APPENDIX I

Hydrology and Water Quality Report

HYDROLOGY & WATER QUALITY REPORT

for

Carol Kimmelman Athletic and Academic Campus
Carson, California

Prepared For:

The Carol Kimmelman Center, LLC.
2121 East 7th Place
Los Angeles, CA 90021

Prepared By:

Langan Engineering and Environmental Services, Inc.
515 South Flower Street, Suite 2860
Los Angeles, California 90071

12 April 2019
Langan Project No. 700060401

LANGAN

TABLE OF CONTENTS

1.0 INTRODUCTION....1

2.0 PROJECT DESCRIPTION....1

2.1 Site Description....1
2.2 Proposed Development....2

3.0 ENVIRONMENTAL SETTING....2

3.1 Surface Water Hydrology....2
3.2 Surface Water Quality....4
3.3 Groundwater....6
3.4 Regulatory....7

4.0 ANALYSIS OF PROJECT IMPACTS....11

4.1 Methodology....11
4.2 Surface Water Hydrology....12
4.3 Surface Water Quality....14
4.4 Groundwater....18

5.0 CONCLUSIONS....19

5.1 Summary of Recommendations....20

6.0 REFERENCES....20

FIGURES

1 Site Vicinity Map
2 Conceptual Site Plan
3 Existing Drainage Features
4 Existing Drainage Map
5 Proposed Drainage Map

APPENDICES

A FEMA Flood Insurance Rate Map
B Existing Storm Drain Records
C County of Los Angeles Department of Public Works - Soil and Precipitation Map
D Excerpt from the March 2014 Contaminated Sediment Management Plan: Dominguez Channel Estuary
E HydroCalc. Exported Values

1.0 INTRODUCTION

The purpose of this report is to inform the Hydrology and Water Quality evaluations of the Environmental Impact Report for the Carol Kimmelman Athletic & Academic Campus project (the "Project"). This report identifies potential surface water hydrology, water quality and flood hazard impacts that may be associated with the development of the Project. The report provides technical information and responds to the following relevant thresholds of significance listed in Appendix G of the California Environmental Quality Act ("CEQA") Guidelines relating to hydrology and water quality:

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?
b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would:
    - result in substantial erosion or siltation on- of 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 to runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?
    - Impede or redirect flood flows?
d) Would the project, in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?
e) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

2.0 PROJECT DESCRIPTION

2.1 Site Description

The Project Site includes approximately 87 acres (Site) of the northeastern portion of the existing approximately 187 acre Victoria Golf Course (see Figure 1 – Site Vicinity Map). The County of Los Angeles (County) owns the Site which the County currently leases for the operation of a golf course. Prior to the Victoria Golf Course's current use as a County golf course, it was the site of a portion of the former Ben K. Kazarian (BKK) landfill, which was approximately 353 acres and was operated as a Class II municipal solid waste landfill from 1948 to approximately 1959. The California Department of Toxic Substances Control (DTSC) is overseeing the former landfill's remediation. The entire former landfill site is divided into Operable Units (OU) focused on two separate remediation operations, of which the Victoria Golf Course site is OU-2.

The Site contains existing infrastructure within and adjacent to its boundaries including water, sewer, stormwater drainage, electric, gas and telecommunications. The County owns and operates the facility which includes sanitary sewer and stormwater drainage. Domestic water is

operated and maintained by California Water Service Company (CWSC). Recycled water is operated and maintained by West Basin Municipal Water District (WBMWD).

2.2 Proposed Development

The Project involves the redevelopment of the Site for public recreation purposes (see Figure 2 for the current architectural concept). Project components would include a tennis center, soccer center, learning center and various support buildings. Features of the Project include:

Tennis Center

- The tennis center component would occupy approximately 28 acres developed with a 23,000 square foot welcome center, a spectator venue with up to 12 hard courts and 1,200 seats, 50 tennis courts of various sizes, a 5,000 square foot administration building, a 13,000 square foot player development building, and outdoor training spaces including a 100-meter sprint track, basketball courts, a training turf, a maintenance facility, and vehicle/ bus parking.

Learning Center

- Adjacent to the tennis center would be an approximately 25,000 square foot learning center that would include classrooms, quiet rooms, staff support for homework, counseling, and tutoring.
- The welcome center and learning center will be located in the main entrance area within the northwest portion of the Site.

Soccer Center

- The soccer center component would occupy approximately 58 acres developed with six full-sized natural grass soccer fields, two full-sized artificial turf soccer fields, and two natural grass multi-purpose fields.

Other Improvement:

- Additional site improvements would include asphalt paved parking lots and two additional overflow parking areas between the fields and South Avalon Boulevard.
- Miscellaneous support buildings, including maintenance facilities, restrooms, and sheds, will be constructed throughout the site.

3.0 ENVIRONMENTAL SETTING

3.1 Surface Water Hydrology

3.1.1 Regional

The Project Site is located within the greater Los Angeles area within the Dominguez Channel Watershed. A brief description of the watershed, as provided in Section 1.1 of

the Coordinated Integrated Monitoring Program (2014 draft) by the Dominguez Channel Watershed Area Management Group, is summarized below.

The Dominguez Channel Watershed, located in the southern portion of Los Angeles County, is about 133 square miles in size; 120 square miles is land, and the remainder consists of the Los Angeles and Long Beach Harbors. Approximately 72 square miles of the land area drains to the Dominguez Channel, and the remaining 48 square miles drains to the Los Angeles/Long Beach Harbors and Machado Lake. Its boundaries range from the Los Angeles International Airport to the Los Angeles Harbor. The Dominguez Channel Watershed is a predominately urban area with a mix of residential, commercial, and industrial use. It receives about 12.1 inches of rain each year, mostly during the winter season.

The relevant Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the Site is Panel 1935 of 2350, Map Number 06037C1935F, dated September 26, 2008 (see Appendix A). Most of the Site is located within Zone X "Other Areas," identified on the FIRM as "areas outside the 0.2% annual chance floodplain." Small perimeter portions of the site are located within Zone X "Other Flood Areas," identified on the FIRM as "areas of 0.2% annual chance of flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood." Zone X areas have moderate to low risk flood and do not have FEMA requirements for flood protection. The Dominguez Channel and an open branch channel that are located off of the Project Site are classified as Zone A, a Special Flood Hazard Area (without base flood elevation).

3.1.2 Local

Underground storm drainage facilities located off-site along Martin Luther King Jr. Street and South Avalon Boulevard are owned and maintained by the County and the County Flood Control District. Stormwater runoff enters catch basins and underground storm drainage pipes convey the runoff to the Del Amo Channel. To the west of the Site there is an existing Los Angeles County open branch channel. This channel and the Del Amo Channel connect to the downstream Dominguez Channel. Figure 3 – Existing Drainage Features and the existing storm drain record documents in Appendix B show the elements of the existing drainage system.

3.1.3 On-Site

Approximately 70% of the Site discharges stormwater runoff to the east to the existing South Avalon Boulevard storm drain system and the Del Amo Channel. The remaining 30% discharges stormwater runoff to the west to the existing County branch channel. Approximately 7% of the Site has impervious cover including buildings, paved parking lots, streets and cart paths and tennis courts (see Figure 4 – Existing Drainage Map). The remainder of the Site is the vegetated golf course area, however, due to the existence of the landfill soil cover (consisting of sandy silt, clayey sand, sandy clay and clay with the predominant soil type as sandy clay) under the vegetation these areas are also characteristic of impervious area.

Peak runoff rates for the 50-year storm event were calculated for the pre-construction (existing) and post-construction (proposed) conditions using the engineering application HydroCalc consistent with the Los Angeles County Hydrology Manual. This software, as provided by Los Angeles County, utilizes hydrograph data to determine the peak runoff rate for a particular watershed. At the location of the Site, the 24-hour 50-year rainfall depth is 6.2 inches, the soil type is 16, and the fire factor is not applicable (see Appendix C and page 55 of the Los Angeles County Hydrology Manual).

3.2 Surface Water Quality

3.2.1 Regional

The Site is tributary to the Dominguez Estuary (unlined portion below Vermont Ave). Currently, the Dominguez Estuary is listed on the California 303(d) list as a Category 5 water segment. The Category 5 criteria are as follows: "A water segment where standards are not met and a TMDL is required, but not yet completed, for at least one of the pollutants being listed for this segment." (2014 and 2016 California 303(d) List of Water Quality Limited Segments). The water quality impairments listed for the Dominguez Estuary are Benthic Community Effects, Benzo(a)anthracene, Benzo(a)pyrene (3,4-Benzopyrene-7-d), Chrysene(C1-C4), Copper, Indicator Bacteria, Lead, PCBs (Polychlorinated biphenyls), Phenanthrene, Pyrene, and Toxicity.

As discussed further below, Section 303(d) of the 1972 Federal Clean Water Act requires States to identify water bodies that do not meet water quality objectives and are not supporting their beneficial uses. Each State must submit an updated list, called the 303(d) list, to the U.S. EPA every two years.

In addition to identifying the water bodies that are not supporting beneficial uses, the list also identifies the pollutant or stressor causing impairment and establishes a priority for developing a control plan to address the impairment. The list also identifies water bodies where 1) a Total Maximum Daily Load (TMDL) has been approved by U.S. EPA and an implementation is available, but water quality standards are not yet met, and 2) water bodies where the water quality problem is being addressed by an action other than a TMDL and water quality standards are not yet met.

Once a water body is placed on the 303(d) list, Regional Board staff evaluates the nature of the impairment and begins developing a TMDL, if appropriate and necessary. For each TMDL developed, staff will also develop an implementation or water quality control plan for each water body and associated pollutant/stressor on the list. The TMDL and the implementation plan serve as the means to attain and maintain water quality standards for the impaired water body.

On May 5, 2011, the Regional Board adopted Resolution No. R11-008, amending the Water Quality Control Plan for the Los Angeles Region to incorporate a TMDL for toxic pollutants in the Dominguez Channel and Greater Los Angeles and Long Beach Harbor waters. The TMDL's are documented in the March 2014 Contaminated Sediment

Management Plan: Dominguez Channel Estuary. An excerpt of this plan is included as Appendix D.

The Dominguez Channel Watershed Management Area contains two Superfund sites, the Montrose Chemical Corporation site and the Del Amo Facility site. The Montrose site manufactured DDT from 1947 to 1982. The compound is still present in soils around the Montrose site and may be carried by stormwater runoff if exposed. The site however, is currently paved and includes a maintenance plan under Initial Action, taken under USEPA oversight in 1985. The Del Amo Facility site was once the center of large-scale production of synthetic rubber that included a styrene and a butadiene plant. Groundwater and soils in the area are contaminated with volatile organic compounds (VOCs), PAHs, and minor amounts of pesticides, PCBs, and heavy metals. Most of the Del Amo facility has been redeveloped into an industrial business park and surficial soils are generally not exposed (City of Los Angeles 2015).

3.2.2 Local

In general, urban stormwater runoff occurs following precipitation events with the rate and volume of runoff flowing into a drainage system dependent on the intensity and duration of the rainfall event. Contaminants that may be found in stormwater from developed areas include sediments, trash, bacteria, metals, nutrients, organics, and pesticides. The sources of contaminants include surface areas where precipitation falls, as well as the air it falls through. Contaminants on surfaces such as roads, maintenance areas, parking lots, and building, which are usually contained in dry weather conditions, may be carried by rainfall into drainage systems.

3.2.3 On-site

The Remedial Action Plan for Soil and Landfill Gas Media (Burns McDonnell, "Remedial Action Plan for Soil and Landfill Gas Media, Former BKK Landfill, Carson Dump, Operable Unit 2, 340 East 192nd St., 19202 South Main St., 19200 South Main St., City of Carson, California 90248" dated June 2016) concluded that the low and undetectable levels of contaminants of potential concern in the surface water runoff and the sediment within the surface water runoff from the Site represented an insignificant ecologic or human health risk.

The Project Site currently has no means for the treatment of stormwater runoff. The existing stormwater pollutant sources include the building roof, on-site pavements, maintenance areas, roadways and the landscaped golf course areas. The pollutants of concern from the areas include a mix of sediment, trash, bacteria, metals, nutrients, organics and debris. The golf course areas absorb a small portion of the direct rainfall and the trees and shrubs intercept some rainfall before it reaches the ground (initial abstraction), hence reducing the amount of stormwater runoff from these areas. However, due to the landfill soil cover beneath the golf course vegetation, most of the direct rainfall becomes stormwater runoff. The inclusion of the low impact development best management practices (LID-BMPs) into the Project, both during and post

construction, will reduce the pollutant loading from the Site since no pollutant reduction measures currently exist.

3.3 Groundwater

3.3.1 Regional and Local

The Site is located within the Palos Verdes Peninsula, which consists of an extensive, primarily submarine terrain where Middle Miocene and younger sediments lie on a tectonically disrupted basement of Mesozoic Catalina Schist. More specifically, the Site is located in a northwest-trending coastal Torrance Plain within the West Coast Basin. The Torrance Plain is bounded by the Pacific Ocean to the west and south, the Los Angeles Basin to the north, the Coastal Plain to the east, and the Santa Ana Mountains to the southeast.

The regional groundwater is defined by the Bellflower Aquitards (upper, middle, lower-middle and lower units), Gage Aquifer, Gage Lynwood Aquitard, Lynwood Aquifer and Silverado Aquifer. These hydrostratigraphic units extend from near-surface to over 329 feet below ground surface and overall groundwater flow is to the south.

3.3.2 On-Site

According to the Urban Water Management Plan prepared by the California Water Service for the Dominguez District in June 2016, groundwater is approximately 40 to 50 feet below sea level at the Site. Since the proposed site elevations range from about 10 to 35 feet above sea level, groundwater depth is estimated to range from about 50 to 85 feet below grade. However, the groundwater monitoring well gauging data from the Final RI/FS BKK Landfill OU-2 Report (Leighton Consulting, Inc., "Final Remedial Investigation and Feasibility Study for Soil and Gas Media Former BKK Landfill, Carson Dump Operable Unit 2, City of Carson, California" dated June 2014) indicates the groundwater beneath the site varies from approximately 9 feet below ground surface to 43 feet below ground surface.

The Dominguez Water Company maintained a leased well-site at OU-02 for water production well DWC-11 (State well identification number 834 and Watermaster well identification number 4S/13W-5 L1). The RI/FS indicates that the well is abandoned (only reported operational from 1919 to 1959) and is no longer visible.

There is limited to no groundwater-surface interaction due to the presence of the landfill soil cover, nor is there evidence of migration of landfill contaminants to surface water. As discussed above, the Site is located within OU-2. A Remedial Action Plan associated with soil and soil gas contamination was completed in June 2016. The DTSC has previously identified several VOCs in the groundwater beneath the Site including vinyl chloride, dichloroethane, dichloroethene, trichloroethene and chlorobenzene. (DTSC Settlement Agreement and Consent Order (State of California, California Environmental Protection Agency, Department of Toxic Substances Control, "Docket No. HAS-CO 05/05-114 Settlement Agreement and Consent Order" dated May 2006) As documented in the

DTSC acceptance of the RI/FS (State of California, California Environmental Protection Agency, Department of Toxic Substances Control, "Review of Draft Revised Remedial Investigation and Feasibility Study for Soil and Gas Media" dated June 2014) and acknowledged in the Final RI/FS, it is understood that the results of groundwater samples collected under DTSC-approved workplans and monitoring programs and potential groundwater response actions will be addressed by DTSC separately from the 2016 Remedial Action Plan.

3.4 Regulatory

The primary statutes that govern the activities under the Project that may affect water quality are the federal CWA (33 U.S.C. 1251 et seq.) and the Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (California Water Code, Section 13000 et seq.). These acts provide the basis for water quality regulation in the Project area.

3.4.1 Federal

Clean Water Act

The Clean Water Act (CWA) (33 U.S.C. 1251 et seq.) established basic guidelines for regulating discharges of pollutants into the waters of the U.S. The CWA requires that states adopt water quality standards to protect public health, enhance the quality of water resources, and ensure implementation of the CWA. The CWA provides the legal framework for several water quality regulations including, for example, the National Pollutant Discharge Elimination System (NPDES) permits. While most of the regulatory responsibilities under the CWA fall under the EPA, the United States Army Corps of Engineers has primary jurisdiction for implementation of the wetlands and streambed alterations regulatory functions under the Act.

The NPDES permit program, as authorized by Section 402 of the CWA, was established to control water pollution by regulating point sources that discharge pollutants into waters of the United States (33 U.S.C. 1342). In the state of California, the EPA has authorized the State Water Resources Control Board (SWRCB) permitting authority to implement the NPDES program.

Section 303(d) of the CWA requires identification and listing of water-quality limited or "impaired" waterbodies where water quality standards and/or receiving water beneficial uses are not met. As discussed above, once a water body is listed as "impaired", TMDLs must be established for the pollutants or flows causing the impairment (33 United States Code [USC] Section 1313(d)(c)). Once established, the TMDL allocates the loads among current and future pollutant sources to the water body. In general, where urban runoff is identified as a significant source of pollutants causing the impairments and is subject to load allocations, implementation of, and compliance with the TMDL requirements are administered through a combination of individual Industrial Stormwater Permits, the General Industrial and General Construction Stormwater Permits, and the County of Los Angeles' municipal stormwater NPDES program, specifically through the Municipal

Separate Storm Sewer System (MS4) Permit issued to the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities.

Safe Drinking Water Act

Under the Safe Drinking Water Act, the EPA sets drinking water standards referred to as the National Primary Drinking Water Regulations, 40 CFR 141, and the National Secondary Drinking Water Regulations, 40 CFR Par 143. These regulations set maximum contaminant levels (MCLs) for substances in drinking water.

3.4.2 State

Port-Cologne Water Quality Control Act

The Porter-Cologne Act of 1967 (California Water Code, Section 13000 et seq.) requires the SWRCB and the nine RWQCBs to adopt water quality criteria to protect state waters. The SWRCB establishes statewide policy for water quality control and provides oversight of the RWQCBs' operations. In addition to other regulatory responsibilities, the RWQCBs have the authority to conduct, order, and oversee investigation and cleanup where discharges or threatened discharges of waste to waters of the state could cause pollution or nuisance, including impacts to public health and the environment.

Actions that involve, or are expected to involve, discharge of waste are subject to water quality certification under Section 401 of the CWA (e.g., if a federal permit is being sought or granted) and/or waste discharge requirements (WDRs) under the Porter-Cologne Act. Chapter 4, Article 4 of the Porter-Cologne Act (California Water Code, Sections 13260–13274), states that persons discharging or proposing to discharge waste that could affect the quality of waters of the state (other than into a community sewer system) shall file a Report of Waste Discharge with the applicable RWQCB. For discharges directly to surface water (waters of the United States), an NPDES permit is required, which is issued under both state and federal law. For other types of discharges, such as waste discharges to land (e.g., spoils disposal and storage), erosion from soil disturbance, or discharges to waters of the state (such as isolated wetlands), WDRs are required and are issued exclusively under state law. WDRs typically require many of the same BMPs and pollution control technologies as required by NPDES-derived permits. Further, the WDRs' application process is generally the same as for CWA Section 401 water quality certification.

As discussed above, the CWA requires stormwater discharges to be in compliance with an NPDES Permit. In California, the SWRCB and its RWQCBs administer the NPDES permit program. The RWQCB also issues WDRs that serve as NPDES permits under the authority delegated to the RWQCBs, under the CWA.

The SWRCB has issued a statewide NPDES General Permit for stormwater discharges associated with construction activities. Projects that disturb land equal to or greater than 1.0 acre are required to file a Notice of Intent to discharge under the Construction General Permit. The Construction General Permit (CGP) requires the development and

implementation of a Stormwater Pollution Prevention Plan (SWPPP), which describes Best Management Practices (BMPs) the discharger would use to eliminate or reduce pollutants in stormwater runoff. The SWPPP must contain a visual monitoring program, a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs, and a sediment-monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Routine inspection of all BMPs is required under the provisions of the CGP.

Stormwater discharges to the municipal separate storm sewer system are regulated by the Los Angeles Regional Water Quality Control Board under Order Number R4-2012-0175, NPDES Permit N0. CA S004001 (MS4) Discharges Within the Coastal Watersheds of Los Angeles County, Except Those Discharges Originating from the City of Long Beach). This permit is discussed further below.

Pursuant to the requirements set forth by Order No. R4-2012-0175, MS4 NPDES Permit, the Dominguez Channel Watershed Management Area Group (Watershed Management Group) developed the Dominguez Channel Enhanced Watershed Management Plan. The plan outlines a series of mitigation measures required to improve water quality, including the construction of regional stormwater detention and groundwater recharge areas. The Watershed Management Group incorporated applicable BMPs into the Enhanced Watershed Management Plan to address the various TMDLs associated with the Dominguez Channel.

California Code of Regulations, Title 22

Groundwater quality delivered for public supply is regulated under the California Domestic Water Quality and Monitoring Regulations (Title 22, Division 4, Chapter 15 of the California Code of Regulations). Along with implementing the federal Safe Drinking Water Act regulations detailed above, these regulations identify primary and secondary drinking water standards for public drinking water supplies in the state.

Sustainable Groundwater Management Act of 2014

The Sustainable Groundwater Management Act of 2014 (SGMA) provides a framework for the sustainable management of groundwater supplies by local authorities. The SGMA requires the formation of local groundwater sustainability agency (GSA) to assess local water basin conditions and adopt locally-based management plans. The SGMA provides 20 years for GSAs to implement plans and achieve long-term groundwater sustainability, and protects existing surface water and groundwater rights. The SGMA provides the local GSAs with the authority to require registration of groundwater wells, measure and manage extractions, require reports and assess fees, and request revisions of basin boundaries, including establishing new subbasins. Furthermore, under the SGMA, GSAs responsible for high- and medium-priority basins must adopt groundwater sustainability plans within five to seven years, depending on whether the basin is in critical overdraft.

3.4.3 Local

Municipal NPDES Permit

The Los Angeles Regional Water Quality Control Board (Regional Water Board) adopted Order No. 90-079 (1990 MS4 Permit), which was the first MS4 permit for the County and incorporated areas therein. On December 13, 2001, the Regional Water Board adopted Order No. 01-182 (2001 MS4 Permit), which replaced the 1990 MS4 Permit and regulated stormwater and non-stormwater discharges within the coastal watersheds of the County, and applied to the Los Angeles County Flood Control District, the unincorporated areas of Los Angeles County under County jurisdiction with the exception of a portion of Antelope Valley including the Cities of Lancaster and Palmdale and the City of Avalon, and 84 cities within the Los Angeles County Flood Control District with the exception of the City of Long Beach. The 2001 MS4 Permit was subsequently amended several times to incorporate new provisions and requirements.

As part of the 2001 MS4 Permit, the County was required to comply with the Standard Urban Stormwater Mitigation Plan (SUSMP). In September 2002, the County developed the SUSMP Manual to comply with the requirements of the 2001 MS4 Permit. The SUSMP Manual outlined BMPs to be incorporated into design plans for certain categories of new development and redevelopment projects. The County subsequently developed the 2004 Design Manual, which was updated in 2010 (2010 Design Manual) and the 2009 LID Manual to further enhance its stormwater management efforts for new development and redevelopment projects.

In October 2008, the County adopted an LID Ordinance into the Los Angeles County Code Title 12, Chapter 84 to require the use of LID principles in all development projects except road and flood infrastructure projects. With the 2012 MS4 Permit, it became necessary for the County to modify this ordinance to reflect the new stormwater runoff water quality and hydromodification requirements for new development and redevelopment projects. In November 2013, the County amended the Los Angeles County Code Title 12, Chapter 84 to incorporate the requirements of the 2012 MS4 Permit. The November 2013 LID Ordinance became effective December 5, 2013, and requires that all Designated, Non-Designated, street and road construction, and single-family hillside home projects comply with Los Angeles County Code Title 12, Chapter 84. The 2014 County LID Standards Manual was prepared to complement and be consistent with the November 2013 LID Ordinance requirements.

The County 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 BMPs and other 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 and technologies.

Basin Plan

The Los Angeles Regional Water Quality Control Board (RWQCB) has adopted the Los Angeles Regional Water Quality Control Board Basin Plan (Basin Plan), which identifies existing and potential beneficial uses supported by the key surface water drainages throughout its jurisdiction. The Los Angeles RWQCB uses its planning, permitting, and enforcement authority to meet its responsibilities adopted in the Basin Plan to implement plans, policies, and provisions for water quality management. The existing and proposed beneficial uses of waterbodies downstream of the Site include: municipal and domestic supply (MUN); warm freshwater habitat (WARM), wildlife habitat (WILD), threatened or endangered species (RARE), recreation (REC-1, REC-2), Commercial and Sport Fishing (COMM), Estuarine Habitat (ES), Marine Habitat (MAR), Migration of Aquatic Organisms (MIGR), Rare, and Spawning, Reproduction, and/or Early Development (SPWN), and navigation and uses for shipping or transportation by private, military , or commercial vessels (NAV) (City of Los Angeles 2015).

4.0 ANALYSIS OF PROJECT IMPACTS

4.1 Methodology

We reviewed information about the Site including location, topography, soil types, impervious and pervious surfaces, surface runoff direction and rate, groundwater, and adjacent storm drain infrastructure from available resources to understand the existing (i.e., pre-development) conditions. The development characteristics of the Project, as defined in the Project Description and on the Concept Plans, were extracted to understand the proposed (i.e., post-development) conditions. Within the regulatory framework previously described, the hydrology and surface water quality aspects of the Project were evaluated by comparing the existing and proposed pervious/impervious coverage conditions and preliminary peak stormwater runoff rates and volumes. The Hydrograph Method, implemented through Los Angeles County's HydroCalc software, was used to compute the preliminary peak stormwater runoff rates. The analysis of the potential impacts regarding groundwater was based on reviewing existing groundwater uses and conditions and evaluating the potential impacts of the proposed Project on those uses and conditions. Based on the results, the potential impacts were assessed and design recommendations were provided to address and mitigate potential hydrology and water quality impacts.

4.2 Surface Water Hydrology

4.2.1 Construction Impacts

Stormwater runoff from the Site is currently uncontrolled. As discussed in Section 4.2.2 below, it is anticipated that nearly the entire Site will be disturbed for the construction of the Project, which includes greater than 1 acre of land disturbance necessitating the preparation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would begin when construction commences and before any site clearing or demolition activity. Construction Best Management Practices (BMPs) would be designed and maintained as part of the implementation of the SWPPP in compliance with the General Permit. The Project would include temporary SWPPP controls to address surface water hydrology during construction. The SWPPP control measures would be designed to convey the 25-year and 50-year frequency rainfall events from the Site.

From a hydrology perspective, the existing cap over the landfill will generally remain and the Project grading would include compaction and the importing of fill to the Site to generally raise site grades. The construction of the Project would include a new stormwater management system, including treatment and conveyance, to remove stormwater runoff from the Project Site. The new on-site storm drains would be designed and sized to provide flood protection for up to a 50-year frequency storm event. Based on the site plan, it is anticipated that on-site storm drains would connect to the existing County storm drainage facilities in Martin Luther King Jr Street, South Avalon Boulevard and the open branch channel. Prior to obtaining building permits, detailed hydrology reports based on the building final design will be prepared and submitted to the County for approval of the proposed drainage facilities consistent with the County Hydrology Manual. The construction of the new draining facilities would be completed in a manner and sequence that would preclude flooding.

The majority of the proposed storm drain facilities would be constructed within the Site, with the exception of the lateral connections to the public storm drain systems in Martin Luther King Jr Street and South Avalon Boulevard. Based on the location of the conceptual driveway access into the Site from South Avalon Boulevard the existing drainage structure located opposite the Elsmere Drive intersection, along the west side of South Avalon Boulevard, may need to be relocated. The existing catch basin structure collects surface drainage from the street and includes the existing 54 inch RCP storm drain lateral from the Site to the existing 78 inch RCP storm drain in South Avalon Boulevard.

Construction impacts, including but not limited to street traffic detouring and control, are anticipated along Martin Luther King Jr Street and South Avalon Boulevard as part the offsite stormwater infrastructure connections for the Project. Most construction impacts are expected to be confined to trenching and would be temporary in nature.

With the preparation and implementation of a SWPPP for the Project in accordance with the General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit, 2012-0006-DWQ) and development of a new on-site storm system consistent with the County Hydrology Manual, the construction impacts to surface water hydrology would not substantially alter the existing drainage pattern of the Site or area, in a manner which would result in substantial erosion or siltation on or off-site, substantially increase the rate of surface runoff in a manner that would result in flooding, or create or contribute to runoff water which would exceed the capacity of existing or planned stormwater drainage systems and, thus, impacts would be less than significant.

4.2.2 Operational Impacts

The Project includes a sport and academic complex with a learning center, tennis center, soccer center, parking, and site improvements. The existing golf course and open space areas would be replaced by new buildings and open space amenities, including green spaces, parking lots and other public areas. The Site area is about 87 +/- acres in size. Approximately 70% of the Site discharges stormwater runoff to the east to the existing South Avalon Boulevard storm drain system and the Del Amo Channel. The remaining 30% discharges stormwater runoff to the west to the existing County open branch channel. Peak runoff rates for the 50-year storm events were calculated for the pre- and post-construction conditions using the engineering application HydroCalc. This software, provided by Los Angeles County, utilizes hydrograph data to determine the peak runoff rate for a particular watershed. At the location of the Site, the 24-hour 50-year rainfall depth is 6.2 inches, the soil type is 16, and the fire factor is not applicable (see Appendix C and page 55 of the Los Angeles County Hydrology Manual).

The 50-year peak flow rates and 24-hour runoff volume from the Site were estimated for the pre-development condition and the post-development condition without any on-site stormwater management (see Figure 4 and Figure 5) and the following Table A.

Table A
Peak 50-year Stormwater Flow Rates and Volume

Condition	Peak Q_{50} (cfs)	24-Hour Volume (acre-ft)
Pre-Development	178.2	31.9
Post- Development	215.2	33.8

The post-development peak 50-year flow and 24-hour volume is currently shown as greater than the pre-development peak flow and volume. These estimates provided do not take into account any on-site stormwater management or treatment, evapo-transpiration and attenuation that would occur within the proposed new on-site LID systems. Prior to obtaining building permits, detailed hydrology reports based on the building final design will be prepared and submitted to the County for approval of the proposed drainage facilities consistent with the County Hydrology Manual.

The stormwater runoff from the completed Project would be conveyed to the same existing infrastructure, which includes the existing County branch channel to the west of the Site and the existing infrastructure in Martin Luther King Jr. Street and South Avalon Boulevard to the east. All stormwater runoff from the Site is eventually conveyed to the Dominguez Channel.

The final stormwater management for the Project would be designed to reduce the post-construction peak flow rates to be less than or equal to the pre-construction peak runoff rates for the 50-year design storm event through the incorporation of on-site sustainable stormwater design and treatment measures as described in Section 4.3.2. With the application of these measures, it is estimated that the proposed project would result in an overall decrease in peak flow rate leaving the Site from approximately 215 cubic feet per second (cfs) to less than approximately 178 cfs. The stormwater volumes will also be reduced to less than the pre-development quantity through the sustainable stormwater measures.

The Project would result in similar peak flow conditions for both the 25 year and 50 year rainfall events. With the development of the drainage facilities consistent with the County Hydrology Manual, the Project would not increase the rate or amount of surface runoff in a manner that would result in flooding, nor create nor contribute stormwater runoff which would exceed the capacity of the existing stormwater drainage conveyance systems downstream of the Site. Further, as discussed above, Project structures would be located in "areas outside the 0.1% annual chance floodplain" (FIRM Number 06037C1935F). Therefore, the Project would not place structures within a 100-year flood hazard area and would not expose people or structures to a significant risk involving flooding. Therefore, the impacts with respect to surface water hydrology would be less than significant.

4.3 Surface Water Quality

4.3.1 Construction Impacts

Stormwater runoff from the Site is currently untreated. The Project would include temporary SWPPP controls to address and mitigate water quality during construction and permanent SUSMP BMP measures to address and mitigate water quality post-development. This combination of temporary and permanent management and treatment of stormwater would have a positive impact on water quality. The following summarizes the key elements of the SWPPP.

During construction, the SWPPP would address construction impacts, especially during soil disturbing activities when soils are exposed to wind, rain and concentrated flows that cause erosion, to minimize the transmission of sediment into the separate storm sewer system (MS4) and the adjacent waterways. The proper usage and storage of common construction materials such as vehicle fluids (oil, grease, etc.), asphalt concrete and Portland cement concrete, paints, solvents and thinners, metals and plated products and fertilizers would also be addressed. Finally, the SWPPP would address construction-related waste such as wastewater from vehicle cleaning operations, trash from material packaging, employee's meal breaks, slurries from sawing and grinding operations,

wastewater/waste from concrete washout operations and sanitary waste. The SWPPP measures would not be removed until the new stormwater system is constructed and operational and the disturbed areas are stabilized.

As part of the SWPPP preparation, the Risk Level would be determined for the Project. The Risk Level would define the extent of effluent monitoring and reporting during construction, and its determination would include an assessment of the sediment risk and the receiving water risk. The following is a list of permit requirements associated with the respective Risk Levels:

- Risk 1: Minimum – BMPs and visual monitoring.
- Risk 2: Minimum – BMPs, visual monitoring, testing for Numeric Action Levels (NAL) and runoff monitoring.
- Risk 3: Minimum – BMPs, visual monitoring, testing for Numeric Action Levels (NAL), testing for Numeric Effluent Limitations (NEL), runoff monitoring and receiving water monitoring.

The CGP requires the SWPPP to include a menu of BMPs to be selected and implemented based on the phase of construction and the weather conditions to effectively control erosion, sediment, and other construction related pollutants to meet the Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology (BAT/BCT) standards. The following types of BMPs, as applicable, would be implemented during construction:

Erosion Control

- Physical stabilization through hydraulic mulch, soil binders, straw mulch, bonded fiber matrices, and/or erosion control blankets.
- Soil roughing of graded areas to slow runoff, enhance infiltration, and reduce erosion.
- Wind erosion (dust) control through the application of water or other dust palliatives as necessary to prevent and alleviate dust nuisances.

Sediment Control

- Perimeter protection through silt fences, fiber rolls, gravel gab germs, sand bag barriers, and straw ball barriers.
- Storm drain inlet protection.
- Sediment capture through sediment traps, storm drain inlet protection, and sediment basins.
- Velocity reduction through check dams, sediment basins, and/or outlet protection/velocity dissipation devices.
- Reduction in off-site sediment tracking through stabilized construction entrance/exist, construction road stabilization, and/or entrance/exit tire wash.

Waste and Materials Management

- Management of the following types of materials, products, and wastes; solid, sanitary, concrete, hazardous, and equipment-related wastes through proper storage of raw materials and appropriate waste disposal practices.

- Protection of soil stockpiles through covers, the application of water or soil binders, and/or perimeter control measures.

Non-stormwater Management

- Good housekeeping practices to reduce or limit pollutants at their source before they are exposed to stormwater, including such measures as: water conservation practices, procedures for propose vehicle and equipment cleaning and fueling, and cover and/or containment of stored materials.
- If construction dewatering or discharges from other specific construction activities such as water line testing and sprinkler system testing are required, comply with the requirements of the CGP, a General NPDES Permit for construction dewatering or an appropriate industrial sewer discharge permit.

Training and Education

- Training of individuals responsible for SWPPP preparation, implementation, and permit compliance, including contractors and subcontractors.
- Signage to address SWPPP related issues (such as site cleanup policies, BMP protection, washout locations, etc.)

Maintenance, Monitoring, and Inspections

- Performing routine site inspections and inspections before, during and after storm events
- Implementing maintenance and repairs of BMPs as indicated by routine and storm event inspections
- Preparation and implementation of a Sampling and Analysis Plan for non-visible pollutants.

These construction site management BMPS would be implemented for the proposed Project during the dry season and wet seas as necessary depending upon the phase of construction weather conditions. The BMPS would provide effective control of not only sediment discharge, but also of pollutants associated with sediments, such as and not limited to nutrients, heavy metals, and certain pesticides.

Prior to issuance of a preliminary or precise grading permits, the Project would provide the County with evidence that a Notice of Intent has been filed with the SWRCB to comply with the CGP. With implementation of the construction BMPs, construction of the Project would not result in a violation of water quality standards, result in substantial erosion or siltation on or off-site, provide substantial additional sources of polluted runoff, or substantially degrade water quality. Therefore, the Project would result in less than significant impacts associated with surface water quality impacts during construction.

4.3.2 Operational Impacts

In order to prevent long-term (operational) impacts to water quality, the Project would be designed to comply with the requirements of the Los Angeles Regional Water Quality Control Board Municipal Regional Stormwater NPDES Permit Order R4-2018-0087 NPDES Permit No. CAG914001 and the Los Angeles County design and construction

standards. A Stormwater Management Plan (aka LID Plan) to address permanent water quality controls and operational impacts would be prepared and implemented

The Project would comply with the County's 2013 LID Ordinance and 2014 Low Impact Development (LID) Standards Manual. 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. LID is a sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional stormwater management, which collects and conveys stormwater runoff through storm drains, pipes, or other conveyances to a centralized stormwater facility, LID takes a different approach by using site design and stormwater management and attempts to maintain the site's pre-development runoff rates and volumes. The goal of the LID would be to mimic the site's predevelopment hydrology by using design techniques that filter, store, evaporate, and detain runoff close to the source of rainfall. LID includes specific techniques, tools, and materials to control the amount of impervious surface, increase infiltration, improve water quality by reducing runoff from developed sites, and reduce costly infrastructure.

Given the Site's landfill history and existing cap, the types of LID measures that may be considered for the Project are biofiltration facilities or rain gardens (lined with underdrains), flow through planters, lined grass swales and channels, vegetated lined filter strips and permeable pavements (lined with underdrains).

The Project LID Plan would include permanent control measures to reduce the long-term impacts of the Project on water quality and the tributary waterways. The LID strategies would be designed to reduce water quality impacts by preserving and recreating natural landscape features, storing, detaining, evapotranspiring and biotreating the surface water runoff on-site. Some examples of these LID measures that would be incorporated into the Project are as follows:

- Minimizing impervious surfaces that are directly connected to the storm drain system by routing runoff to landscaped areas;
- Using landscaping as a drainage feature;
- Using roofed trash enclosures;
- Connecting areas used for washing equipment to the sanitary sewer;
- Marking storm drain inlets with a "No Dumping" message;
- Street and parking lot sweeping;
- Regular inspection and cleaning of storm drain inlets;
- Engineering source control treatment measures (further described below).

Per the LID Manual, the Project must retain the stormwater quality design volume (SWQDv) on-site through infiltration, evapotranspiration, stormwater runoff harvest and reuse, or a combination thereof unless it is demonstrated that it is technically infeasible to do so. The Site and Project have some unique attributes that may make the implementation of LID technically infeasible.

- Based on the Site being a landfill, infiltration of stormwater poses a risk of pollutant mobilization. Hence, retention based stormwater quality control measures would be avoided.
- The proposed Project does not have a substantial need for stormwater re-use. Hence, stormwater runoff harvest and reuse would not be technically feasible.

Per the LID manual, alternative compliance methods which do not rely on infiltration or reuse to treat the stormwater runoff would be designed and implemented. The proposed BMPs could include a combination of the following engineering measures:

- On-site biofiltration (lined bioswales and biodetention basins).
- Vegetation-based stormwater quality control measures (self-treating landscape areas and lined planters).
- Proprietary stormwater quality control measures (aka manufactured treatment devices).

A LID Plan would be prepared to document the design of the LID BMP measures for the Project. The Plan would be submitted for approval by the County and would be the operable stormwater system approval for the Project. Based on the alternative compliance requirements, these LID BMP measures would be designed to satisfy the General Permit requirements. Implementation of the LID measures would improve surface water runoff quality compared to current conditions, since currently no pollutant reduction measures exist, and the Project would not result in a violation of water quality standards, result in substantial erosion or siltation on or off-site, provide substantial additional sources of polluted runoff, or substantially degrade water quality. Therefore, the project impacts with respect to surface water quality will be less than significant.

4.4 Groundwater

4.4.1 Construction Impacts

Groundwater at the Site is not pumped for beneficial uses. The nearest active drinking water supply wells are over 2 miles south-southeast of the BKK landfill. The Project would be serviced by the California Water Service and Los Angeles County Sanitation District, and no short-term or long-term dewatering activities are anticipated, and no production wells for a source of water during construction would be installed. The Project would not draw directly from any groundwater supplies. Therefore, Project construction would not substantially deplete groundwater supplies.

Short-term groundwater quality impacts could potentially occur during construction of the Project as a result of soil or shallow groundwater being exposed to construction materials, wastes or spilled materials. Compliance with existing, applicable federal, state and local requirements concerning the handling, storage and disposal of hazardous materials would effectively reduce the potential for the construction of the Project to release contaminants into groundwater

The status of abandoned well DWC-11 within OU-2 is unknown, however, it was reportedly covered with up to 15 ft fill material and is not visible. Attempts to locate the well during final design and/or construction via geophysical methods and possibly test pits will be made. If encountered, the well will be closed per the applicable California Department of Water Resources and DTSC requirements.

With compliance with the existing, applicable regulatory requirements, Project construction would not violate water quality standards or waste discharge requirements or otherwise substantially degrade water quality. Therefore, Project construction impacts to groundwater would be less than significant.

4.4.2 Operational Impacts

Due to the landfill soil cover there is limited to no existing surface water infiltration into and through the landfill, and limited to no groundwater recharge currently occurring. While some surface water infiltration and storage has occurred in the vegetative cover and previous reports documented areas of surface ponding that may have promoted infiltration through cracks in the soil cover cap, the existing conditions significantly limit the potential for groundwater recharge regardless of the percentage of impervious surfaces on the Site. The areas beyond the refuse areas also contain existing impermeable surfaces such as buildings and paved parking lots.

The Project would enhance the functionality of the landfill soil cover cap by the placement of fill over the majority of the Site. Consistent with the DTSC Remedial Action Plan that requires reducing infiltration, the Project would further reduce potential infiltration due the increase in impervious cover, use of liners in the stormwater LID BMPs and under the athletic fields and an increased level of overall property and improvement maintenance.

On-site activities during operation of the Project are not anticipated to have an impact on groundwater quality. Other than routine handling of hazardous materials associated with office, janitorial, building maintenance and landscaping supplies, no handling of hazardous materials is anticipated. Any potential surface spills from the handling of hazardous materials most often involve small quantities that are cleaned up in a timely manner, thereby resulting in little threat to groundwater. With implementation of general good housekeeping procedures and compliance with the existing, applicable regulatory requirements Project operation would not violate water quality standards or waste discharge requirements or otherwise substantially degrade water quality.

The Project will have less than significant impacts on groundwater due to the preservation of the existing low-permeability soil cover cap and the import of fill, which further limits surface water infiltration.

5.0 CONCLUSIONS

5.1 Summary of Recommendations

The Site and surrounding areas are located in a fully developed urbanized area with existing stormwater, utility and roadway infrastructure. The Project would be designed and operated in compliance with the relevant regulatory requirements. With compliance with the applicable regulatory requirements as provided herein impacts to surface water hydrology and water quality and groundwater would be less than significant.

6.0 REFERENCES

California Code of Regulations, "Title 14. California Code of Regulations; Chapter 3. Guidelines for the Implementation of the California Environmental Quality Act", dated 27 July 2007.

California State Water Resources Board, "General Permit for Stormwater Discharges Associated with Construction Activities, Water Quality Order 2009-0009-DWQ", as amended by "Order No. 2010-0014-DWQ" and "2012-006-DWQ", dated 17 July 2012.

California Stormwater Quality Association, "Stormwater Best Management Practice Handbook", dated January 2003.

California Water Service Company, "Dominguez District 2015 Urban Water Management Plan", dated 2015.

County of Los Angeles Department of Public Works, "Hydrology Manual", dated January 2006.

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

Dominguez Channel Watershed Management Area Group, "Coordinated Integrated Monitoring Program for the Dominguez Channel Watershed Management Area Group: Draft", dated June 2014.

Federal Emergency Management Agency, "Flood Insurance Rate Map (FIRM)", Panel 1935 of 2350, Map Number 06037C1935F, dated 26 September 2008.

Burns McDonnell, "Remedial Action Plan for Soil and Landfill Gas Media, Former BKK Landfill, Carson Dump, Operable Unit 2, 340 East 192nd St., 19202 South Main St., 19200 South Main St., City of Carson, California 90248" dated June 2014.

State of California, California Environmental Protection Agency, Department of Toxic Substances Control, "Docket No. HAS-CO 05/05-114 Settlement Agreement and Consent Order" dated May 2006.

State of California, California Environmental Protection Agency, Department of Toxic Substances Control, "Review of Draft Revised Remedial Investigation and Feasibility Study for Soil and Gas Media" dated June 2014.

California DOT, City of Long Beach, City of Los Angeles, City of Torrance, Los Angeles County and Los Angeles County Flood Control District Contaminated Sediment Management Plan: Dominguez Channel Estuary dated March 2014

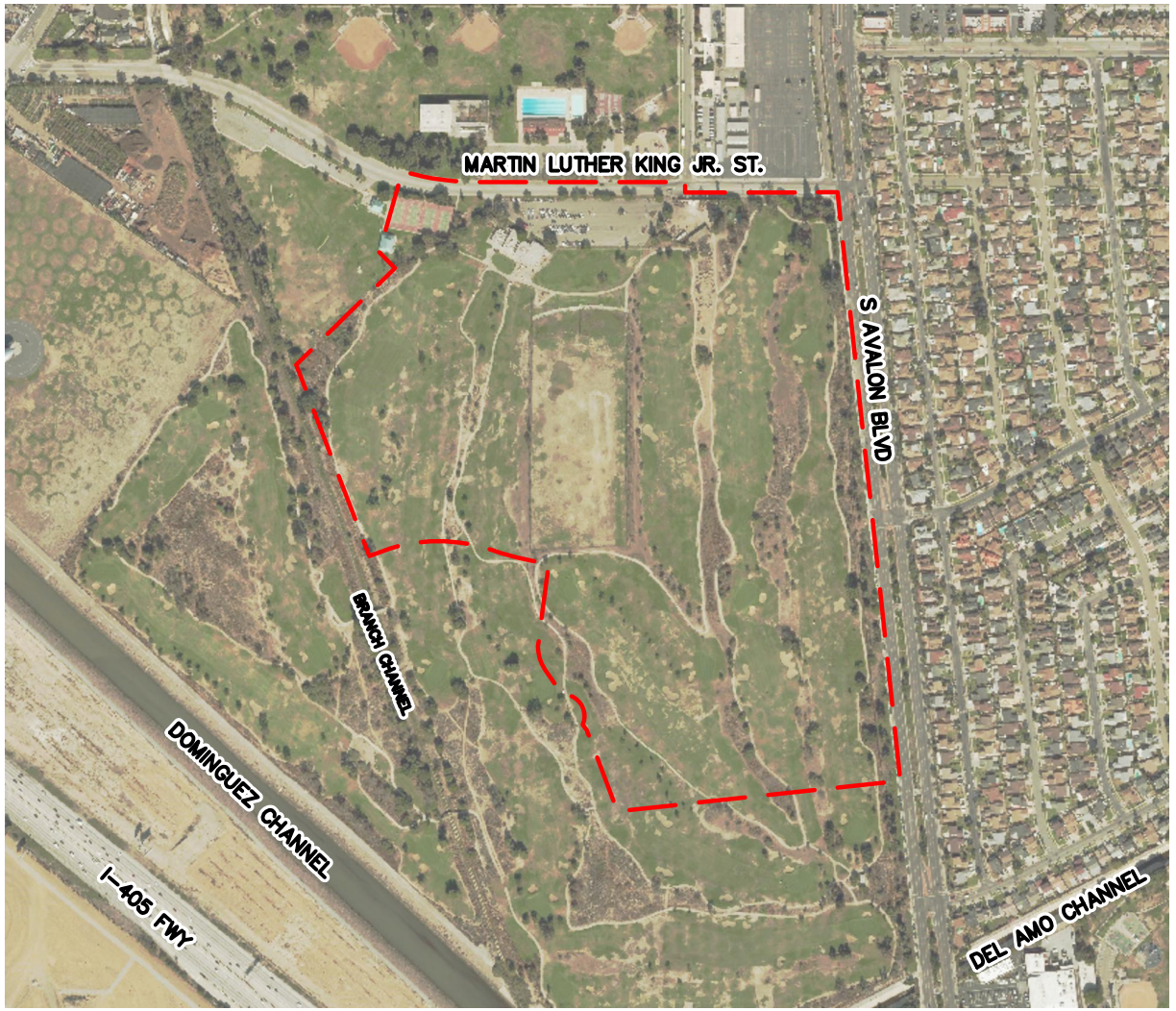
FIGURES

LEGEND:

APPROXIMATE SITE LIMITS

NOTES:

1. BACKGROUND AERIAL IMAGE REFERENCED FROM BING MAPS ON 30 JULY 2018.
2. APPROXIMATE SITE LIMITS BASED ON THE PLAN TITLES "CAROL KIMMELMAN SPORTS AND ACADEMIC CENTER, ILLUSTRATIVE OVERALL SITE PLAN" BY MEIS ARCHITECTS, INC.



700 350 0 700

SCALE: 1"=700'

LANGAN
Langan Engineering and Environmental Services, Inc.
32 Executive Park, Suite 130
Irvine, CA 92614
T: 949.255.8640 F: 949.255.8641 www.langan.com

Project	CAROL KIMMELMAN ATHLETIC & ACADEMIC CAMPUS UNINCORPORATED AREA OF LOS ANGELES COUNTY CA
Drawing Title	SITE VICINITY MAP
Project No.	700060401
Date	12 APRIL 2019
Drawn By	JL
Checked By	DJ
Drawing No.	1

Filename: \\langan.com\data\IRV\data4\700060401\Project Data\CAD\01\SheetFiles\Hydrology Figures\700060401-FIG-01-Site Location Plan.dwg Date: 4/16/2019 Time: 15:14 User: dhodson Style Table: Langan.stb Layout: 8.5 X 11

NOTE:

1. CONCEPTUAL SITE PLAN BASED ON THE PLAN TITLES "CAROL KIMMELMAN SPORTS AND ACADEMIC CENTER, ILLUSTRATIVE OVERALL SITE PLAN" BY MEIS ARCHITECTS, INC.

LEGEND

TENNIS CENTER

1. WELCOME CENTER
2. LEARNING CENTER
3. ENTRY PLAZA
4. BASKETBALL COURTS
5. COMPETITION VENUE (12 HARD COURTS)
6. PLAYER DEVELOPMENT / COLLEGIATE CENTER
7. TOURNAMENT/ LEAGUE ADMINISTRATION BUILDING
8. 100M SPRINT TRACK
9. 4 CLAY COURTS
10. MONUMENT ENTRY/ SIGN
11. CENTRAL PLAZA
12. 8 36 FT COURTS
13. 4 60 FT COURTS (+4 FUTURE COURTS)
14. TRAINING TURF
15. TENNIS CENTER COURTS (24 HARD COURTS)
16. FUTURE COVERED COURTS (6 COURTS)
17. MAINTENANCE BUILDING
18. OUTDOOR EXERCISE COURSE
19. VISITOR PARKING
20. BUS PARKING
21. EMPLOYEE PARKING
22. OVERFLOW PARKING

SOCCER CENTER

23. 2 NATURAL GRASS MULTIPURPOSE FIELDS
24. 6 FULL SIZE NATURAL GRASS SOCCER FIELDS
25. 2 FULL SIZE ARTIFICIAL TURF SOCCER FIELDS
26. SUPPORT BUIDLING
27. SOCCER PARKING
28. OVERFLOW PARKING

N

NOT TO SCALE

MEIS

ILLUSTRATIVE OVERALL SITE PLAN

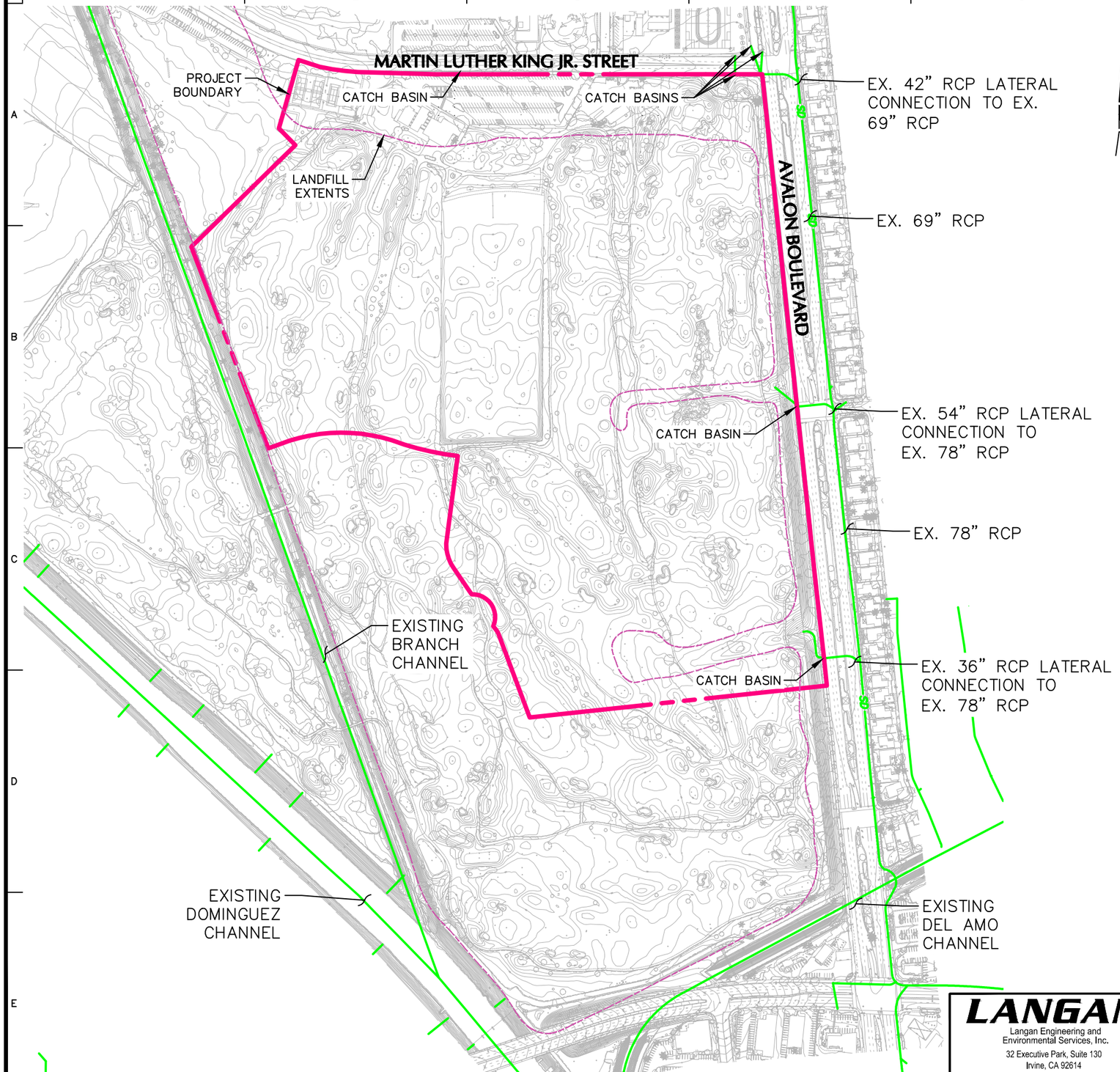
07/20/2018

A 100

LANGAN
Langan Engineering and Environmental Services, Inc.
32 Executive Park, Suite 130
Irvine, CA 92614
T: 949.255.8640 F: 949.255.8641 www.langan.com

Project	CAROL KIMMELMAN ATHLETIC & ACADEMIC CAMPUS UNINCORPORATED AREA OF LOS ANGELES COUNTY CA
Drawing Title	CONCEPTUAL SITE PLAN
Project No.	700060401
Date	12 APRIL 2019
Drawn By	CJH, WH
Checked By	DJ
Figure No.	2

Filename: \\langan.com\data\IRV\data4\700060401\Project Data\CAD\01\SheetFiles\Hydrology Figures\700060401-FIG-02-Conceptual Site Plan.dwg Date: 4/16/2019 Time: 15:17 User: dhodson Style Table: Langan.stb Layout: 11 X 17



LEGEND:

- PROJECT BOUNDARY LINE
- LANDFILL EXTENTS
- SD — EXISTING STORM DRAIN (APPROXIMATE LOCATION)

NOTES:

1. EXISTING TOPOGRAPHIC INFORMATION AS SHOWN ON THIS DRAWING IS BASED ON THE SURVEY BY DIGITAL MAPPING, INC., DATED 03/06/2018.
2. LANDFILL EXTENTS ARE BASED ON CONCEPT BY MEIS ARCHITECTS.
3. STORMWATER DRAINS ARE BASED ON GIS INFORMATION PROVIDED BY LOS ANGELES COUNTY.

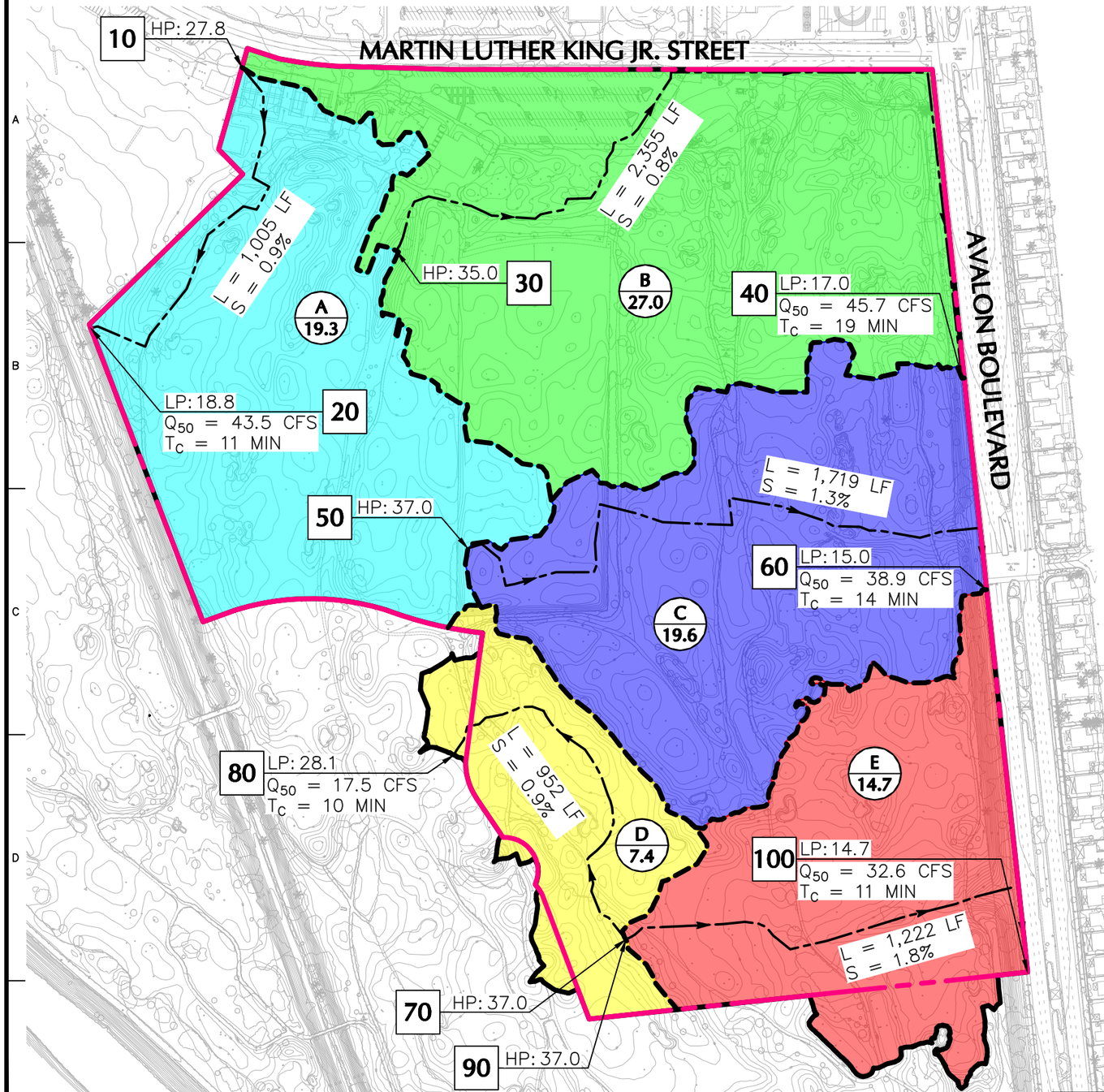
400 200 0 400

SCALE: 1"=400'

LANGAN
Langan Engineering and Environmental Services, Inc.
32 Executive Park, Suite 130
Irvine, CA 92614
T: 949.255.8640 F: 949.255.8641 www.langan.com

Project	CAROL KIMMELMAN ATHLETIC & ACADEMIC CAMPUS UNINCORPORATED AREA OF LOS ANGELES COUNTY CA
Drawing Title	EXISTING DRAINAGE FEATURES
Project No.	700060401
Date	12 APRIL 2019
Drawn By	CJH, WH
Checked By	DJ
Figure No.	3

Filename: \\langan.com\data\IRV\data4\700060401\Project Data\CAD\01\SheetFiles\Hydrology Figures\700060401-FIG-03-ExDrainage features.dwg Date: 4/16/2019 Time: 15:21 User: dhodson Style Table: Langan.stb Layout: FIG-05



AREA AND RUNOFF SUMMARY:

Location	*Subarea Area (ac)*	*Subarea Q_{50} (cfs)*
A	19.3	43.5
B	27.0	45.7
C	19.6	38.9
D	7.4	17.5
E	14.7	32.6
Total:	87.9	178.2

LEGEND:

- PROJECT BOUNDARY LINE
- PROJECT WATERSHED BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- A / X — WATERSHED LABEL / AREA (AC)
- T_C — TIME OF CONCENTRATION
- Q_{50} — 50-YEAR RUNOFF FLOW
- LP: 15.4 — LOW POINT ELEVATION
- HP: 38.2 — HIGH POINT ELEVATION
- 80 — NODE NUMBER

NOTE:

1. EXISTING TOPOGRAPHIC INFORMATION AS SHOWN ON THIS DRAWING IS BASED ON THE SURVEY BY DIGITAL MAPPING, INC., DATED 03/06/2018.

LANGAN
Langan Engineering and Environmental Services, Inc.
32 Executive Park, Suite 130
Irvine, CA 92614
T: 949.255.8640 F: 949.255.8641 www.langan.com

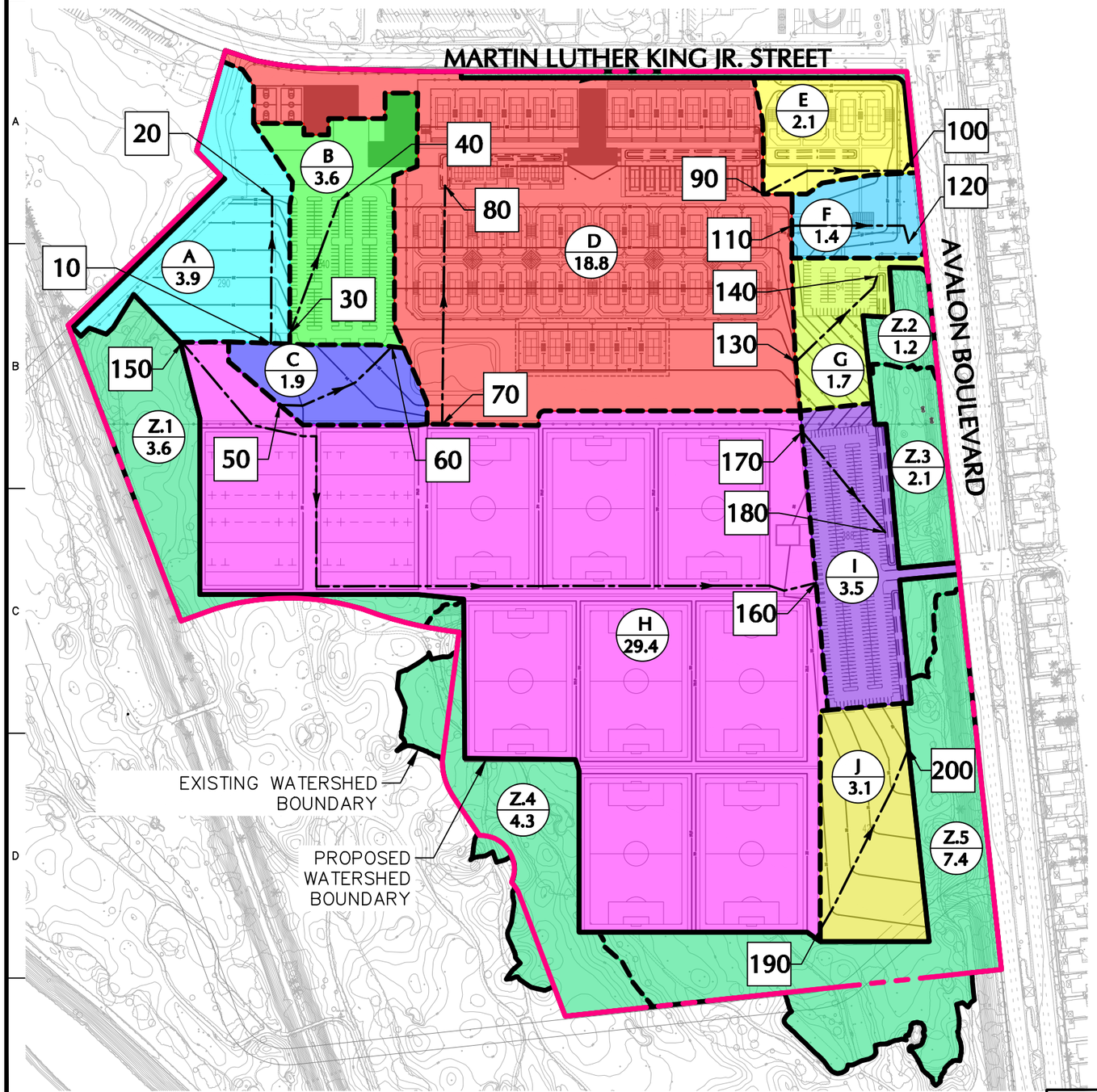
Project: CAROL KIMMELMAN ATHLETIC & ACADEMIC CAMPUS
UNINCORPORATED AREA OF LOS ANGELES COUNTY CA

Drawing Title: EXISTING DRAINAGE MAP

Project No. 700060401
Date 12 APRIL 2019
Drawn By CJH, WH
Checked By DJ

Figure No. 4

Filename: \\langan.com\data\IRV\data4\700060401\Project Data\CAD\01\SheetFiles\Hydrology Figures\700060401-FIG-04-ExDrainage.dwg Date: 4/16/2019 Time: 15:26 User: dhodson Style Table: Langan.stb Layout: 11x17



AREA AND RUNOFF SUMMARY:

Subarea	*Subarea Area (ac)*	*Subarea Q_{50} (cfs)*	*HP Node Number*	*High Pt. Elev. (ft)*	*LP Node Number*	*Low Pt. Elev. (ft)*	*Flow Plath Length (ft)*	*Flow Path Slope*	*T_c (min)*
A	3.9	12.9	*10*	35.5	*20*	27.6	360	2.2%	5
B	3.6	11.9	*30*	33.5	*40*	26.5	345	2.0%	5
C	1.8	6.0	*50*	35.2	*60*	32.5	323	0.8%	5
D	18.8	49.8	*70*	33.8	*80*	28.5	585	0.9%	8
E	2.1	6.9	*90*	28.5	*100*	24.5	360	1.1%	5
F	1.4	4.6	*110*	28.9	*120*	24.0	318	1.5%	5
G	1.7	5.6	*130*	33.0	*140*	21.4	291	4.0%	5
H	29.4	48.3	*150*	35.7	*160*	30.2	2,023	0.3%	21
I	3.5	11.6	*170*	33.0	*180*	24.6	320	2.6%	5
J	3.1	8.1	*190*	33.5	*200*	29.0	613	0.7%	8
Z.1	3.6	11.9							
Z.2	1.2	2.0							
Z.3	2.1	6.9							
Z.4	4.3	13.1							
Z.5	7.4	15.6							
Total:	87.9	215.2							

LEGEND:

- PROJECT BOUNDARY LINE
- PROJECT WATERSHED BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- A / X — WATERSHED LABEL / AREA (AC)
- T_C — TIME OF CONCENTRATION
- Q_{50} — 50-YEAR RUNOFF FLOW
- LP: 15.4 — LOW POINT ELEVATION
- HP: 38.2 — HIGH POINT ELEVATION
- 80 — NODE NUMBER

NOTE:

1. EXISTING TOPOGRAPHIC INFORMATION AS SHOWN ON THIS DRAWING IS BASED ON THE SURVEY BY DIGITAL MAPPING, INC., DATED 03/06/2018.

LANGAN
Langan Engineering and Environmental Services, Inc.
32 Executive Park, Suite 130
Irvine, CA 92614
T: 949.255.8640 F: 949.255.8641 www.langan.com

Project: CAROL KIMMELMAN ATHLETIC & ACADEMIC CAMPUS
UNINCORPORATED AREA OF LOS ANGELES COUNTY CA

Drawing Title: PROPOSED DRAINAGE MAP

Project No. 700060401
Date 12 APRIL 2019
Drawn By CJH, WH
Checked By DJ

Figure No. 5

Filename: \\langan.com\data\IRV\data4\700060401\Project Data\CAD\01\SheetFiles\Hydrology Figures\700060401-FIG-05-PrDrainage.dwg Date: 4/16/2019 Time: 15:37 User: dhodson Style Table: Langan.stb Layout: 11x17

APPENDIX A
Federal Emergency Management Agency
Flood Insurance Rate Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later and from National Geospatial Intelligence Agency imagery produced at a scale of 1:4,000 from photography dated 2003 or later.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

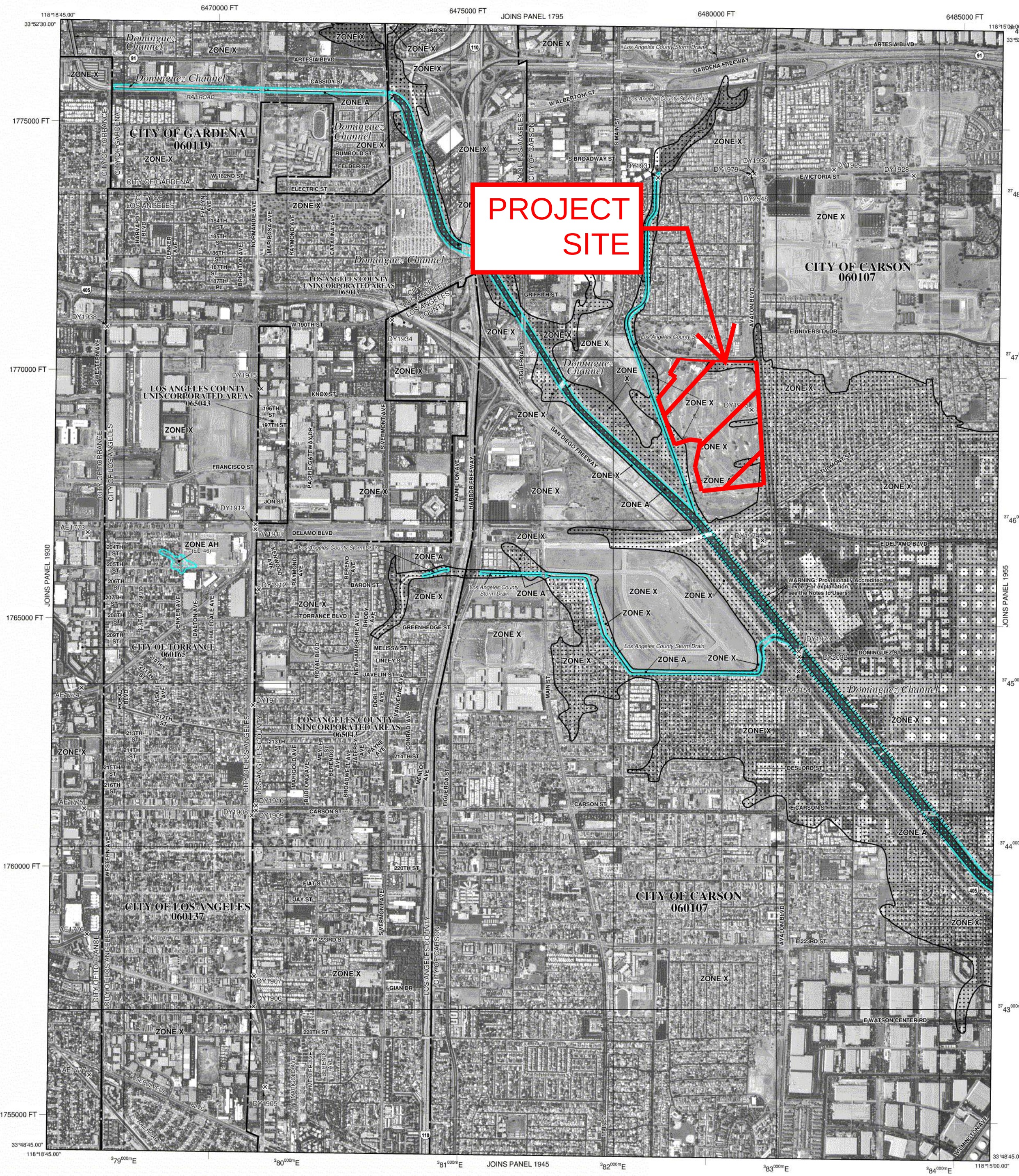
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.

WARNING: This levee, dike, or other structure has been provisionally accredited and mapped as providing protection from the 1-percent-annual-chance flood. To maintain accreditation, the levee owner or community is required to submit documentation necessary to comply with 44 CFR Section 65.10 by October 16, 2009. Because of the risk of overtopping or failure of the structure, communities should take proper precautions to protect lives and minimize damages in these areas, such as issuing an evacuation plan and encouraging property owners to purchase flood insurance.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~ 513 ~~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

(A)———(A)	Cross section line
(23)- - - - -(23)	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 11
6000000 FT	5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1935F

FIRM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 1935 OF 2350
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	1935	F
CARSON, CITY OF	060107	1935	F
GARDENA, CITY OF	060119	1935	F
LOS ANGELES, CITY OF	060137	1935	F
TORRANCE, CITY OF	060165	1935	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C1935F

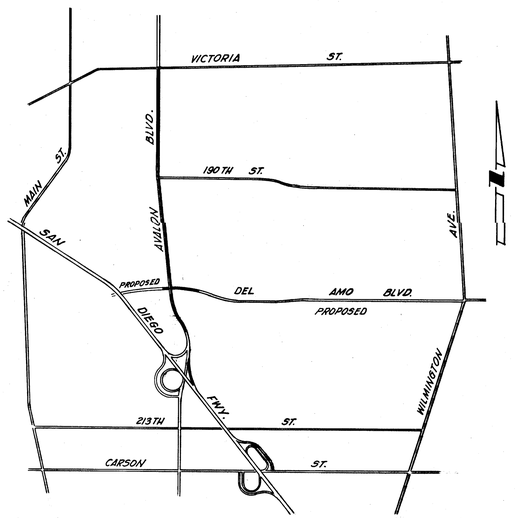
EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

APPENDIX B
Existing Storm Drain Records

SHEET INDEX TO DRAWINGS

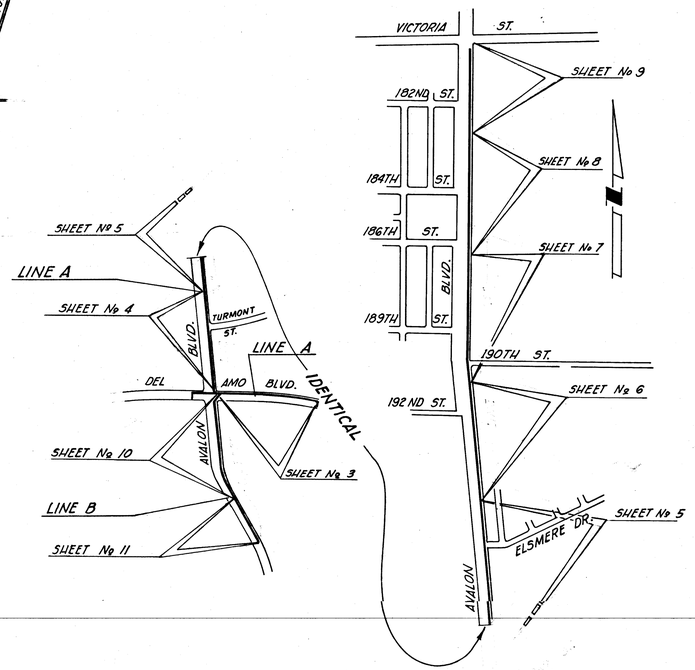
SHEET NO. 1	SHEET INDEX, GENERAL NOTES, LOCATION MAP.
SHEET NO. 2	STANDARD DRAWING LIST, TYPICAL CONNECTOR PIPE PROFILE & RESURFACING REQUIREMENTS.
SHEET NO. 3	PLAN & PROFILE, STA. 1+09.87 TO 10+45.50 ,LINE A
SHEET NO. 4	PLAN & PROFILE, STA. 10+45.50 TO 23+00.00 ,LINE A
SHEET NO. 5	PLAN & PROFILE, STA. 23+00.00 TO 37+00.00 ,LINE A
SHEET NO. 6	PLAN & PROFILE, STA. 37+00.00 TO 47+00.00 ,LINE A
SHEET NO. 7	PLAN & PROFILE, STA. 47+00.00 TO 61+00.00 ,LINE A
SHEET NO. 8	PLAN & PROFILE STA. 61+00.00 TO 72+00.00 LINE A
SHEET NO. 9	PLAN & PROFILE STA. 72+00.00 TO 80+56.17 ,LINE A
SHEET NO. 10	LINE B - PLAN & PROFILE - STA. 0+00.00 TO 11+00.00
SHEET NO. 11	LINE B - PLAN & PROFILE - STA. 11+00.00 TO 16+90.37
SHEET NO. 12	PROFILES, LATERALS "A", "B", "C" & "G", STRUCTURAL NOTES.
SHEET NO. 13	LOG OF SOIL BORINGS
SHEET NO. 14	STRUCTURAL DETAILS
SHEET NO. 15	DETAILS OF EXISTING R.C. CHANNEL



VICINITY MAP

0 1000 2000 4000

GRAPHIC SCALE
1"= 2000'



LOCATION MAP

0 600 1200

GRAPHIC SCALE
1"= 600'

LEGEND

TEST BORING	T.B.
LOCAL DEPRESSION	L.D.
CURB & GUTTER	C.&G.
TOP OF CURB	T.C.
FLOW LINE	F.L.
MANHOLE	M.H.
JUNCTION STRUCTURE	J.S.
TRANSITION STRUCTURE	T.S.

GENERAL NOTES

1. Numbers in circles indicate items under which payment will be made.
2. Elevations shown are in feet above the U.S.G.S. mean sea level datum.
3. Stations shown on drawings are along center line of conduit or on a line normal to center line of conduit.
4. Stations and invert elevations of pipe inlets shown on the profiles are at the inside face of the conduit, unless otherwise shown.
5. All field book references are to Los Angeles Co. Road Dept. field books, unless otherwise noted.
6. All pipe in open trench shall be bedded according to Standard Drawing 2-D177, Case III, except bell and spigot pipe which shall be Case II bedding, unless otherwise shown or modified in the specifications.
7. Pipe connections to storm drain shall conform to Standard Drawings 2-D191 and 2-D193 unless otherwise noted.
8. Where required by Standard Drawing 2-D 213.1, concrete backfill shall be used around connector pipes 36 inches or less in diameter. Concrete backfill for mainline pipe shall be used only when directed by the Engineer.
9. Ties for catch basins as shown on the drawings are from curb return to centerline of catch basin, unless otherwise shown.
10. See Sheet 14 for details of reinforced concrete box conduits - See Sheet 12 for structural notes.
11. Local Depressions shall be L.D. N° 4 per 2-D415, except that the dimension "G" on the PLAN shall be "6" for Catch Basins No.7. Where no gutter exists, G=2'. where there is no existing pavement to join, the outer edge of the local depressions are to be constructed 0.5' below top of curb.
12. The openings and top slabs of all side inlet catch basins shall be modified to meet the requirements shown on Standard Drawing No. 2-D232, including Catch Basins N° 7.
13. Locations of catch basin connector pipe junctions with catch basins as shown on the drawings are schematic. It is intended that such junctions be located at the downstream ends of the catch basins, unless otherwise shown. In all cases the exact locations will be determined in the field by the Engineer to meet field conditions.
14. Monolithic catch basin connections shall be constructed, where applicable, per Standard Drawing 2-D 224.
15. The depth of the upstream end of catch basins 10 feet or more in length shall be curb face plus 12 inches, unless otherwise shown.
16. "V", is the depth of inlet of catch basins in series measured from top of curb to invert of connector pipe.
17. All existing utilities shown on the drawings are the property of the County of Los Angeles, unless otherwise noted.
18. Existing utilities shall be maintained in place by the Contractor, unless otherwise noted.
19. The Contractor shall notify Mr. Robert Powell (NEvada 6-3079) of the Los Angeles County Sanitation Districts at least forty-eight hours prior to commencing construction work on Los Angeles County Sanitation Districts' sanitary sewers or appurtenances.
20. Utilities designated by the symbol "*" will be abandoned in place and the owner will reinstall a new section of the affected utility at a location in close proximity to, but which does not physically interfere with, the proposed storm drain conduit and appurtenant structures.
21. Utilities designated by the symbol "≠" will be removed by the owner and the owner will reinstall a new section of the affected utility of a location in close proximity to, but which does not physically interfere with, the proposed storm drain conduit and appurtenant structures.
22. Deleted
23. Locations shown on the plans for existing sanitary sewer house connections are approximate only.
24. Sanitary sewer house connection reconstruction and reconnection shall be in accordance with Standard Drawing 2-D 250.
25. Sanitary sewers and house connections crossing over the storm drain trench shall be supported in accordance with Standard Drawing 2-D 173.1 to .3 and encased per General Note 1 on Standard Drawing 2-D 173.1.
26. When indicated on the drawings, sanitary sewers and house connections shall be encased or blanketed in accordance with Standard Drawing 2-D 251.
27. All openings resulting from the cutting or partial removal of existing culverts, pipes or similar structures shall be sealed with 8 inches of brick and mortar or 6 inches of concrete, unless otherwise shown.
28. All resurfacing, curbs and gutters, sidewalks, driveways and other existing improvements to be reconstructed shall be constructed at the same elevation and location as the existing improvements, unless otherwise noted.
29. Refer to Sheet 2 for typical catch basin connector pipe profile.
30. Soil test borings for this project were made in April, 1966.
31. All Catch Basins N° 7 are required to have protection bar(s). The protection bar installation shall be in accordance with Standard Drawing N° 2-D232, except that the bottom(s) of required bolt support(s) shall be cut off and welded to the angle of the grating frame as directed by the Engineer in the field. Repair of galvanized surfaces shall be in accordance with par. 9-03 of the Specifications.

"AS BUILT" DRAWING

DRAWN BY	REVISIONS		
V.T.N.	MARK	DATE	DESCRIPTION
CHECKED BY V.T.N.			
DESIGNED BY V.T.N.			
SUBMITTED BY C.W.H.			

APPROVED BY
E. T. Mahan
ACTING ROAD COMMISSIONER
6/28/66 DATE
LOS ANGELES COUNTY ROAD DEPARTMENT

PLANS PREPARED BY
VOORHEIS-TRINDLE AND NELSON, INC.
Jack Mahoney
JACK MAHONEY R.E. 14,325

PD017033

LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT

DEL AMO CHANNEL — AVALON BLVD. STORM DRAIN

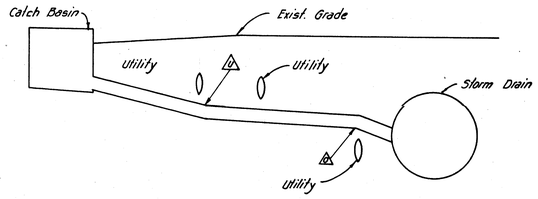
SHEET INDEX, GENERAL NOTES, LOCATION MAP, VICINITY MAP

RECOMMENDED BY
C. F. Eichelberg
DIVISION ENGINEER - DESIGN

APPROVAL RECOMMENDED BY
Milton W. Ransom
ASS'T CHIEF DEPUTY ENGINEER

APPROVED BY
Walter J. Ward
CHIEF ENGINEER

SCALE	DATE	DWG. NO. 314-D2.1
AS SHOWN	JULY, 1966	SHEET 1 OF 15



NOTES :

1. The change in grade of the connector pipe may occur either over or under an existing utility. The particular utility at which the change occurs is noted on the project drawings. At locations where utility crossings are marked (4), the connector pipe grade will break over the utility. At locations where utility crossings are marked (4), the connector pipe grade will break under the utility.
2. On those connector pipes where a change in grade is not indicated, it is assumed that that the connector pipe can be laid on a straight grade from the catch basin to the storm drain without interfering with the utilities.
3. The Contractor shall make exploratory excavations to determine the exact location and depth of utilities which are marked (4) or (4). After the exact location of a utility has been determined, the grade and alignment of the connector pipe will be staked so as to clear the utility.
4. Where the connector pipe has a change of grade exceeding 0.10' per foot or differs in diameter from the existing pipe, use conc. collar per Std. 2-D393.

TYPICAL CONNECTOR PIPE PROFILE

NO SCALE

STANDARD DRAWINGS

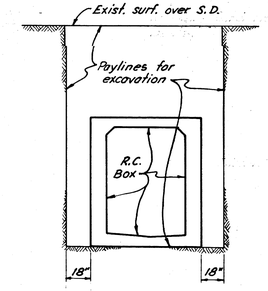
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

2-D96 STD. DROP STEP
2-D107 CONCRETE RINGS REDUCER & PIPE FOR MANHOLE SHAFT
2-D112 JUNCTION STRUCTURE NO. 2
2-D113 MANHOLE NO. 4
2-D156 MANHOLE FRAME & COVER FOR CATCH BASINS.
2-D157 CATCH BASIN REINFORCEMENT FOR ROUND MANHOLES.
2-D158 DETAIL OF BOLT SUPPORT FOR CATCH BASINS
2-D160 CATCH BASIN NO. 1
2-D161 ANGLE & ANCHOR FOR CATCH BASINS
2-D162 CATCH BASIN NO.2
2-D163 CATCH BASIN NO.3
2-D164 CATCH BASIN NO. 5
2-D171 STANDARD A305 REINFORCING BARS
2-D172 CATCH BASIN REINFORCEMENT
2-D173.1 & 3 PIPE SUPPORTS ACROSS TRENCHES
2-D175 REMOVABLE PROTECTION BAR FOR CATCH BASINS
2-D177 PIPE BEDDING IN TRENCHES
2-D181 STD. NON ROCKING MANHOLE FRAME & COVER
2-D184 MANHOLE NO. 2
2-D188 TRANSITION STRUCTURE NO. 3
2-D193 JUNCTION STRUCTURE NO. 4
2-D213 & 2 'D LOAD TABLES
2-D191 JUNCTION STRUCTURE NO. 3
2-D224 CONNECTIONS TO CATCH BASINS
2-D227 FRAME & GRATING FOR CATCH BASINS
2-D232 CATCH BASIN OPENINGS
2-D415 LOCAL DEPRESSION NO. 4
2-D 251 PROTECTION FOR MAIN LINE & HOUSE CONNECTION SEWERS
2-D264 ADJUSTABLE PROTECTION BAR STIRRUP
2-D393 CONCRETE COLLAR

2D 399 DESIGN OF SHORING FOR EXCAVATIONS
2-D400 CALC. SHEET FOR SHORING OF EXCAVATIONS
2-D413 UNIFIED SOIL CLASSIFICATION SYSTEM
2-D250 REMODELING OF SANITARY SEWER HOUSE CONNECTIONS
2-D170 CATCH BASIN NO. 7
2-D102 MANHOLE NO. 1

LOS ANGELES COUNTY ROAD DEPARTMENT

430.01 CURB & GUTTER
M57-39R PARTIAL CONCRETE REPLACEMENT FOR CROSS GUTTERS & SPANDRELS.
M57-45R SPECIFICATIONS FOR REPAIRS OF CUTS IN CONCRETE PAVEMENT.



TYPICAL PAYLINES FOR EXCAVATION (4)

NO SCALE

RESURFACING REQUIREMENTS

EXISTING SURFACE *	REPLACEMENT (1)
2" P.M.S. over 3" base	4" A.C. over 8" base
3" P.M.S. over 5" base	4" A.C. over 5" base
4" P.M.S. over 8" base	5" A.C. over 8" base
4" P.M.S. over 7" base	5" A.C. over 7" base
12" Concrete	12" Concrete
8" conc. over 16" base	8" conc. over 16" base
8" conc. over 5" base	8" conc. over 5" base
8" conc. over 12" base	8" conc. over 12" base
4" P.M.S. over 8" conc. over 20" base	8" conc. over 12" base
4" P.M.S. over 8" conc. over 24" base	8" conc. over 12" base
4" P.M.S.	5" A.C.

* See general plans for location of various types of existing surfacing.

"AS BUILT" DRAWING

DRAWN BY	REVISIONS		
V. T. N.	MARK	DATE	DESCRIPTION
CHECKED BY V. T. N.			
DESIGNED BY V. T. M.			
SUBMITTED BY C. W. H.			

"PD017034"

PLANS PREPARED BY
VOORHEIS-TRINDLE AND NELSON, INC.
Jack Mahoney
JACK MAHONEY R.E.14,325

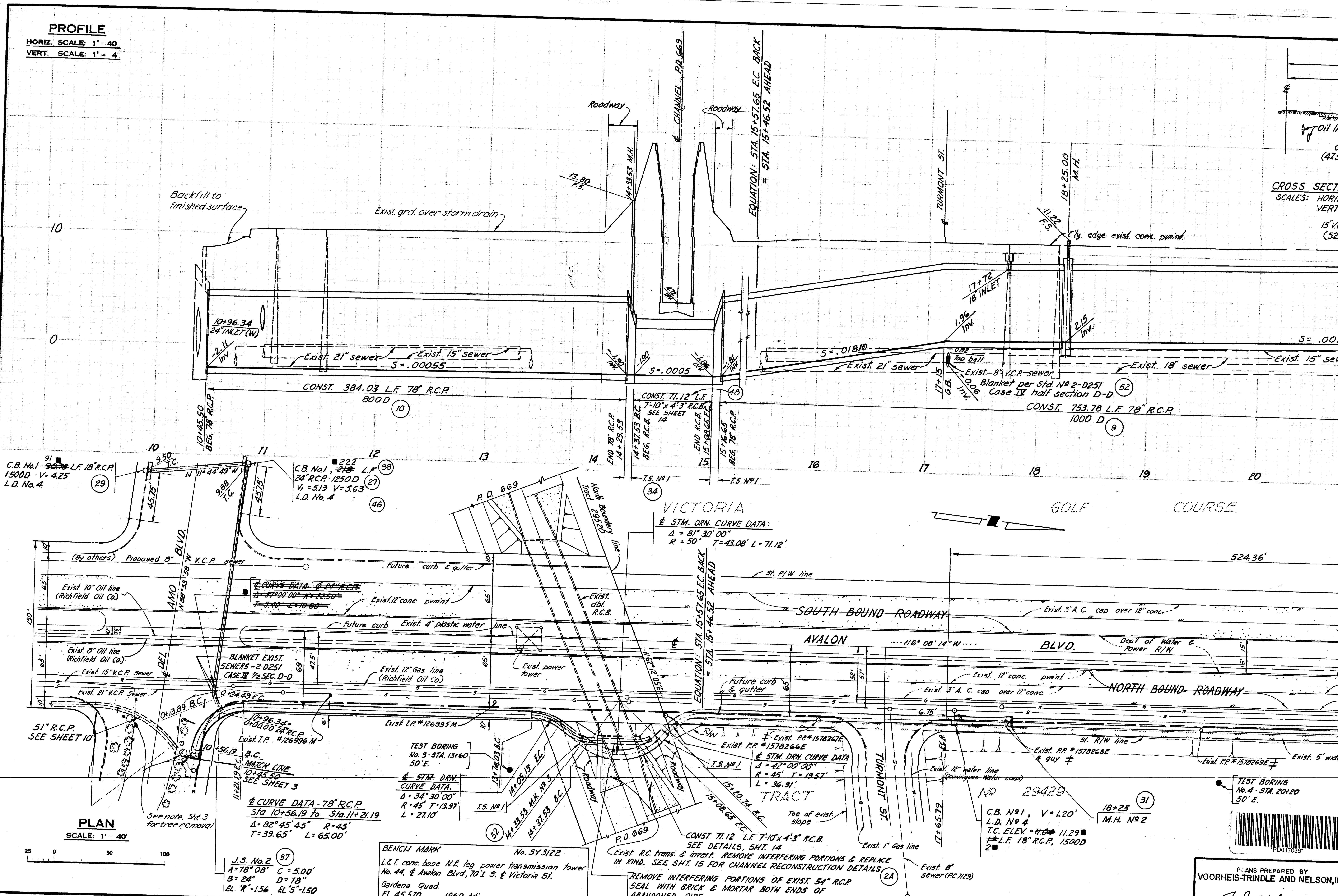
LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT

DEL AMO CHANNEL —
AVALON BLVD. STORM DRAIN

LIST OF STANDARD DRAWINGS,
TYPICAL CONNECTOR PIPE PROFILE

RECOMMENDED BY C. F. Ahlberg DIVISION ENGINEER (DESIGN)
APPROVED BY Warren J. Wood CHIEF ENGINEER

SCALE	DATE	DWG. NO. 314-D2.2
AS SHOWN	JULY, 1966	SHEET 2 OF 15



BENCH MARK No. 5Y3122
L.C.T. conc. base N.E. leg power transmission tower No. 44, ¢ Avalon Blvd., 70'± S. ¢ Victoria St.
Gardena Quad.
El. 45.570 1960 Adj.

"AS BUILT" DRAWING

REVISIONS		
MARK	DATE	DESCRIPTION
■	3-6-68	"As built"

PLANS PREPARED BY VOORHEIS-TRINDLE AND NELSON, INC.
Jack Mahoney
JACK MAHONEY R.E. 14,325

DRAWN BY V.T.N. — DESIGNED BY V.T.N.
TRACED BY V.T.N. — SUBMITTED BY C.W.H.
CHECKED BY
RECOMMENDED BY C.F. Cabelly DIVISION ENGINEER (DESIGN)

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
DEL AMO CHANNEL — AVALON BLVD. STORM DRAIN
LINE A
CONCRETE CONDUIT
STA. 10+45.50 TO STA. 23+00.00
PLAN, PROFILE & SECTION

APPROVED BY Walter J. Wood CHIEF ENGINEER

SCALE	DATE	NO. 314-D2.4
1" = 40'	JULY '66	SHEET 4 OF 15

"AS BUILT" DRAWING

REVISIONS		
MARK	DATE	DESCRIPTION
■	3-6-68	

PLANS PREPARED BY VOORHEIS-TRINDLE AND NELSON, INC.

JACK MAHONEY R.E. 14,325

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

DEL AMO CHANNEL — AVALON BLVD. STORM DRAIN

LINE A

CONCRETE CONDUIT

STA. 23+00.00 TO STA. 37+00.00

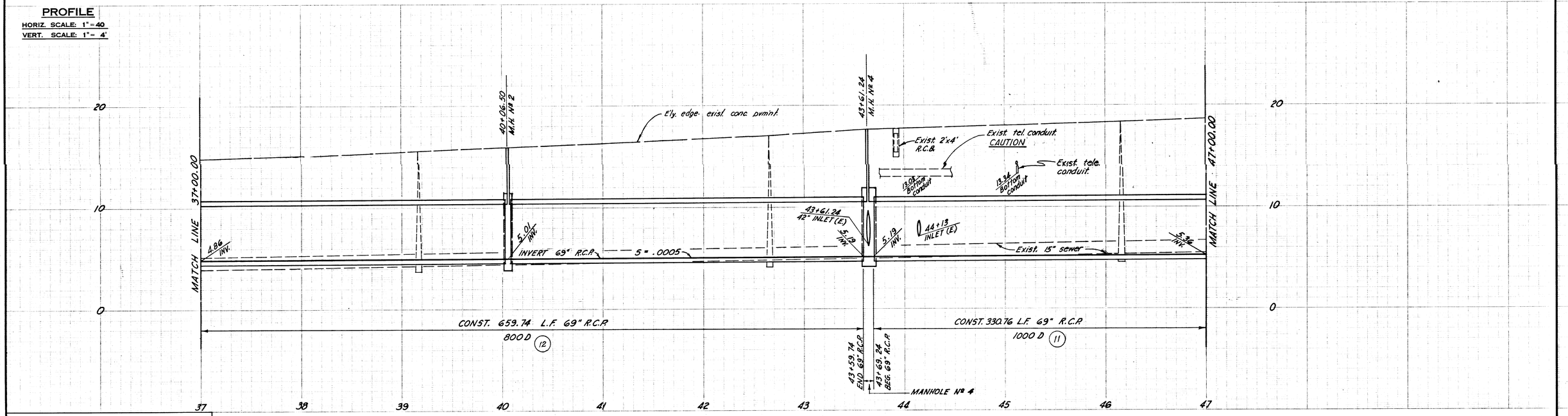
PLAN, PROFILE & SECTION

DRAWN BY V.T.N. DESIGNED BY V.T.N.
TRACED BY V.T.N. SUBMITTED BY C.W.H.
CHECKED BY
RECOMMENDED BY G. F. Cahalley, DIVISION ENGINEER (DESIGN)
APPROVED BY Walter J. Wood, CHIEF ENGINEER

SCALE 1" = 40' | DATE JULY, 1966 | NO. 314-D2.5 | SHEET 5 OF 15

PROFILE

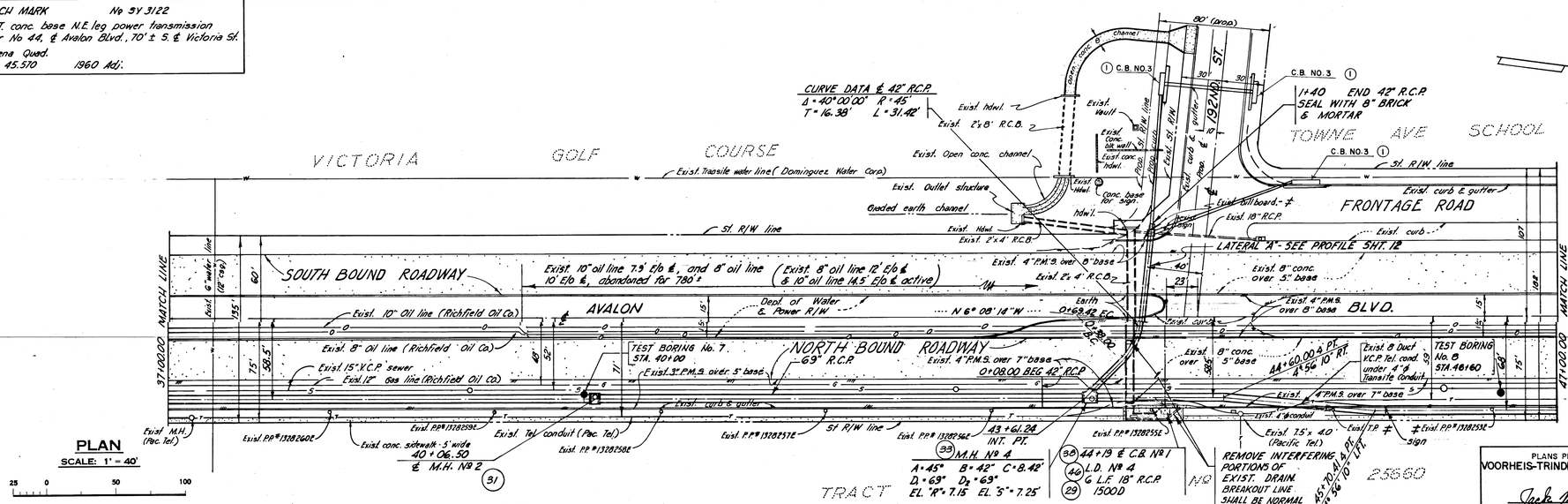
HORIZ. SCALE: 1"=40
VERT. SCALE: 1"= 4'

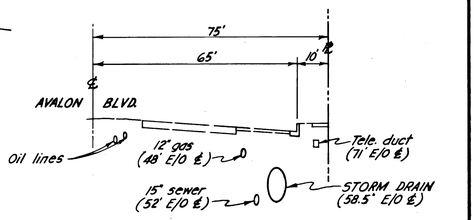


BENCH MARK No 3Y 3122
L.C.T. conc. base N.E. leg power transmission tower No 44, ℄ Avalon Blvd., 70' ± S. ℄ Victoria St.
Gardena Quad.
Elev. 45.570 1960 Adj.

PLAN

SCALE: 1" = 40'





CROSS SECTION - STA. 42+00
SCALE: HORIZ: 1" = 20'
VERT: 1" = 10'

"PD017038"

"AS BUILT" DRAWING

PLANS PREPARED BY
VOORHEIS-TRINDLE AND NELSON, INC.
Jack Mahoney
JACK MAHONEY R.E. 14,325

REVISIONS		
MARK	DATE	DESCRIPTION
①	8-24-73	PERMIT 67037 314-F28.2

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

DEL AMO CHANNEL — AVALON BLVD. STORM DRAIN
LINE A
CONCRETE CONDUIT
STA. 37+00.00 TO STA. 47+00.00
PLAN, PROFILE & SECTION

DRAWN BY V.T.N. | DESIGNED BY V.T.N.
TRACED BY V.T.N. | SUBMITTED BY C.W.N.
CHECKED BY
RECOMMENDED BY C. F. Gholson, DIVISION ENGINEER (Acting)
APPROVED BY Walter A. Hess, CHIEF ENGINEER

SCALE 1"=40' | DATE JULY, 1966 | NO. 314-D2.6 | SHEET 6 OF 15

"AS BUILT" DRAWING

REVISIONS		
MARK	DATE	DESCRIPTION
■	3-6-68	"As built"

PLANS PREPARED BY VOORHEIS-TRINDLE AND NELSON, INC.

JACK MAHONEY R.E. 14,325

DRAWN BY V.T.N. — DESIGNED BY V.T.N.
TRACED BY V.T.N. — SUBMITTED BY G.W.H.
CHECKED BY — RECOMMENDED BY C.F. Eckelberg, DIVISION ENGINEER (DESIGN)

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

DEL AMO CHANNEL — AVALON BLVD. STORM DRAIN

LINE A
CONCRETE CONDUIT
STA. 47+00.00 TO STA. 61+00.00
PLAN, PROFILE & SECTION

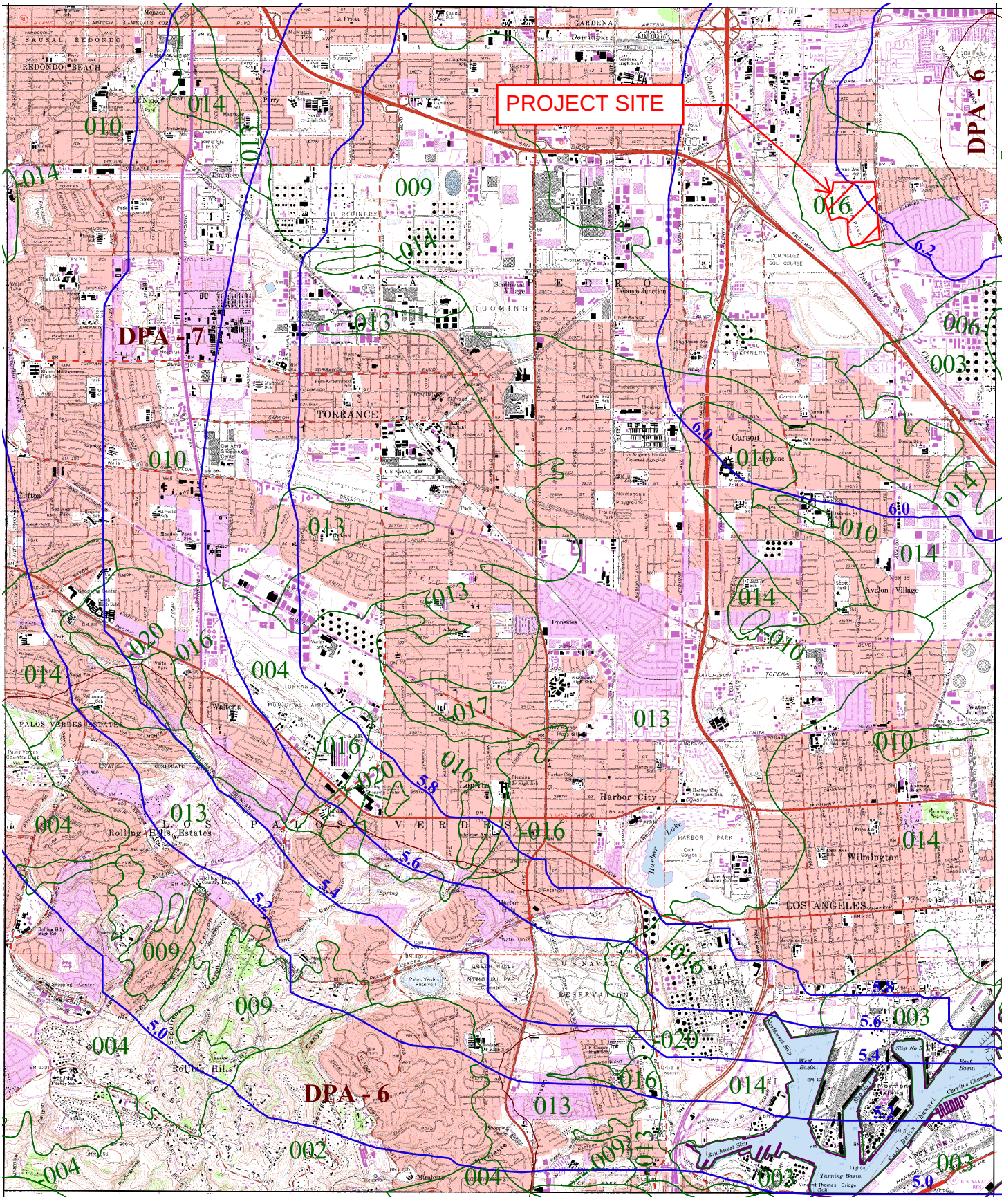
APPROVED BY Walter J. Wood, CHIEF ENGINEER

SCALE 1" = 40' | DATE JULY, 1966 | NO. 314-D2.7 SHEET 7 OF 15

PD017039

APPENDIX C

County of Los Angeles Department of Public Works Soil and Precipitation Map



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

N W E S

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

APPENDIX D

Excerpt from the March 2014 Contaminated Sediment Management Plan: Dominguez Channel Estuary

1.1 Setting: Dominguez Channel and Dominguez Channel Estuary

Dominguez Channel is a channelized stormwater conveyance system beginning at 116th Street in the city of Hawthorne and runs in a generally southerly direction, passing through the cities of Gardena, Torrance, Carson, and Los Angeles and the unincorporated County of Los Angeles before discharging into Consolidated Slip within the Port of Los Angeles (POLA). Historically, the southern end of the Dominguez Channel consisted of marshes and wetlands. This area was dredged in the early twentieth century to create the Los Angeles/Long Beach Harbor. The channelization of this drainage system in the 1960s ended ongoing flooding concerns and provided land for the construction of homes and businesses (City of Los Angeles 2014). The Dominguez Watershed Management Area (WMA) is shown in Figure 1. The Dominguez WMA includes the drainage area of the Dominguez Channel, Machado Lake, and the Los Angeles/Long Beach Harbor watersheds. Approximately 93 percent of the land within the Dominguez WMA is developed with 41 percent industrial, commercial, and transportation land uses and 40 percent residential development. The eastern portion of the watershed near the Dominguez Channel has a high concentration of industrial uses with very little vacant and open spaces present. Of the six Watershed Management Areas within Los Angeles County, the Dominguez WMA has the highest ratio of impervious land cover (Weston 2005).

The Dominguez Channel Watershed is divided into two sub-watersheds. The upper watershed is the portion that drains to the concrete-lined, rectangular reach of the Dominguez Channel (above Vermont Avenue). The lower watershed consists of the drainage area tributary to the DCE. The lower watershed also includes the Torrance Lateral, which is a significant tributary channel to the DCE. The combined drainage area is approximately 72 square miles (or approximately 62 percent of the Dominguez WMA). The remaining areas of the Dominguez WMA drain into Machado Lake, or directly into the Los Angeles/Long Beach Harbor (MEC 2004). A brief description of the channel and adjacent land use is provided in *Dominguez Watershed Management Master Plan* (MEC 2004).

Figure 1

Dominguez Watershed Management Area

The Dominguez Channel Watershed contains two Superfund sites: the Montrose Chemical Corporation (Montrose) site and the Del Amo site. Montrose manufactured Dichlorodiphenyltrichloroethane (DDT) on a 13-acre site in a light industrial/residential area in the city of Torrance from 1947 to 1982. Contaminants of concern at the Montrose site are DDT, chlorobenzene, and benzene hexachloride. DDT has been found in soils at the former plant property and surrounding areas, in sediments and soils in the historical stormwater pathway from the site (Kenwood Drain), and in the groundwater close to the former plant property.

Shell Oil Company (Shell), Dow Chemical Company, and several other companies operated the Del Amo Synthetic Rubber Manufacturing plant from 1955 to 1972 to produce synthetic rubber for the United States military operations. In 1972 the plant was dismantled, and the buildings were demolished (USEPA 1999). Contaminants of concern at the Del Amo site are volatile organic compounds, including benzene and toluene, Polycyclic Aromatic Hydrocarbons (PAHs), and semi-volatile organic compounds (Lyons and Birosik 2007).

1.2 Dominguez Channel Toxics TMDL

California's 303(d) List of Water Quality Limited Segments (SWRCB 2006) includes three areas of Dominguez Channel: lined portion above Vermont Avenue, unlined portion below Vermont Avenue (also referred to as DCE), and Torrance Lateral (also referred to as Torrance Carson Channel). The upper, freshwater portion consists of 6.7 miles of the channel located above Vermont Avenue and is constructed of reinforced concrete with vertical sides. Below Vermont Avenue, the channel changes to a trapezoidal compacted earth bottom channel with riprap banks. The 8.3 miles from Vermont Avenue to Consolidated Slip is subjected to tidal flows (WBMWD 2009) and is identified as the DCE on the 303(d) List.

On March 23, 2012, the Dominguez Channel Toxics TMDL became effective and was promulgated to protect and restore fish tissue, water, and sediment quality in the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters by remediating contaminated sediments and controlling the sediment loading and accumulation of contaminated sediments in the Dominguez Channel Watershed.

Total maximum daily loads (TMDLs) are established to attain and maintain applicable water quality standards for impaired waterbodies. TMDLs provide pollutant limits that are implemented through permits (Municipal Separate Storm Sewer System [MS4], other National Pollutant Discharge Elimination System [NPDES] permits, etc.). This CSMP has been developed in response to the Dominguez Channel Toxics TMDL, which addresses localized sediment quality and regional fish tissue quality and is expected to achieve attainment of fish tissue, water, and sediment quality through source reduction, source control, management actions, and Monitored Natural Recovery (MNR).

1.2.1 TMDL Compliance

The Dominguez Channel Toxics TMDL set Waste Load Allocations (WLAs) in waterbodies within the Dominguez Channel Watershed to limit sediment-bound pollutant loadings from upstream and on-land sources. In addition, the Dominguez Channel Toxics TMDL set LAs in waterbodies to limit concentrations in bedded sediments believed to impact marine benthos (direct effects) and fish tissue (indirect effects). Mass-based limits for chemical constituents are provided in Table 1 and Attachment A to Resolution No. R11-008, Amendment to the Water Quality Control Plan – Los Angeles Region (Basin Plan Amendment; RWQCB and USEPA 2011).

Table 1

Final, Mass-Based TMDLs and Allocations for Metals, PAHs, DDT, and PCBs

Waterbody	Total Copper (kg/year)	Total Lead (kg/year)	Total Zinc (kg/year)	Total PAHs (kg/year)	TDDT (g/year)	Total PCBs (g/year)
Dominguez Channel Estuary	84	115.4	370.5	9.94	3.9	7.9

Notes:
g = gram
kg = kilogram
TDDT = total DDT

Compliance with sediment allocations may be demonstrated via any one of three different means:

1. Final sediment allocations, as presented in the Basin Plan Amendment (RWQCB and USEPA 2011), are met.
2. The qualitative sediment condition ranking of "unimpacted" or "likely unimpacted" by interpreting and integrating Multiple Lines of Evidence (MLOE) as defined in the Sediment Quality Objective (SQO) Part 1 is met, except for chromium which is not included in the SQO Part 1.
3. Sediment numeric targets are met in bedded sediments over a 3-year averaging period.

The SQO program provides guidance for applying the *Water Quality Control Plan for Enclosed Bays and Estuaries: Sediment Quality Plan* (SWRCB 2009). SQOs have been developed for contaminants of concern in bays and estuaries in California based on an approach that incorporates MLOE (Bay et al. 2009). These MLOE include sediment chemistry, sediment toxicity, and benthic community condition.

Compliance with fish tissue targets may be demonstrated via any one of four different means:

1. Fish tissue targets are met in species resident to the Dominguez Channel Toxics TMDL waterbodies.
2. Final sediment allocations, as presented in the Basin Plan Amendment (RWQCB and USEPA 2011), are met.
3. Sediment numeric targets to protect fish tissue are met in bed sediment over a 3-year averaging period.
4. Demonstrate that the sediment quality condition protective of fish tissue is achieved per the *Water Quality Control Plan for Enclosed Bays and Estuaries: Sediment Quality Plan* (SWRCB 2009), as amended to address contaminants in resident finfish and wildlife.

Numeric targets, implementation schedules, and listed contaminants of concern may be revised during the TMDL reopener, tentatively scheduled for spring 2018.

APPENDIX E
HydroCalc Exported Values

Peak Flow Hydrologic Analysis

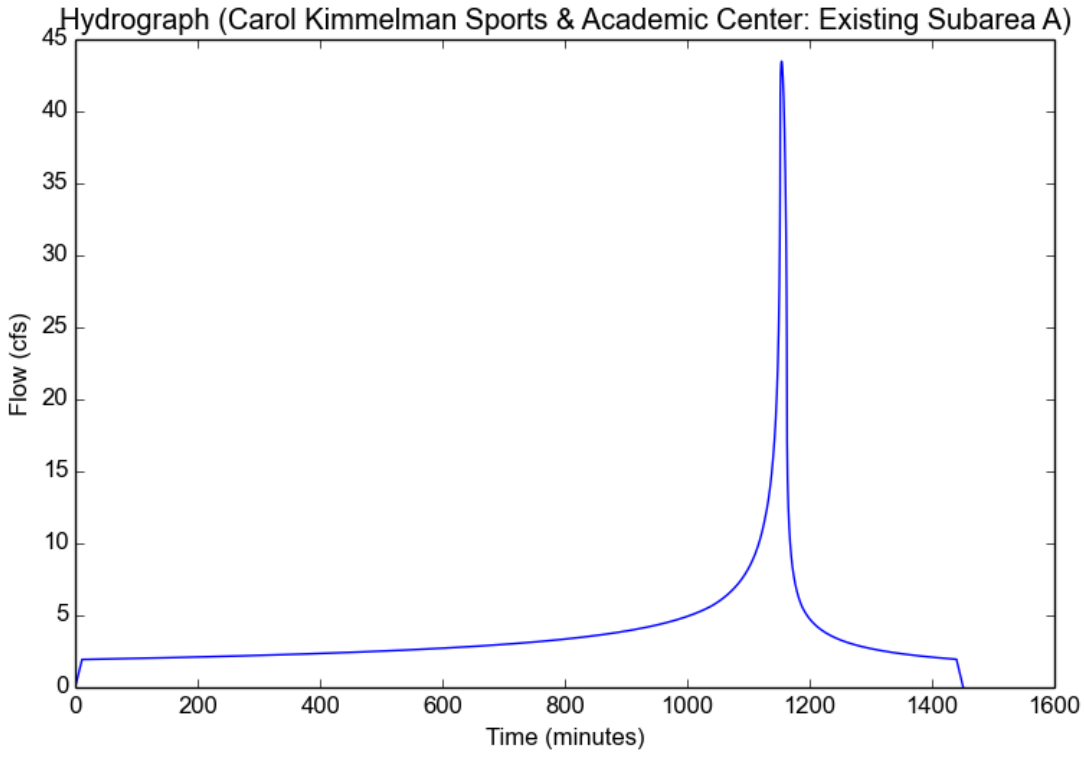
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Existing Sub
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Existing Subarea A
Area (ac)	19.3
Flow Path Length (ft)	1005.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.79
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	2.5536
Undeveloped Runoff Coefficient (Cu)	0.8149
Developed Runoff Coefficient (Cd)	0.8821
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	43.4755
Burned Peak Flow Rate (cfs)	45.3306
24-Hr Clear Runoff Volume (ac-ft)	7.451
24-Hr Clear Runoff Volume (cu-ft)	324563.7469



Peak Flow Hydrologic Analysis

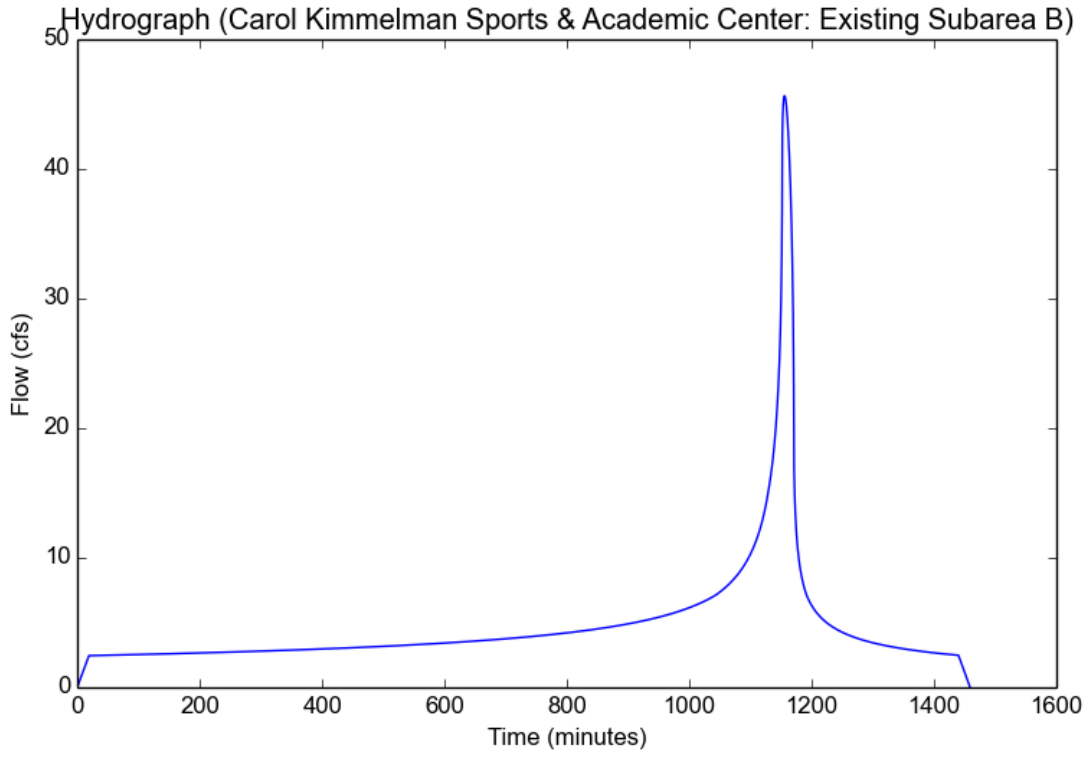
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Existing Sub
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Existing Subarea B
Area (ac)	27.0
Flow Path Length (ft)	2355.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.7
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	1.9751
Undeveloped Runoff Coefficient (Cu)	0.7534
Developed Runoff Coefficient (Cd)	0.856
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	45.6501
Burned Peak Flow Rate (cfs)	47.998
24-Hr Clear Runoff Volume (ac-ft)	9.5495
24-Hr Clear Runoff Volume (cu-ft)	415975.8305



Peak Flow Hydrologic Analysis

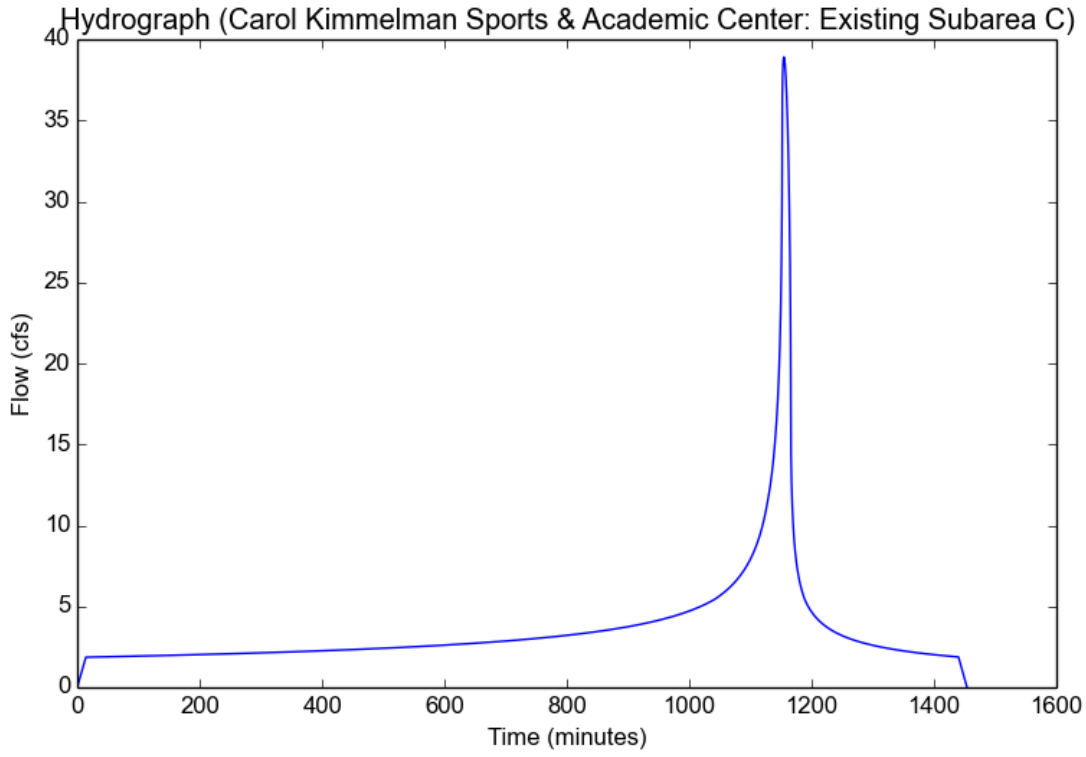
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Existing Sub
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Existing Subarea C
Area (ac)	19.6
Flow Path Length (ft)	1719.0
Flow Path Slope (vft/hft)	0.013
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.74
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	2.28
Undeveloped Runoff Coefficient (Cu)	0.7872
Developed Runoff Coefficient (Cd)	0.8707
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	38.9087
Burned Peak Flow Rate (cfs)	40.7198
24-Hr Clear Runoff Volume (ac-ft)	7.215
24-Hr Clear Runoff Volume (cu-ft)	314285.1803



Peak Flow Hydrologic Analysis

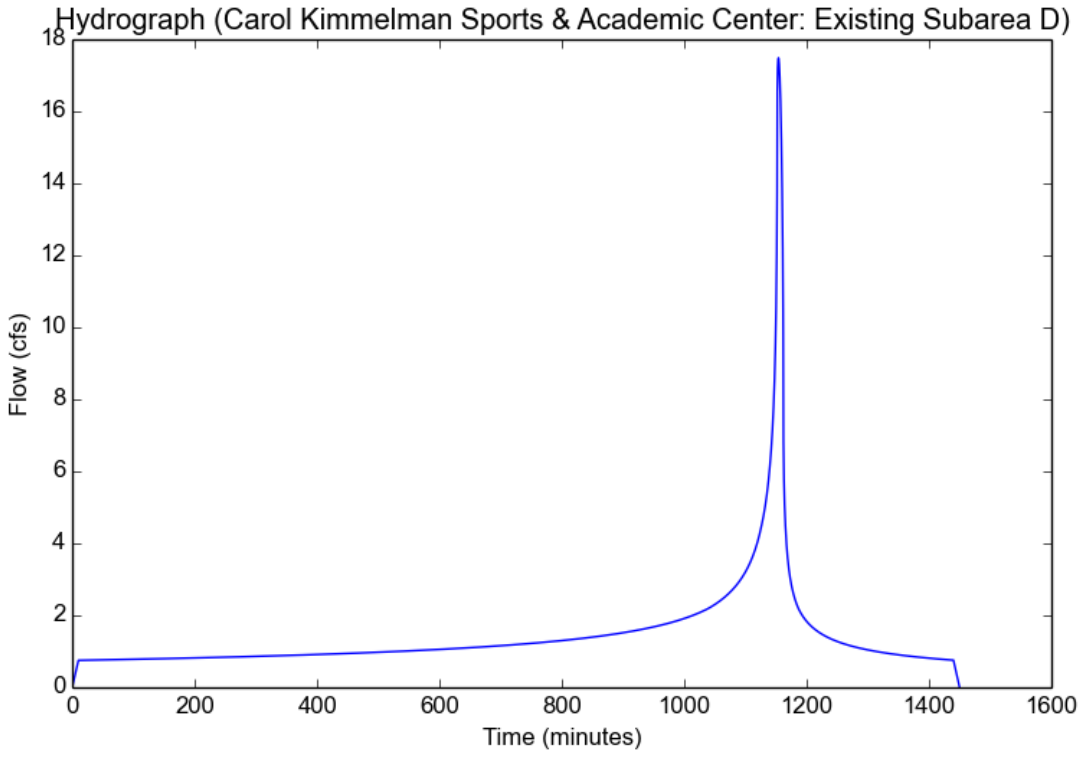
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Existing Sub
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Existing Subarea D
Area (ac)	7.4
Flow Path Length (ft)	952.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.8
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	2.6706
Undeveloped Runoff Coefficient (Cu)	0.8239
Developed Runoff Coefficient (Cd)	0.8848
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	17.4856
Burned Peak Flow Rate (cfs)	18.218
24-Hr Clear Runoff Volume (ac-ft)	2.8834
24-Hr Clear Runoff Volume (cu-ft)	125601.3164



Peak Flow Hydrologic Analysis

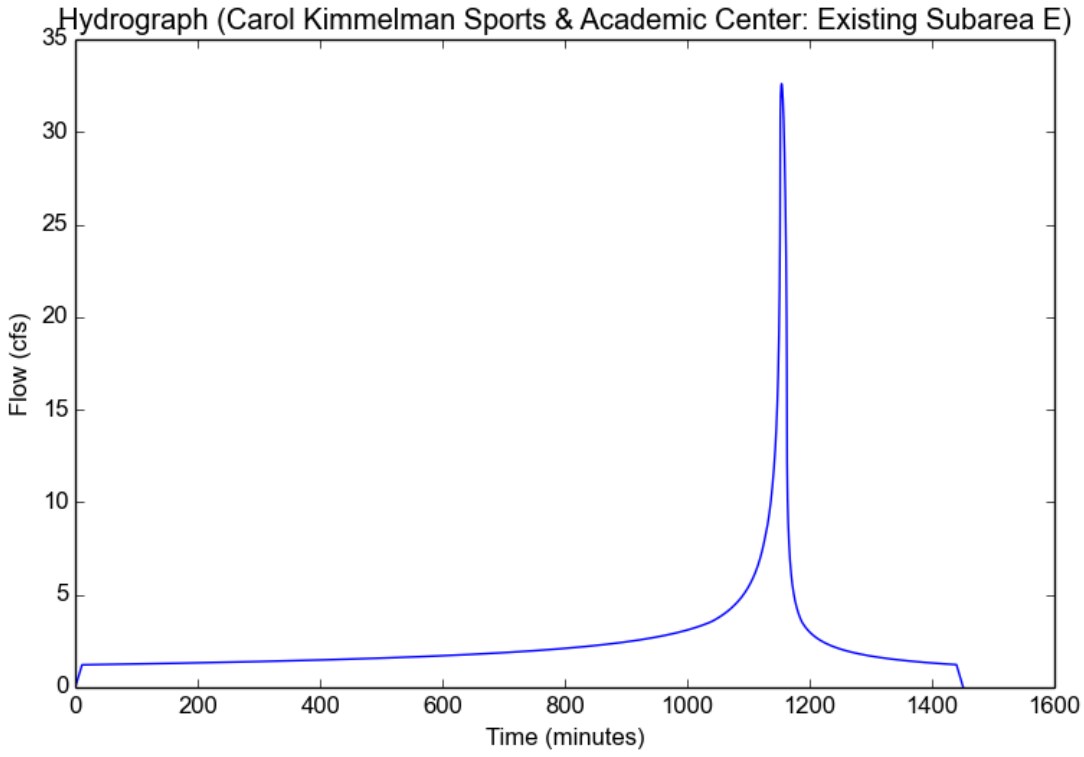
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Existing Sub
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Existing Subarea E
Area (ac)	14.7
Flow Path Length (ft)	1222.0
Flow Path Slope (vft/hft)	0.018
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.63
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	2.5536
Undeveloped Runoff Coefficient (Cu)	0.8149
Developed Runoff Coefficient (Cd)	0.8685
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	32.6023
Burned Peak Flow Rate (cfs)	34.1785
24-Hr Clear Runoff Volume (ac-ft)	4.834
24-Hr Clear Runoff Volume (cu-ft)	210568.5153



Peak Flow Hydrologic Analysis

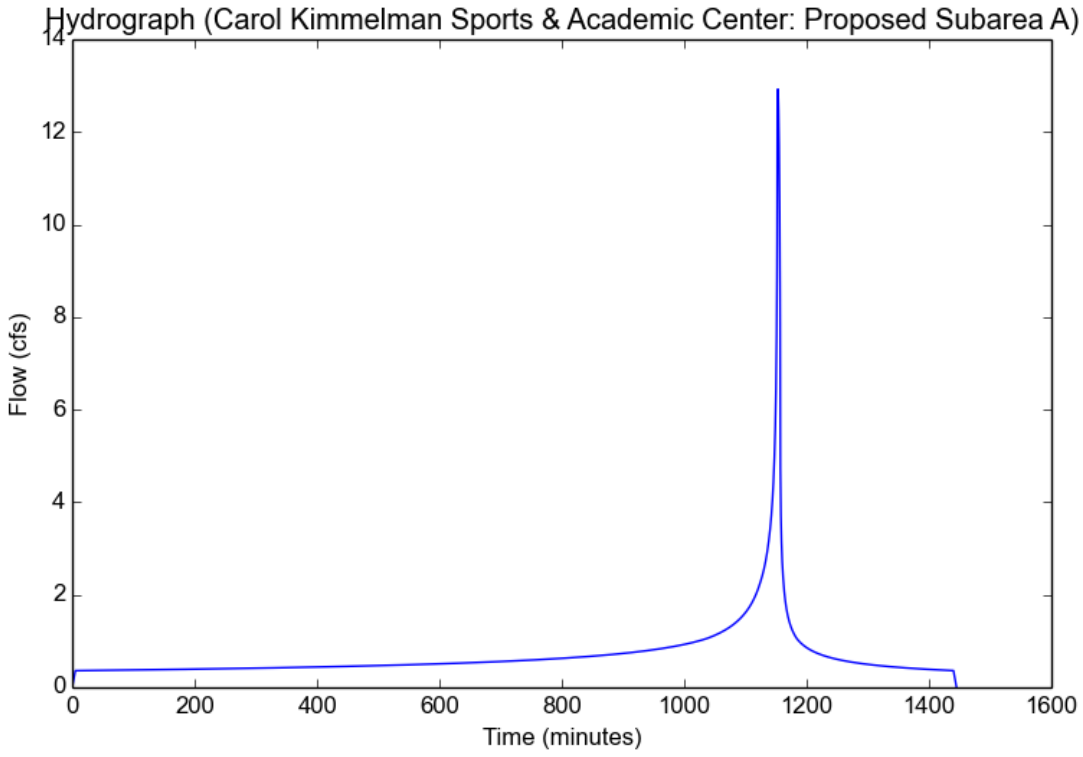
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Proposed Su
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Proposed Subarea A
Area (ac)	3.9
Flow Path Length (ft)	360.0
Flow Path Slope (vft/hft)	0.022
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.72
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8852
Developed Runoff Coefficient (Cd)	0.8959
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	12.9242
Burned Peak Flow Rate (cfs)	13.4324
24-Hr Clear Runoff Volume (ac-ft)	1.4085
24-Hr Clear Runoff Volume (cu-ft)	61352.3751



Peak Flow Hydrologic Analysis

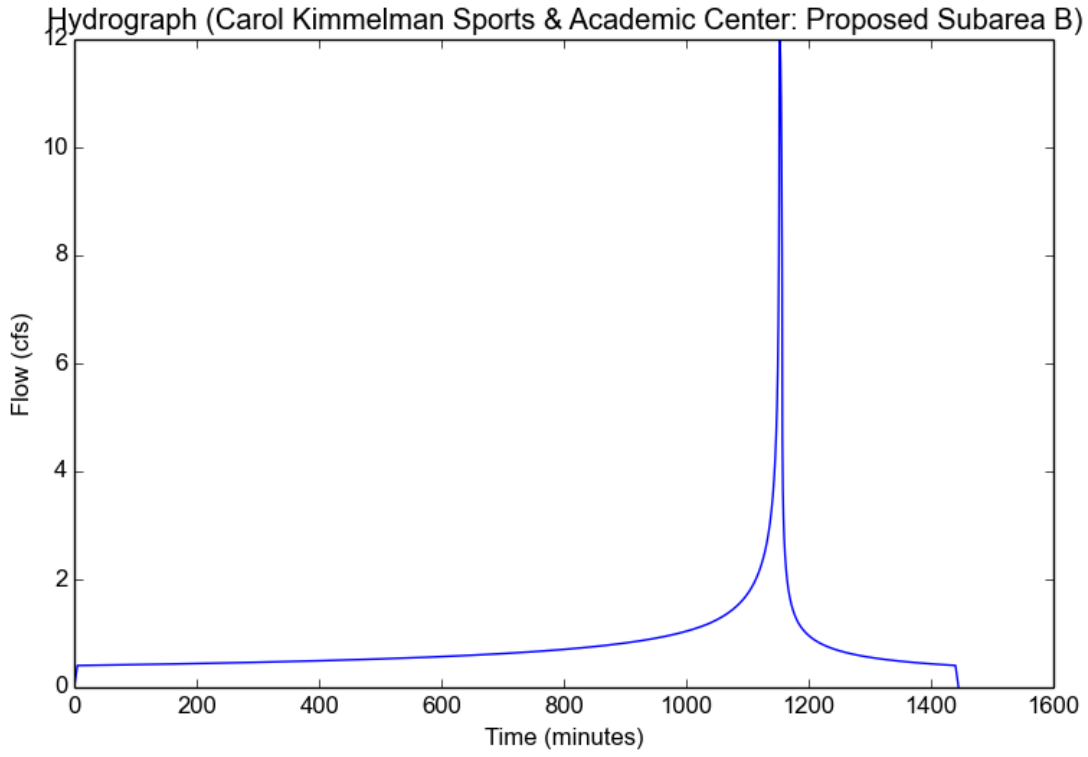
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Proposed Su
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Proposed Subarea B
Area (ac)	3.6
Flow Path Length (ft)	345.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.9
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8852
Developed Runoff Coefficient (Cd)	0.8985
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	11.9654
Burned Peak Flow Rate (cfs)	12.4225
24-Hr Clear Runoff Volume (ac-ft)	1.5316
24-Hr Clear Runoff Volume (cu-ft)	66715.4437



Peak Flow Hydrologic Analysis

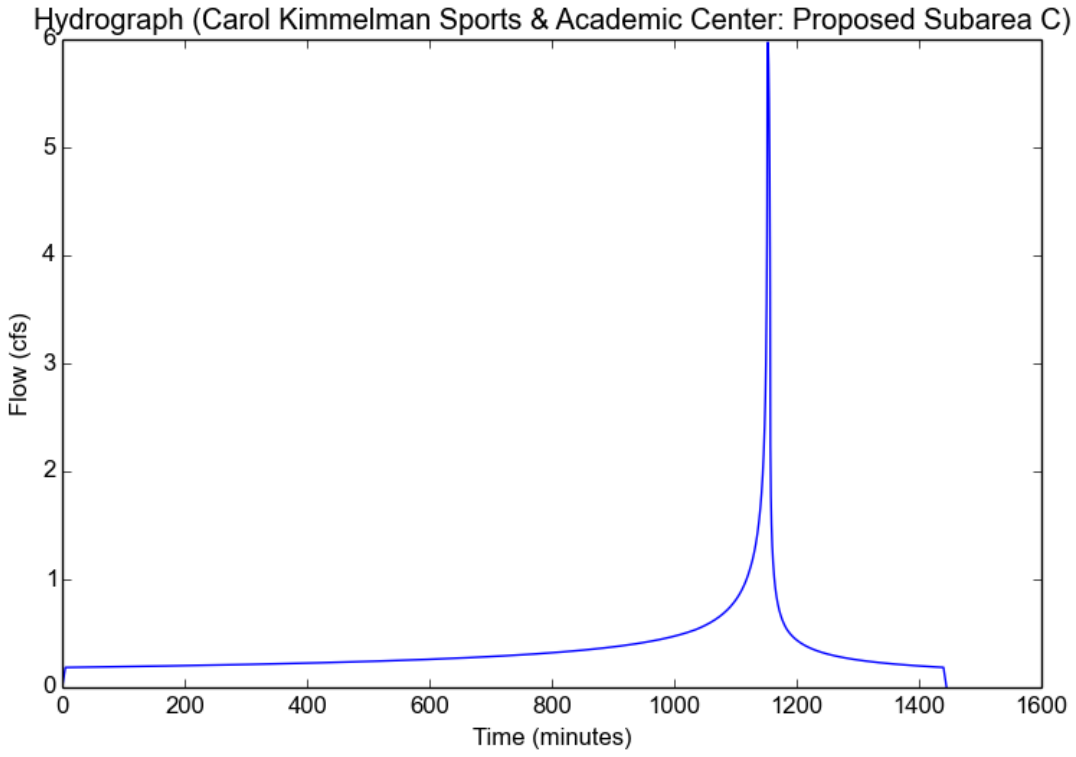
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Proposed Su
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Proposed Subarea C
Area (ac)	1.8
Flow Path Length (ft)	323.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.81
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8852
Developed Runoff Coefficient (Cd)	0.8972
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.9738
Burned Peak Flow Rate (cfs)	6.2054
24-Hr Clear Runoff Volume (ac-ft)	0.7079
24-Hr Clear Runoff Volume (cu-ft)	30837.1013



Peak Flow Hydrologic Analysis

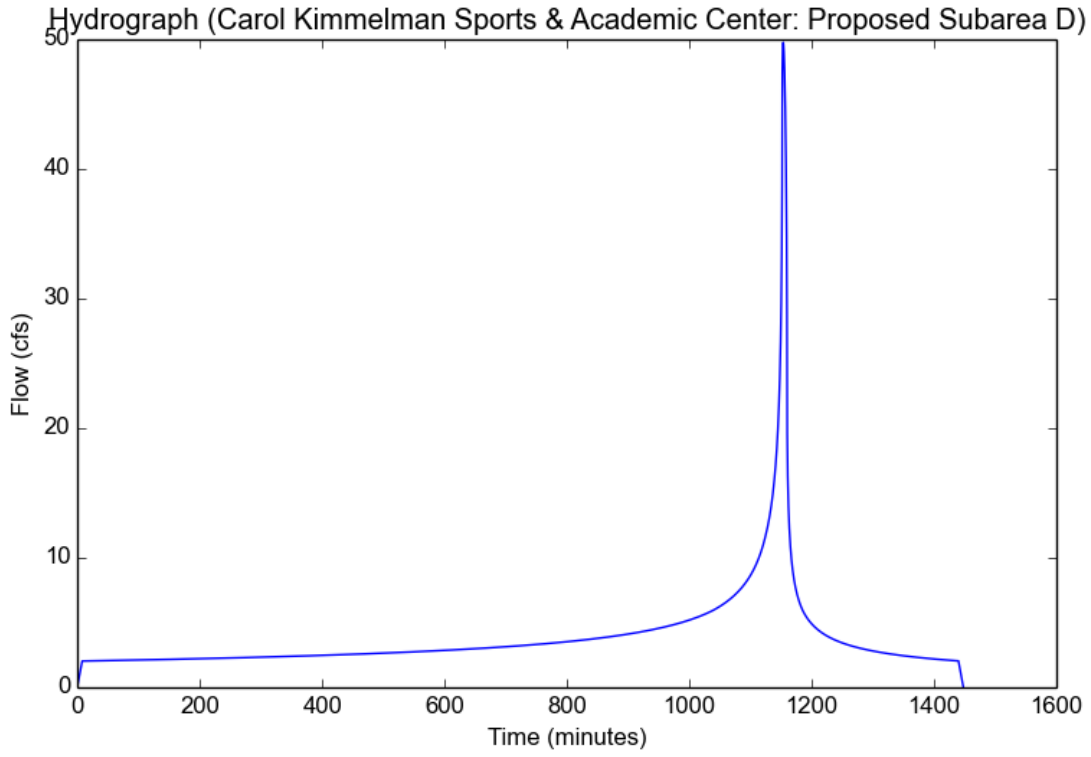
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Proposed Su
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Proposed Subarea D
Area (ac)	18.8
Flow Path Length (ft)	585.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.86
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	2.9659
Undeveloped Runoff Coefficient (Cu)	0.8468
Developed Runoff Coefficient (Cd)	0.8925
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	49.7676
Burned Peak Flow Rate (cfs)	51.7273
24-Hr Clear Runoff Volume (ac-ft)	7.7291
24-Hr Clear Runoff Volume (cu-ft)	336681.0483



Peak Flow Hydrologic Analysis

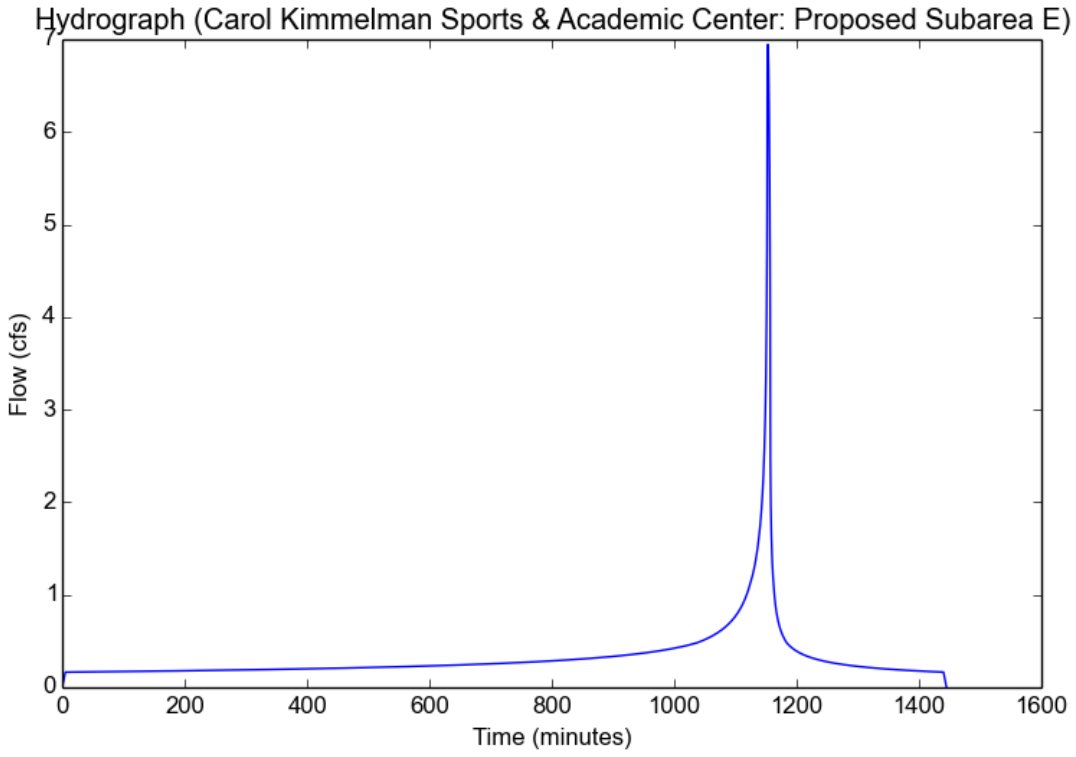
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Proposed Su
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Proposed Subarea E
Area (ac)	2.1
Flow Path Length (ft)	360.0
Flow Path Slope (vft/hft)	0.011
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.59
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8852
Developed Runoff Coefficient (Cd)	0.8939
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.9443
Burned Peak Flow Rate (cfs)	7.2229
24-Hr Clear Runoff Volume (ac-ft)	0.6609
24-Hr Clear Runoff Volume (cu-ft)	28788.1819



Peak Flow Hydrologic Analysis

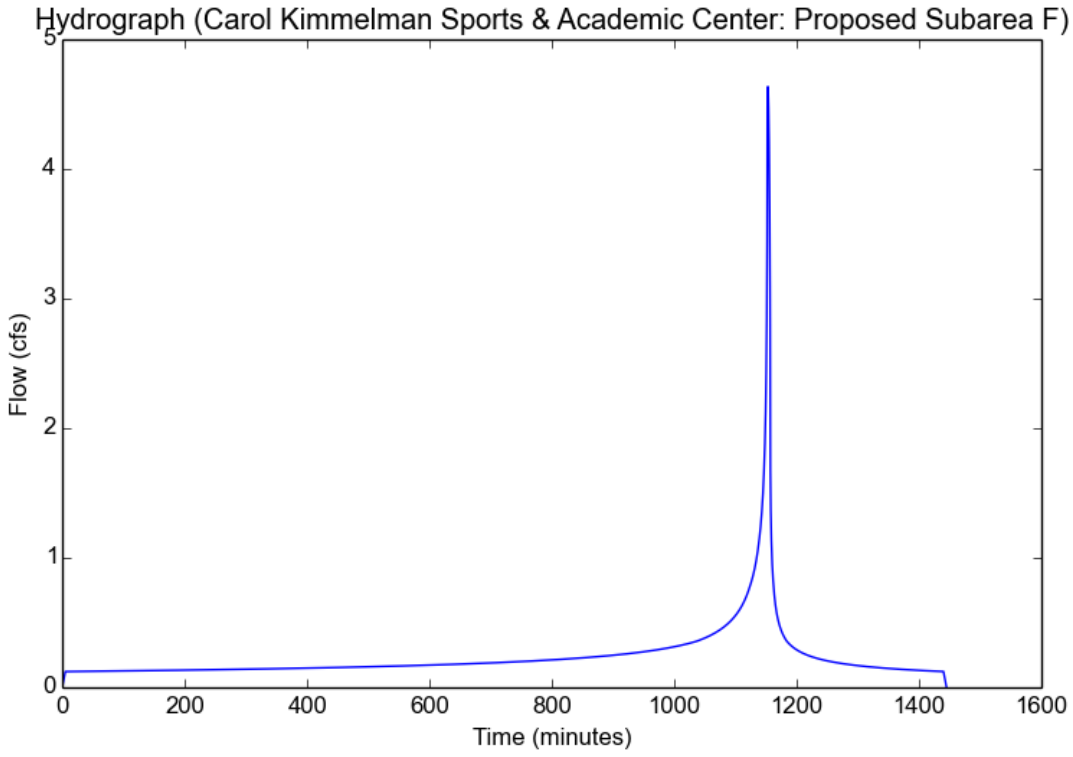
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Proposed Su
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Proposed Subarea F
Area (ac)	1.4
Flow Path Length (ft)	318.0
Flow Path Slope (vft/hft)	0.015
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.67
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8852
Developed Runoff Coefficient (Cd)	0.8951
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.6356
Burned Peak Flow Rate (cfs)	4.8193
24-Hr Clear Runoff Volume (ac-ft)	0.4806
24-Hr Clear Runoff Volume (cu-ft)	20934.7725



Peak Flow Hydrologic Analysis

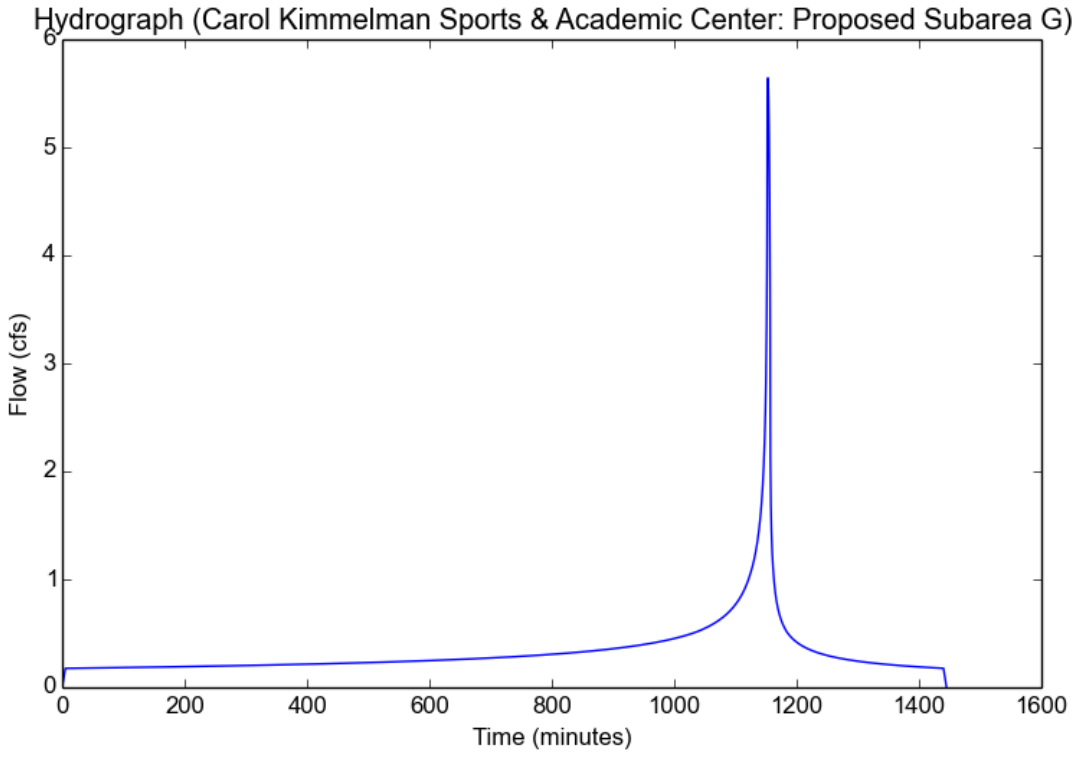
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Proposed Su
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Proposed Subarea G
Area (ac)	1.7
Flow Path Length (ft)	291.0
Flow Path Slope (vft/hft)	0.04
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.82
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8852
Developed Runoff Coefficient (Cd)	0.8973
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.6429
Burned Peak Flow Rate (cfs)	5.8613
24-Hr Clear Runoff Volume (ac-ft)	0.6747
24-Hr Clear Runoff Volume (cu-ft)	29388.4386



Peak Flow Hydrologic Analysis

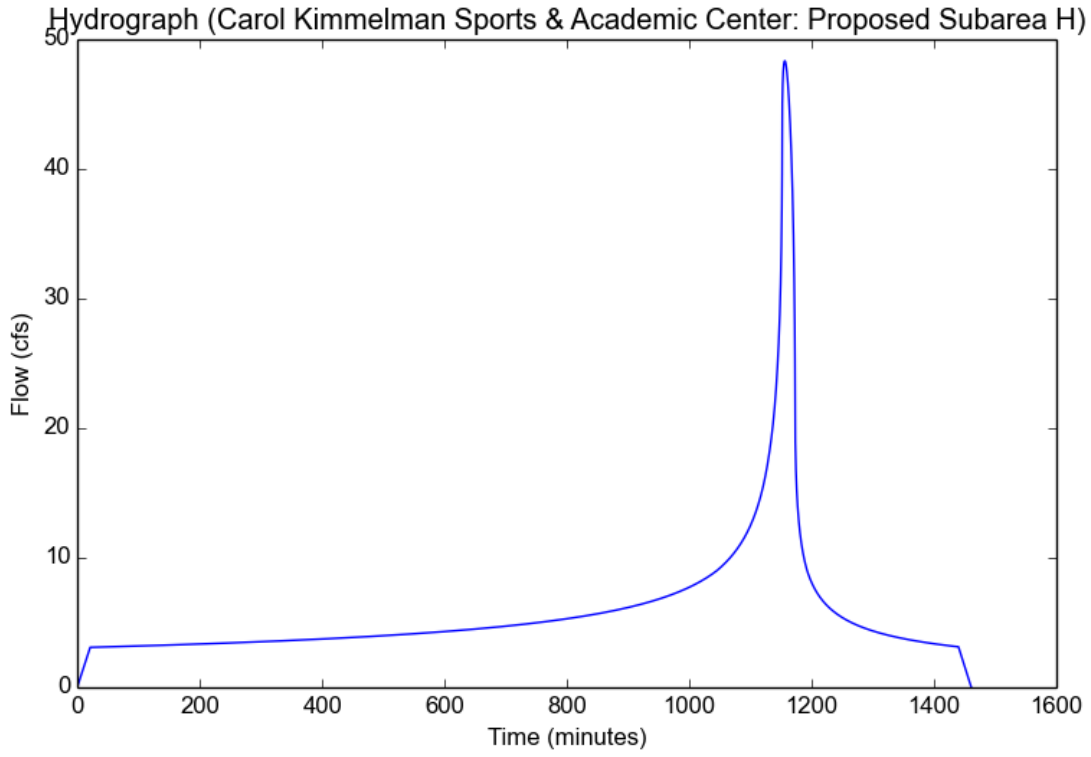
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Proposed Su
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Proposed Subarea H
Area (ac)	29.4
Flow Path Length (ft)	2023.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.83
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	1.8844
Undeveloped Runoff Coefficient (Cu)	0.7389
Developed Runoff Coefficient (Cd)	0.8726
Time of Concentration (min)	21.0
Clear Peak Flow Rate (cfs)	48.3437
Burned Peak Flow Rate (cfs)	50.4838
24-Hr Clear Runoff Volume (ac-ft)	11.7666
24-Hr Clear Runoff Volume (cu-ft)	512553.2867



Peak Flow Hydrologic Analysis

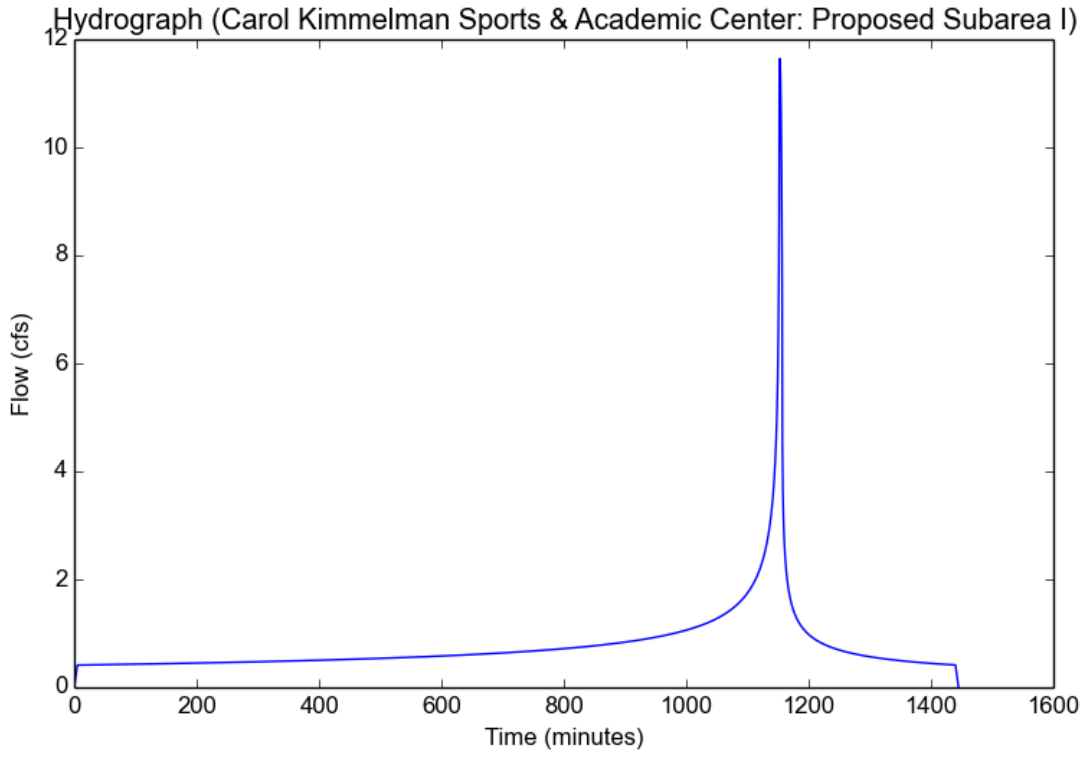
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Proposed Su
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Proposed Subarea I
Area (ac)	3.5
Flow Path Length (ft)	320.0
Flow Path Slope (vft/hft)	0.026
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.95
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8852
Developed Runoff Coefficient (Cd)	0.8993
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	11.6426
Burned Peak Flow Rate (cfs)	12.0838
24-Hr Clear Runoff Volume (ac-ft)	1.5515
24-Hr Clear Runoff Volume (cu-ft)	67585.1295



Peak Flow Hydrologic Analysis

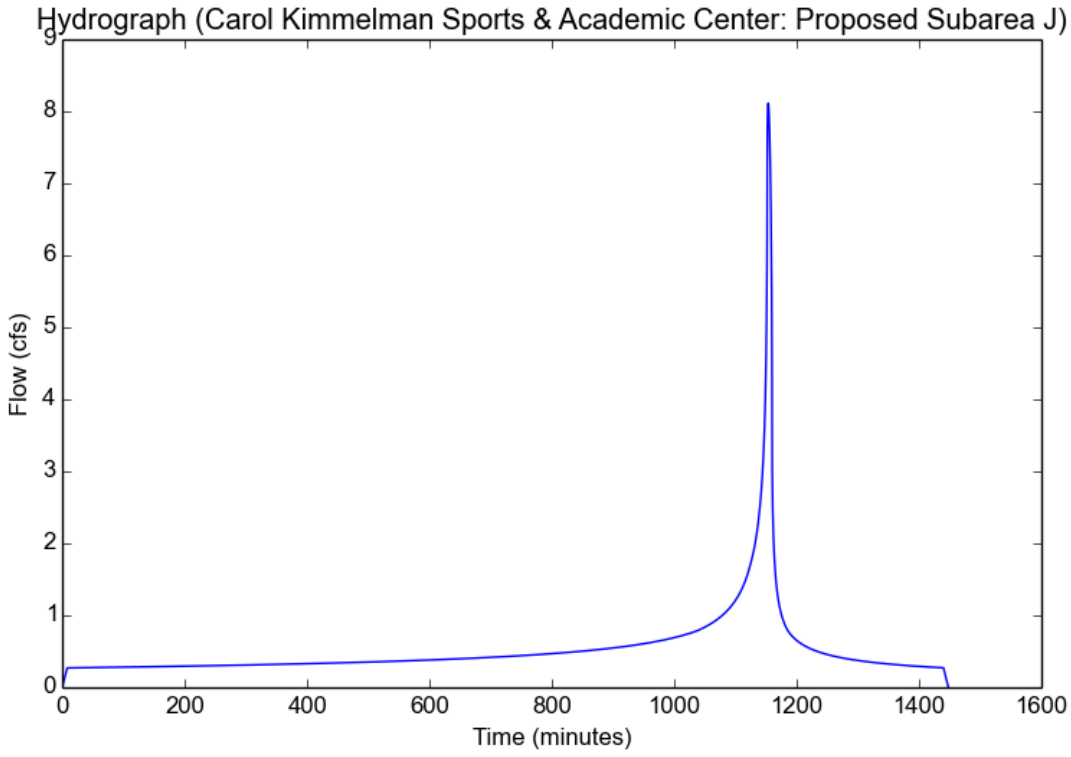
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Proposed Su
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Proposed Subarea J
Area (ac)	3.1
Flow Path Length (ft)	613.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.67
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	2.9659
Undeveloped Runoff Coefficient (Cu)	0.8468
Developed Runoff Coefficient (Cd)	0.8824
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	8.1134
Burned Peak Flow Rate (cfs)	8.4669
24-Hr Clear Runoff Volume (ac-ft)	1.064
24-Hr Clear Runoff Volume (cu-ft)	46347.2993



Peak Flow Hydrologic Analysis

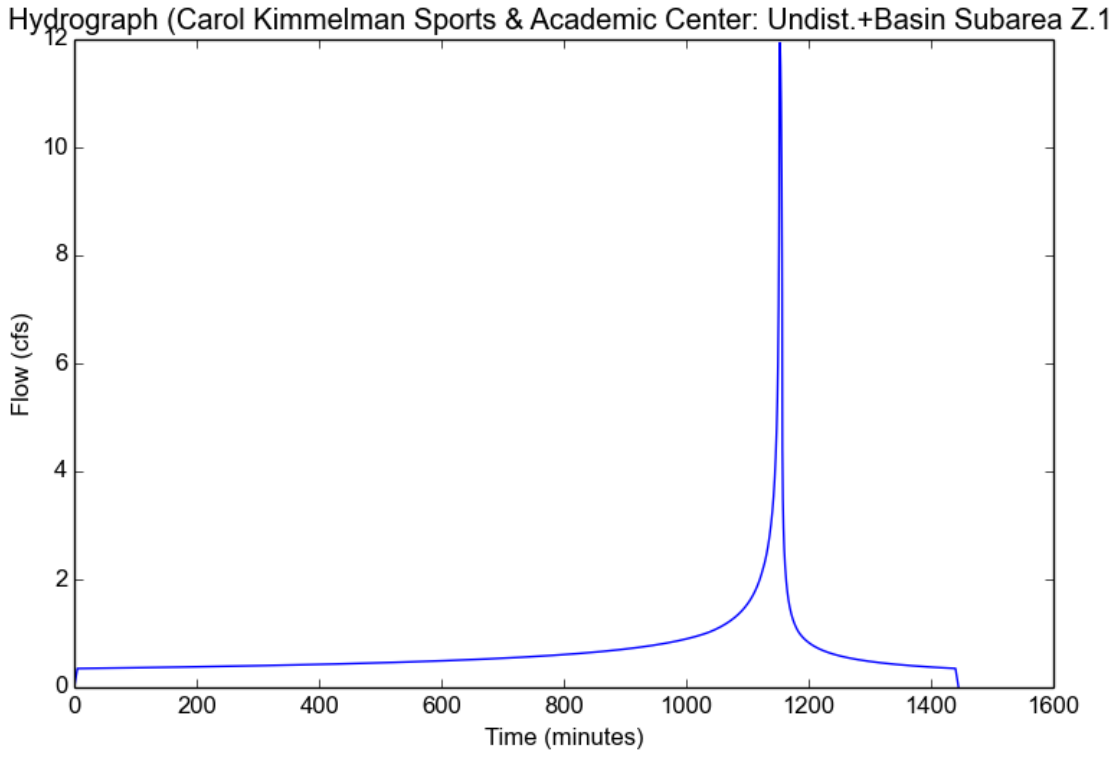
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Undisturbed
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Undist.+Basin Subarea Z.1
Area (ac)	3.6
Flow Path Length (ft)	232.0
Flow Path Slope (vft/hft)	0.037
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.76
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8852
Developed Runoff Coefficient (Cd)	0.8965
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	11.9379
Burned Peak Flow Rate (cfs)	12.4043
24-Hr Clear Runoff Volume (ac-ft)	1.3515
24-Hr Clear Runoff Volume (cu-ft)	58873.5132



Peak Flow Hydrologic Analysis

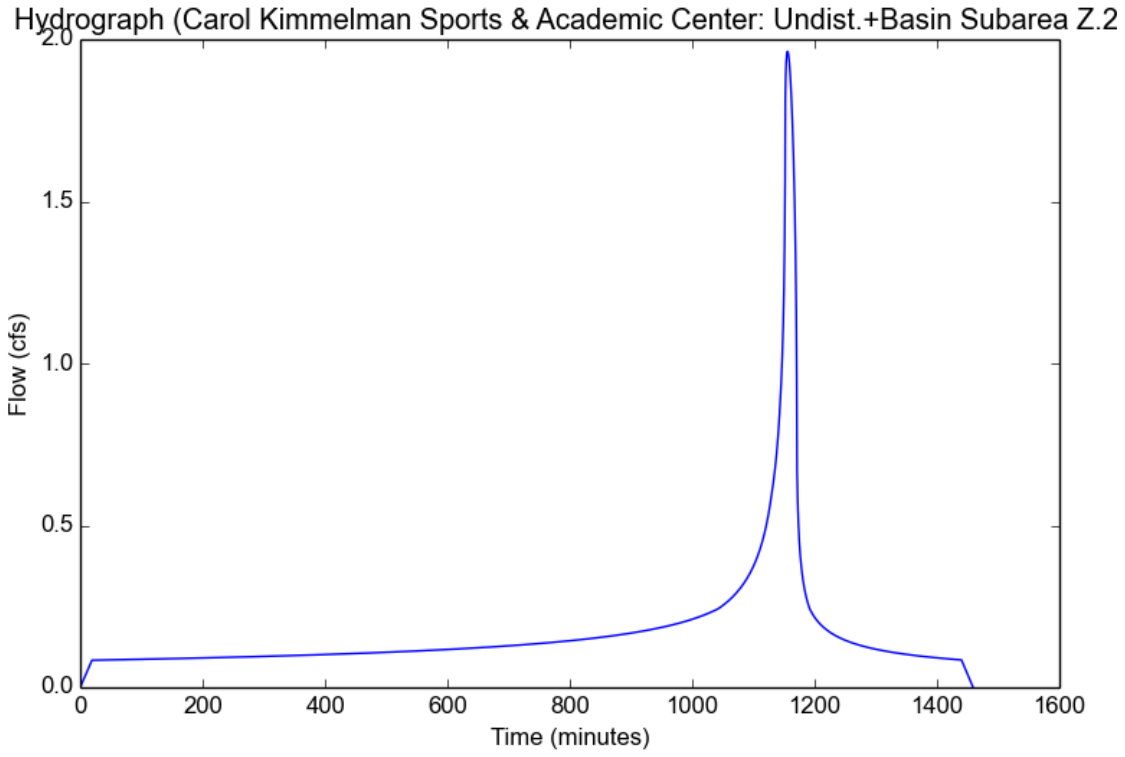
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Undisturbed
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Undist.+Basin Subarea Z.2
Area (ac)	1.2
Flow Path Length (ft)	1838.0
Flow Path Slope (vft/hft)	0.004
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.51
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	1.9751
Undeveloped Runoff Coefficient (Cu)	0.7534
Developed Runoff Coefficient (Cd)	0.8282
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	1.9629
Burned Peak Flow Rate (cfs)	2.0874
24-Hr Clear Runoff Volume (ac-ft)	0.3427
24-Hr Clear Runoff Volume (cu-ft)	14929.8142



Peak Flow Hydrologic Analysis

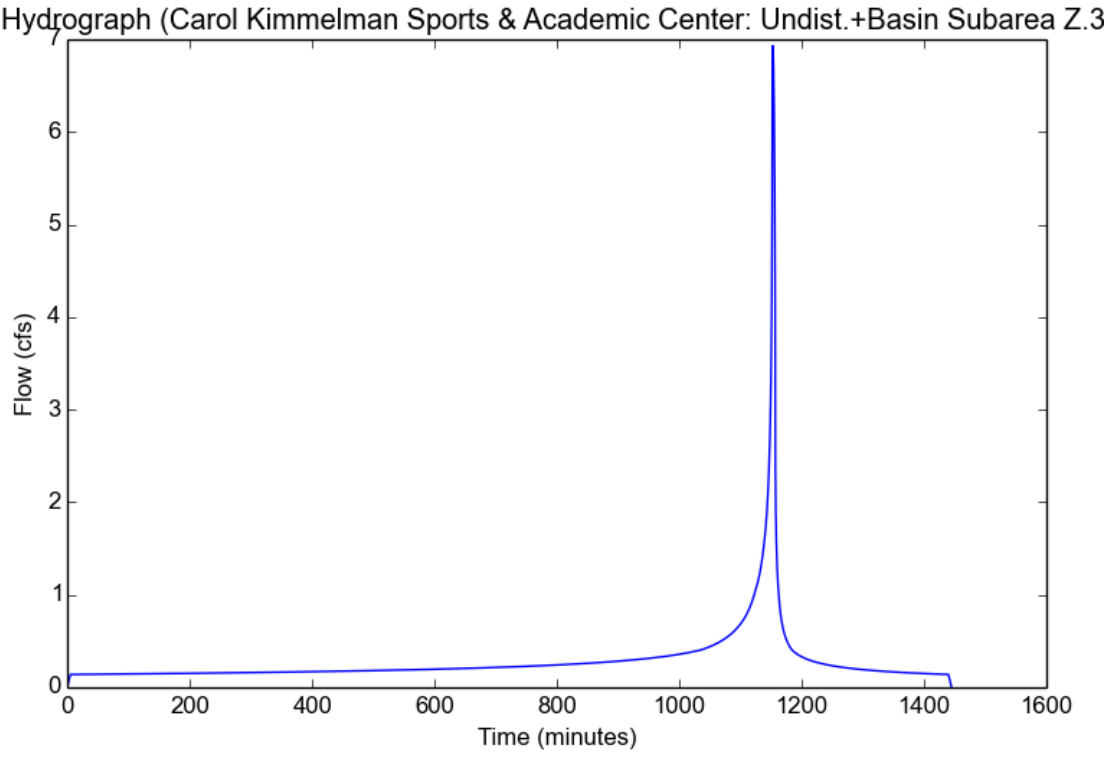
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Undisturbed
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Undist.+Basin Subarea Z.3
Area (ac)	2.1
Flow Path Length (ft)	295.0
Flow Path Slope (vft/hft)	0.027
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.48
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.6991
Undeveloped Runoff Coefficient (Cu)	0.8852
Developed Runoff Coefficient (Cd)	0.8923
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.9316
Burned Peak Flow Rate (cfs)	7.2146
24-Hr Clear Runoff Volume (ac-ft)	0.5784
24-Hr Clear Runoff Volume (cu-ft)	25193.9637



Peak Flow Hydrologic Analysis

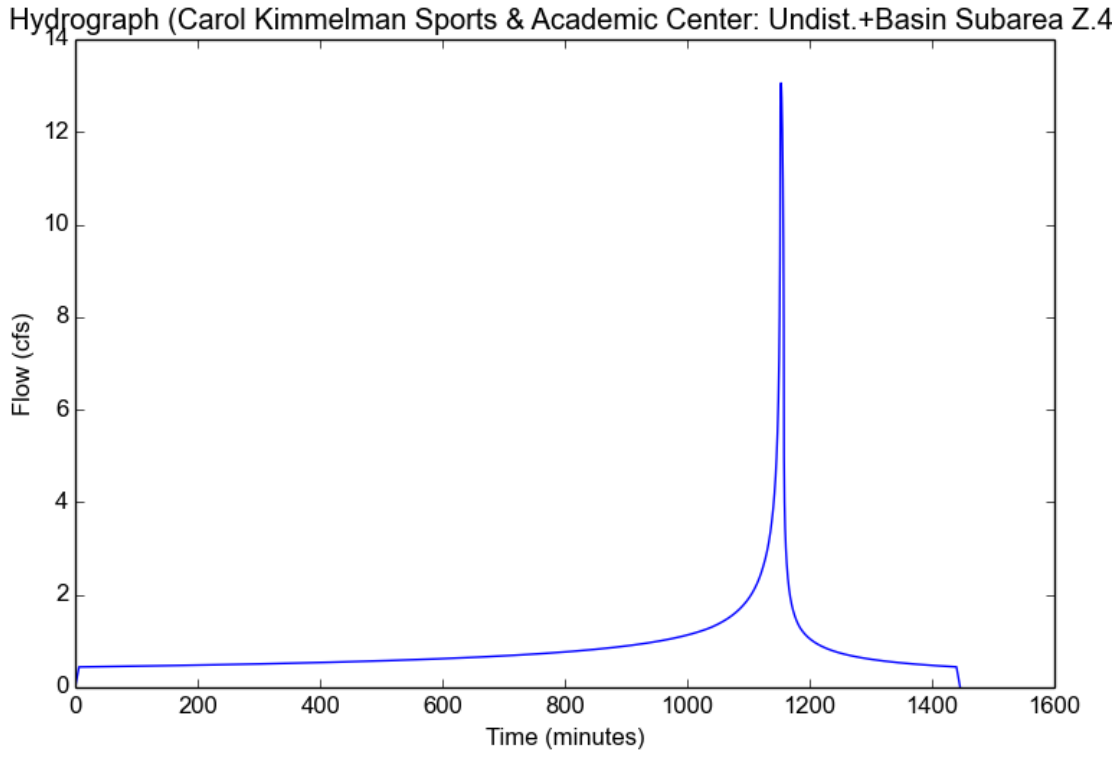
File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Undisturbed
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Undist.+Basin Subarea Z.4
Area (ac)	4.3
Flow Path Length (ft)	497.0
Flow Path Slope (vft/hft)	0.012
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.81
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	3.3953
Undeveloped Runoff Coefficient (Cu)	0.8697
Developed Runoff Coefficient (Cd)	0.8942
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	13.0557
Burned Peak Flow Rate (cfs)	13.5714
24-Hr Clear Runoff Volume (ac-ft)	1.6911
24-Hr Clear Runoff Volume (cu-ft)	73664.0683



Peak Flow Hydrologic Analysis

File location: //langan.com/data/IRV/data4/700060401/Project Data/_Discipline/Site Civil/Reports/Hydrology/Calculations/HydroCalc Exports/Undisturbed
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Carol Kimmelman Sports & Academic Center
Subarea ID	Undist.+Basin Subarea Z.5
Area (ac)	7.4
Flow Path Length (ft)	1304.0
Flow Path Slope (vft/hft)	0.017
50-yr Rainfall Depth (in)	6.2
Percent Impervious	0.58
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	coastal
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.2
Peak Intensity (in/hr)	2.4513
Undeveloped Runoff Coefficient (Cu)	0.8055
Developed Runoff Coefficient (Cd)	0.8603
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	15.606
Burned Peak Flow Rate (cfs)	16.4097
24-Hr Clear Runoff Volume (ac-ft)	2.3008
24-Hr Clear Runoff Volume (cu-ft)	100224.4776