 206
  Tustin, CA 92780
  Gabriel Camacho
  P: (626) 319-3590 | E: Gabriel@duexperts.com

- **SOUTHERN CALIFORNIA EDISON**

  P.O. Box 4699, Compton, CA 90224
  1924 Cashdan Street, Compton, CA 90224
  Tel: (310) 608-5023
  Planner to be determined when electrical loads are submitted.

- **SOUTHERN CALIFORNIA GAS**

  Planner to be determined when gas loads are submitted.

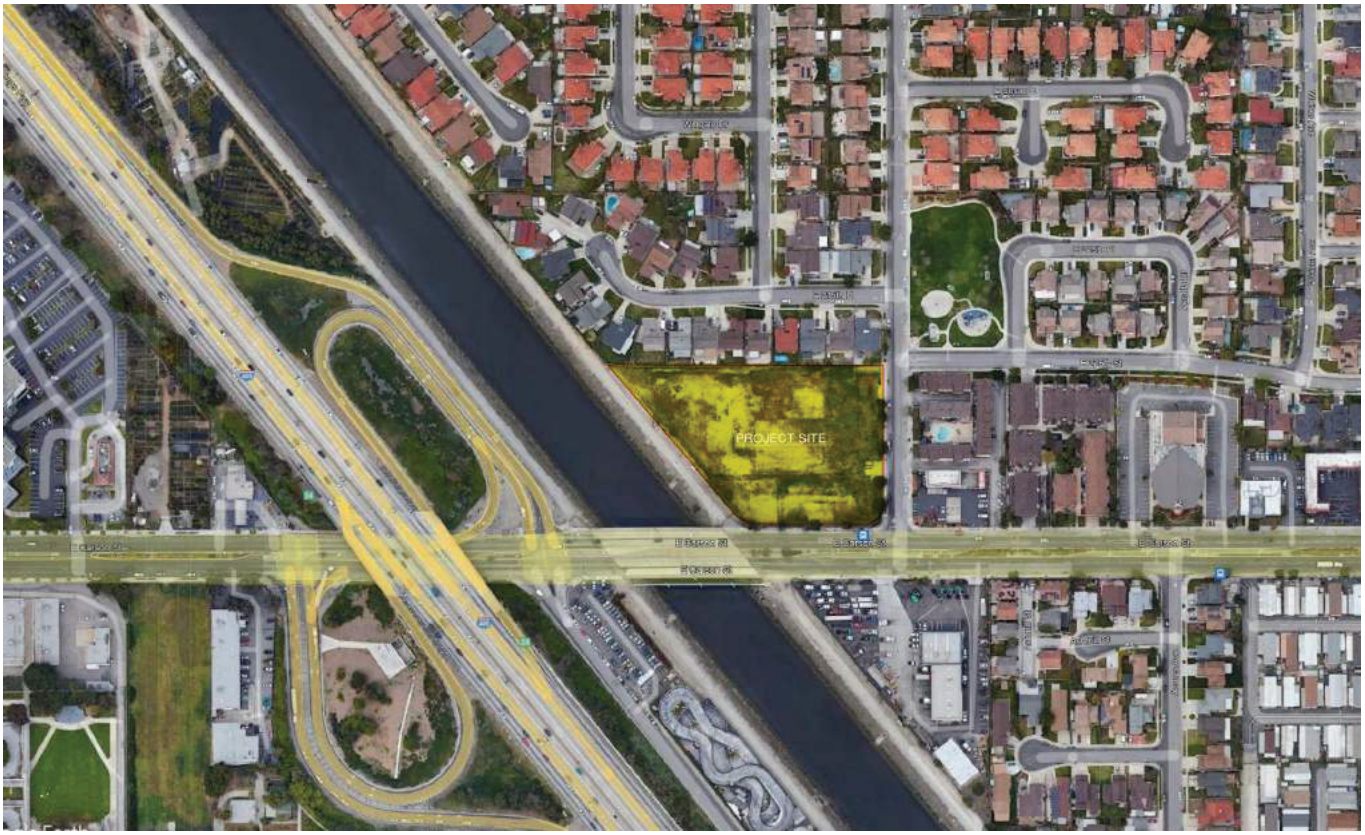
- **AT&T**

  Planner to be determined when service is requested.

- **CHARTER**

  Planner to be determined when service is requested.

VICINITY MAP



PROJECT SUMMARY

SITE SUMMARY

21611 Perry Street LLC is performing due diligence for their project in the city of Carson. DUEx has been retained to provide dry utility feasibility and a summary of findings. This report will summarize closest source and costs.

ELECTRIC: SOUTHERN CALIFORNIA EDISON

SCE will be the electric service provider for this project. Records are attached.

Title 24 of the California Code of Regulations regulates energy consumption in new construction. The standards regulate energy consumed in buildings for heating, cooling, ventilation, and lighting. Title 24 is implemented through the local plan check and permit process. The current (2016) standards effective date is January 1, 2017, and it applies for new construction of both residential and non-residential buildings.

Existing:

There is no apparent existing electrical structure or equipment on site but will be verified during the removal process.

Proposed:

- **Temporary Power:** There is overhead power available from the pole at the south-east corner of the property which can be a potential source, given that the temporary power is no more than 200A-600A Single Phase.

- **Permanent Power:** SCE will need to run primary cabling from the existing Edison manhole on Perry St. to the proposed onsite 10'x12' transformer pad approximately 175' away. Based off historical data provided by SCE, to service buildings of this size & expected usage in this climate zone, we anticipate a single transformer to feed the entire site. We've provided all estimated kVA's per building on the proposed utility exhibit.

GAS: SOUTHERN CALIFORNIA GAS COMPANY

SoCalGas will be the natural gas provider for this area. Records are attached.

As a public utility, the Southern California Gas Company (the Gas Co.) is under jurisdiction of the California Public Utilities Commission. As mentioned in section 3.2.3, Title 24 of the California Code of Regulations regulates energy consumption in new constructions. The standards regulate energy consumed in buildings for heating, cooling, ventilation, and lighting. Title 24 is implemented through the local plan check and permit process. The Gas Co.'s 2018 Gas Report that commercial and industrial demand is expected to increase at an annual rate of 0.2 percent. This is mainly due to increased efficiency of power plants and the statewide efforts to use renewable sources of energy for electricity generation.

Existing:

There is no apparent existing gas equipment on site but will be verified during the removal process.

Proposed:

The nearest gas mainline is located on Perry St. east of the property. SoCal Gas will need to obtain permits to conduct work in the public right of way.

Please note: Gas meters must be 3' from any open doors and windows, if under an opening window, window must be minimum 10' above. Gas meters must be easily accessible for emergencies & for maintenance.

TELEPHONE: AT&T

AT&T is the telephone and fiber provider for the project. Will Serve Letter attached.

As a private utility, telecommunications service providers operate jurisdiction of the California Public Utilities Commission. As mentioned in section 3.2.3, Title 24 of the California Code of Regulations regulates energy consumption in new constructions. The standards regulate energy consumed in buildings for heating, cooling, ventilation, and lighting. Title 24 is implemented through the local plan check and permit process.

Existing:

There is no apparent existing telephone structure or equipment on site but will be verified during the removal process.

Proposed:

The nearest existing telephone provider tie in point is located overhead on Carson St. AT&T will run their services to our proposed pull box located near Perry St.

The AT&T point of connection is pending confirmation. Development is responsible to route within the property to designed MPOE location.

- Typical AT&T marketing agreement will need to be executed for AT&T to bring fiber to the site.

CATV: CHARTER

Charter is the cable tv and fiber provider for the project. Records are attached.

As a private utility, telecommunications service providers operate jurisdiction of the California Public Utilities Commission. As mentioned in section 3.2.3, Title 24 of the California Code of Regulations regulates energy consumption in new constructions. The standards regulate energy consumed in buildings for heating, cooling, ventilation, and lighting. Title 24 is implemented through the local plan check and permit process.

Existing:

There is no apparent existing cable TV structure or equipment on site but will be verified during the removal process.

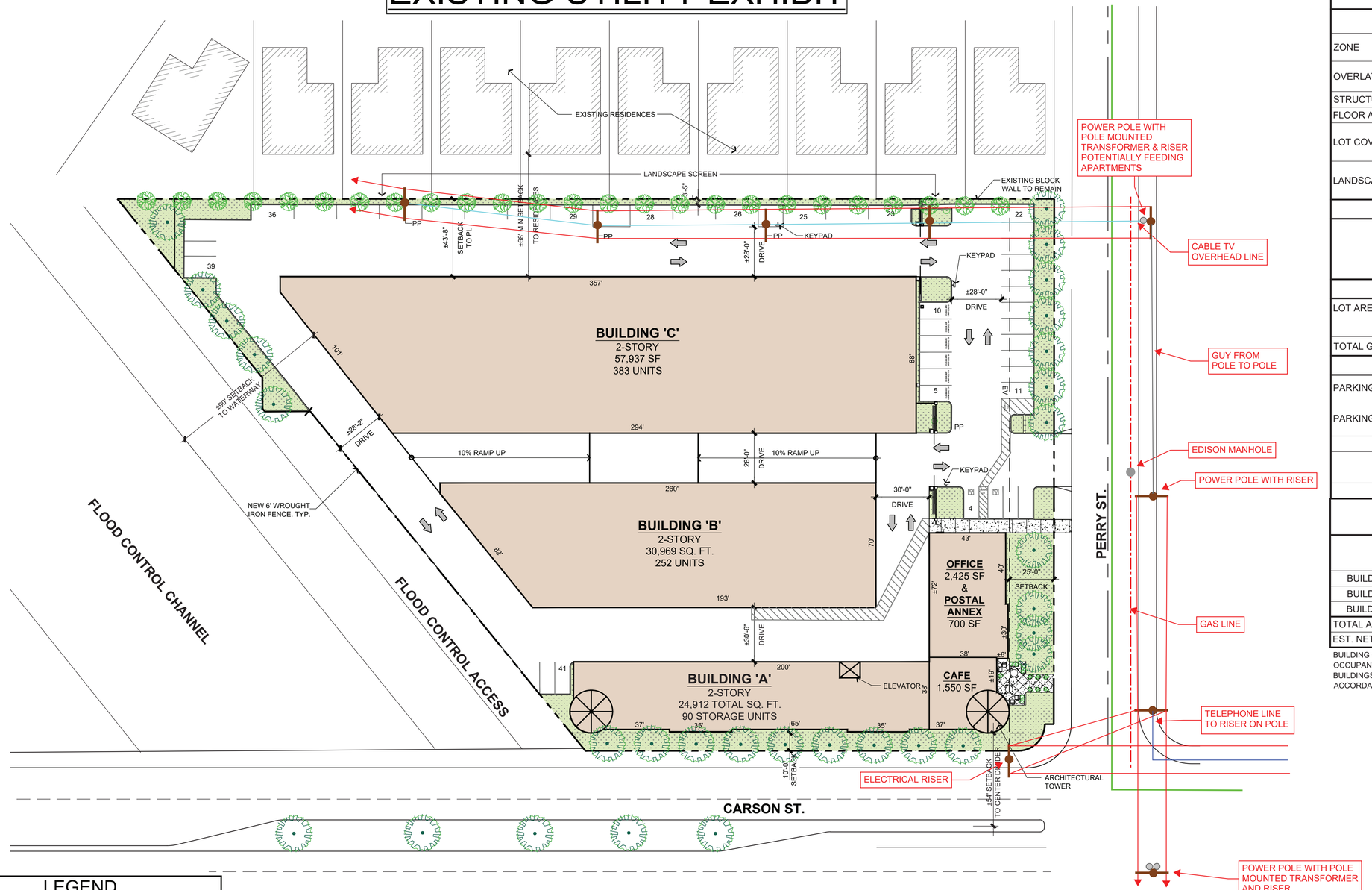
Proposed:

The nearest existing cable provider tie in point is located overhead on the north side of the property near Perry St. Charter will run their services to our proposed pull box located near Perry St.

The Charter point of connection is pending confirmation. Development is responsible to route within the property to designed MPOE location.

- Typical Charter marketing agreement will need to be executed for Charter to bring fiber to the site.

EXISTING UTILITY EXHIBIT



BASIS OF DESIGN

	REQUIRED / EXISTING	PROVIDED / PROPOSED
ZONE	ML - MANUFACTURING, LIGHT	TBD
OVERLAY	D OVERLAY	
STRUCTURE HEIGHT	N/A	TBD
FLOOR AREA RATIO	.5 (GP)	.99 (118,928)
LOT COVERAGE	-	46.6% (56,906 S.F.)
LANDSCAPE	-	±23,000 S.F. (18.8%) LANDSCAPE AREA

SETBACKS

FRONT	25'	25 FT. MIN.
STREET SIDE	10 FT.	10 FT. MIN
REAR (RESIDENTIAL)	10 FT.	40 FT. MIN
INTERIOR SIDE	10 FT.	28' FT. MIN.

SITE DATA

LOT AREA	121,968	SQ. FT.
	2.8	ACRES
TOTAL GROSS BLDG. AREA	113,805	SQ. FT.

PARKING

PARKING SPACES	1 SPACE PER 20 UNITS 725/20 = ±36 STALLS	41 SPACES
PARKING SIZE	STANDARD: 8.5' X 18' PARALLEL: 8' X 24'	STANDARD: 8.5' X 18' PARALLEL: 8' X 24'

PARKING PROVIDED		
STANDARDS	39	
ACCESSIBLE	2	
TOTAL	41	

BUILDING AREA TABULATIONS (Square Feet)

	SELF STORAGE	OFFICE/POSTAL ANNEX/CAFE	TOTAL
BUILDING A 2-STORY	20,133	4,675	24,808
BUILDING B 2-STORY	30,969		30,969
BUILDING C 2-STORY	57,937		57,937
TOTAL AREA:	109,039	4,675	113,714
EST. NET STORAGE AREA = 81,840 S.F.			

BUILDING CONSTRUCTION TYPE: IIB
OCCUPANCY CLASSIFICATION: S-1. TOP STORAGE IN NOT GRATER THAN 8'
BUILDINGS ARE EQUIPPED WITH AUTOMATIC FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH NFPA 13.

LEGEND

- ELECTRIC
- CATV
- TEL
- GAS

NORTH

PERRY STREET STORAGE

CARSON, CA

SCHEME I

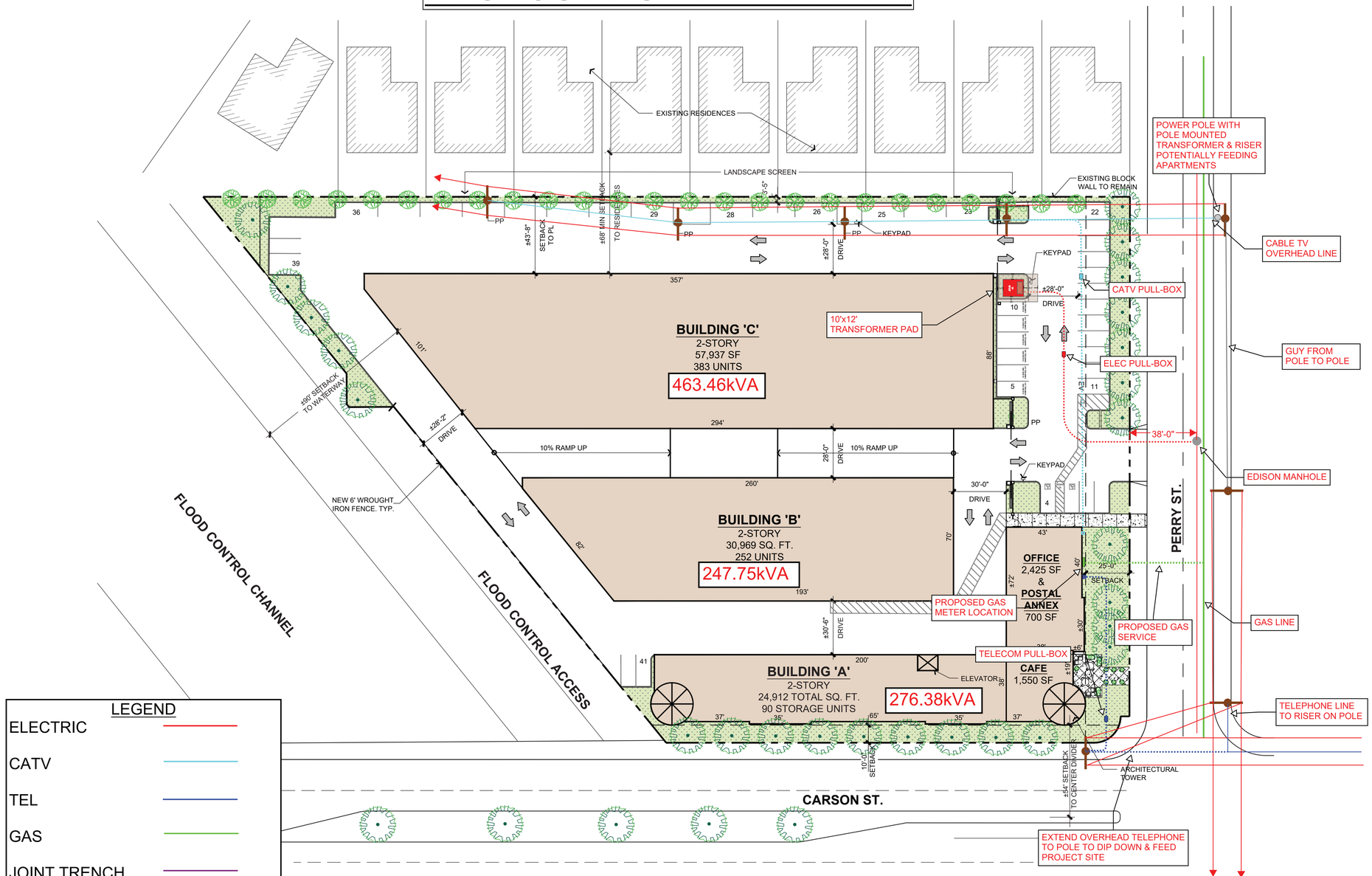
PRELIM. SITE PLAN

JOB NUMBER: 20-817
SCALE: 1"=30'-0"
DATE: 12/16/2021

JORDAN
ARCHITECTS
131 CALLE IGLESIA, SUITE 100
SAN CLEMENTE, CA 92672
949.388.8090

SHEET A1

PROPOSED UTILITY EXHIBIT



LEGEND

- ELECTRIC
- CATV
- TEL
- GAS
- JOINT TRENCH
- PROPOSED ELEC
- PROPOSED CATV
- PROPOSED TEL
- PROPOSED GAS

BASIS OF DESIGN

	REQUIRED / EXISTING	PROVIDED / PROPOSED
ZONE	ML - MANUFACTURING, LIGHT	TBD
OVERLAY	D OVERLAY	
STRUCTURE HEIGHT	N/A	TBD
FLOOR AREA RATIO	.5 (GP)	.99 (118,928)
LOT COVERAGE	-	46.6% (56,906 S.F.)
LANDSCAPE	-	±23,000 S.F. (18.8%) LANDSCAPE AREA

SETBACKS

FRONT	25'	25 FT. MIN.
STREET SIDE	10 FT.	10 FT. MIN
REAR (RESIDENTIAL)	10 FT.	40 FT. MIN
INTERIOR SIDE	10 FT.	28' FT. MIN.

SITE DATA

LOT AREA	121,968	SQ. FT.
	2.8	ACRES
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ACCESSIBLE	2	
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BUILDING AREA TABULATIONS (Square Feet)

	SELF STORAGE	OFFICE/POSTAL ANNEX/CAFE	TOTAL
BUILDING A 2-STORY	20,133	4,675	24,808
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EST. NET STORAGE AREA = 81,840 S.F.			

BUILDING CONSTRUCTION TYPE: IIB
OCCUPANCY CLASSIFICATION: S-1. TOP STORAGE IN NOT GRATER THAN 8' BUILDINGS ARE EQUIPPED WITH AUTOMATIC FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH NFPA 13.

NORTH

PERRY STREET STORAGE

CARSON, CA

SCHEME I

PRELIM. SITE PLAN

JOB NUMBER: 20-817
SCALE: 1"=30'-0"
DATE: 12/16/2021

JORDAN
ARCHITECTS
131 CALLE IGLESIA, SUITE 100
SAN CLEMENTE, CA 92672
949.388.8090

SHEET A1

Upper Left: 118°15'33"W 33°50'4"N

Page to the North: LT-8344-D

Upper Right: 118°15'13"W 33°50'4"N

Page to the West: LT-8344-E

Page to the East: LT-8444-E

Facility Map

UNDERGROUND SERVICE ALERT DIAL 811
CALL USA FOR UNDERGROUND LOCATING

Grid Name: LT-8344-F (US National Grid)

- SUBSTATION_BOUNDARY
- DIST BURD
- DIST HANDHOLE
- DIST PAD
- DIST POLE
- DIST STREET LIGHTS
- OH Conductor 0 - 750 volts
- OH Conductor 750 - 22,500 volts
- OH Conductor 22.5 - 300 kV
- OH Conductor 66 - 300 kV
- OH Conductor 300 - 500 kV (mm)
- UG Conductor 0-750 volts
- UG Conductor 750-22,500 volts
- UG Conductor 22.5 - 300 kV
- UG Conductor 66 - 300 kV
- UG Conductor 300 - 500 kV (mm)
- DUCT DIA in inches
- Parcels

Date: 1/28/2022
Geomatics | Central Field Services

For Reference Only

0 35 70 140 Feet

1 inch equals 107 feet

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Page to the South: LT-8344-H

Upper Left: 118°15'33"W 33°49'56"N

Page to the North: LT-8344-F

Upper Right: 118°15'13"W 33°49'56"N

Page to the West: LT-8344-G

Page to the East: LT-8444-G

Billing department; SCE only charges for maps that include SCE infrastructure.

Path: P:\PROJECTS\RP_Quality_Control_cGIS\MapSolaterArtProProject\MapSolaterLine\1211\MapSolaterLine.MapSolater_Template.aprx

UG-5052466

5 inches

UG-5052999

2 inches

5 inches

2 inches

4 inches

4 inches

E Carson St

E Carson St

E Carson St

E Carson St

E Carson St

San Diego Fwy

San Diego Fwy

San Diego Fwy

34

34

405

405

5053000

1926557E

5153044

5485011

1926579E

4440897E

Recreation Rd

Go Kart World

1926578E

1710223E

1710217E

1710216E

1710222E

1710215E

1926514E

Recreat

Facility Map

UNDERGROUND SERVICE ALERT DIAL 811
CALL USA FOR UNDERGROUND LOCATING

Grid Name: LT-8344-H (US National Grid)

- SUBSTATION_BOUNDARY
- DIST PAD
- DIST PEDESTAL
- DIST POLE
- DIST PULLBOX
- DIST SPLICEBOX
- DIST VAULT
- OH Conductor 0 - 750 volts
- OH Conductor 750 - 22,500 volts
- OH Conductor 22.5 - 300 kV
- OH Conductor 66 - 300 kV
- OH Conductor 300 - 500 kV (mm)
- UG Conductor 0-750 volts
- UG Conductor 750-22,500 volts
- UG Conductor 22.5 - 300 kV
- UG Conductor 66 - 300 kV
- UG Conductor 300 - 500 kV (mm)
- DUCT DIA in inches
- Parcels

NO CHARGE

Date: 1/28/2022
Geomatics | Central Field Services

For Reference Only

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National Geographic Style: Esri Community Maps Contributors, City of Carson, County of Los Angeles, California State Parks, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA
National Geographic Style Base: Sources: Esri, USGS
World Hillshade: Esri, NASA, NGA, USGS, FEMA

0 35 70 140 Feet

1 inch equals 107 feet

SOUTHERN CALIFORNIA EDISON
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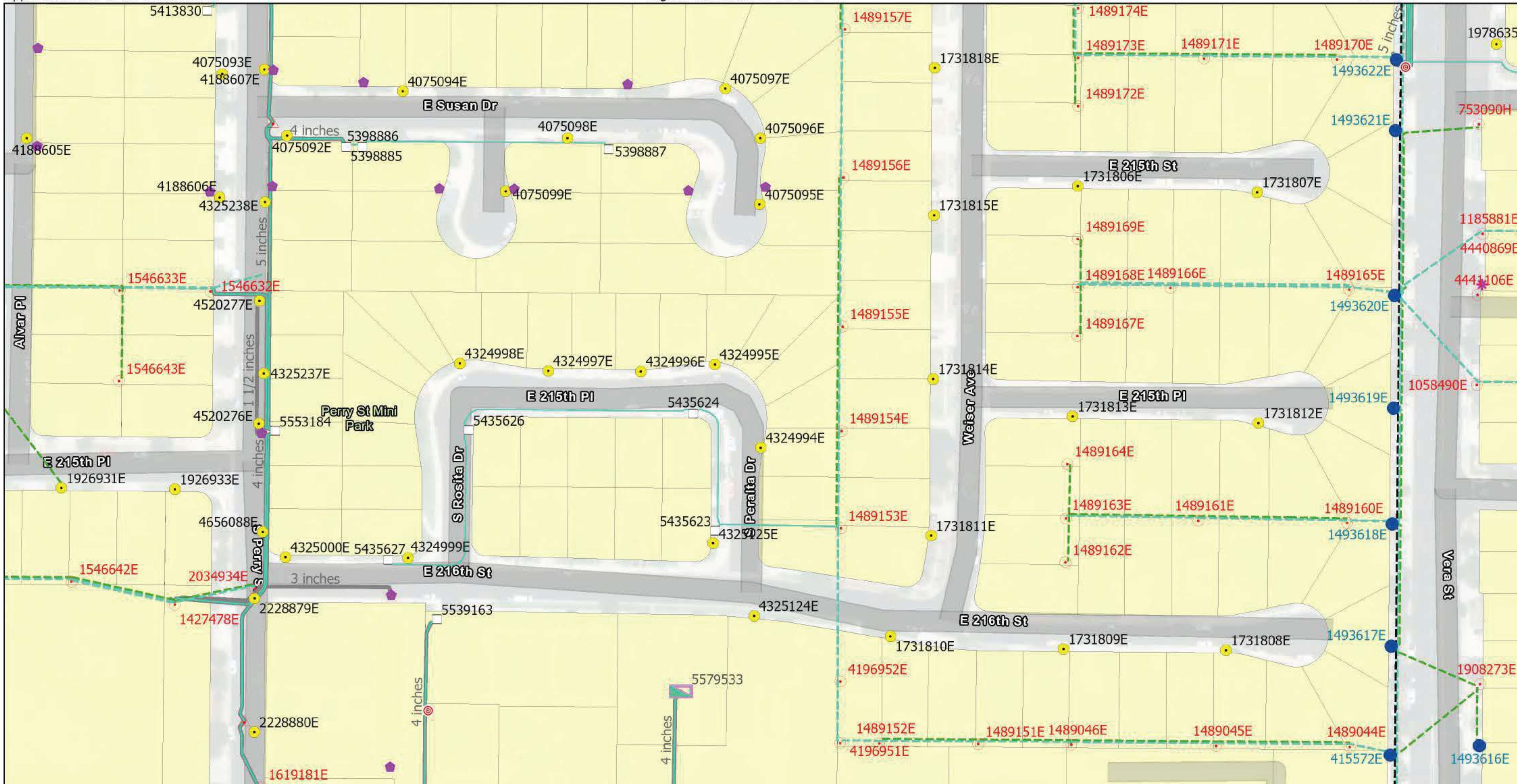
Page to the South: LT-8343-B

Upper Left: 118°15'13"W 33°50'4"N

Page to the North: LT-8444-C

Upper Right: 118°14'53"W 33°50'4"N

Page to the West: LT-8344-F



Page to the East: LT-8444-F

Facility Map

UNDERGROUND SERVICE ALERT DIAL 811
CALL USA FOR UNDERGROUND LOCATING

Grid Name: LT-8444-E (US National Grid)

SUBSTATION_BOUNDARY
DIST HANDHOLE
DIST MANHOLE
DIST PAD
DIST PEDESTAL
DIST POLE
DIST PULLBOX
DIST SPLICEBOX
DIST STREET LIGHTS
TRNS POLE
OH Conductor 0 - 750 volts
OH Conductor 750 - 22,500 volts
OH Conductor 22.5 - 300 kV
OH Conductor 66 - 300 kV
OH Conductor 300 - 500 kV (mm)
UG Conductor 0-750 volts
UG Conductor 750-22,500 volts
UG Conductor 22.5 - 300 kV
UG Conductor 66 - 300 kV
UG Conductor 300 - 500 kV (mm)
DUCT DIA in inches
Parcels

Date: 1/28/2022
Geomatics | Central Field Services

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National Geographic Style Base: Sources: Esri, USGS
World Hillshade: Esri, NASA, NGA, USGS, FEMA

0 35 70 140 Feet
1 inch equals 107 feet

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Page to the South: LT-8444-G

Billing department; SCE only charges for maps that include SCE infrastructure.

Path: P:\PROJECTS\RP_Quality_Control_eGIS\MapSales\ArcProProject\MapSalesLive\211\MapSalesLive\MapSales_Template.aprx

Upper Left: 118°15'13"W 33°49'56"N

Page to the North: LT-8444-E

Upper Right: 118°14'53"W 33°49'56"N

Page to the West: LT-8344-H

Page to the East: LT-8444-H

Billing department; SCE only charges for maps that include SCE infrastructure.

Path: P:\PROJECTS\RP_Quality_Control_v5(6)\MapSolver\RevProject\MapSolverLevel2\11\MapSolverLive MapSolver_Template.aprx

1619181E
1619180E
1619183E
4025118E
1619185E
5539161
4467430E
4666307E
4442531E
5166991
1860183E
1860182E
1860181E
1860180E
5610707
415572E
415571E
1949586E
4 inches
5 inches
E Carson St
768431H
1638227E
638246E
2304013E
1747000E
415570E
4711344E
1638226E
1638222E
1651780E
5603501
3 inches
Park Villa Mobile Homes Est
4444494E
1638225E
1638229E
4219737E
UG-5046591
UG-5046590
1651781E
1638220E
4753708E
2036122E
1651782E
415568E
Acarus Ave
1651783E
Vera St
1638224E
1638228E
1638219E
1651793E
5706903
5706901
5706900
415567E
Vera Carson Mobile Home Est
1651785E
1651784E
1621661E
1638223E
Recreation P
1946514E
Dominguez Channel

Facility Map

UNDERGROUND SERVICE ALERT DIAL 811
CALL USA FOR UNDERGROUND LOCATING

Grid Name: LT-8444-G (US National Grid)

- SUBSTATION_BOUNDARY
- DIST BURD
- DIST HANDHOLE
- DIST MANHOLE
- DIST PAD
- DIST PEDESTAL
- DIST POLE
- DIST PULLBOX
- DIST STREET LIGHTS
- TRNS POLE
- OH Conductor 0 - 750 volts
- OH Conductor 750 - 22,500 volts
- OH Conductor 22.5 - 300 kV
- OH Conductor 66 - 300 kV
- OH Conductor 300 - 500 kV (mm)
- UG Conductor 0-750 volts
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- UG Conductor 300 - 500 kV (mm)
- DUCT DIA in inches
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National Geographic Style Base Sources: Esri, USGS
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0 35 70 140 Feet

1 inch equals 107 feet

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Page to the South: LT-8443-A

701 N. Bullis Rd.
Compton, CA 90224-9099

February 7, 2022

Duex
17291 Irvine Blvd, Suite 206
Tustin, CA 92780
Attn: Nick Molina

Subject: Maps & Will Serve - 21611 S. Perry St, Carson, CA 90745

Thank you for inquiring about the availability of natural gas service for your project. We are pleased to inform you that Southern California Gas Company (SoCalGas) has facilities in the area where the above named project is being proposed. The service would be in accordance with SoCalGas' policies and extension rules on file with the California Public Utilities Commission (CPUC) at the time contractual arrangements are made.

This letter should not be considered a contractual commitment to serve the proposed project, and is only provided for informational purposes only. The availability of natural gas service is based upon natural gas supply conditions and is subject to changes in law or regulation. As a public utility, SoCalGas is under the jurisdiction of the Commission and certain federal regulatory agencies, and gas service will be provided in accordance with the rules and regulations in effect at the time service is provided. Natural gas service is also subject to environmental regulations, which could affect the construction of a main or service line extension (for example, if hazardous wastes were encountered in the process of installing the line). Applicable regulations will be determined once a contract with SoCalGas is executed.

If you need assistance choosing the appropriate gas equipment for your project, or would like to discuss the most effective applications of energy efficiency techniques, please contact our area Service Center at 800-427-2200.

Thank you again for choosing clean, reliable, and safe natural gas, your best energy value.

Sincerely,

Jason Sum

Jason Sum
Pipeline Planning Assistant
SoCalGas-Compton HQ

C-410-E

C-638-E

C-411-E

C-407-E

Map Number:	C-406-E
Map Type:	Gas Asset Map
Printed By:	Sum, Jason
Printed Date:	2/7/2022

SoCalGas
Sempra Energy utility

Will Serve Letter

2/22/2022

Nick Molina
DUEx (Dry Utility Experts)
17291 Irvine Blvd, Suite 206
Tustin, CA 92780

Project Name: WSL - 21611 S Perry St, Carson, CA 90745
LOCATION: 21611 S Perry St, Carson, CA 90745

Re: May Serve Letter by Charter Communications or an affiliate authorized to provide service ("Charter")

Thank you for your interest in receiving Charter service. The purpose of this letter is to confirm that the Property is within an area that Charter may lawfully serve. However, it is not a commitment to provide service to the Property. Prior to any determination as to whether service can or will be provided to the Property, Charter will conduct a survey of the Property and will need the following information from you:

- Exact site address and legal description
- Is this an existing building or new construction?
- Site plans, blue prints, plat maps or any similar data
- The location of any existing utilities or utility easements
- _____

Please forward this information to the construction manager listed below. Upon receipt, a Charter representative will be assigned to you to work through the process. Ultimately, a mutually acceptable service agreement for the Property will be required and your cooperation in the process is appreciated.

Construction Manager Contact:
Diaz, Ana
Director, Enterpise Service Delivery
17777 Center Court Drive North, 8th Floor
Cerritos CA 90703
562-677-0325
DL-Enterprise-MET-West@charter.com

Sincerely,

DocuSigned by:
Ana Diaz
311326782FB0483...

Green-existing charter underground facilities within project limits.

21611 S Perry St,
MAP
Carson, CA 90745

Red-existing charter aerial facilities within project limits.

AT&T California
17200 S Vermont Ave,
Floor 2nd
Gardena, CA 90247 USA

01/31/2022

Attn: Nick Molina

RE: 21611 S Perry St, Carson, CA 90745

Dear Applicant:

Under its present plans, AT&T California expects to be in a position to provide telephone service to applicants in the above project upon request, in accordance with requirements of, and at rates and charges specified in its tariffs on file with the California Public Utilities Commission.

This project will be served with AT&T facilities. In accordance with the above-mentioned tariffs, the applicant or customer, on his property will be responsible for furnishing, installing, and maintaining the conduit AT&T requires for the service connection.

Please do not hesitate to contact me if you have any further questions.

Respectfully,

Kosal Sieng
17200 S Vermont Ave,
Floor 2nd
Gardena, CA 90247 USA
Cell Phone: (310) 200-7228