PSOMAS

2325 Crenshaw Blvd.
Preliminary Hydrology Report

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1.0 Introduction

1.1 Project Description

The 2325 Crenshaw Blvd. Multi-family Residential Project, herein known as the Project, involves the development of multiple residential buildings along with open/landscaped amenity spaces on top of a single-story, partly subterranean parking structure. The parking structure spans the majority of the site, with the outer ~30' up to the property line being left clear for a fire access road, parking, etc.

The Project site currently consists of an existing 1-story, concrete, government office building and parking lot. The Project is bounded by residential developments to the north and west and by office/hotel buildings and their parking lots to the south/east.

1.2 Scope of Work

This report provides a description of the existing surface water hydrology, and water quality review for Low Impact Development (LID) at the Project Site and an analysis of the Project's potential impacts related to surface water hydrology and water quality.

2.0 Regulatory Framework

2.1 Surface Water Hydrology

County of Los Angeles Hydrology Manual

The Los Angeles County (County) Department of Public Works Hydrology Manual is the basis of design for storm drainage facilities. The Hydrology Manual requires that a storm drain conveyance system be designed for a 25-year storm event and that the combined capacity of a storm drain, and street flow system accommodate flow from a 50-year storm event. Areas with sump conditions are required to have a storm drain conveyance system capable of conveying flow from a 50-year storm event. The County also limits the allowable discharge into existing storm drain facilities based on the MS4 Permit which is enforced on all new developments that discharge directly into the County's storm drain system. Any proposed drainage improvements of County owned storm drain facilities such as catch basins and storm drain lines requires the approval/review from the County Flood Control District department.

2.2 Surface Water Quality

Clean Water Act

The Clean Water Act was first introduced in 1948 as the Water Pollution Control Act. The Clean Water Act authorizes Federal, state, and local entities to cooperatively create comprehensive programs for eliminating or reducing the pollution of state waters and tributaries. The primary goals of the Clean Water Act are to restore and maintain the chemical, physical, and biological integrity of the nation's waters and to make all surface waters fishable and swimmable. As such, the Clean Water Act forms the basic national framework for the management of water quality and the control of pollutant discharges. The Clean Water Act also sets orth a number of objectives in order to achieve the above-mentioned goals. These objectives include regulating pollutant and toxic pollutant discharges; providing for water quality that protects and fosters the propagation of fish, shellfish and wildlife; developing waste treatment management plans; and developing and implementing programs for the control of non-point sources of pollution.

Since its introduction, major amendments to the Clean Water Act have been enacted (e.g., 1961, 1966, 1970, 1972, 1977, and 1987). Amendments enacted in 1970 created the U.S. Environmental Protection Agency (USEPA), while amendments enacted in 1972 deemed the discharge of pollutants into waters of the United States from any point source unlawful unless authorized by a USEPA National Pollutant Discharge Elimination System (NPDES) permit. Amendments enacted in 1977 mandated development of a "Best Management Practices" Program at the state level and provided the Water Pollution Control Act with the common name of "Clean Water Act," which is universally used today. Amendments enacted in 1987 required the USEPA to create specific requirements for discharges.

In response to the 1987 amendments to the Clean Water Act and as part of Phase I of its NPDES permit program, the USEPA began requiring NPDES permits for: (1) municipal separate storm sewer systems (MS4) generally serving, or located in, incorporated cities with 100,000 or more people (referred to as municipal permits); (2) 11 specific categories of industrial activity (including landfills); and (3) construction activity that disturbs five acres or more of land. Phase II of the USEPA's NPDES permit program, which went into effect in early 2003, extended the requirements for NPDES permits to: (1) numerous small municipal separate storm sewer systems, (2) construction sites of one to five acres, and (3) industrial facilities owned or operated by small municipal separate storm sewer systems. The NPDES permit program is typically administered by individual authorized states.

In 2008, the USEPA published draft Effluent Limitation Guidelines (ELGs) for the construction and development industry. On December 1, 2009 the EPA finalized its 2008 Effluent Guidelines Program Plan.

In California, the NPDES stormwater permitting program is administered by the State Water Resources Control Board (SWRCB). The SWRCB was created by the Legislature in 1967. The joint authority of water distribution and water quality protection allows the Board to provide protection for the State's waters, through its nine Regional Water Quality Control Boards (RWQCBs). The RWQCBs develop and enforce water quality objectives and implement plans that will best protect California's waters, acknowledging areas of different climate, topography, geology, and Hydrology. The RWQCBs develop "basin plans" for their hydrologic areas, issue waste discharge requirements, enforce action against stormwater discharge violators, and monitor water quality.

Federal Anti-Degradation Policy

The Federal Antidegradation Policy (40 Code of Federal Regulations 131.12) requires states to develop statewide antidegradation policies and identify methods for implementing them. Pursuant to the Code of Federal Regulations (CFR), state antidegradation policies and implementation methods shall, at a minimum, protect and maintain (1) existing in-stream water uses; (2) existing water quality, where the quality of the waters exceeds levels necessary to support existing beneficial uses, unless the state finds that allowing lower water quality is necessary to accommodate economic and social development in the area; and (3) water quality in waters considered an outstanding national resource.

California Porter-Cologne Act

The Porter-Cologne Water Quality Control Act established the legal and regulatory framework for California's water quality control. The California Water Code authorizes the SWRCB to implement the provisions of the CWA, including the authority to regulate waste disposal and require cleanup of discharges of hazardous materials and other pollutants.

As discussed above, under the California Water Code (CWC), the State of California is divided into nine RWQCBs, governing the implementation and enforcement of the CWC and CWA. The Project Site is located within Region 4, also known as the Los Angeles Region. Each RWQCB is required to formulate and adopt a Basin Plan for its region. This Plan must adhere to the policies set forth in the CWC and established by the SWRCB. The RWQCB is also given authority to include within its regional plan water discharge prohibitions applicable to particular conditions, areas, or types of waste.

California Anti-Degradation Policy

The California Antidegradation Policy, otherwise known as the *Statement of Policy with Respect to Maintaining High Quality Water in California* was adopted by the SWRCB (State Board Resolution No. 68-16) in 1968. Unlike the Federal Antidegradation Policy, the California Antidegradation Policy applies to all waters of the State, not just surface waters. The policy states that whenever the existing quality of a water body is better than the quality established in individual Basin Plans, such high quality shall be maintained and discharges to that water body shall not unreasonably affect present or anticipated beneficial use of such water resource.

California Toxic Rule

In 2000, the EPA promulgated the California Toxic Rule, which establishes water quality criteria for certain toxic substances to be applied to waters in the State. The EPA promulgated this rule based on the EPA's determination that the numeric criteria are necessary in the State to protect human health and the environment. The California Toxic Rule establishes acute (i.e., short-term) and chronic (i.e., long-term) standards for bodies of water such as inland surface waters and enclosed bays and estuaries that are designated by the LARWQCB as having beneficial uses protective of aquatic life or human health.

Board Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties

As required by the California Water Code, the LARWQCB has adopted a plan entitled “Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties” (Basin Plan). Specifically, the Basin Plan designates beneficial uses for surface and groundwaters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's antidegradation policy, and describes implementation programs to protect all waters in the Los Angeles Region. In addition, the Basin Plan incorporates (by reference) all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. Those of other agencies are referenced in appropriate sections throughout the Basin Plan.

The Basin Plan is a resource for the RWQCB and others who use water and/or discharge wastewater in the Los Angeles Region. Other agencies and organizations involved in environmental permitting and resource management activities also use the Basin Plan. Finally, the Basin Plan provides valuable information to the public about local water quality issues.

NPDES Permit Program

The NPDES permit program was first established under authority of the CWA to control the discharge of pollutants from any point source into the waters of the United States. As indicated above, in California, the NPDES stormwater permitting program is administered by the SWRCB through its nine RWQCBs.

The General Permit

SWRCB Order No. 2009-0009-DWQ known as “The General Permit” was adopted on September 2, 2009. This NPDES permit establishes a risk-based approach to stormwater control requirements for construction projects by identifying three project risk levels. The main objectives of the General Permit are to:

1. Reduce erosion
2. Minimize or eliminate sediment in stormwater discharges
3. Prevent materials used at a construction site from contacting stormwater
4. Implement a sampling and analysis program
5. Eliminate unauthorized non-stormwater- discharges from construction sites
6. Implement appropriate measures to reduce potential impacts on waterways both during and after construction of projects
7. Establish maintenance commitments on post-construction pollution control measures

California mandates requirements for all construction activities disturbing more than one acre of land to develop and implement Stormwater Pollution Prevention Plans (SWPPP). The SWPPP documents the selection and implementation of Best Management Practices for a specific construction project, charging Owners with stormwater quality management responsibilities. A construction site subject to the General Permit must prepare and implement a SWPPP that meets the requirements of the General Permit.

Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit

As described above, USEPA regulations require that MS4 permittees implement a program to monitor and control pollutants being discharged to the municipal system from both industrial and commercial projects that contribute a substantial pollutant load to the MS4.

On December 13, 2001, the LARWQCB adopted Order No. 01-182 under the CWA and the Porter-Cologne Act. This Order is the NPDES Permit or MS4 permit for municipal stormwater and urban runoff discharges within Los Angeles County. The requirements of this Order (the "Permit") cover 84 cities and most of the unincorporated areas of Los Angeles County. Under the Permit, the Los Angeles County Flood Control District (LACFCD) is designated as the Principal Permittee. The Permittees are the 84 Los Angeles County cities (including the City of Carson) and Los Angeles County. Collectively, these are the "Co-Permittees". The Principal Permittee helps to facilitate activities necessary to comply with the requirements outlined in the Permit but is not responsible for ensuring compliance of any of the Permittees.

Stormwater Quality Management Program (SQMP)

In compliance with the Los Angeles County MS4 Permit, the Co-Permittees are required to implement a stormwater quality management program (SQMP) with the goal of accomplishing the requirements of the Permit and reducing the amount of pollutants in stormwater runoff. The SQMP requires the County of Los Angeles and the 84 incorporated cities to:

- Implement a public information and participation program to conduct outreach on storm water pollution;
- Control discharges at commercial/industrial facilities through tracking, inspecting, and ensuring compliance at facilities that are critical sources of pollutants;
- Implement a development planning program for specified development projects;
- Implement a program to control construction runoff from construction activity at all construction sites within the relevant jurisdictions;

- Implement a public agency activities program to minimize storm water pollution impacts from public agency activities; and

- Implement a program to document, track, and report illicit connections and discharges to the storm drain system.

The MS4 Permit contains the following provisions for implementation of the SQMP by the Co-Permittees:

1. General Requirements:

   - Each permittee is required to implement the SQMP in order to comply with applicable stormwater program requirements.
   - The SQMP shall be implemented and each permittee shall implement additional controls so that discharge of pollutants is reduced.

2. Best Management Practice Implementation:

   - Permittees are required to implement the most effective combination of BMPs for stormwater/urban runoff pollution control. This should result in the reduction of storm water runoff.

3. Revision of the SQMP:

   - Permittees are required to revise the SQMP in order to comply with requirements of the RWQCB while complying with regional watershed requirements and/or waste load allocations for implementation of TMDLs for impaired waterbodies.

4. Designation and Responsibilities of the Principal Permittee:

   The Los Angeles County Flood Control District is designated as the Principal Permittee who is responsible for:

   - Coordinating activities that comply with requirements outlined in the NPDES Permit;
   - Coordinating activities among Permittees;
   - Providing personnel and fiscal resources for necessary updates to the SQMP;
   - Providing technical support for committees required to implement the SQMP; and
   - Implementing the Countywide Monitoring Program required under this Order and assessing the results of the monitoring program,

5. Responsibilities of Co-Permittees:

   Each co-permittee is required to comply with the requirements of the SQMP as applicable to the discharges within its geographical boundaries. These requirements include:

   - Coordinating among internal departments to facilitate the implementation of the SQMP requirements in an efficient way;
   - Participating in coordination with other internal agencies as necessary to successfully implement the requirements of the SQMP; and
   - Preparing an annual Budget Summary of expenditures for the storm water management program by providing an estimated breakdown of expenditures for different areas of concern, including budget projections foil the following year.

6. Watershed Management Committees (WMCs):

- Each WMC shall be comprised of a voting representative from each Permittee in the Watershed Management Area (WMA).
- Each WMCs is required to facilitate exchange of information between co-Permittees, establish goals and deadlines for WMAs, prioritize pollution control measures, develop and update adequate information, and recommend appropriate revisions to the SQMP.

7. Legal Authority:

- Co-permittees are granted the legal authority to prohibit non-storm water discharges to the storm drain system including discharge to the MS4 from various development types.

Standard Urban Stormwater Mitigation Plan (SUSMP)

Under the Los Angeles County Municipal NPDES Permit, permittees are required to implement a development planning program to address storm water pollution. These programs require project applicants for certain types of projects to implement Standard Urban Stormwater Mitigation Plans (SUSMP) throughout the operational life of their projects. The purpose of SUSMP is to reduce the discharge of pollutants in storm water by outlining BMPs which must be incorporated into the design plans of new development and redevelopment. A project is subject to SUSMP if it falls under one of the categories listed below:

1. Single-family hillside homes
2. Ten or more unit homes (including single family homes, multifamily homes, condominiums, and apartments).
3. Automotive service facilities
4. Restaurants
5. 100,000 or more square-feet of impervious surface in industrial/commercial development.
6. Retail gasoline outlet
7. Parking lots with 5,000 square feet or more of surface area or with 25 or more parking spaces
8. Redevelopment projects in subject categories that meet redevelopment thresholds
9. Location within or directly adjacent to or discharging directly to an environmentally sensitive area if the discharge is likely to impact a sensitive biological species or habitat and the development creates 2,500 square feet or more of impervious surface.

Permittees are required to adopt the requirements set herein in their own SUSMP. Additional BMPs may be required by ordinance or code adopted by the Permittee and applied in a general way to all projects or on a case by case basis.

Low Impact Development (LID)

The County of Los Angeles (County) has prepared the 2014 Low Impact Development Standards Manual (LID Standards Manual) to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit for stormwater and non-stormwater discharges from the MS4 within the coastal watersheds of Los Angeles County (CAS004001, Order No. R4- 2012-0175), henceforth referred to in this document as the 2012 MS4 Permit. The LID

Standards Manual provides guidance for the implementation of stormwater quality control measures in new development and redevelopment projects in unincorporated areas of the County with the intention of improving water quality and mitigating potential water quality impacts from stormwater and non-stormwater discharges.

The LID Standards Manual addresses the following objectives and goals:

- Lessen the adverse impacts of stormwater runoff from development and urban runoff on natural drainage systems, receiving waters, and other water bodies;
- Minimize pollutant loadings from impervious surfaces by requiring development projects to incorporate properly-designed, technically-appropriate Best Management Practices (BMPs) and other Low Impact Development (LID) strategies; and
- Minimize erosion and other hydrologic impacts on natural drainage systems by requiring development projects to incorporate properly-designed, technically appropriate hydromodification control development principles and technologies

2.3. Groundwater

Board Basin Plan for the Coastal Watersheds of Los Angeles anal Ventura Counties

As required by the California Water Code, the LARWQCB has adopted a plan entitled “Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties” (Basin Plan). Specifically, the Basin Plan designates beneficial uses for surface and groundwaters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's antidegradation policy, and describes implementation programs to protect all waters in the Los Angeles Region. In addition, the Basin Plan incorporates (by reference) all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. Those of other agencies are referenced in appropriate sections throughout the Basin Plan.

The Basin Plan is a resource for the Regional Board and others who use water and/or discharge wastewater in the Los Angeles Region. Other agencies and organizations involved in environmental permitting and resource management activities also use the Basin Plan. Finally, the Basin Plan provides valuable information to the public about local water quality issues.

Safe Drinking Water Act (SDWA)

The Federal Safe Drinking Act, established in 1974, sets drinking water standards throughout the country and is administered by the USEPA. The drinking water standards established in the SDWA, as set forth in the Code of Federal Regulations (CFR), are referred to as the National Primary Drinking Water Regulations (Primary Standards, Title 40, CFR Part 141) and the National Secondary Drinking Water Regulations (Second Standards, 40 CFR Part 143). California passed its own Safe Drinking Water Act in 1986 that authorizes the State’s Department of Health Services (DHS) to protect the public from contaminants in drinking water by establishing maximum contaminants levels (MCLs), as set forth in the CCR, Title 22, Division 4, Chapter 15, that are at least as stringent as those developed by the USEPA, as required by the federal Safe Drinking Water Act.

California Water Plan

The California Water Plan (The Plan) provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California’s water future. The Plan, which is updated every five years, presents basic data and information on California’s water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The Plan also identifies and evaluates existing and proposed statewide

demand management and water supply augmentation programs and projects to address the State's water needs.

The goal for the California Water Plan Update is to meet Water Code requirements, receive broad support among those participating in California's water planning, and be a useful document for the public, water planners throughout the state, legislators and other decision-makers.

3.0 Surface Water Hydrology

3.1 General Approach

The LACDPW Hydrology Manual requires projects to have drainage facilities that meet the Urban Flood level of protection. The Urban Flood is 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, this report analyzed the larger storm event threshold, the 50-year frequency design storm event.

The Modified Rational Method was used to calculate storm water runoff. The "peak" (maximum value) runoff for a drainage area is calculated using the formula, **Q=CIA**

Where,

Q = Volumetric flow rate (cfs)

C = Runoff coefficient (dimensionless)

I = Rainfall Intensity at a given point in time (in/hr)
A = Basin area (acres)

The Modified Rational Method assumes that a steady, uniform rainfall rate will produce maximum runoff when all parts of the basin area are contributing to outflow. This occurs when the storm event lasts longer than the time of concentration. The time of concentration (Tc) is the time it takes for rain in the most hydrologically remote part of the basin area to reach the outlet.

The method assumes that the runoff coefficient (C) remains constant during a storm. The runoff coefficient is a function of both the soil characteristics and the percentage of impervious surfaces in the drainage area.

LACDPW developed a time of concentration calculator, Tc Calculator (TC_calc_depth.xls, July 2006), to automate time of concentration calculations as well as the peak runoff rates and volumes using the Modified Rational Method design criteria as outlined in the Hydrology Manual. The data input requirements include: sub-area size, soil type, land use, flow path length, flow path slope and rainfall isohyet. The LACDPW has produced Isohyetal maps that provide the Project Site's soil type and the rainfall isohyet value based on the location of the project. Once all values were known, the Tc Calculator was used to calculate the storm water peak runoff flow rate for the Existing and Proposed Project conditions by evaluating an individual sub-area independent of all adjacent subareas. See Table 1 for the Tc Calculator Peak Runoff Flow results. Results for the 10-, 25-, and 50-year events were all included for information.

3.2 Data Sources

The primary sources of data are the *LACDPW Hydrology / Sedimentation Manual and Appendices* (LACDPW 2006), and the Los Angeles County *Standard Urban Stormwater Mitigation Plan* (September 2002).

Rainfall and soil characteristics for the Project Site are given in Isohyet Map Figure LACDPW 1-H1.4. A copy of the map is provided in the Appendix. The 50-year (24-hour) rainfall isohyet indicates the rainfall intensity at the Project area: approximately 5.83-inches. The isohyets for all of the storm events, based on factors from the LA County Hydrology Manual in Table 5.3.1, are as listed:

- 85th Percentile Storm: 0.92-inches
- 10-Year 24-Hour: 4.16-inches
- 25-Year 24-Hour: 5.12-inches
- 50-Year 24-Hour: 5.83-inches

As shown on the Isohyet Map, the soil classification of the Project Site falls predominantly into Soil Type 010. From County of Los Angeles isohyet mapping, the 85th percentile storm for the project site is at 0.92-inch, which is larger than the ¾" rain event of 0.75-inches. Therefore, the 85th percentile storm will be used throughout the report as it relates to reviewing the project's Low Impact Development rain event to be mitigated. The Project Site area to be disturbed in connection with construction of the Project is approximately 5.5 acres in total.

3.3 Existing Site Conditions

The existing Project Site is currently improved with a 1-story, concrete, government office building and parking lot. The Project is bounded by residential developments to the north and west and by office/hotel buildings and their parking lots to the south/east. The Project Site totals 5.5 acres and is approximately 78% impervious.

Stormwater runoff currently flows mostly into v-gutters in the parking lot/road before being collected by various catch basins. These catch basins drain to 1 of the 2 existing storm drain branches (SD-434) that run through the site. Further discussion on these 2 existing branches and their downstream trunk to follow.

In addition to the onsite catch basins, a portion of the site drains east to the existing private street curb and gutter that flows north until collected in an existing side opening catch basin that drains via 18" RCP to the existing storm drain branch that drains westerly across the northerly edge of the project site, hereby referred to as "Branch A" – 30" RCP.

Branch B – 45" RCP, drains south to north across the middle of the project site and joins with Branch A at the north end of the site. The upstream end of Branch B extends south collecting stormwater from the properties directly south of the project site as well as a portion of Sepulveda Boulevard.

Once the 2 branches have merged, the stormwater drains west, exiting the northwest corner of the project site via the existing 51" RCP Trunk Line. The final outfall is the nearby Madrona Marsh Retention Basin to the west.

Per an email correspondence with a representative from the City of Torrance on September 1, 2022, the existing storm drain was designed for a 50-year storm event. Furthermore, the Madrona Marsh Retention Basin has capacity for a 100-year storm event.

Per the FEMA Flood Map, the project site is located in an area of minimal flood hazard, Zone "X".

3.4 Proposed Project Site Conditions

The proposed Project will consist of multiple residential buildings along with open/landscaped amenity spaces on top of a partially submerged parking structure. The parking structure spans most of the site, with the outer ~30' up to the property line being left clear for a fire access road, parking, etc. The average imperviousness of the project site will decrease from 78% down to 71% in the proposed condition.

The proposed stormwater flows will continue to drain into the 2 storm drain branches. However, Branch B–45" RCP will be rerouted within the project site to avoid conflicts with the proposed building/parking structure. Refer to plan exhibits in Appendix.

As described below, the Project's compliance with regional Low Impact Development (LID) requirements, in addition to the decrease in imperviousness, will create reductions in the stormwater flows generated on site. No further retention beyond the required LID treatment volume is required for the site.

3.5 Hydrology Results

Table 1 below summarizes the hydrology results demonstrating the peak stormwater runoff flows for the 10-, 25-, and 50-storm events under existing conditions and following construction of the Project:

Table 1 Existing and Proposed Peak Runoff Flows and Runoff Volumes

	Existing Site (78% Impervious)		Proposed Site (71% Impervious)		Existing to Proposed
Storm Event	Peak Flow, Q (cfs)	24-hr Runoff Volume (ft^3)	Peak Flow, Q (cfs)	24-hr Runoff Volume (ft^3)	% Reduction in Runoff Volume (%)
10	6.0	59,893	5.5	55,333	7.6
25	8.1	73,833	7.7	68,303	7.5
50	9.7	84,242	9.3	77,990	7.4

Table 1 demonstrates that for all storms, the stormwater runoff volumes will be reduced after construction based solely on the decrease in imperviousness in the proposed condition.

Further reduction to the generated runoff will be realized because of the Low Impact Development (LID) system. The LID system is required to manage post construction stormwater runoff and is preliminary as the project design is only in the planning phase and elements associated with final LID will be determined in final design. The Project will include the installation of private catch basins, planter drains, and roof downspouts throughout the Project Site to collect roof and site runoff, and direct stormwater to the LID system through a series of underground storm drain pipes. This onsite stormwater conveyance system would serve to prevent onsite flooding and nuisance water build-up on the Project Site.

The proposed LID system will detain a minimum of 12,169 cu-ft via ~620 linear feet of 60" retention pipe. This preliminary LID volume was computed using Hydrocalc and was generated to meet the requirements of the County of Los Angeles as well as the City of Torrance Municipal Code. Refer to the Appendix for the calculations.

The Project Site in the proposed condition was reviewed as one hydrology area since all runoff flows to the storm drain system, through an LID system and ultimately to the 51" RCP trunk line. This methodology allows a straightforward comparison to ensure that the proposed Project will not exceed the existing stormwater flows. It also presumes a conservative result for all discharge into the existing 51" storm drain.

Table 1 demonstrates that 10-yr, 25-yr, and 50-yr storm events results in stormwater runoff reduction of 7.6%, 7.5%, and 7.4%, respectively. Therefore this demonstrates that the Project poses no significant impact to the region's existing stormwater conveyance system.

4.0 Surface Water Quality

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 2014 Low Impact Development (LID) Manual design guidelines. The purpose of this surface 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 of 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 for the Project Site's location is 0.92 inches; therefore, the 85th percentile rainfall event governs.

4.2 Site Characterization for Water Quality Review

Current Property Use: One-story, concrete, government office building and asphalt parking lot. There are no known existing BMPs serving the Project Site.

Proposed Property Use: The Project will consist of multiple residential buildings and open/landscaped amenity spaces on top of a single-story, partially submerged parking structure with an asphalt fire lane and parking along the project perimeter.

Soils: The soil of this Project Site is classified as predominantly Type 010 as shown in the LACDPW Isohyet Map 1-H1.4. Refer to the Appendix.

Receiving Waters: The Project Site is tributary to the Madrona Marsh Retention Basin.

Per the previously mentioned email correspondence with the City of Torrance on September 1, 2022, Madrona Marsh Retention Basin is an Environmentally Sensitive Area (ESA) and BMPs must be installed by the developer to address trash and nutrient pollutants per the Machado Lake Requirements.

Machado Lake (Harbor Park Lake) is listed on the 2018 CWA Section 303(d) list (approved by SWRCB October 20, 2020) as impaired due to the prevalence of the pollutants shown in Table 2 below, which is excerpted from the State Water Resources Control Board. Currently, Madrona Marsh's existing beneficial uses include wildlife habitat and wetland habitat. The Marsh could potentially provide warm freshwater habitat.

Table 2: Receiving Waters for Urban Runoff from Site[1]

Receiving Waters	303(d) List Impairments[2] (Machado Lake)	Designated Beneficial Uses (Madrona Marsh)	Proximity to RARE Uses
Madrona Marsh / Machado Lake (Harbor Park Lake)	Pesticides, Nutrients, Trash, Other Organics, Nuisance Odor	Existing: WILD, WET Potential: WARM	No – Madrona Yes – Machado

4.3 Pollutants of Concern

Table 3 lists the pollutants anticipated to be generated by the Project's proposed land use: Residential. For residential development, the following pollutants could potentially be generated: sediment/turbidity, nutrients, trash and debris, oxygen demanding substances, bacteria and viruses, oil and grease and pesticides.

Table 3: Potential Pollutants Generated by Land Use Type[3]

Type of Development (Land Use)	Sediment /Turbidity	Nutrients	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Bacteria & Viruses	Oil & Grease	Pesticides	Metals
Residential	P	P	N	P	P(1)	P	P(2)	P	N

Abbreviations: P=Potential N=Not expected

Notes:
(1) A potential pollutant if landscaping or open area exists on the Project site
(2) A potential pollutant if land use involves animal waste
(3) Specifically, petroleum hydrocarbons
(4) Bacterial indicators are routinely detected in pavement runoff.

A comparison of the pollutants existing in Machado Lake based on the State 303(d) list and pollutants associated with the planned land use activities on the Project Site show an overlap of **pesticides, nutrients, trash, and organic compounds** as pollutants. These common pollutants are considered the pollutants of concern. Stormwater best management practices (BMP) implemented for the Project in conformance with applicable regulatory requirements will be designed to address these pollutants of concern. Table 4 summarizes the efficiency of general categories of BMPs in treating different types of pollutants.

[1] State Water Resources Control Board, Los Angeles Region. *Water Quality Control Plan Los Angeles Region*. June 13, 1994.
[2] Los Angeles Regional Water Quality Control Board. 2010 CWA Section 303(d) *List of Water Quality Limited Segments*. October 11, 2011.
[3] Riverside County Flood Control and Conservation District, Riverside County Water Quality Management Plan for Urban Runoff, July 24, 2006. Note: This source is utilized because the Los Angeles County Flood Control District has not established a table that outlines pollutants of concern; however, the Riverside County plan accurately represents pollutant types typically occurring in Los Angeles County.

The Los Angeles County Department of Public Works requires LID compliance for all new development projects. As noted above, the LID mitigation concept for this Project is not known at this time but could involve a combination of stormwater capture & use, planter box BMPs, or infiltration. The stormwater for the LID system will be routed to discharge into the public storm drain system as per proposed conditions, as described in section 3.4, above. Additional pre-screening inlet devices may also be installed within the building's internal storm drain system and/or exterior site catch basins as preventative measures for trash and debris.

Table 4 summarizes treatment control levels for each Low Impact Development strategy selected. Items highlighted with grey coloring indicate the previously mentioned pollutants of concern for the Machado Lake/Madrona Marsh.

Table 4: Treatment Control BMP Selection Matrix[4]

Machado Lake Pollutant of Concern (Yes/No)	**Treatment Control BMP Categories**							
	Veg. Swale /Veg. Filter Strips	Detention Basins	**Planter Box /Harvesting/Infiltration Basins & Trenches**	Wet Ponds or Wetlands	Sand Filter or Filtration	**Water Quality Inlets**	Hydro-dynamic Separator Systems	Manufactured / Proprietary Devices
Sediment/Turbidity	H/M	M	H/M	H/M	H/M	L	H/M (L for turbidity)	U
No								
Nutrients	L	M	H/M	H/M	L/M	L	L	U
Yes			✓			✓		
Organic Compounds	U	U	U	U	H/M	L	L	U
Yes			✓			✓		
Trash & Debris	L	M	U	U	H/M	M	H/M	U
Yes			✓			✓		
Oxygen Demanding Substances	L	M	H/M	H/M	H/M	L	L	U
No								
Bacteria & Viruses	U	U	H/M	U	H/M	L	L	U
No								
Oils & Grease	H/M	M	U	U	H/M	M	L/M	U
No								
Pesticides (non-soil bound)	U	U	U	U	U	L	L	U
Yes			✓			✓		
Metals	H/M	M	H	H	H	L	L	U
No								

Abbreviations:
L: Low removal efficiency H/M: High or medium removal efficiency U: Unknown removal efficiency

[4] Riverside County Flood Control and Conservation District, Riverside County Water Quality Management Plan for Urban Runoff, July 24, 2006. Note: This table is utilized because the Los Angeles County Flood Control District has not established a table that summarizes each BMP's efficiency for treating pollutants of concern.

4.4 Best Management Practices

Source and Treatment Control Best Management Practices (BMPs) are required for this Project under the LA County Standard Urban Stormwater Mitigation Plan (SUSMP) and Los Angeles County Department of Public Works Low Impact Development (LID) Standards Manual.

4.4.1 Site Design BMPs

4.4.1.1 Minimize Stormwater Pollutants of Concern

The Project will minimize pollutants of concern from impacting surface water quality by maximizing the reduction of pollutant loadings to the Maximum Extent Practicable. The size of the LID system will be designed to support a treatment volume equivalent to roughly the size listed in Table 6 in this report. The pollutants of concern – namely, pesticides, nutrients, trash, and organic compounds– will be addressed through the LID treatment system. Building roof run-off will be collected via roof drains and routed internally through the buildings and directed into the project's final LID system.

4.4.1.2 Conserve Natural Areas

There is minimal existing landscape within the Project Site. Following development of the Project, the Project Site will increase the site's landscaped open areas, and as discussed above, will provide water quality treatment to meet the LID requirements of the Los Angeles County Department of Public Works and the City of Torrance.

4.4.2 Source Control BMPs

4.4.2.1 Protect Slopes and Channels

There are no unprotected slopes or unlined channels onsite. The entire area to be developed will be either vegetated or hardscaped.

4.4.2.2 Provide Storm Drain System Stenciling and Signage

Stenciling will be provided for public storm drains near the vicinity of the Project.

4.4.3 Treatment Control BMPs

4.4.3.1 Mitigation Design (Volumetric or Flow based)

The LID calculation methodology was used to calculate the required treatment volume for the proposed project site based on the 85th percentile storm event, which is larger than the ¾" storm event. Refer to the Appendix for the calculations.

Table 5. Proposed Condition LID Results

Project Site Area [ac]	BMP Type	85th percentile
		*V_M [ft^3]
5.5	TBD	12,169

Table 6. Summary SUSMP / LID Mitigation BMPs

Area	Area [ac]	Impervious Area [ac]	Required Storage Volume SWQDv [ft^3]	BMP Type	Provided Treatment SWQDv [ft^3]	% Treated	Impervious Area Untreated [ac]
1	5.5	1.6	12,169	TBD	12,169 min.	100	0
Total Percent Treatment						**100%**	

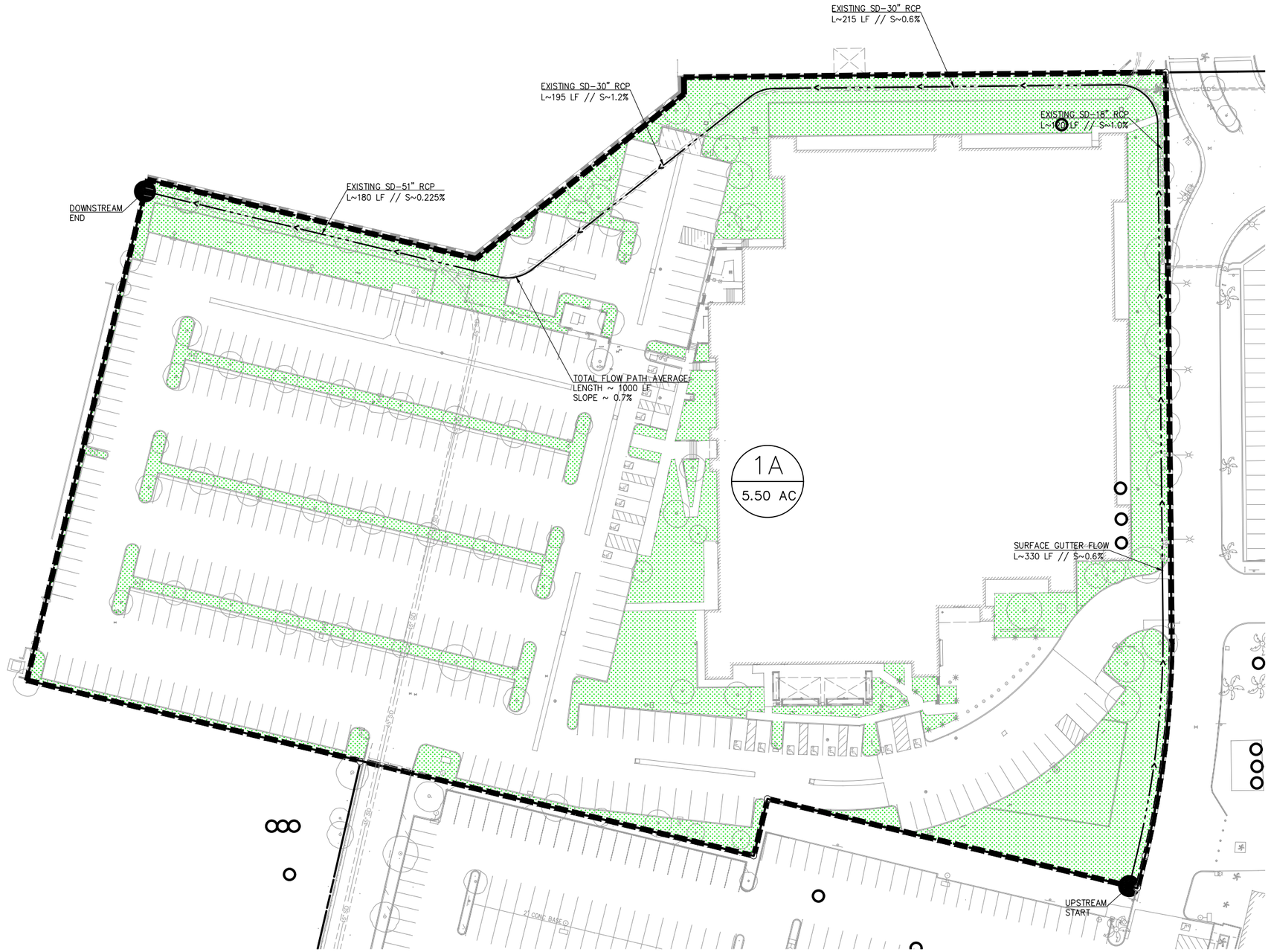
The proposed BMPs located in the design phase will provide full treatment of the 85th percentile storm event. The selected BMP for the Project Site will have a larger volume capacity to treat more than the required baseline volume of 12,169 ft^3.

5.0 Conclusion

The proposed BMPs located in the design phase will provide full treatment of the 85th percentile storm event as described above. The implementation of the Project's LID mitigation strategy addresses stormwater quality and therefore, the Project poses no significant impact to the region's stormwater quality.

Table 1 demonstrates that 10-yr, 25-yr, and 50-yr storm events results in stormwater runoff reduction of 7.6%, 7.5%, and 7.4%, respectively. Therefore, this demonstrates that the Project poses no significant impact to the region's existing stormwater conveyance system.

6.0 Appendix – Calculations, Site Plan, and Backup Documents



30' 15' 0' 30' 60'

GRAPHIC SCALE

Note: For reduced sized prints, original scale is in inches

LEGEND:

PROPERTY LINE

TC FLOW PATH

HYDROLOGY DRAINAGE SUB-AREA BOUNDARY

1A / 5.5 ac — SUB-AREA DESIGNATION AND ACREAGE

CALCULATION (SEE HYDROCALC):

INPUT:

TOTAL SITE AREA = 239,581 SF (5.50 AC)
PERVIOUS AREA = 54,140 SF (1.24 AC)
PERCENT IMPERVIOUS = 78%
FLOW PATH LENGTH ~ 1000 LF
SLOPE ~ 0.7%
SOIL TYPE = 10
50 YR RAINFALL INTENSITY = 5.83 INCHES

EXISTING SITE (78% IMPERVIOUS) SUMMARY		
STORM EVENT	PEAK FLOW (CFS)	24-HR RUNOFF VOLUME (CF)
10 YR	6.0	59,893
25 YR	8.1	73,833
50 YR	9.7	84,242

2325 CRENSHW BLVD EXISITNG HYDROLOGY EXHIBIT

PSOMAS

DATE: 01-05-2023 REVISED ON:
JOB No:1ROS230101

SHEET 1 OF 1

LEGEND:

PROPERTY LINE

TC FLOW PATH

HYDROLOGY DRAINAGE SUB-AREA BOUNDARY

1A / 5.5 ac — SUB-AREA DESIGNATION AND ACREAGE

CALCULATION (SEE HYDROCALC):

INPUT:
TOTAL SITE AREA = 239,581 SF (5.50 AC)
PERVIOUS AREA = 69,781 SF (1.60 AC)
PERCENT IMPERVIOUS = 71%
FLOW PATH LENGTH ~ 1000 LF
SLOPE ~ 0.7%
SOIL TYPE = 10
50 YR RAINFALL INTENSITY = 5.83 INCHES

PROPOSED SITE (71% IMPERVIOUS) SUMMARY		
STORM EVENT	PEAK FLOW (CFS)	24-HR RUNOFF VOLUME (CF)
10 YR	5.5	55,333
25 YR	7.7	68,303
50 YR	9.3	77,990

30' 15' 0' 30' 60'
GRAPHIC SCALE
Note: For reduced sized prints, original scale is in inches

2325 CRENSHW BLVD PROPOSED HYDROLOGY EXHIBIT

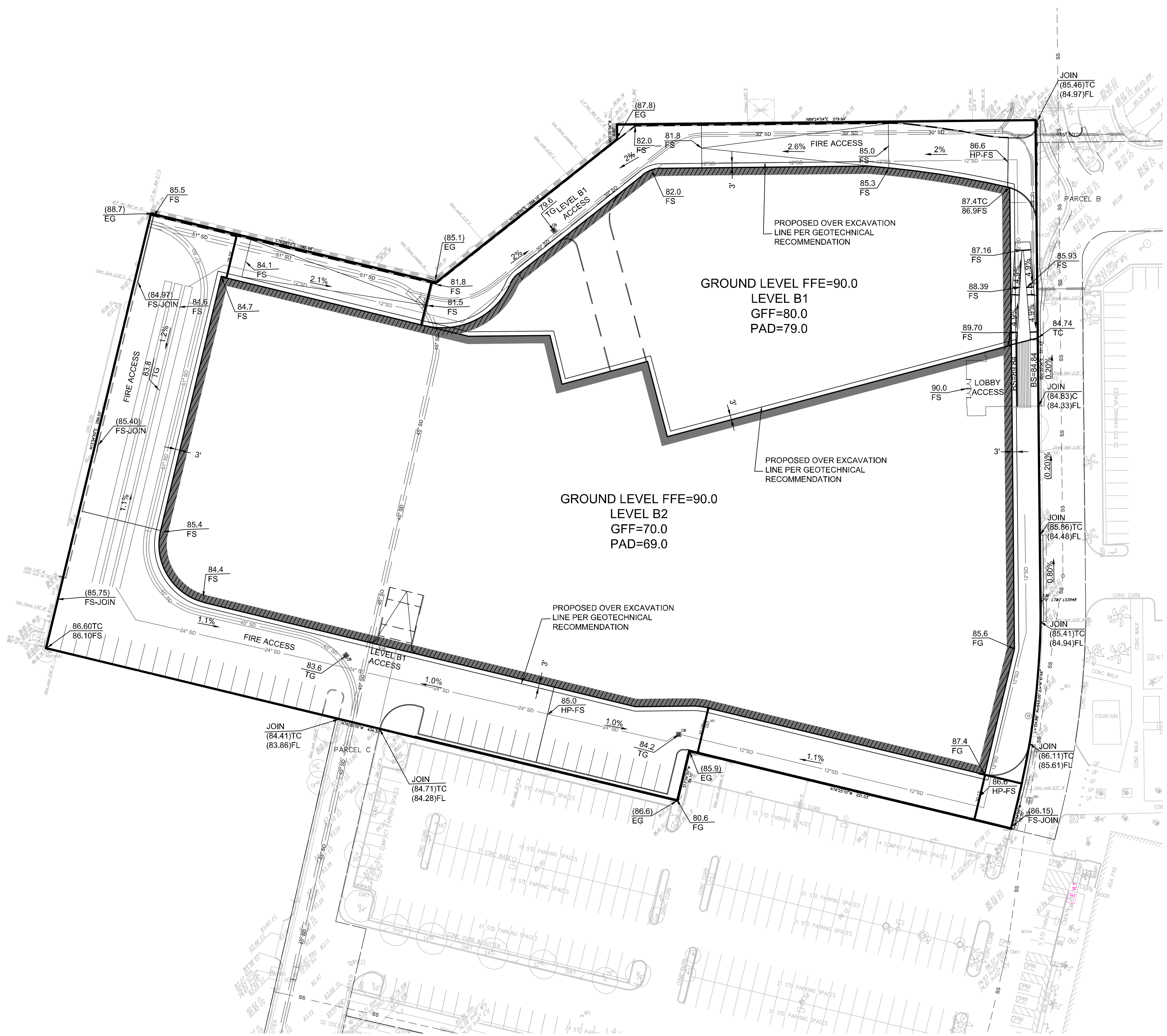
PSOMAS

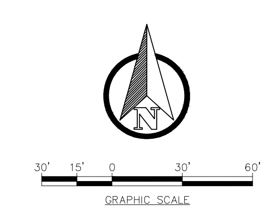
DATE: 01-05-2023 REVISED ON:
JOB No:1ROS230101

SHEET 1 OF 1

EARTHWORK QUANTITY
CUT- 111.800 CY
EXISTING PAVEMENT REMOVAL- 8,400 CY
TOTAL CUT- 103,400 CY (EXPORT)

SITE AREA - 5.5 ACRES (339,580SF)
PROPOSED PAVEMENT AREA - 6,700 SF





ROSE EQUITIES
2325 CRENSHAW BOULEVARD
TORRANCE CA 90051
CONCEPTUAL GRADING PLAN

DATE: 1/4/23
SCALE: AS SHOWN
PROJECT NUMBER: 1ROS230101

PSOMAS
555 South Flower Street, Suite 4300 Los Angeles, CA 90071 (213) 223-1400 (213) 223-1444 fax
www.psomas.com

RCE NO. DATE

SEAL

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SHEET

OF

LEGEND

- EXISTING WATER
- EXISTING SEWER
- EXISTING STORM DRAIN(SIZE NOTED ON PLAN)
- EXISTING ELECTRIC
- EXISTING COMMUNICATION/TELEPHONE
- EXISTING GAS
- PROPOSED WATER
- PROPOSED SEWER (SIZE NOTED ON LINE)
- PROPOSED STORM DRAIN(SIZE NOTED ON PLAN)
- PROPOSED ELECTRIC
- PROPOSED COMMUNICATION/TELEPHONE
- PROPOSED GAS
- PROPOSED FIRE HYDRANT
- PROPOSED FIRE SERVICE
- PROPOSED DOMESTIC AND BUILDING SPRINKLER SERVICE
- PROPOSED SEWER MANHOLE
- PROPOSED STORM DRAIN CATCH BASIN

30' 15' 0 30' 60'

GRAPHIC SCALE
SCALE: 1" = 30'

DATE: 1/4/23
SCALE: AS SHOWN
PROJECT NUMBER: 1RGS230101

SEAL

ROSE EQUITIES
2325 CRENSHAW BOULEVARD
TORRANCE CA 90051
CONCEPT UTILITY PLAN

PSOMAS
556 South Flower Street, Suite 4300 Los Angeles, CA 90071 (213) 223-1400 (213) 223-1444 fax
www.psomas.com

RCE NO. DATE

BY APP'D

DESCRIPTION

NO. DATE

DESIGNED DRAFTED CHECKED

SHEET

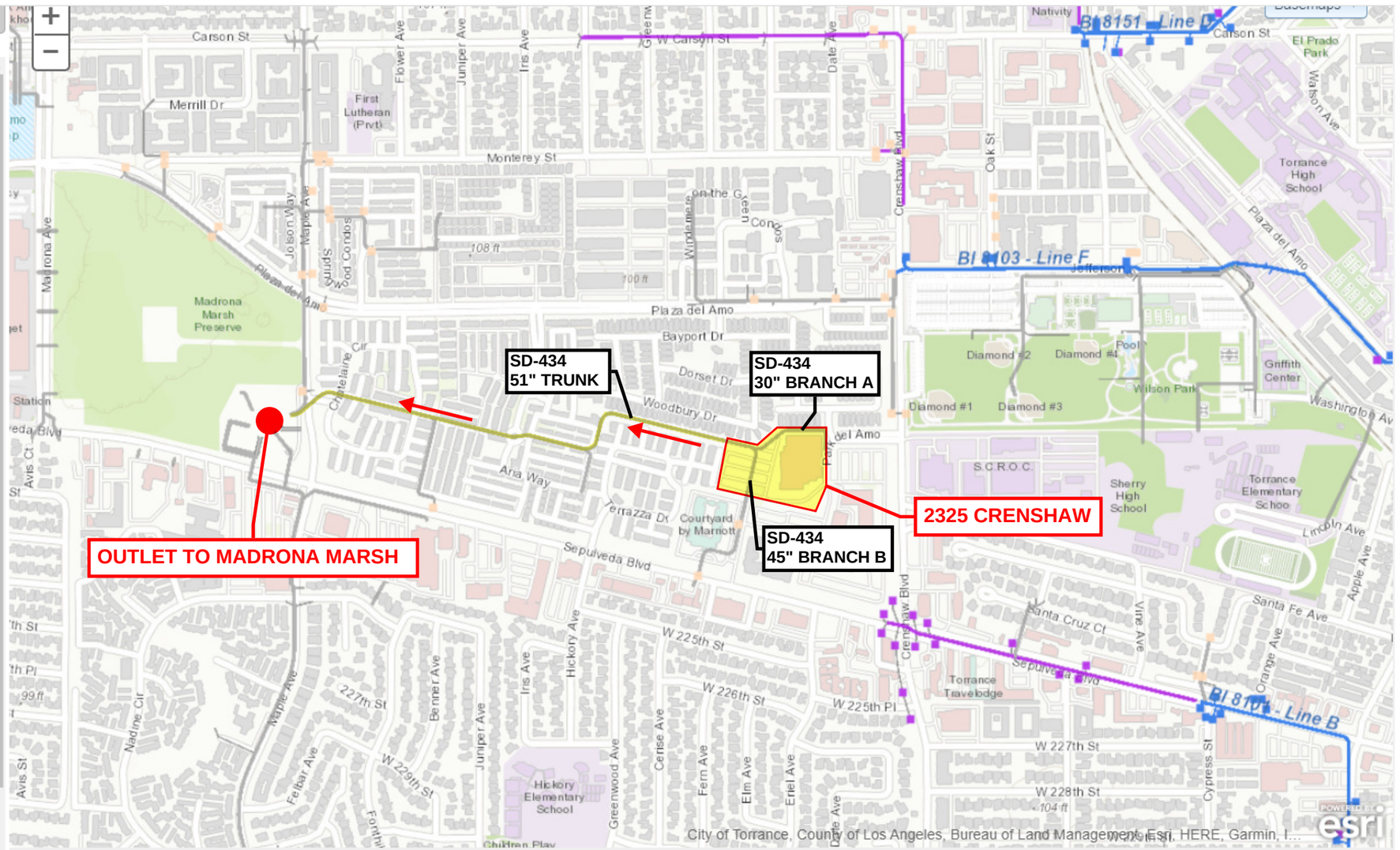
OF

LA COUNTY STORM DRAIN MAP

pw.lacounty.gov/fcd/StormDrain/index.cfm

Search | Layers | Info

- Drains
  - Maintained by LACFCD
  - Maintained by City
  - Maintained by Road
  - Maintained by Metro/Parks & Recreation
  - Maintained by Private/Permittee/Others
  - Maintained by Private/Permittee/Others (Proposed)
  - Maintained by Caltrans
  - Maintenance Unknown
- Channels
  - Maintained by LACFCD
  - Maintained by City
  - Maintained by Caltrans
  - Maintenance Unknown
  - Maintained by Army Corp
- Catch Basins
  - Maintained by LACFCD
  - Maintained by City
  - Maintained by Road
  - Maintained by Caltrans
  - Maintenance Unknown
  - Maintained by Others
- Maintenance Holes
  - Maintained by LACFCD
  - Maintained by City
  - Maintenance Unknown
- Laterals
  - Maintained by LACFCD
  - Maintained by City
  - Maintained by Road
  - Maintained by Metro/Parks & Recreation
  - Maintained by Private/Permittee/Others
  - Maintained by Private/Permittee/Others (Proposed)
  - Maintained by Caltrans
  - Maintenance Unknown
- MS4 Outfalls
- MS4 Outfalls (CUA)
- Debris Basins
  - Maintained by LACFCD
  - Maintained by City
  - Maintained by Caltrans
  - Maintenance Unknown
- Inlets/Outlets
  - Inlets
  - Outlets
- Low Flow Diversion
  - Maintained by LACFCD



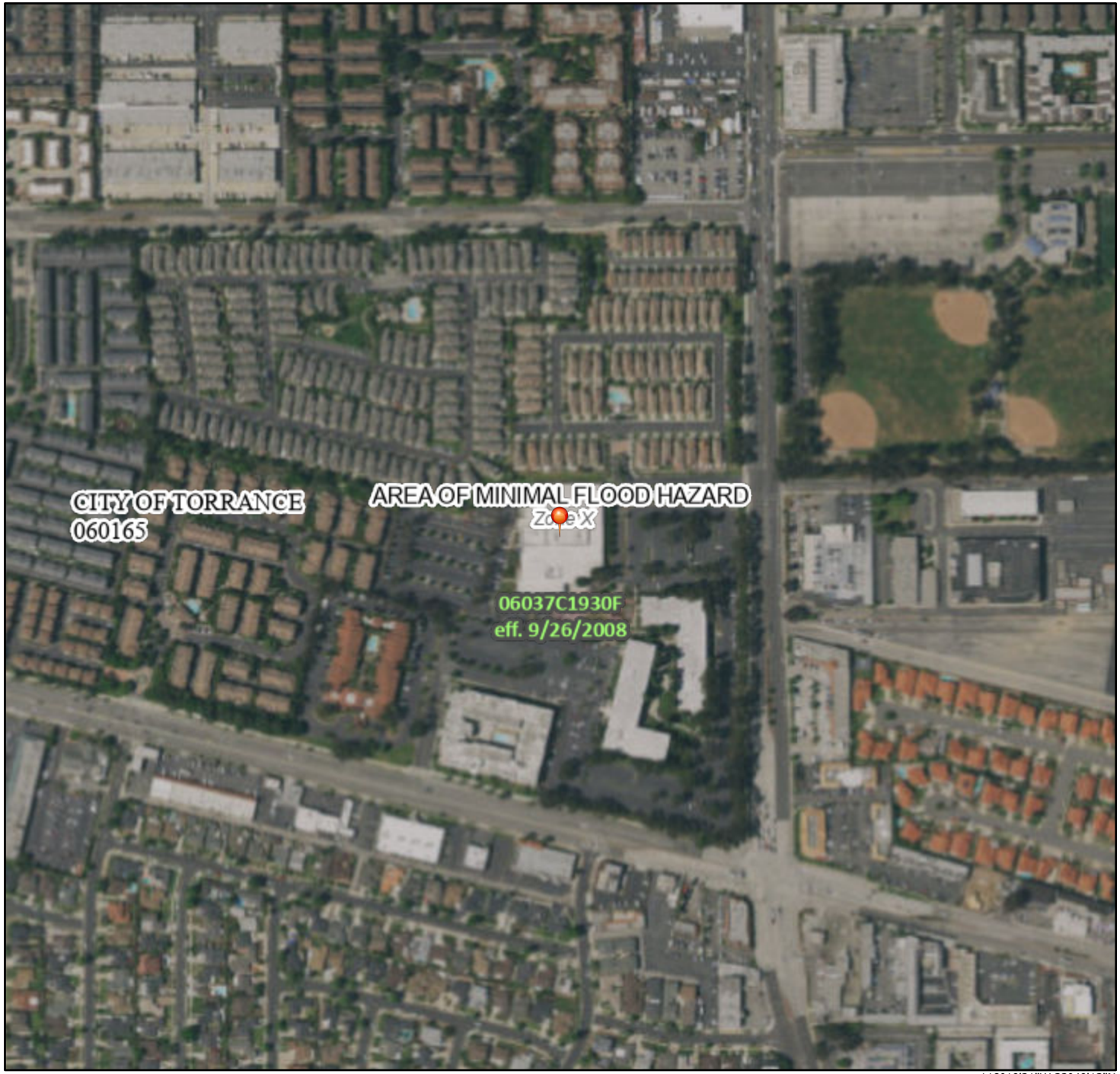
Map Tips

Hold SHIFT to drag a zoom location box.
Hold SHIFT + CTRL to drag a zoom out location box.

National Flood Hazard Layer FIRMette

FEMA

118°20'8"W 33°49'43"N



118°19'31"W 33°49'13"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

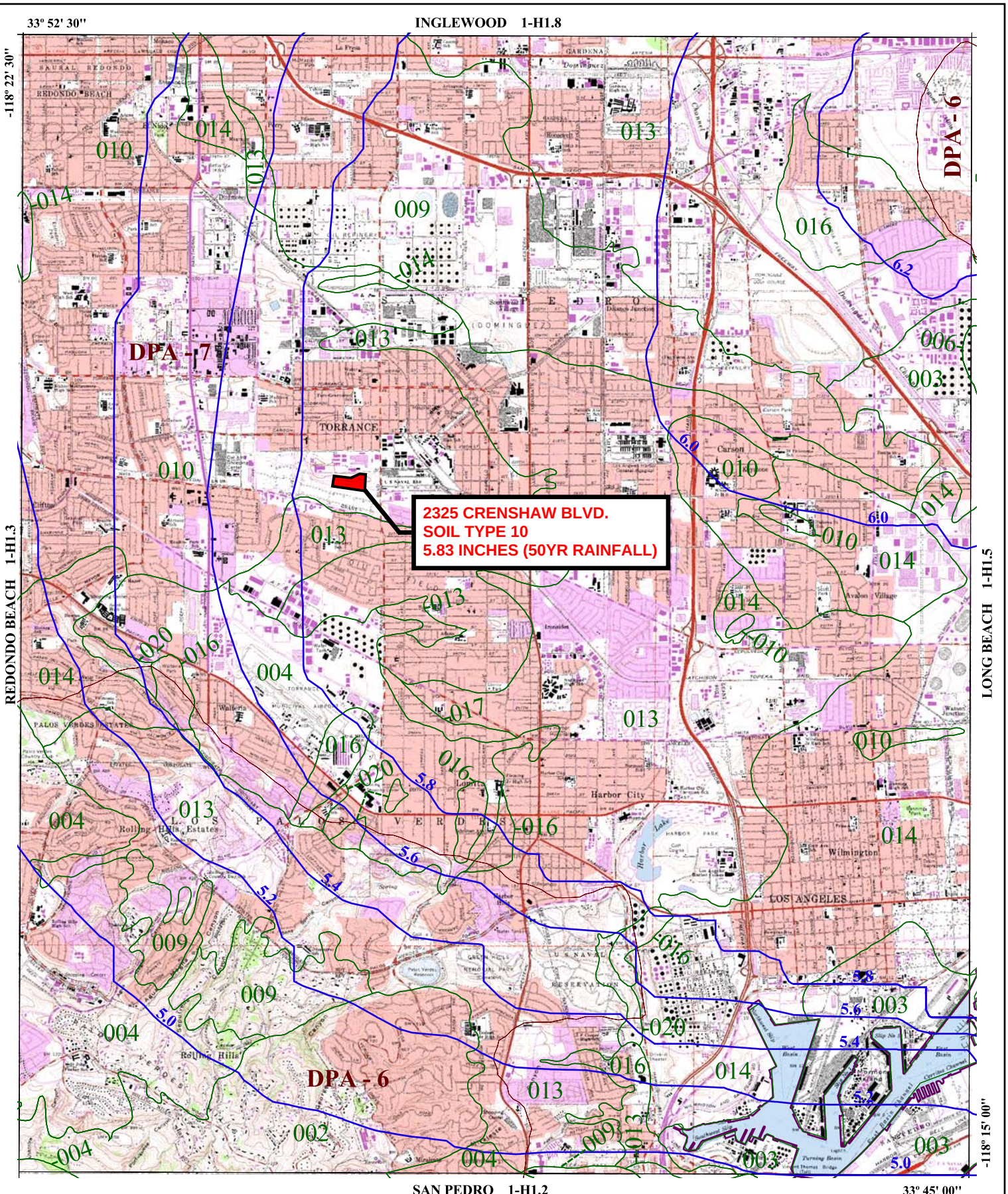
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/4/2023 at 7:07 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.


33° 52' 30"
INGLEWOOD 1-H1.8
-118° 22' 30"
REDONDO BEACH 1-H1.3
LONG BEACH 1-H1.5
-118° 15' 00"
SAN PEDRO 1-H1.2
33° 45' 00"
2325 CRENSHAW BLVD.
SOIL TYPE 10
5.83 INCHES (50YR RAINFALL)
DPA - 6
DPA - 7
DPA - 6
TORRANCE
Carson
Harbor City
Wilmington
LOS ANGELES
Rolling Hills
Rolling Hills Estates
PALOS VERDES ESTATES
016
7.2
DPA - 6
SOIL CLASSIFICATION AREA
INCHES OF RAINFALL
DEBRIS POTENTIAL AREA
N
S
E
W
1 0 1 2 Miles
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714
TORRANCE
50-YEAR 24-HOUR ISOHYET
1-H1.4
LOS ANGELES COUNTY PUBLIC WORKS
Public Service That Works

Peak Flow Hydrologic Analysis

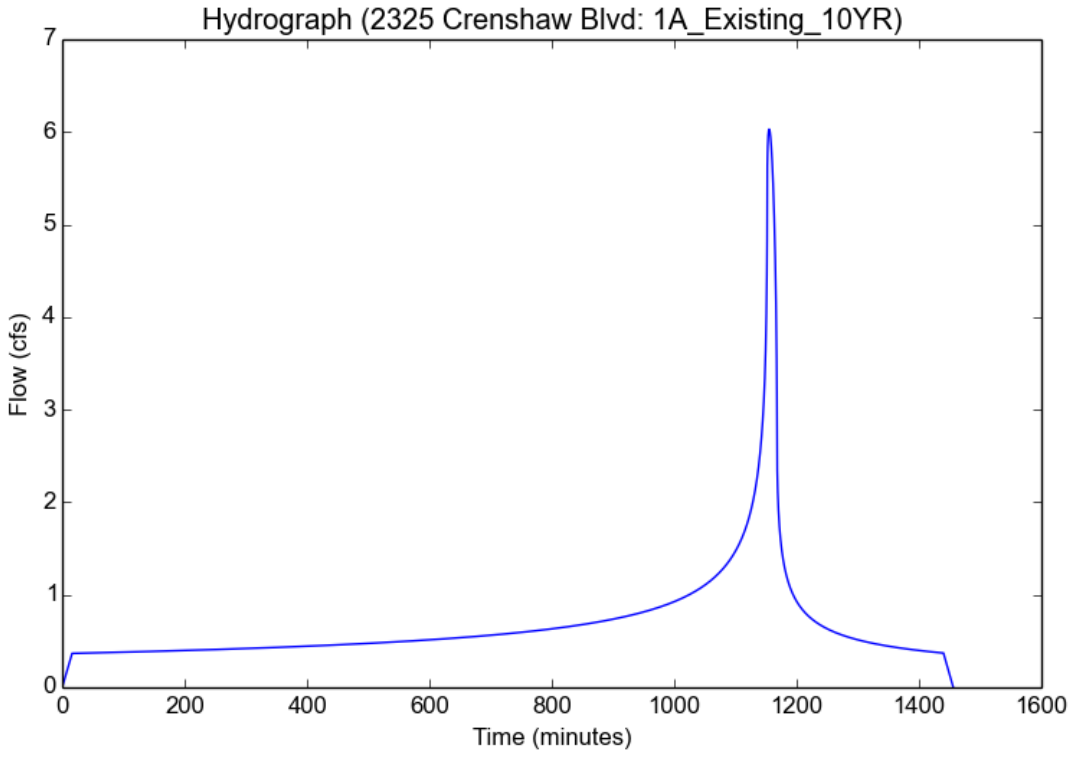
File location: W:/1ROS230101/ENGR/DESIGN/HYDR/Hydrocalcs/2325 Crenshaw Blvd - 1A_Existing_10YR.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2325 Crenshaw Blvd
Subarea ID	1A_Existing_10YR
Area (ac)	5.5
Flow Path Length (ft)	1000.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	5.83
Percent Impervious	0.78
Soil Type	10
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.1626
Peak Intensity (in/hr)	1.4376
Undeveloped Runoff Coefficient (Cu)	0.2752
Developed Runoff Coefficient (Cd)	0.7625
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	6.0294
Burned Peak Flow Rate (cfs)	6.0294
24-Hr Clear Runoff Volume (ac-ft)	1.375
24-Hr Clear Runoff Volume (cu-ft)	59892.99



Peak Flow Hydrologic Analysis

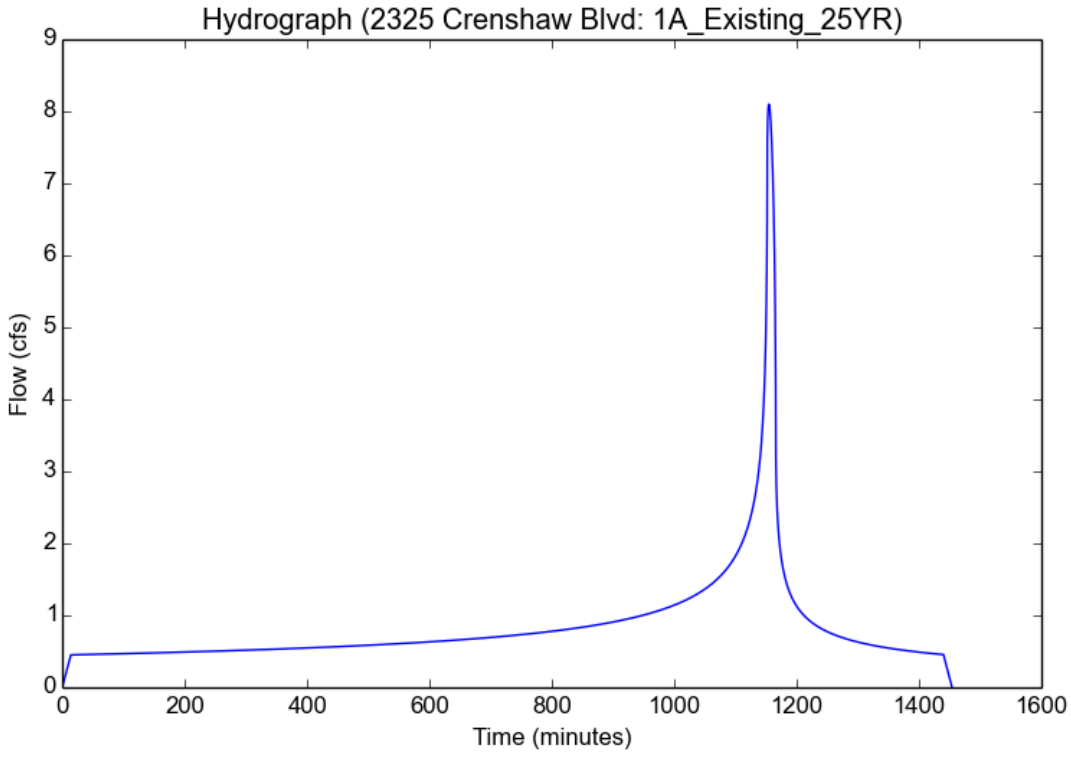
File location: W:/1ROS230101/ENGR/DESIGN/HYDR/Hydrocalcs/2325 Crenshaw Blvd - 1A_Existing_25YR.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2325 Crenshaw Blvd
Subarea ID	1A_Existing_25YR
Area (ac)	5.5
Flow Path Length (ft)	1000.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	5.83
Percent Impervious	0.78
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.1187
Peak Intensity (in/hr)	1.8824
Undeveloped Runoff Coefficient (Cu)	0.3655
Developed Runoff Coefficient (Cd)	0.7824
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	8.1003
Burned Peak Flow Rate (cfs)	8.1003
24-Hr Clear Runoff Volume (ac-ft)	1.695
24-Hr Clear Runoff Volume (cu-ft)	73833.4371



Peak Flow Hydrologic Analysis

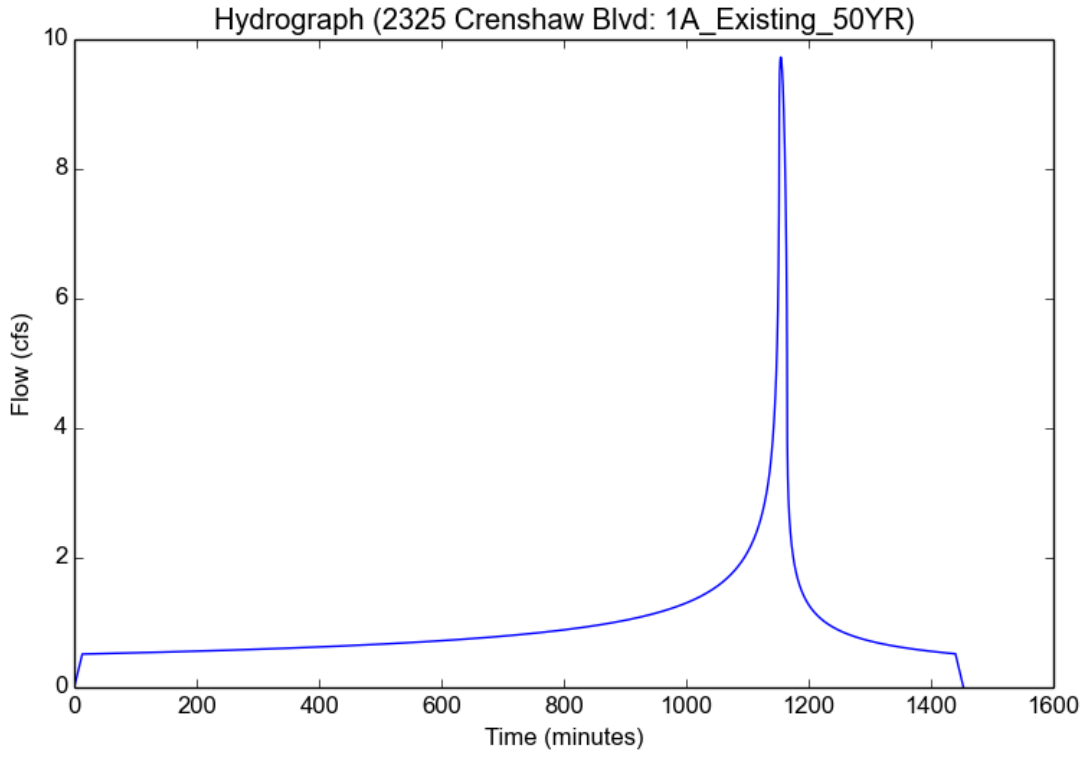
File location: W:/1ROS230101/ENGR/DESIGN/HYDR/Hydrocalcs/2325 Crenshaw Blvd - 1A_Existing_50YR.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2325 Crenshaw Blvd
Subarea ID	1A_Existing_50YR
Area (ac)	5.5
Flow Path Length (ft)	1000.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	5.83
Percent Impervious	0.78
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.83
Peak Intensity (in/hr)	2.2199
Undeveloped Runoff Coefficient (Cu)	0.4296
Developed Runoff Coefficient (Cd)	0.7965
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	9.7251
Burned Peak Flow Rate (cfs)	9.7251
24-Hr Clear Runoff Volume (ac-ft)	1.9339
24-Hr Clear Runoff Volume (cu-ft)	84241.6647



Peak Flow Hydrologic Analysis

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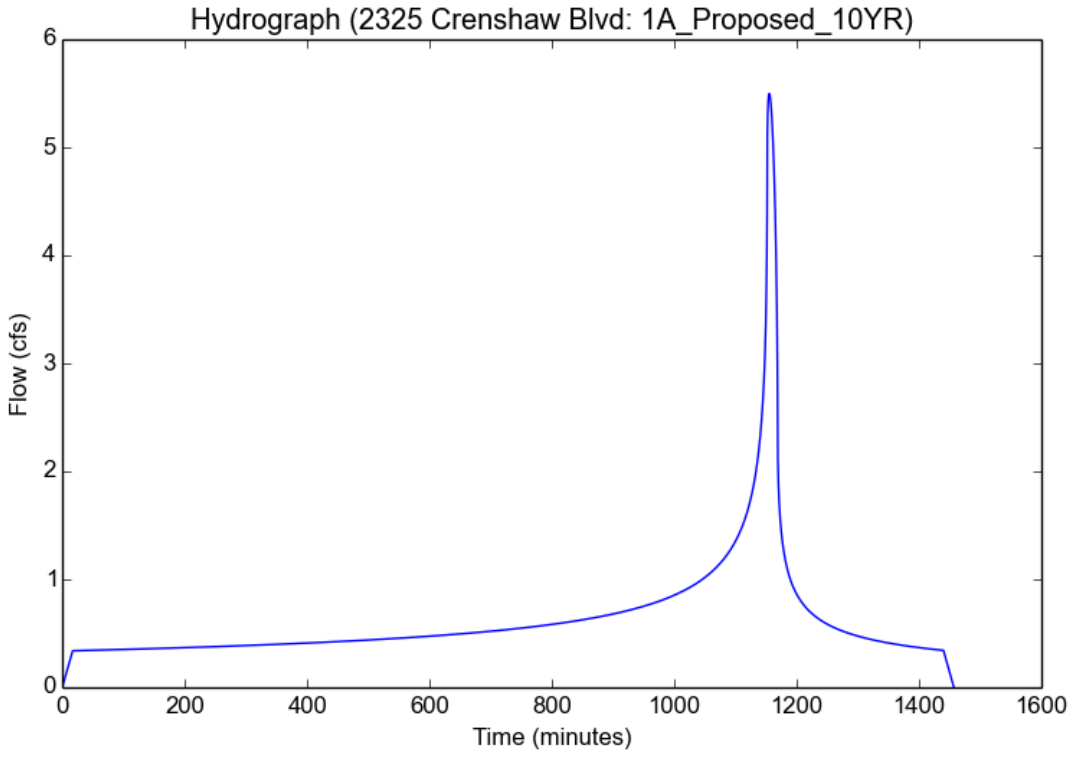
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2325 Crenshaw Blvd
Subarea ID	1A_Proposed_10YR
Area (ac)	5.5
Flow Path Length (ft)	1000.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	5.83
Percent Impervious	0.71
Soil Type	10
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.1626
Peak Intensity (in/hr)	1.3973
Undeveloped Runoff Coefficient (Cu)	0.2637
Developed Runoff Coefficient (Cd)	0.7155
Time of Concentration (min)	17.0
Clear Peak Flow Rate (cfs)	5.4984
Burned Peak Flow Rate (cfs)	5.4984
24-Hr Clear Runoff Volume (ac-ft)	1.2703
24-Hr Clear Runoff Volume (cu-ft)	55333.0743



Peak Flow Hydrologic Analysis

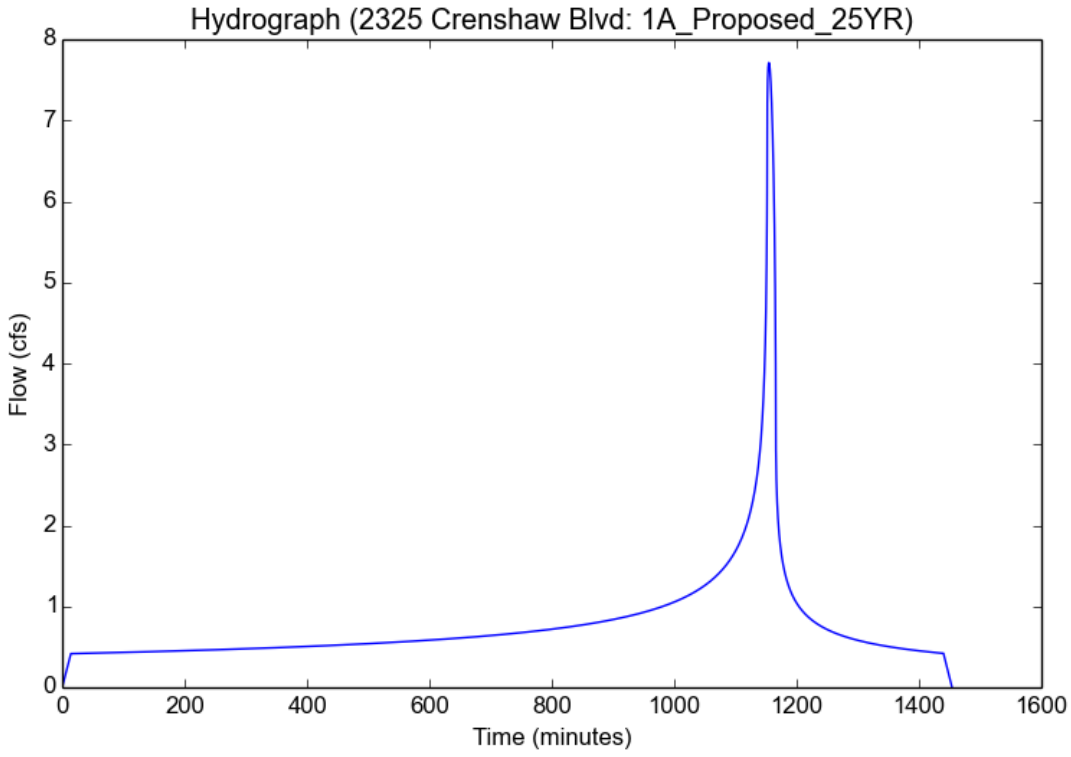
File location: W:/1ROS230101/ENGR/DESIGN/HYDR/Hydrocalcs/2325 Crenshaw Blvd - 1A_Proposed_25YR.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2325 Crenshaw Blvd
Subarea ID	1A_Proposed_25YR
Area (ac)	5.5
Flow Path Length (ft)	1000.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	5.83
Percent Impervious	0.71
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.1187
Peak Intensity (in/hr)	1.8824
Undeveloped Runoff Coefficient (Cu)	0.3655
Developed Runoff Coefficient (Cd)	0.745
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	7.7129
Burned Peak Flow Rate (cfs)	7.7129
24-Hr Clear Runoff Volume (ac-ft)	1.568
24-Hr Clear Runoff Volume (cu-ft)	68302.5667



Peak Flow Hydrologic Analysis

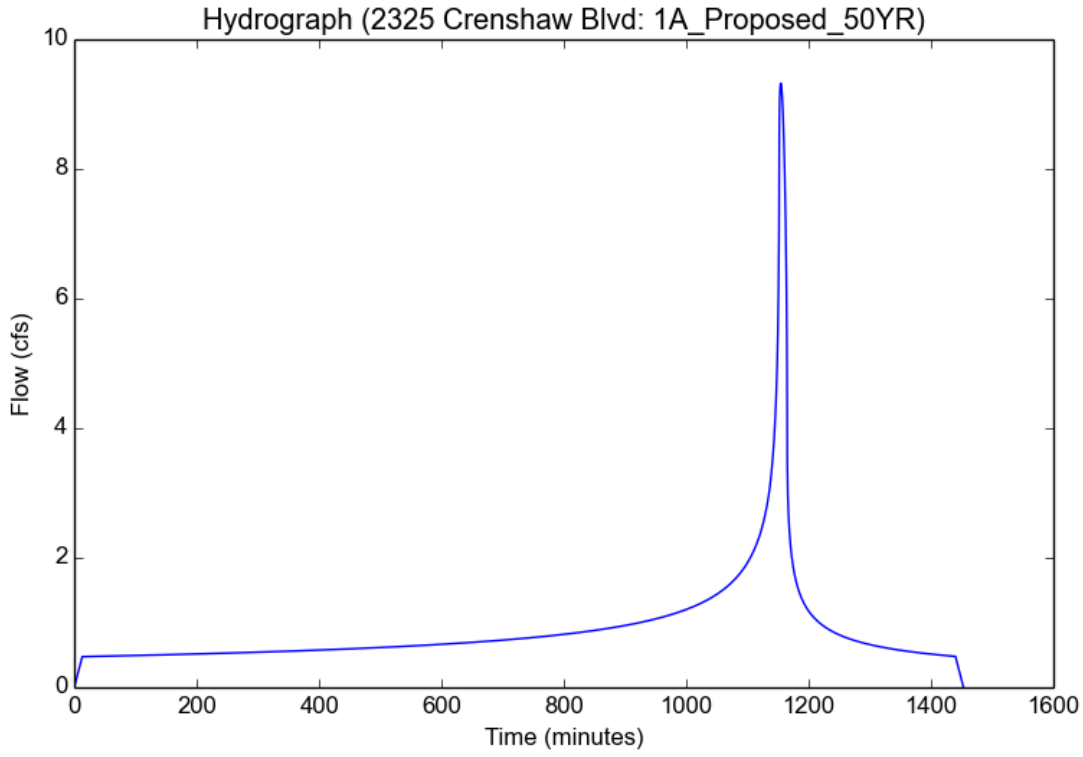
File location: W:/1ROS230101/ENGR/DESIGN/HYDR/Hydrocalcs/2325 Crenshaw Blvd - 1A_Proposed_50YR.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2325 Crenshaw Blvd
Subarea ID	1A_Proposed_50YR
Area (ac)	5.5
Flow Path Length (ft)	1000.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	5.83
Percent Impervious	0.71
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.83
Peak Intensity (in/hr)	2.2199
Undeveloped Runoff Coefficient (Cu)	0.4296
Developed Runoff Coefficient (Cd)	0.7636
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	9.3231
Burned Peak Flow Rate (cfs)	9.3231
24-Hr Clear Runoff Volume (ac-ft)	1.7904
24-Hr Clear Runoff Volume (cu-ft)	77989.6603



Peak Flow Hydrologic Analysis

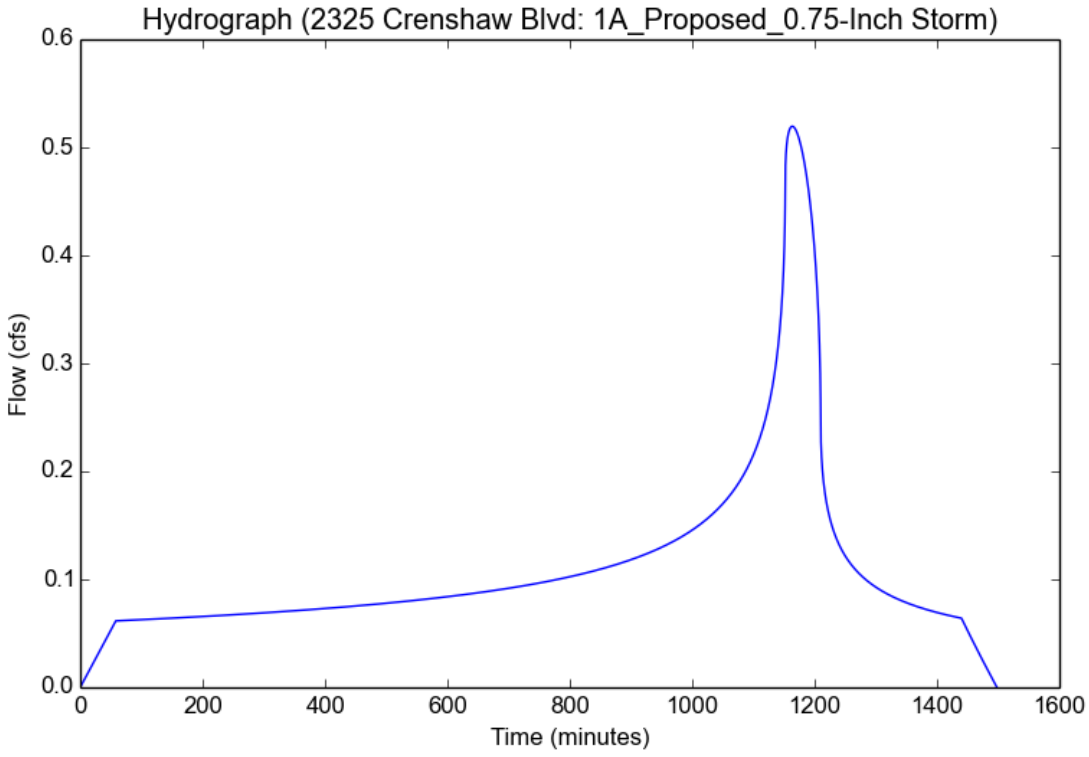
File location: W:/1ROS230101/ENGR/DESIGN/HYDR/Hydrocalcs/2325 Crenshaw Blvd - 1A_Proposed_0.75-Inch Storm.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2325 Crenshaw Blvd
Subarea ID	1A_Proposed_0.75-Inch Storm
Area (ac)	5.5
Flow Path Length (ft)	1000.0
Flow Path Slope (vft/hft)	0.007
0.75-inch Rainfall Depth (in)	0.75
Percent Impervious	0.71
Soil Type	10
Design Storm Frequency	0.75 inch storm
Fire Factor	0
LID	True

Output Results

Modeled (0.75 inch storm) Rainfall Depth (in)	0.75
Peak Intensity (in/hr)	0.1414
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.668
Time of Concentration (min)	58.0
Clear Peak Flow Rate (cfs)	0.5195
Burned Peak Flow Rate (cfs)	0.5195
24-Hr Clear Runoff Volume (ac-ft)	0.2277
24-Hr Clear Runoff Volume (cu-ft)	9920.2336



Peak Flow Hydrologic Analysis

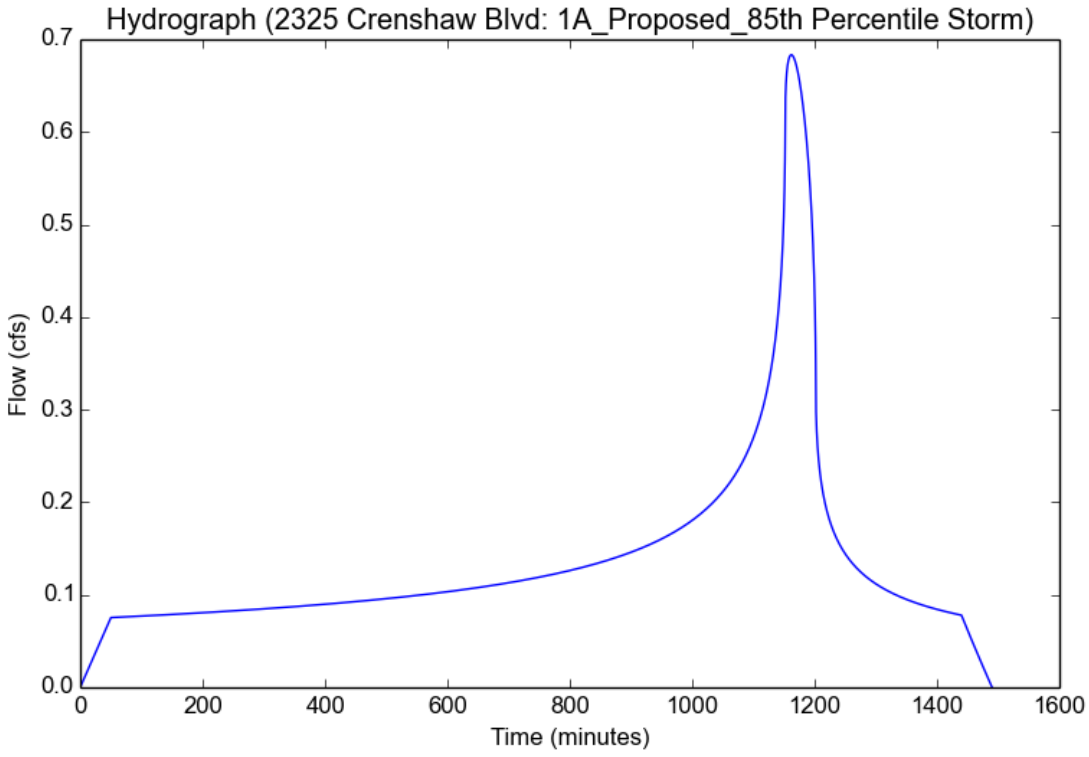
File location: W:/1ROS230101/ENGR/DESIGN/HYDR/Hydrocalcs/2325 Crenshaw Blvd - 1A_Proposed_85th Percentile Storm.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2325 Crenshaw Blvd
Subarea ID	1A_Proposed_85th Percentile Storm
Area (ac)	5.5
Flow Path Length (ft)	1000.0
Flow Path Slope (vft/hft)	0.007
85th Percentile Rainfall Depth (in)	0.92
Percent Impervious	0.71
Soil Type	10
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.92
Peak Intensity (in/hr)	0.186
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.668
Time of Concentration (min)	50.0
Clear Peak Flow Rate (cfs)	0.6833
Burned Peak Flow Rate (cfs)	0.6833
24-Hr Clear Runoff Volume (ac-ft)	0.2794
24-Hr Clear Runoff Volume (cu-ft)	12168.6812



2325 Crenshaw Blvd
Retention Pipe Sizing

Required Volume = **12,169** cf

Givens:			Input:	Ouput:
Pipe Diameter (ft)	(in)	Area (sf)	Required Volume (cf)	Resulting length of pipe
1	12	0.79	12,169	15,501.9
1.5	18	1.77	12,169	6,889.7
2	24	3.14	12,169	3,875.5
3	36	7.07	12,169	1,722.4
4	48	12.56	12,169	968.9
5	60	19.63	12,169	620.1
6	72	28.26	12,169	430.6
7	84	38.47	12,169	316.4
8	96	50.24	12,169	242.2

CITY OF TORRANCE EMAIL CORRESPONDENCE 9/1/2022

Linda Boswell

From: Wong, Chui <CWONG@TorranceCA.gov>
Sent: Thursday, September 1, 2022 1:44 PM
To: Linda Boswell
Cc: Maatubang, Anthony
Subject: RE: 2325 Crenshaw Blvd - Sewer and Storm Drain Follow Up
Attachments: Sewer Study for 22600 Crenshaw Blvd..pdf

Hi Linda,
Please see response below.

CHUI WONG
Assistant Civil Engineer – Community Development Department
City of Torrance I 3031 Torrance Boulevard I Torrance CA 90503 I 310.618.2826 voice I CWong@TorranceCA.Gov
www.TorranceCA.Gov I www.TorranceCA.Gov/SocialMedia I www.TorranceCA.Gov/COVID19 I

From: Linda Boswell <linda.boswell@psomas.com>
Sent: Thursday, August 25, 2022 10:48 AM
To: Wong, Chui <CWONG@TorranceCA.gov>
Cc: Maatubang, Anthony <AMaatubang@TorranceCA.gov>
Subject: 2325 Crenshaw Blvd - Sewer and Storm Drain Follow Up

Hi Chui,

Mike is out on vacation this week and I wanted to keep the ball rolling on this project. I'm following up on some of the items that came from our meeting last week.

- Storm Drain
  - Have you been able to review the storm drain line to confirm what storm event it was originally designed for? Q10?

    The public storm drain system SD-434 was designed for Q50 and the Madrona Marsh Retention Basin that this public system drains to has the capacity for 100 Year Storm.
    No onsite storm drain detention is required; however, according to the City's Public Works Department, the Madrona Marsh is considered as an Environmentally Sensitive Area (ESA). As an ESA it has special regulatory requirements for discharges to the basin, a developer would need to install BMP's to address trash and nutrients per the Machado Lake Trash TMDL and the Machado Lake Nutrients TMDL

    The following link was provided by the Public Works Dept. and Keo (Ukeo@TorranceCa.gov) may provide more information about the BMP's
    https://planning.lacounty.gov/sea/faqs

- Sewer
  - Have you received flow monitoring data and if so, could you share that information with us?
  - I didn't receive the flow monitoring data. Attached is a complete set of sewer study that I have.
  -

CITY OF TORRANCE EMAIL CORRESPONDENCE 9/1/2022 - CONTINUED...

- Just to confirm that the City will accept a study based on land use as an alternative to gathering flow monitoring data.
- The City accepts proposed sewer flow using land use calculation based on the County's standards.
- What standard does the City use to determine the proposed sewer flow? Is it based on the County's standards?

Once we get a handle on we'd like to do, we can certainly set up a call so we get your input to make sure we meet the City's expectations. Thanks Chui and nice to be working with you again!

Anthony – Not sure if you remember me but looking forward to working with you too!

Linda (Luu) Boswell, PE, QSD, ENV SP
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Facilities, Infrastructure, and Development
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