Appendix IS-5

Hydrology and Water Quality Report

HYDROLOGY AND WATER QUALITY REPORT
ANGELS LANDING MIXED-USE PROJECT

361 S HILL STREET, LOS ANGELES

DATE: MARCH 20, 2019

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Table of Contents

Appendix

1. INTRODUCTION

1.1. PROJECT DESCRIPTION

The Angels Landing Project (Project) is a new mixed-use development proposed on a 97,631-square-foot (2.24-acre) site located at 332, 350, and 358 South Olive Street/351 and 361 South Hill Street/417 and 425 West 4th Street (Project Site) in the Central City Community Plan area of the City of Los Angeles (City). The Project Site is within the boundaries of the former Community Redevelopment Agency (CRA) Bunker Hill Urban Renewal Project (also known as the Bunker Hill Redevelopment Project). The CRA redevelopment plan identified the Project Site together with the Angels Flight parcel as Bunker Hill Parcel Y1. The City adopted the Bunker Hill Specific Plan in 2013 to refine and replace the regulations of the prior redevelopment plan. The Bunker Hill Specific Plan area generally comprises the same area established by the Bunker Hill Redevelopment Project and the Project Site and Angels Flight parcel are also identified collectively as Parcel Y1 in the Bunker Hill Specific Plan.

The Project is a new mixed-use development that includes an integrated mix of residential, hospitality, civic, educational, and commercial uses. Specifically, the Project proposes 180 residential for-sale condominium units, 261 residential apartments (including a mix of market rate and affordable units), two hotels with a combined total of 509 guest rooms and ancillary food and beverage spaces, 38,977 square feet of educational/cultural/civic uses, and 36,515 square feet of commercial space. The Project would also provide private and public open spaces totaling 56,881 square feet. The Project would result in up to 1,269,150 square feet of floor area on an approximately 2.24-acre site with a maximum floor area ratio (FAR) of up to 13:1.

The proposed uses would be provided in two towers (referred to as Tower A and Tower B). Tower A would include 64 floors with a building height of up to 854 feet. Tower B would include 42 floors with a building height of up to 494 feet. Tower A and Tower B would be built over a seven-level subterranean parking garage up to a depth of 84 feet. The existing Los Angeles County Metropolitan Transportation Authority (Metro) Pershing Square Station portal would be maintained on-site. The Project would require the removal of existing landscaping and the excavation and export of approximately 590,000 cubic yards of soil.

The Project would provide up to 750 parking spaces to support the proposed uses. Parking would be provided in seven subterranean parking levels and in one partially subterranean parking level. The Project would provide a variety of open space totaling approximately 56,881 square feet.

1.2. SCOPE OF WORK

This report provides a description of the existing surface water hydrology, surface water quality, groundwater level, and groundwater quality at the Project Site. It also analyzes the Project's potential impacts related to surface water hydrology, surface water quality, groundwater level, and groundwater quality.

2. REGULATORY FRAMEWORK

2.1. SURFACE WATER HYDROLOGY

County of Los Angeles Hydrology Manual

Per the City of Los Angeles (City) Special Order No. 007-1299, December 3, 1999, the City has adopted the Los Angeles County (County) Department of Public Works Hydrology Manual as its basis of design for storm drainage facilities. The Hydrology Manual requires that a storm drain conveyance system be designed for a 25-year storm event and that the combined capacity of a storm drain and street flow system accommodate flow from a 50-year storm event. Areas with sump conditions are required to have a storm drain conveyance system capable of conveying flow from a 50-year storm event.[1] The County also limits the allowable discharge into existing storm drain facilities based on the municipal separate storm sewer systems (MS4) Permit, which is enforced on all new developments that discharge directly into the County's storm drain system. Any proposed drainage improvements of County owned storm drain facilities such as catch basins and storm drain lines require approval/review from the County Flood Control District department.

Los Angeles Municipal Code

Any proposed drainage improvements within the street right of way or any other property owned by, to be owned by, or under the control of the City requires the approval of a B-permit (Section 62.105, Los Angeles Municipal Code (LAMC)). Under the B-permit process, storm drain installation plans are subject to review and approval by the City of Los Angeles Department of Public Works, Bureau of Engineering. Additionally, any connections to the City's storm drain system from a property line to a catch basin or a storm drain pipe requires a storm drain permit from the City of Los Angeles Department of Public Works, Bureau of Engineering.

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1 Los Angeles County Department of Public Works Hydrology Manual, January 2006, http://ladpw.org/wrd/publication/index.cfm, accessed May 16, 2018.

2.2. Surface Water Quality

Clean Water Act

The Clean Water Act was first introduced in 1948 as the Water Pollution Control Act. The Clean Water Act authorizes Federal, state, and local entities to cooperatively create comprehensive programs for eliminating or reducing the pollution of state waters and tributaries. The primary goals of the Clean Water Act are to restore and maintain the chemical, physical, and biological integrity of the nation's waters and to make all surface waters fishable and swimmable. As such, the Clean Water Act forms the basic national framework for the management of water quality and the control of pollutant discharges. The Clean Water Act also sets forth a number of objectives in order to achieve the above-mentioned goals. These objectives include regulating pollutant and toxic pollutant discharges; providing for water quality that protects and fosters the propagation of fish, shellfish and wildlife; developing waste treatment management plans; and developing and implementing programs for the control of non-point sources of pollution.[2]

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

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

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[2] Non-point sources of pollution are carried through the environment via elements such as wind, rain, or stormwater and are generated by diffuse land use activities (such as runoff from streets and sidewalks or agricultural activities) rather than from an identifiable or discrete facility.

[3] A small municipal separate storm sewer system (MS4) is any MS4 not already covered by the Phase I program as a medium or large MS4. The Phase II Rule automatically covers on a nationwide basis all small MS4s located in "urbanized areas" as defined by the Bureau of the Census (unless waived by the NPDES permitting authority), and on a case-by-case basis those small MS4s located outside of urbanized areas that the NPDES permitting authority designates.

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

In California, the NPDES stormwater permitting program is administered by the State Water Resources Control Board (SWRCB). The SWRCB was created by the Legislature in 1967. The joint authority of water distribution and water quality protection allows the Board to provide protection for the State's waters, through its nine Regional Water Quality Control Boards (RWQCBs). The RWQCBs develop and enforce water quality objectives and implement plans that will best protect California's waters, acknowledging areas of different climate, topography, geology, and hydrology. The RWQCBs develop "basin plans" for their hydrologic areas, issue waste discharge requirements, enforce action against stormwater discharge violators, and monitor water quality.[4]

Federal Anti-Degradation Policy

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

California Porter-Cologne Act

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

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

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[4] USEPA. U.S. Environmental Protection Agency - Clean Water Act. July 2011. <http://www.epa.gov/lawsregs/laws/cwa.html>.

California Anti-Degradation Policy

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

California Toxic Rule

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

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

As required by the California Water Code, the LARWQCB has adopted a plan entitled "Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties" (Basin Plan). Specifically, the Basin Plan designates beneficial uses for surface and groundwaters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's anti-degradation policy, and describes implementation programs to protect all waters in the Los Angeles Region. In addition, the Basin Plan incorporates (by reference) all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. Those of other agencies are referenced in appropriate sections throughout the Basin Plan.[5]

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

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[5] Los Angeles Regional Water Quality Control Board. LARWQCB Basin Plan. <http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/> accessed May 16, 2018.

NPDES Permit Program

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

The General Permit

SWRCB Order No. 2012-0006-DWQ known as "The General Permit" was adopted on July 17, 2012. This NPDES permit establishes a risk-based approach to stormwater control requirements for construction projects by identifying three project risk levels. The main objectives of the General Permit are to:

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

California mandates requirements for all construction activities disturbing more than one acre of land to develop and implement Stormwater Pollution Prevention Plans (SWPPP). The SWPPP documents the selection and implementation of Best Management Practices (BMPs) for a specific construction project, charging owners with stormwater quality management responsibilities. A construction site subject to the General Permit must prepare and implement a SWPPP that meets the requirements of the General Permit.[6, 7]

Los Angeles County Municipal Storm Water System (MS4) Permit

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

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6 State Water Resources Control Board. State Water Resources Control Board. July 2012, http://www.swrcb.ca.gov/water_issues/programs/npdes/.

7 USEPA. U.S. Environmental Protection Agency - NPDES. July 2012, https://www.epa.gov/npdes.

On November 8, 2012, the LARWQCB adopted Order No. R4-2012-0175 under the CWA and the Porter-Cologne Act. This Order is the NPDES permit or MS4 permit for municipal stormwater and urban runoff discharges within Los Angeles County. The requirements of this Order (the "Permit") cover 84 cities and most of the unincorporated areas of Los Angeles County. Under the Permit, the Los Angeles County Flood Control District (LACFCD) is designated as the Principal Permittee. The Permittees are the 84 Los Angeles County cities (including the City of Los Angeles) and Los Angeles County. Collectively, these are the "Co-Permittees". The Principal Permittee helps to facilitate activities necessary to comply with the requirements outlined in the Permit but is not responsible for ensuring compliance of any of the Permittees.

Stormwater Quality Management Program (SQMP)

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

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

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

1. General Requirements:
    - Each permittee is required to implement the SQMP in order to comply with applicable stormwater program requirements.
    - The SQMP shall be implemented and each permittee shall implement additional controls so that discharge of pollutants is reduced.
2. Best Management Practice Implementation:

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

3. Revision of the SQMP:

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

4. Designation and Responsibilities of the Principal Permittee:

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

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

5. Responsibilities of Co-Permittees:

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

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

6. Watershed Management Committees (WMCs):

- Each WMC shall be comprised of a voting representative from each Permittee in the Watershed Management Area (WMA).

- Each WMC is required to facilitate exchange of information between co-permittees, establish goals and deadlines for WMAs, prioritize pollution control measures, develop and update adequate information, and recommend appropriate revisions to the SQMP.

7. Legal Authority:

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

City of Los Angeles Water Quality Compliance Master Plan for Urban Runoff

On March 2, 2007, City Council Motion 07-0663 was introduced by the City of Los Angeles City Council to develop a water quality master plan with strategic directions for planning, budgeting and funding to reduce pollution from urban runoff in the City of Los Angeles. The Water Quality Compliance Master Plan for Urban Runoff was developed by the Bureau of Sanitation, Watershed Protection Division in collaboration with stakeholders to address the requirements of this Council Motion. The primary goal of the Water Quality Compliance Master Plan for Urban Runoff is to help meet water quality regulations. Implementation of the Water Quality Compliance Master Plan for Urban Runoff is intended over the next 20 to 30 years to result in cleaner neighborhoods, rivers, lakes and bays, augmented local water supply, reduced flood risk, more open space, and beaches that are safe for swimming. The Water Quality Compliance Master Plan for Urban Runoff also supports the Mayor and Council's efforts to make Los Angeles the greenest major city in the nation.

- The Water Quality Compliance Master Plan for Urban Runoff identifies and describes the various watersheds in the City, summarizes the water quality conditions of the City's waters, identifies known sources of pollutants, describes the governing regulations for water quality, describes the BMPs that are being implemented by the City, discusses existing TMDL Implementation Plans and Watershed Management Plans. Additionally, the Water Quality Compliance Master Plan for Urban Runoff provides an implementation strategy that includes the following three initiatives to achieve water quality goals:

- Water Quality Management Initiative, which describes how Water Quality Management Plans for each of the City's watershed and TMDL-specific Implementation Plans will be developed to ensure compliance with water quality regulations.

- The Citywide Collaboration Initiative, which recognizes that urban runoff management and urban (re)development are closely linked, requiring collaborations of many City agencies. This initiative requires the development of

City policies, guidelines, and ordinances for green and sustainable approaches for urban runoff management.

- The Outreach Initiative, which promotes public education and community engagement with a focus on preventing urban runoff pollution.

- The Water Quality Compliance Master Plan for Urban Runoff includes a financial plan that provides a review of current sources of revenue, estimates costs for water quality compliance, and identifies new potential sources of revenue.

City of Los Angeles Stormwater Program

The City of Los Angeles supports the policies of the Construction General Permit and the Los Angeles County NPDES permit through the *Development Best Management Practices Handbook. Part A Construction Activities*, 3rd Edition, and associated ordinances were adopted in September 2004. *Part B Planning Activities*, 4th Edition was adopted in June 2011. The Handbook provides guidance for developers in complying with the requirements of the Development Planning Program regulations of the City's Stormwater Program. Compliance with the requirements of this manual is required by City of Los Angeles Ordinance No. 173,494. The handbook and ordinances also have specific minimum BMP requirements for all construction activities and require dischargers whose construction projects disturb one acre or more of soil to prepare a SWPPP and file a Notice of Intent (NOI) with the SWRCB. The NOI informs the SWRCB of a particular project and results in the issuance of a Waste Discharger Identification (WDID) number, which is needed to demonstrate compliance with the General Permit.

The City of Los Angeles implements the requirement to incorporate stormwater BMPs through the City's plan review and approval process. During the review process, project plans are reviewed for compliance with the City's General Plan, zoning ordinances, and other applicable local ordinances and codes, including storm water requirements. Plans and specifications are reviewed to ensure that the appropriate BMPs are incorporated to address storm water pollution prevention goals. The Standard Urban Stormwater Mitigation Plan (SUSMP) provisions that are applicable to new residential and commercial developments include, but are not limited to, the following:[8]

- Peak Storm Water Runoff Discharge Rate: Post-development peak storm water runoff discharge rates shall not exceed the estimated pre-development rate for developments where the increased peak storm water discharge rate will result in increased potential for downstream erosion;

- Provide storm drain system Stenciling and Signage (only applicable if a catch basin is built on-site);

8 City of Los Angeles Stormwater Program website, http://www.lastormwater.org/green-la/standard-urban-stormwater-mitigation-plan/; accessed May 16, 2018.

- Properly design outdoor material storage areas to provide secondary containment to prevent spills;
- Properly design trash storage areas to prevent off-site transport of trash;
- Provide proof of ongoing BMP Maintenance of any structural BMPs installed;
- Conserve natural and landscaped areas;
- Provide planter boxes and/or landscaped areas in yard/courtyard spaces;

Design Standards for Structural or Treatment Control BMPs:

- Post-construction treatment control BMPs are required to incorporate, at minimum, either a volumetric or flow based treatment control design or both, to mitigate (infiltrate, filter or treat) storm water runoff.

In addition, project applicants subject to the SUSMP requirements must select source control and, in most cases, treatment control BMPs from the list approved by the RWQCB. The BMPs must control peak flow discharge to provide stream channel and over bank flood protection, based on flow design criteria selected by the local agency. Further, the source and treatment control BMPs must be sufficiently designed and constructed to collectively treat, infiltrate, or filter stormwater runoff from one of the following:

- The 85th percentile 24-hour runoff event determined as the maximized capture stormwater volume for the area, from the formula recommended in *Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998)*;
- The volume of annual runoff based on unit basin storage water quality volume, to achieve 80 percent or more volume treatment by the method recommended in *California Stormwater Best Management Practices Handbook—Industrial/ Commercial, (1993)*;
- The volume of runoff produced from a 0.75-inch storm event, prior to its discharge to a stormwater conveyance system; or
- The volume of runoff produced from a historical-record based reference 24-hour rainfall criterion for "treatment" (0.75-inch average for the Los Angeles County area) that achieves approximately the same reduction in pollutant loads achieved by the 85th percentile 24-hour runoff event.

Los Angeles Municipal Code

Section 64.70 of the LAMC sets forth the City's Stormwater and Urban Runoff Pollution Control Ordinance. The ordinance prohibits the discharge of the following into any storm drain system:

- Any liquids, solids, or gases which by reason of their nature or quantity are flammable, reactive, explosive, corrosive, or radioactive, or by interaction with other materials could result in fire, explosion or injury.

- Any solid or viscous materials, which could cause obstruction to the flow or operation of the storm drain system.

- Any pollutant that injures or constitutes a hazard to human, animal, plant, or fish life, or creates a public nuisance.

- Any noxious or malodorous liquid, gas, or solid in sufficient quantity, either singly or by interaction with other materials, which creates a public nuisance, hazard to life, or inhibits authorized entry of any person into the storm drain system.

- Any medical, infectious, toxic or hazardous material or waste.

Additionally, unless otherwise permitted by a NPDES permit, the ordinance prohibits industrial and commercial developments from discharging untreated wastewater or untreated runoff into the storm drain system. Furthermore, the ordinance prohibits trash or any other abandoned objects/materials from being deposited such that they could be carried into the storm drains. Lastly, the ordinance not only makes it a crime to discharge pollutants into the storm drain system and imposes fines on violators, but also gives City public officers the authority to issue citations or arrest business owners or residents who deliberately and knowingly dump or discharge hazardous chemicals or debris into the storm drain system.

Earthwork activities, including grading, are governed by the Los Angeles Building Code, which is contained in LAMC, Chapter IX, Article 1. Specifically, Section 91.7013 includes regulations pertaining to erosion control and drainage devices, and Section 91.7014 includes general construction requirements, as well as requirements regarding flood and mudflow protection.

Low Impact Development (LID)

In October 2011, the City of Los Angeles passed an ordinance (Ordinance No. 181899) amending LAMC Chapter VI, Article 4.4, Sections 64.70.01 and 64.72 to expand the applicability of the existing SUSMP requirements by imposing rainwater Low Impact Development (LID) strategies on projects that require building permits. The LID ordinance became effective on May 12, 2012.

LID is a stormwater management strategy with goals to mitigate the impacts of increased runoff and stormwater pollution as close to its source as possible. LID promotes the use of natural infiltration systems, evapotranspiration, and the reuse of stormwater. The goal of these LID practices is to remove nutrients, bacteria, and metals from stormwater while also reducing the quantity and intensity of stormwater flows. Through the use of various infiltration strategies, LID is aimed at minimizing impervious surface area. Where infiltration is not feasible, the use of bioretention, rain gardens, green roofs, and rain barrels that will store, evaporate, detain, and/or treat runoff may be used. [9]

The intent of the City of Los Angeles LID standards is to:

- Require the use of LID practices in future developments and redevelopments to encourage the beneficial use of rainwater and urban runoff;
- Reduce stormwater/urban runoff while improving water quality;
- Promote rainwater harvesting;
- Reduce offsite runoff and provide increased groundwater recharge;
- Reduce erosion and hydrologic impacts downstream; and
- Enhance the recreational and aesthetic values in our communities.

The City of Los Angeles Bureau of Sanitation, Watershed Protection Division will adopt the LID standards as issued by the LARWQCB and the City of Los Angeles Department of Public Works. The LID Ordinance will conform to the regulations outlined in the NPDES Permit and SUSMP.

2.3. GROUNDWATER

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

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

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

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[9] City of Los Angeles. "Development Best Management Practices Handbook." June, 2011

Safe Drinking Water Act (SDWA)

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

California Water Plan

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

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

3. ENVIRONMENTAL SETTING

3.1. SURFACE WATER HYDROLOGY

3.1.1. REGIONAL

As illustrated on Figure 6, the Project Site is located within the Los Angeles River Watershed Reach 2 (from Carson to Figueroa Street) in the Los Angeles Basin. The Watershed encompasses an area of approximately 834 square miles and is bounded, at its headwaters, by the Santa Monica, Santa Susana, and San Gabriel mountains to the north and west. The southern portion of the Watershed captures runoff from urbanized areas surrounding downtown Los Angeles. Jurisdictions in the Watershed include the City of Los Angeles (33%), 42 other cities (29%), and eight agencies (37%). The 55-mile long Los Angeles River originates in western San Fernando Valley and flows through the central portion of the city south to San Pedro Bay near Long Beach. Most portions of the Los Angeles River are completely channelized for flood protection, as are many of its tributaries including Compton Creek, Rio Hondo, Arroyo Seco, and Tujunga Wash. They are fed by a complex underground network of storm drains and a surface network of tributaries.

3.1.2. LOCAL

Based on the existing conditions, the Project Site is divided into three drainage areas, which are described further below. Drainage from Area A surface flows to a catch basin located at south east side of the property which then is discharge through the curb face on S. Hill Street. Drainage from Area B is directed by sheet flow to S. Hill Street. Drainage from Area C, the Pershing Square Metro Station, is directed via subterranean drainage to an underground storm drain pipe in S. Hill Street.

Offsite underground storm drainage facilities in the Project vicinity consist of a storm drain pipe that starts as a 22-inch pipe upstream to 15-inch to 24-inch storm pipe downstream located along S. Hill Street. Along S. Olive Street, one 24-inch storm drain pipe runs from north to south towards 4th Street. The 24-inch storm drain continues along W. 4th Street, running west to east towards Hill Street. All these underground pipes are owned and maintained by the City of Los Angeles. Stormwater runoff from the Project Site is discharged into offsite storm drainage catch basins and underground storm drainage pipes which convey stormwater through various underground pipe networks into the Los Angeles River. The Los Angeles River flows generally east and south, ultimately discharging into the Pacific Ocean at the San Pedro Bay. Based on input received from the City of Los Angeles, Street and Stormwater Division, there is no record of complaints for flooding or storm drain capacity issues in the Project vicinity.

3.1.3. ON SITE

As noted above and shown in Figure 1, the Project Site as observed in the existing conditions has been divided into three drainage areas.[10] These drainage areas are determined by the drainage patterns and flow paths of stormwater that are tributary to a common point or area.

The existing Project Site is currently occupied with a grass covered parcel, small paved area, and a metro station entrance. The drainage from the grass portion of the site sheet flows from east to west down the sloped surface and is collected by a concrete swale where runoff flows to an on-site grate inlet catch basin. The catch basin is then connected to an underground storm drain pipe that discharges through the curb face where the drainage is conveyed to a catch basin on Hill Street. The paved area runoff sheet flows to Hill Street where it is conveyed to catch basins on Hill Street located near the intersection of Hill and 4th. The drainage from the metro station entrance collects internally and drains to underground storm drain system in Hill Street. As noted above, the surface drainage along Hill Street flows south. Refer to Figure 1 for existing on-site drainage pattern.

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[10] The drainage areas tributary to each discharge point or area were determined from a topographical survey and site observations.

The existing Project Site is 20% impervious, consisting of the metro station entrance structure and impervious pavements for pedestrian and vehicular circulation. A summary of existing imperviousness conditions is found in Table 1 below.

Generally, the portion of the Project Site occupied by the landscaped park slopes downward from north to south by 60 feet. The eastern portion of the Project Site occupied by the paved area slopes downward from west to east by approximately 1.5 foot towards Hill Street. Figure 1 illustrates the existing on-site drainage pattern.

Figure 3 shows all the input parameters used for analyzing the existing site. Table 1 shows the existing volumetric flow rate generated by a 50-year storm event for all three drainage areas combined.

Table 1- Existing Onsite Drainage Stormwater Runoff Calculations

Drainage Area	Area (Acres)	Percent Imperviousness (%)	Q50 (cfs) (volumetric flow rate measured in cubic feet per second)
Total Site	2.26	20	6.89

3.2. Surface Water Quality

3.2.1. Regional

As stated above, the Project Site lies within the Los Angeles River Watershed Reach 2. Constituents of concern listed for the Los Angeles River Reach 2 under California's Clean Water Act Section 303(d) List include cadmium (sediment), copper (dissolved), lead, selenium, zinc, E. Coli, and trash.[11]

3.2.2. Local

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

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11 USEPA, Waterbody Quality Assessment Report, 2012 Waterbody Report for Los Angeles River Reach 2 (Carson to Figueroa Street), https://iaspub.epa.gov/waters10/attains_waterbody.control?p_au_id=CAR4051501019990202085021&p_cycle=2012&p_state=CA&p_report_type=; accessed May 16, 2018.

basins with screens to capture debris before entering the storm drain system. In addition, the City conducts routine street cleaning operations, as well as periodic cleaning and maintenance of catch basins, to reduce stormwater pollution within the City.

3.2.3. On Site

Based on a site investigation, it appears the Project Site currently does not implement Best Management Practices (BMPs) and apparently has no means of water quality treatment for stormwater runoff. As stated above, the drainage from the grass portion of the site sheet flows from east to west down the sloped surface and is collected by a concrete swale where runoff flows to an on-site grate inlet catch basin. The catch basin is then connected to an underground storm drain pipe that discharges through the curb face where the drainage is conveyed to a catch basin on Hill Street. The paved area runoff sheet flows to Hill Street where it is conveyed to catch basins on Hill Street located near the intersection of Hill and 4th. The drainage from the metro station entrance collects internally and drains to underground storm drain system in Hill Street. As noted above, the surface drainage along Hill Street flows south. Refer to Figure 1 for existing on-site drainage pattern. Refer to Figure 1 for existing on-site drainage pattern.

3.3. Groundwater Hydrology

3.3.1. Regional

Groundwater use for domestic water supply is a major beneficial use of groundwater basins in Los Angeles County. The City of Los Angeles overlies the Los Angeles Coastal Plain Groundwater Basin (Basin). The Basin is comprised of the Hollywood, Santa Monica, Central, and West Coast Subbasins. Groundwater flow in the Basin is generally south-southwesterly and may be restricted by natural geological features. Replenishment of groundwater basins occurs mainly by percolation of precipitation throughout the region via permeable surfaces, spreading grounds, and groundwater migration from adjacent basins, as well as injection wells designed to pump freshwater along specific seawater barriers to prevent the intrusion of salt water.

3.3.2. Local

Within the Basin, the Project Site specifically overlies the Central Subbasin (Subbasin), which underlies the southeastern portion of the Basin. The Subbasin occupies a large portion of the southeastern part of the Coastal Plain of Los Angeles Groundwater Basin. This subbasin is commonly referred to as the “Central Basin” and is bounded on the north by a surface divide called the La Brea high, and on the northeast and east by emergent less permeable Tertiary rocks of the Elysian, Repetto, Merced and Puente Hills. The southeast boundary between Central Basin and Orange County Groundwater Basin roughly follows Coyote Creek, which is a regional drainage province boundary. The southwest boundary is formed by the Newport Inglewood fault system and the associated folded rocks of the Newport Inglewood uplift.[12]

Groundwater enters the Central Basin through surface and subsurface flow and by direct percolation of precipitation, stream flow, and applied water; and replenishes the aquifers dominantly in the forebay areas where permeable sediments are exposed at ground surface (DWR 1961). Natural replenishment of the subbasin's groundwater supply is largely from surface inflow through Whittier Narrows (and some underflow) from the San Gabriel Valley. Imported water purchased from Metropolitan Water District and recycled water from Whittier and San Jose Treatment Plants are used for artificial recharge in the Montebello Forebay at the Rio Hondo and San Gabriel River spreading grounds (DWR 1999).

The Watermaster reported natural recharge for the subbasin to be 31,950 af and artificial recharge to be 63,688 af for 1998 (DWR 1999). Additionally, the subbasin receives 27,000 af/yr of water through the Whittier Narrows from the San Gabriel Valley Basin in the form of subsurface flow (SWRB 1952). Urban extractions for the subbasin were 204,335 af in 1998 (DWR 1999).

The Project Site is located toward the northeastern portion of the Subbasin.

3.3.3. On-Site

Geotechnical reporting of the existing Angels Landing Site was performed by Wood Environment & Infrastructure Solutions, Inc. dated March 11 and 15, 2019. Exploratory borings showed that groundwater was encountered in borings at 270 feet below grade on the upper portion of the site. In prior reports by LeRoy Crandall and Associates, dated May 9, 1988 and supplemental studies dated December 2, 1988, seepage was encountered at depths of 47 and 63 feet within the bedrock. The localized seepage indicates a perched groundwater condition that most likely fluctuates with seasonal precipitation.

In addition, County Department of Public Works reports no existing groundwater production wells within the Project Site.[13]

3.4. Groundwater Quality

3.4.1. Regional

As stated above, the City of Los Angeles overlies the Los Angeles Coastal Plain Groundwater Basin, which falls under the jurisdiction of the Los Angeles Regional Water Quality Control Board (LARWQCB). According to LARWQCB's Basin Plan, objectives

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12 http://www.water.ca.gov/groundwater/bulletin118/basindescriptions/4-11.04.pdf

13 County of Los Angeles Department of Public Works http://dpw.lacounty.gov/general/wells/, accessed June 20, 2018.

applying to all ground waters of the region include bacteria, chemical constituents and radioactivity, mineral quality, nitrogen (nitrate, nitrite), and taste and odor.[14]

3.4.2. Local

As stated above, the Project Site specifically overlies the Central Subbasin. Based upon LARWQCB's Basin Plan, constituents of concern listed for the Central Subbasin include boron, chloride, sulfate, Total Dissolved Solids (TDS), and nitrate.[15]

3.4.3. On-Site

The existing Project Site is 80% pervious. The proposed development's pervious areas would all be above structure, so there would be minimal percolation of surface water into the groundwater. Per geotechnical reporting of the existing Angels Landing Site performed by Wood Environment & Infrastructure Solutions, Inc. dated March 11 and 15, 2019, the site is in the Bunker Hill area of Downtown Los Angeles and is outside the areal limits of valley fill sediments that constitute the principal water-bearing units; therefore, the site is not considered to be within the regional groundwater basin. Although the bedrock of the Fernando formation is considered non-water bearing, perched groundwater may be present locally in fractures and along bedding planes in the bedrock. Localized seepage within the wedge of alluvium overlying bedrock is representative of a perched groundwater condition that probably fluctuates with seasonal precipitation. The bedrock beneath the site is not considered water bearing.

4. SIGNIFICANCE THRESHOLDS

4.1. Surface Water Hydrology And Quality

Appendix G of the State of California's 2019 CEQA Guidelines provides a set of sample questions that address impacts with regard to surface water hydrology. These questions are as follows:

Would the project:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

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[14] Los Angeles Regional Water Quality Control Board, Basin Plan, March 2013, http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/electronics_documents/Final%20Chapter%203%20Text.pdf accessed May 16, 2018.

[15] Los Angeles Regional Water Quality Control Board, Basin Plan, March 2013, http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/electronics_documents/Final%20Chapter%203%20Text.pdf accessed May 16, 2018.

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

4.2. Groundwater Hydrology And Quality

Appendix G of the 2019 CEQA Guidelines provides a sample question that addresses impacts with regard to groundwater. This question is as follows:

Would the project:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

5. METHODOLOGY

5.1. Surface Water hydrology

The Project Site is located within the City of Los Angeles, and drainage collection, treatment and conveyance are regulated by the City. Per the City's Special Order No. 007-

1299, December 3, 1999, the City has adopted the Los Angeles County Department of Public Works (LACDPW) Hydrology Manual as its basis of design for storm drainage facilities. The LACDPW Hydrology Manual requires projects to have drainage facilities that meet the Urban Flood level of protection. The Urban Flood is runoff from a 25-year frequency design storm falling on a saturated watershed. A 25-year frequency design storm has a probability of 1/25 of being equaled or exceeded in any year. The *L.A. CEQA Thresholds Guide*, however, establishes the 50-year frequency design storm event as the threshold to analyze potential impacts on surface water hydrology as a result of development. To provide a more conservative analysis, this report analyzes the larger storm event threshold, i.e., the 50-year frequency design storm event.

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

Where,

Q = Volumetric flow rate (cfs)

C = Runoff coefficient (dimensionless)

I = Rainfall Intensity at a given point in time (in/hr)

A = Basin area (acres)

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

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

LACDPW has developed a time of concentration calculator, Hydrocalc, to automate time of concentration calculations as well as the peak runoff rates and volumes using the Modified Rational Method design criteria as outlined in the Hydrology Manual. The data input requirements include: sub-area size, soil type, land use, flow path length, flow path slope and rainfall isohyet. The Hydrocalc Calculator was used to calculate the storm water peak runoff flow rate for the Project conditions by evaluating an individual sub-area independent of all adjacent subareas. See Figures 3 and 4 for the Hydrocalc Calculator results and Figure 5 for the Isohyet Map.

5.2. Surface Water Quality

5.2.1. Construction

Construction BMPs will be designed and maintained as part of the implementation of the local SWPPP (Erosion Control Plan) in compliance with the General Permit. The Erosion Control Plan shall be implemented when construction commences and, before any site clearing or demolition activity. During construction, the Erosion Control Plan will be referred to regularly and amended as changes occur throughout the construction process.

5.2.2. Operation

The Project will meet the requirements of the City's LID standards.[18] Under section 3.1.3. of the LID Manual, post-construction stormwater runoff from a new development must be infiltrated, evapotranspirated, captured and used, and/or treated through high efficiency BMPs onsite for at least the volume of water produced by the greater of the 85th percentile storm or the 0.75 inch storm event. The LID Manual prioritized the selection of BMPs used to comply with stormwater mitigation requirement. The order of priority is:

1. Infiltration Systems
2. Stormwater Capture and Use
3. High Efficient Biofiltration/Bioretention Systems
4. Combination of Any of the Above

The Project Site is located within a liquefaction and landslide zone, as specified by the Department of City Planning's Zone of Information and Map Access System, see Figure 9. It is infeasible to infiltrate within these zones per the City's LID standards. Thus, a stormwater capture and use system and/or a bio-infiltration system will be the BMP used.

5.3. Groundwater

The significance of this Project as it relates to the level of the underlying groundwater table of the Central Groundwater Basin included a review of the following considerations:

Project Design Features

Per the LID Manual requirements governing the Project stormwater management, a capture and use system shall be sized to capture and store the design capture volume based on the runoff produced from the greater between the 85th percentile storm event and the 0.75-inch storm event. To meet these requirements, the Project proposes the installation of storm drains capturing the entire Project site runoff and storm pipes conveying the runoff towards

[18] The Development Best Management Practices Handbook, Part B Planning Activities, 4th edition was adopted by the City of Los Angeles, Board of Public Works on July 1, 2011 to reflect Low Impact Development (LID) requirements that took effect May 12, 2012.

the capture and use tank. The captured water will then be used for irrigation throughout the project site. Typical capture and use systems such as storage tank facilities are illustrated in Exhibit 2. Additionally, the Project would include the installation of a structural pretreatment unit prior to the runoff discharge into the storage tank system.

6. PROJECT IMPACT ANALYSIS

6.1. CONSTRUCTION

6.1.1. SURFACE WATER HYDROLOGY

Construction activities for the Project would include demolition of existing hardscape, excavating down approximately 110 feet from the ground surface at Hill Street and 170 feet from the ground surface at Olive Street for subterranean parking, building the mixed-used development building, and constructing hardscape and landscape around the building. It is anticipated that up to approximately 590,000 cubic yards of soil would be graded and exported to construct the Project. These activities have the potential to temporarily alter existing drainage patterns and flows on the Project Site by exposing the underlying soils, modifying flow direction, and making the Project Site temporarily more permeable. Also, exposed and stockpiled soils could be subject to erosion and conveyance into nearby storm drains during storm events. In addition, on-site watering activities to reduce airborne dust could contribute to pollutant loading in runoff.

However, as the construction site would be greater than one acre, the Project would be required to obtain coverage under the NPDES General Construction stormwater permit. In accordance with the requirements of this permit, the Project would implement a SWPPP that specifies BMPs and erosion control measures to be used during construction to manage runoff flows and prevent pollution. BMPs would be designed to reduce runoff and pollutant levels in runoff during construction. The NPDES and SWPPP measures are designed to (and would in fact) contain and treat, as necessary, stormwater or construction watering on the Project site so runoff does not impact off-site drainage facilities or receiving waters. Construction activities would be temporary, and flow directions and runoff volumes during construction would be controlled.

In addition, the Project would be required to comply with all applicable City grading permit regulations that require necessary measures, plans, and inspections to reduce sedimentation and erosion. Thus, through compliance with all NPDES General Construction Permit requirements, including preparation of a SWPPP, implementation of BMPs, and compliance with applicable City grading regulations, the Project would not substantially alter the Project Site drainage patterns in a manner that would result in substantial erosion, siltation, or flooding on- or off-site. Similarly, adherence to standard compliance measurements in construction activities would avoid flooding, substantially increasing or decreasing the amount of surface water flow from the Project Site into a water body, or a permanent, adverse change to the movement of surface water. As such, construction-related impacts to surface water hydrology would be less than significant.

6.1.2. SURFACE WATER QUALITY

Construction activities such as earth moving, maintenance/operation of construction equipment, potential dewatering, and handling/storage/disposal of materials could contribute to pollutant loading in stormwater runoff. However, as previously discussed, construction contractors disturbing greater than one acre of soil would be required to obtain coverage under the NPDES General Construction Permit (order No. 2009-0009-SWQ as well as its subsequent amendments 2010-0014-DWQ and 2012-0006-DWQ). In accordance with the requirements of the permit, the Project Applicants would prepare and implement a site-specific SWPPP adhering to the California Stormwater Quality Association (CASQA) BMP Handbook. The SWPPP would specify BMPs to be used during construction. BMPs would include, but would not necessarily be limited to: erosion control, sediment control, non-stormwater management, and materials management BMPs. Refer to Exhibit 1 for typical SWPPP BMPs implemented during the construction of development projects.

As discussed below, the Project may require dewatering during construction, due to the perched groundwater condition that fluctuates with seasonal precipitation. Dewatering operations are practices that discharge non-stormwater, such as ground water, that must be removed from a work location to proceed with construction into the drainage system. Discharges from dewatering operations can contain high levels of fine sediments, which if not properly treated, could lead to exceedance of the NPDES requirements. If groundwater is encountered during construction, temporary pumps and filtration would be utilized in compliance with the NPDES permit. The temporary system would comply with all relevant NPDES requirements related to construction and discharges from dewatering operations. If dewatering is required, the treatment and disposal of the dewatered water would occur in accordance with the requirements of LARWQCB's Waste Discharge Requirements for Discharges of Groundwater from Construction and Project Dewatering to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties.

With the implementation of site-specific BMPs included as part of the required Erosion Plan, the Project would reduce or eliminate the discharge of potential pollutants from the stormwater runoff. In addition, the Project Applicant would be required to comply with City grading permit regulations, which require necessary measures, plans (including a wet weather erosion control plan if construction occurs during the rainy season), and inspection to reduce sedimentation and erosion. Therefore, with compliance with NPDES requirements and City grading regulations, construction of the Project would not result in discharge that would cause: (1) pollution which would alter the quality of the water of the State (i.e. Los Angeles River) to a degree which unreasonably affects beneficial uses of the waters; (2) contamination of the quality of the water of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of diseases; or (3) nuisance that would be injurious to health; affect an entire community or neighborhood, or any considerable number of persons; and occurs during or as a result of the treatment or disposal of wastes. Furthermore, construction of the Project would not result in discharges that would cause regulatory standards to be violated in Los Angeles River. Therefore, temporary construction-related impacts on surface water quality would be less than significant.

6.1.3. Groundwater Hydrology

As stated above, construction activities for the Project would include excavating down approximately 110 feet from the ground surface at Hill Street and 170 feet from the ground surface at Olive Street for subterranean parking, building up the structure, and hardscape and landscape around the structure. As described in the geotechnical report of the existing Angels Landing Site performed by Wood Environment & Infrastructure Solutions, Inc. dated March 11 and 15, 2019. Exploratory borings showed that groundwater was encountered in borings at 270 feet below grade on the upper portion of the site. In prior reports by LeRoy Crandall and Associates, dated May 9, 1988 and supplemental studies dated December 2, 1988, seepage was encountered at depths of 47 and 63 feet within the bedrock. The localized seepage indicates a perched groundwater condition that most likely fluctuates with seasonal precipitation, therefore dewatering operations may be expected. If groundwater is encountered during construction, temporary pumps and filtration would be utilized in compliance all applicable regulations and requirements, including with all relevant NPDES requirements related to construction and discharges from dewatering operations. Therefore, the Project would result in less than significant impacts related to groundwater and would not substantially deplete groundwater supplies in a manner that would result in a net deficit in aquifer volume or lowering of the local groundwater table.

6.1.4. Groundwater Quality

As discussed above, the Project would include excavations to a maximum depth of approximately 110 feet from the ground surface at Hill Street and 170 feet from the ground surface at Olive Street. The Project would also result in a net export of existing soil material. Although not anticipated at the Project Site, any contaminated soils found would be captured within that volume of excavated material, removed from the Project Site, and remediated at an approved disposal facility in accordance with regulatory requirements.

During on-site grading and building construction, hazardous materials, such as fuels, paints, solvents, and concrete additives, could be used and would therefore require proper management and, in some cases, disposal. The management of any resultant hazardous wastes could increase the opportunity for hazardous materials releases into groundwater. Compliance with all applicable federal, state, and local requirements concerning the handling, storage and disposal of hazardous waste, would reduce the potential for the construction of the Project to release contaminants into groundwater that could affect existing contaminants, expand the area or increase the level of groundwater contamination, or cause a violation of regulatory water quality standards at an existing production well. In addition, as there are no groundwater production wells or public water supply wells within one mile of the Project Site [19], construction activities would not be anticipated to affect existing wells. Therefore, the Project would not result in any substantial increase in

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19 Los Angeles County Department of Public Works, Groundwater wells Data, http://dpw.lacounty.gov/general/wells/ accessed May 16, 2018.

groundwater contamination through hazardous materials releases and impacts on groundwater quality would be less than significant.

6.2. Operation

6.2.1. Surface Water Hydrology

The Project will increase the percentage of impervious area compared to what currently exists at the Project Site. Specifically, the Project Site is currently 20% impervious with stairs spanning the length of the site along Angels Flight, paved area, and hardscape and structure for the Pershing Square Station Metro portal. The site is mostly pervious with about 80% of grassy landscaped area. In the existing condition, based upon a site visit, it appears stormwater discharges from the Project Site without City of LA standard filtration or treatment. Considering the Project would develop a high rise building with subterranean parking, paved areas, and proposed landscaping and planters within the Project Site area, the post-project condition will be approximately 100% impervious.

Under the proposed conditions illustrated in Figure 2, the Project Site would consist of one drainage area, which would drain via building roof drains, surface flow and subterranean drainage to the capture and use tank in the parking garage. Stormwater would then be used for irrigation and overflow would discharge through the curb face along Hill Street. The Project site runoff would flow in the gutter to the catch basin located at the intersection of Hill Street and 4^{th} Street on Hill Street. This catch basin connects to the previously-mentioned 24-in pipe. Figure 4 shows all the input parameters used for analyzing the proposed Project Site. Table 2 shows the proposed volumetric flow rates generated by a 50-year storm event.

Table 2 summarizes the existing and post-Project 50-year frequency design storm event peak flow rates from the Project Site. A comparison of the Pre- and Post- peak flow rates indicates no increase in stormwater runoff.

Table 2 – Pre- and Post-Project 50-year frequency peak flow rates

Drainage Area	**Project Site Area (Acres)**	**Pre-Project Q50 (cfs)** (volumetric flow rate measured in cubic feet per second)	**Post-ProjectQ50 (cfs)** (volumetric flow rate measured in cubic feet per second)	**Incremental Increase from Existing to Proposed Condition (%)**
Entire Site	2.26	6.89	7.16	3.9%

While the Project will slightly increase the 50-year peak flow rate from the Project Site, the existing site runoff pattern will remain similar. All stormwater will still flow from Olive Street to Hill Street, west to east across the site, and discharge onto Hill Street. See Figures 1 and 2 for reference.

Consequently, the Project would not result in a substantial erosion or siltation on- or off-site, substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff, or impede or redirect flood flows. As such, operation of the Project would result in a less than significant impact on surface water hydrology per the 2019 CEQA threshold guide.

In addition, as described above, as part of the stormwater mitigation plan for the Project to manage post-construction stormwater runoff, the Project would include the installation of catch basins, planter drains, and building roof drain downspouts throughout the Project Site to collect roof and site runoff and direct stormwater away from structures through a series of underground storm drain pipes. This on-site stormwater conveyance system would serve to prevent onsite flooding and nuisance water on the Project Site. The project site would drain to two existing catch basins, one located in 4th Street, and one located in Hill Street. Both catch basins connect to the City of LA's storm drain system via underground connector pipes. Together these connector pipes have the capacity to convey the proposed project runoff. See Exhibit 3.

Earthquake-induced flooding can result from the failure of dams or other water-retaining structures resulting from earthquakes. According to the City of Los Angeles General Plan Safety Element, Exhibit G: Inundation & Tsunami Hazard Areas (Refer to Figure 8), the project site is not located in a potential dam inundation area. Additionally, the Project Site is not located within a FEMA or City of Los Angeles designated 100- or 500-year flood plain. See Figure 7 for FEMA floodplain map.

Dam safety regulations are the primary means of reducing damage or injury due to inundation occurring from dam failure. The California Division of Safety of Dams regulates the siting, design, construction, and periodic review of all dams in the State. In addition, the Los Angeles Department of Water and Power (LADWP) operates the dams in the Project Site area and mitigates the potential for over flow and seiche hazard through control of water levels and dam wall height. These measures include seismic retrofits and other related dam improvements completed under the requirements of the 1972 State Dam Safety Act. The City's Local Hazard Mitigation Plan,[20] which was adopted in July 2011, provides a list of existing programs, proposed activities and specific projects that may assist the City of Los Angeles in reducing risk and preventing loss of life and property damage from natural and human-caused hazards, including dam failure. The Hazard Mitigation Plan evaluation of dam failure vulnerability classifies dam failure as a moderate risk rating. Therefore, considering the above information and risk reduction projects, the risk of

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[20] City of Los Angeles Emergency Management Department, *Local Hazard Mitigation Plan,* dated July 1, 2011.

flooding from inundation by a seiche or dam failure is considered low and impacts are less than significant.

6.2.2. Surface Water Quality

As previously described, the Project would be required to implement LID requirements throughout the operational life of the Project. As part of these requirements, the Project would prepare a Hydrology “LID” Report which would specifically outline the proposed stormwater treatment measures or post-construction BMPs required to control pollutants of concern. In addition, consistent with LID requirements to reduce the quantity and improve the quality of rainfall runoff that leaves the Project Site, the Project would include the installation of a capture and use system as established by the LID Manual.

The LID Manual prioritizes BMPs with infiltration systems as the top tier priority BMP. Feasibility of the proposed infiltration BMP will be determined according to the criteria established in the LID manual, along with coordination with the City. As stated above, the project is located within a liquefaction and landslide zone. The geotechnical reporting of the existing Angels Landing Site performed by Wood Environment & Infrastructure Solutions, Inc. dated March 11 and 15, 2019 states that although the project site is partially within an area identified as having a potential for liquefaction, the bedrock and alluvial materials are not anticipated to be susceptible to liquefaction. Considering the minor seepage encountered, dense alluvial deposits, and proposed excavations into bedrock, the potential for liquefaction to occur at the project site is considered low. However, it is infeasible to infiltrate within these zones per the City’s LID standards. Thus, a stormwater capture and use system will be the BMP used. As is typical of most urban developments, stormwater runoff from the Project Site has the potential to introduce pollutants into the stormwater system. Anticipated and potential pollutants generated by the Project are sediment, nutrients, pesticides, metals, pathogens, and oil and grease.

The pollutants listed above are expected to, and would in fact, be mitigated through the implementation of approved LID BMPs. In addition, the implementation of the following LID BMPs would be included as part of the SUSMP for the Project to manage post-construction stormwater runoff.

- Promote evapotranspiration and infiltration, and the use of native and/or drought tolerant plants;
- Provide storm drain system stenciling and signage to discourage illegal dumping;
- Design material storage areas and loading docks within structures or enclosures to prevent leaks or spills of pollutants from entering the storm drain system;
- Provide evidence of ongoing BMP maintenance as part of a legal agreement with the City of Los Angeles. Recorded covenant and agreements for BMP maintenance are part of standard building permit approval processing; and

- Design post-construction structural or treatment control BMPs to infiltrate stormwater runoff. Stormwater treatment facilities and systems would be designed to meet the requirements of the LID Manual.

As set forth in the LID Manual, infiltration facilities shall be sized to capture and infiltrate the design capture volume based on the runoff produced from the greater between the 85th percentile storm event and the 0.75-inch storm event. Based on these requirements, the total storage volume needed within the Project Site was determined to be approximately 7,385 cubic feet. To achieve this storage volume, the Project proposes the installation of a capture and use tank. Inside the tank would be a pump to use the storm water for a drip irrigation system. An overflow duplex pump system would pump excess storm water to discharge to the curb face along Hill Street when the tank is full. Typical capture and use systems are illustrated in Exhibit 2. The capture and use tank is proposed to be located in the subterranean parking garage and span three levels.

As described above, the Project Site currently does not have structural BMPs for the treatment of stormwater runoff from the existing impervious surfaces. Therefore, implementation of BMP systems proposed as part of the Project would result in an improvement in surface water quality runoff from the Project Site. Implementation of BMPs, which would capture the stormwater and use it for irrigation, would allow for more opportunities to direct stormwater to flow through the planting media where pollutants are filtered, absorbed, and biodegraded by the soil and plants, prior to discharge to the Los Angeles storm drain system.

Consequently, the Project would not result in a substantial erosion or siltation on- or off-site, substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff, or impede or redirect flood flows. As such, operation of the Project would result in a less than significant impact on surface water hydrology per the 2019 CEQA threshold guide.

6.2.3. GROUNDWATER HYDROLOGY

The percolation of precipitation that falls on pervious surfaces is variable dependent upon the soil type, condition of the soil, vegetative cover, and other factors. As stated above, the implementation of the Project would include the removal of some pervious surfaces throughout the Project Site boundary. The Project would include the installation of LID BMPs, which would mitigate at minimum the first flush or the equivalent of the greater between the 85^{th} percentile storm and first 0.75-inch of rainfall for any storm event. The installed BMP systems will be designed with an internal bypass or overflow system to prevent upstream flooding due to large storm events. The stormwater which bypasses the BMP systems would discharge to an approved discharge point in the public right-of-way and not result in infiltration of a large amount of rainfall, which would affect groundwater hydrology, including the direction of groundwater flow.

As discussed above, Project development would require excavations with a depth of approximately 110 feet from the ground surface at Hill Street and 170 feet from the ground surface at Olive Street. As described in the geotechnical report of the existing Angels Landing Site performed by Wood Environment & Infrastructure Solutions, Inc. dated March 11 and 15, 2019. Exploratory borings showed that groundwater was encountered in borings at 270 feet below grade on the upper portion of the site. In prior reports by LeRoy Crandall and Associates, dated May 9, 1988 and supplemental studies dated December 2, 1988, seepage was encountered at depths of 47 and 63 feet within the bedrock. The localized seepage indicates a perched groundwater condition that most likely fluctuates with seasonal precipitation, therefore dewatering operations may be expected. If groundwater is encountered during construction, temporary pumps and filtration would be utilized in compliance with the NPDES permit. The temporary system would comply with all relevant NPDES requirements related to construction and discharges from dewatering operations. Furthermore, there are no existing wells or spreading grounds within one mile of the Project Site and the Project would not include new injection or supply wells.

Based on the above, operation of the Project would result in a less than significant impact on groundwater hydrology, including groundwater levels.

6.2.4. GROUNDWATER QUALITY

While the development of expanded facilities would increase the use of existing on-site hazardous materials, compliance with all applicable existing regulations at the Project Site would prevent the Project from affecting or expanding any potential areas of contamination, increasing the level of contamination, or causing regulatory water quality standards at an existing production well to be violated, as defined in CCR, Title 22, Division 4, Chapter 15 and the Safe Drinking Water Act. Furthermore, as described above, operation of the Project would not require extraction from the groundwater supply based on the depth of excavation for the proposed uses and the depth of groundwater below the Project Site. The Project does not include the installation or operation of water wells, or any extraction or recharge system that is in the vicinity of the coast, an area of known groundwater contamination or seawater intrusion, a municipal supply well or spreading ground facility. The Project does not include surface or subsurface application or introduction of potential contaminants or waste materials during construction or operation. The Project is not anticipated to result in releases or spills of contaminants that could reach a groundwater recharge area or spreading ground or otherwise reach groundwater through percolation.

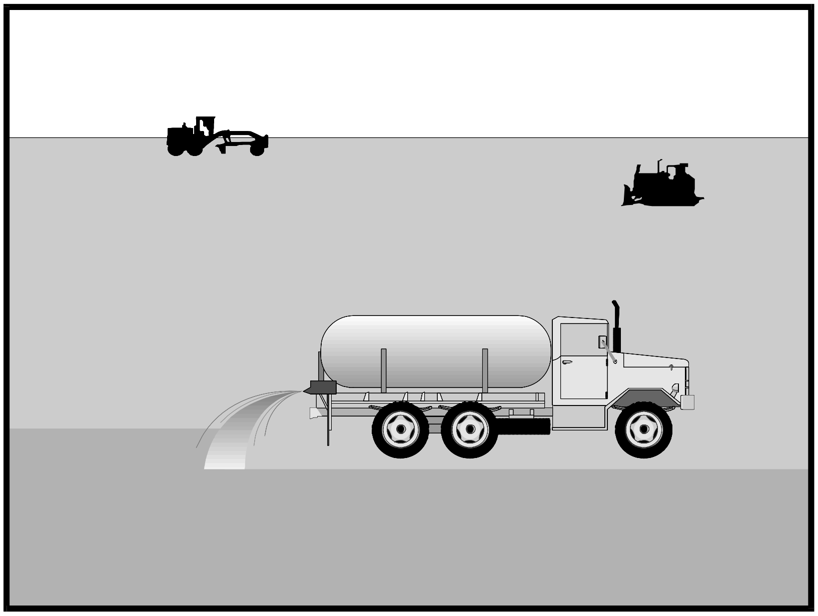
Consequently, the Project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality, or substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin. As such, operation of the Project would result in a less than significant impact on groundwater quality per the 2019 CEQA threshold guide.

7. LEVEL OF SIGNIFICANCE

Based on the analysis contained in this report, no significant impacts have been identified for surface water hydrology, surface water quality, groundwater hydrology or groundwater quality for this Project.

APPENDIX

Soil Binders EC-5



Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

EC-6 Straw Mulch

EC-7 Geotextiles and Mats

EC-8 Wood Mulching

Description and Purpose

Soil binding consists of application and maintenance of a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water and wind induced erosion of exposed soils on construction sites.

Suitable Applications

Soil binders are typically applied to disturbed areas requiring temporary protection. Because soil binders, when used as a stand-alone practice, can often be incorporated into the soil, they are a good alternative to mulches in areas where grading activities will soon resume. Soil binders are commonly used in the following areas:

- Rough graded soils that will be inactive for a short period of time
- Soil stockpiles
- Temporary haul roads prior to placement of crushed rock
- Compacted soil road base
- Construction staging, materials storage, and layout areas

Limitations

- Soil binders are temporary in nature and may need reapplication.

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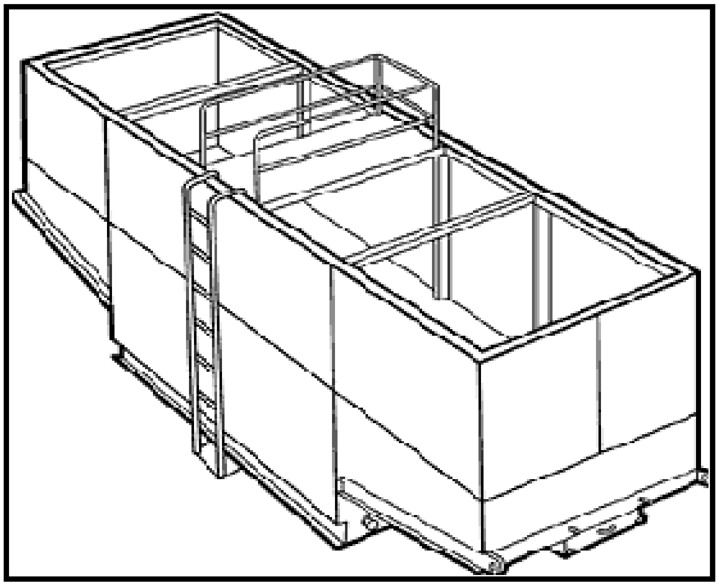
Dewatering Operations NS-2



Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

SE-5: Fiber Roll

SE-6: Gravel Bag Berm

Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation (stormwater) must be removed from a work location to proceed with construction work or to provide vector control.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Discharges from dewatering operations can contain high levels of fine sediment that, if not properly treated, could lead to exceedences of the General Permit requirements.

Suitable Applications

These practices are implemented for discharges of non-stormwater from construction sites. Non-stormwaters include, but are not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area to facilitate construction.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated precipitation (stormwater) from depressed areas at a construction site.

Stormwater mixed with non-stormwater should be managed as non-stormwater.

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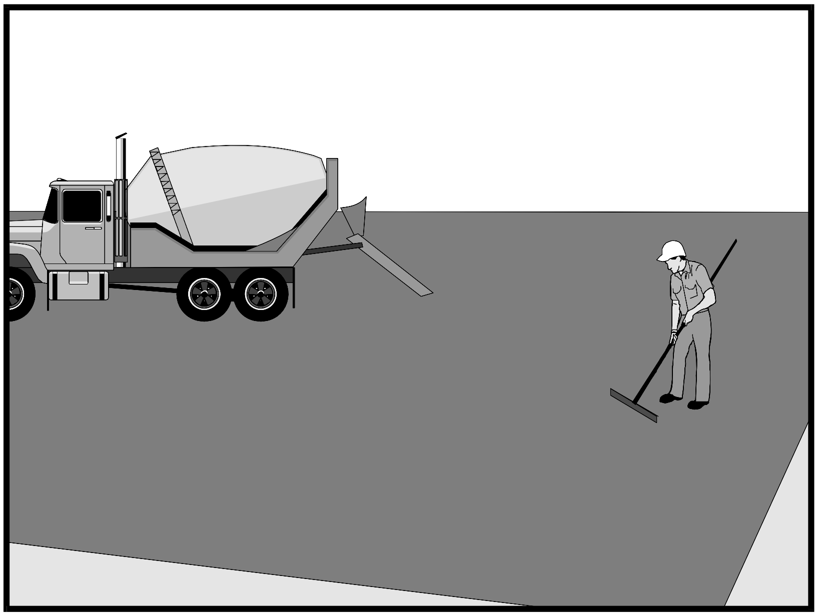
Paving and Grinding Operations NS-3



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

Legend:
☑ Primary Category
☒ Secondary Category

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

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runon and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH and turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials associated with paving and grinding operations, including mortar, concrete, and cement and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations

- Paving opportunities may be limited during wet weather.
- Discharges of freshly paved surfaces may raise pH to environmentally harmful levels and trigger permit violations.

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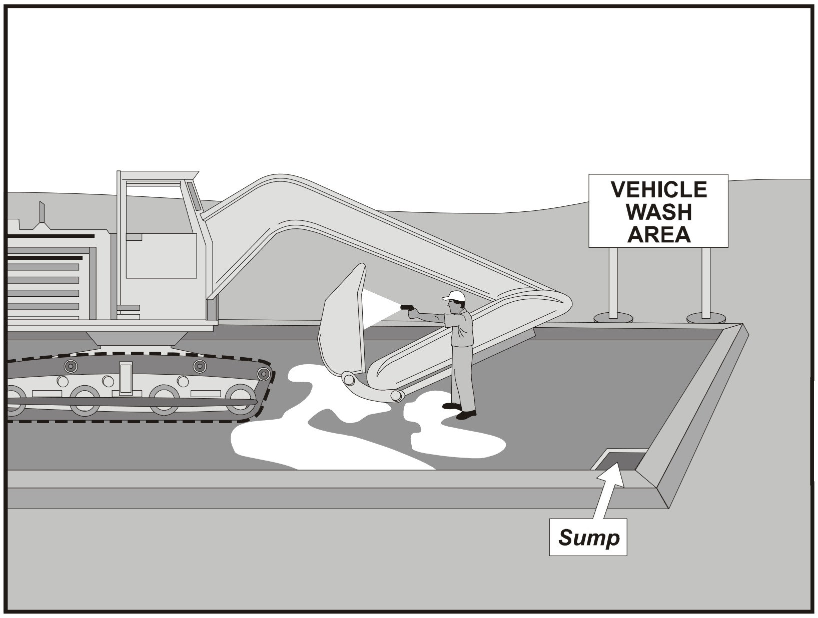
Vehicle and Equipment Cleaning NS-8



Description and Purpose

Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment cleaning is performed.

Limitations

Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Implementation

Other options to washing equipment onsite include contracting with either an offsite or mobile commercial washing business. These businesses may be better equipped to handle and dispose of the wash waters properly. Performing this work offsite can also be economical by eliminating the need for a separate washing operation onsite.

If washing operations are to take place onsite, then:

Categories

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

Legend:

☑ **Primary Objective**

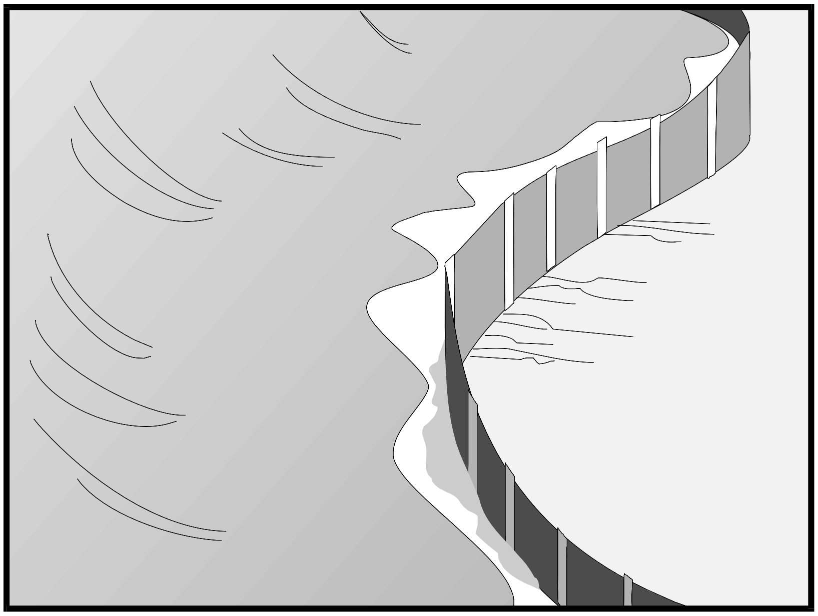
☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None



Categories

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

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls
SE-6 Gravel Bag Berm
SE-8 Sandbag Barrier
SE-10 Storm Drain Inlet Protection
SE-14 Biofilter Bags

Description and Purpose

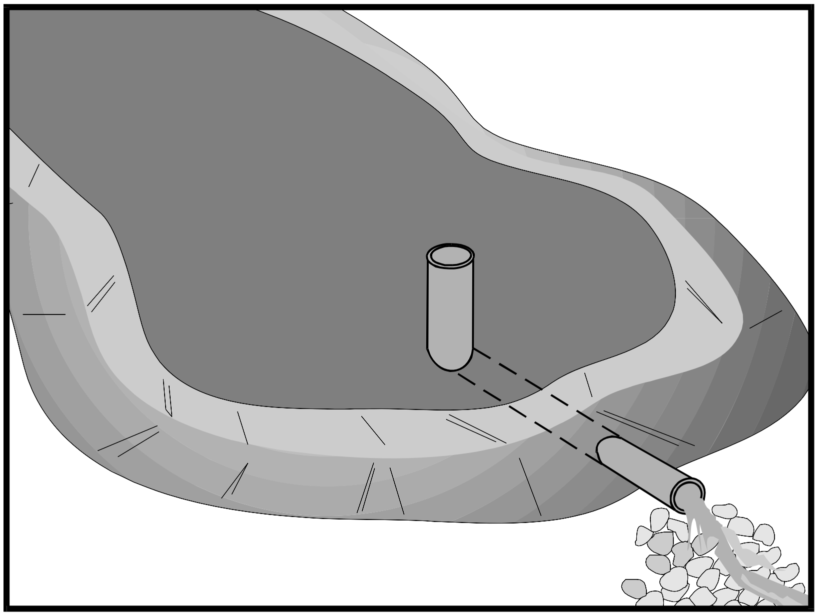
A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows. Silt fences are most effective when used in combination with erosion controls. Suitable applications include:

- Along the perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

Sediment Basin SE-2



Description and Purpose

A sediment basin is a temporary basin formed by excavation or by constructing an embankment so that sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out before the runoff is discharged.

Sediment basin design guidance presented in this fact sheet is intended to provide options, methods, and techniques to optimize temporary sediment basin performance and basin sediment removal. Basin design guidance provided in this fact sheet is not intended to guarantee basin effluent compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. Therefore, optimally designed and maintained sediment basins should be used in conjunction with a comprehensive system of BMPs that includes:

- Diverting runoff from undisturbed areas away from the basin
- Erosion control practices to minimize disturbed areas on-site
  and to provide temporary stabilization and interim sediment controls (e.g., stockpile perimeter control, check dams, perimeter controls around individual lots) to reduce the basin's influent sediment concentration.

At some sites, sediment basin design enhancements may be required to adequately remove sediment. Traditional

Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-3 Sediment Trap (for smaller areas)

Street Sweeping and Vacuuming SE-7

Categories

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

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

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

Suitable Applications

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

Limitations

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

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

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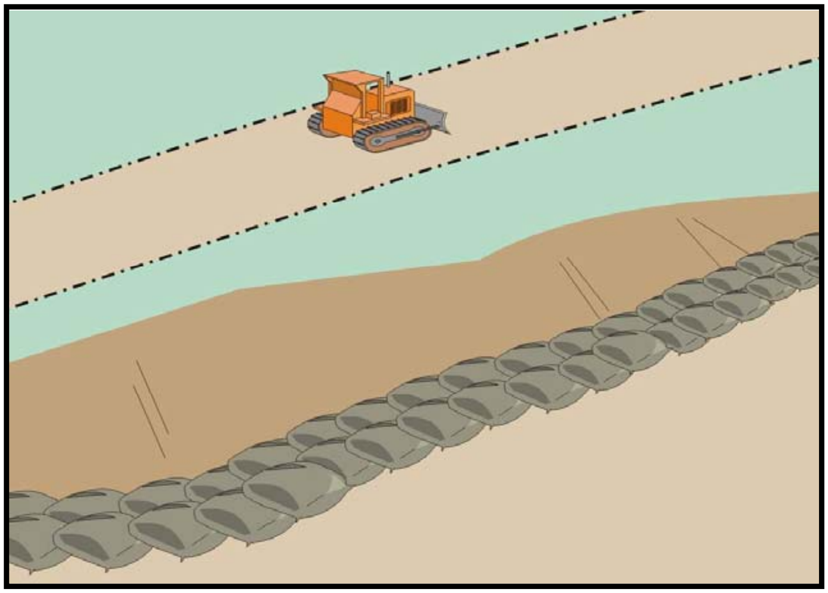
Sandbag Barrier SE-8



Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-14 Biofilter Bags

Description and Purpose

A sandbag barrier is a series of sand-filled bags placed on a level contour to intercept or to divert sheet flows. Sandbag barriers placed on a level contour pond sheet flow runoff, allowing sediment to settle out.

Suitable Applications

Sandbag barriers may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes.
  - As sediment traps at culvert/pipe outlets.
  - Below other small cleared areas.
  - Along the perimeter of a site.
  - Down slope of exposed soil areas.
  - Around temporary stockpiles and spoil areas.
  - Parallel to a roadway to keep sediment off paved areas.
  - Along streams and channels.
- As linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

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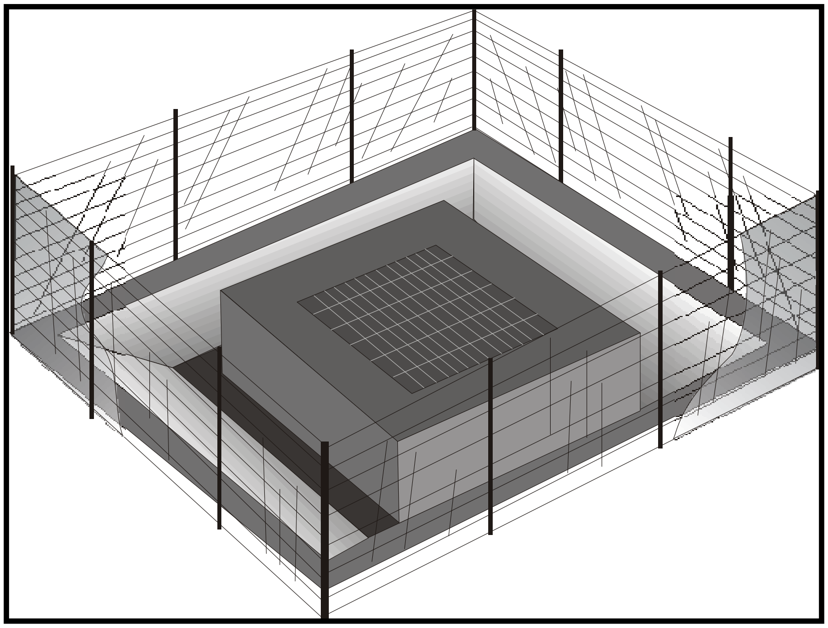
Storm Drain Inlet Protection SE-10



Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☒
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

Suitable Applications

Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.

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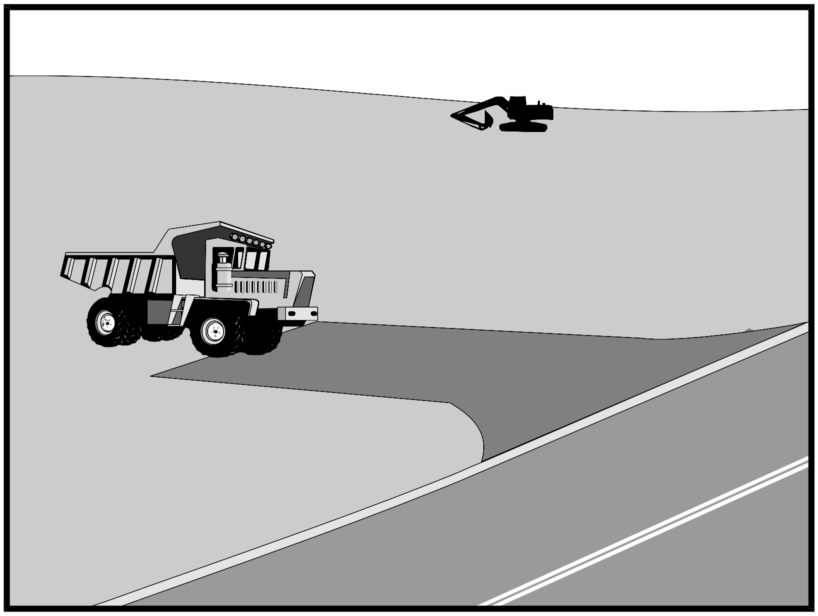
Stabilized Construction Entrance/Exit TC-1



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

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

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

Potential Alternatives

None

Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water

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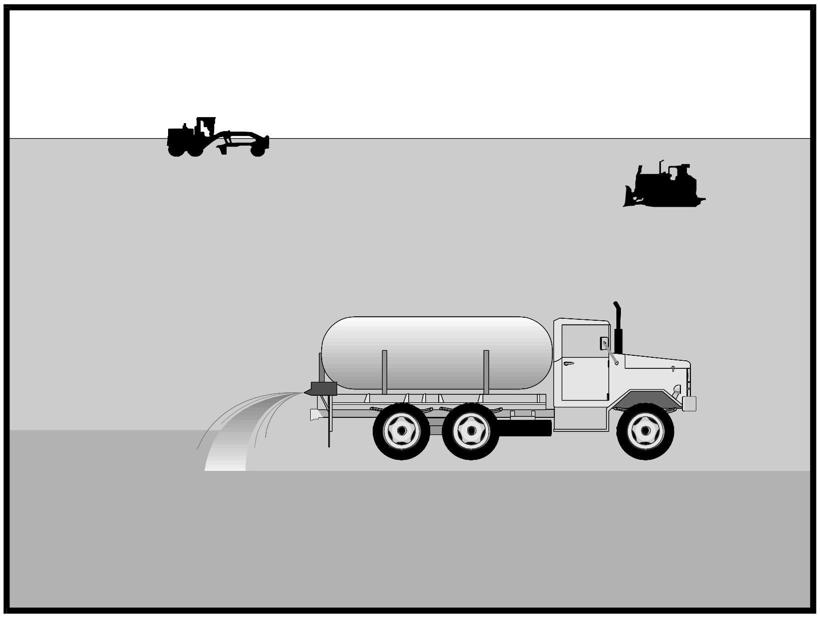

Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

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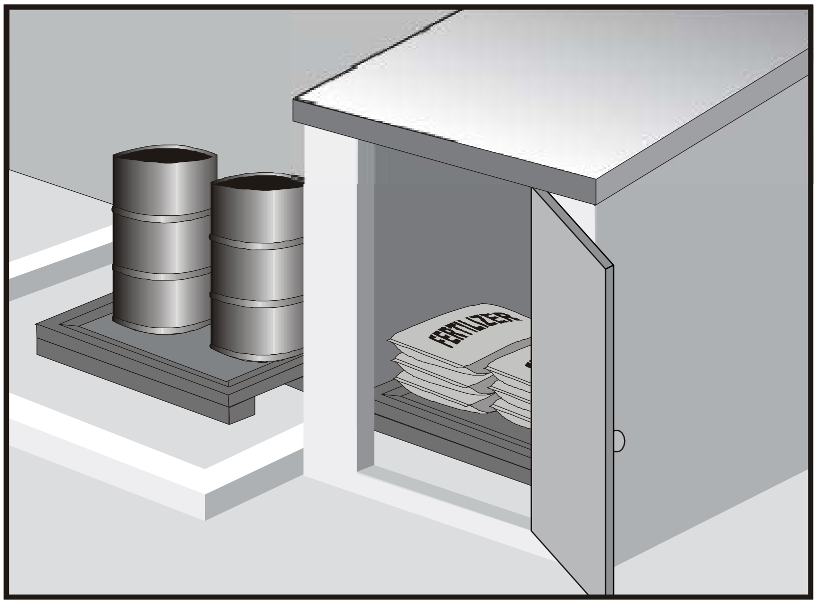
Material Delivery and Storage WM-1



Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

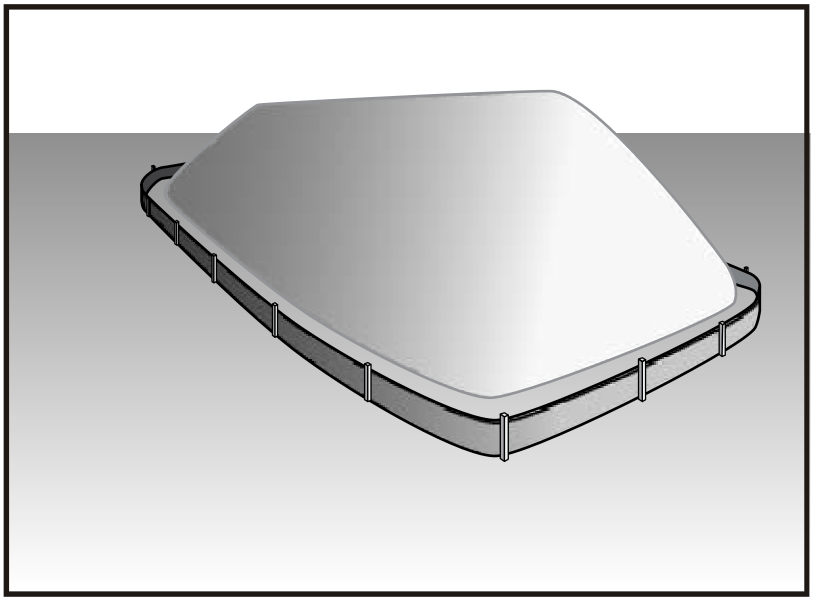
Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease



Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of Plastic materials and photodegradable plastics should be avoided.

Implementation

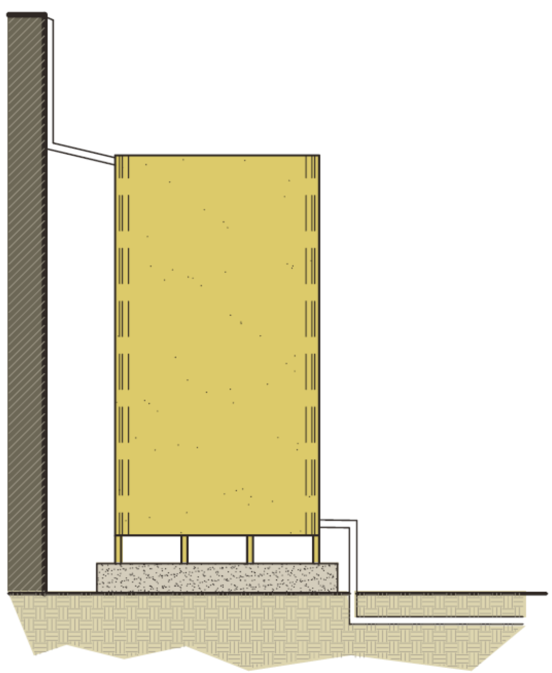
Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

EXHIBIT 2: TYPICAL LID CAPTURE AND USE BMPS

4.5 CAPTURE AND USE BMPS

Underground Cistern
Photo Credit: TreePeople

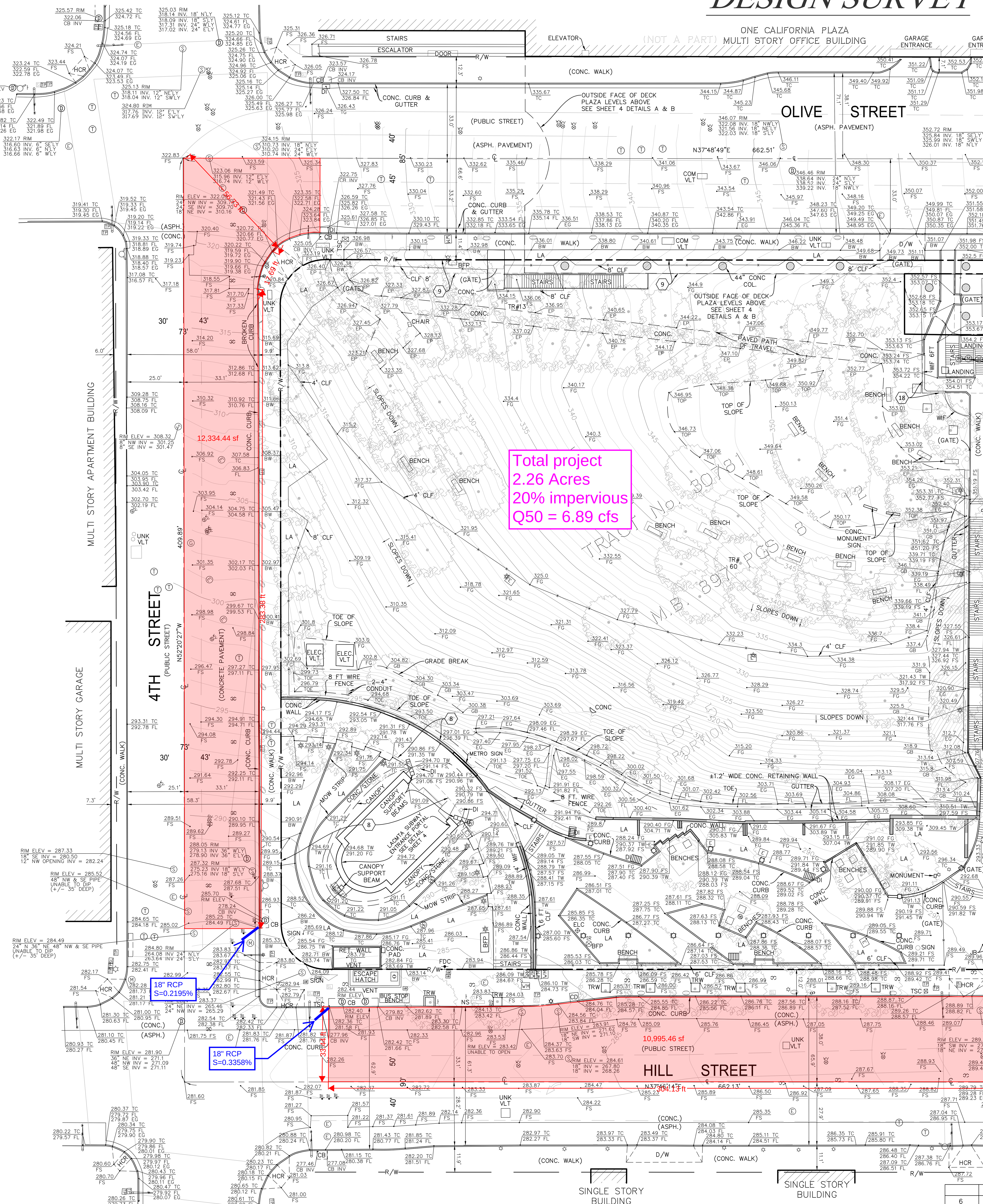
Capture and Use refers to a specific type of BMP that operates by capturing stormwater runoff and holding it for efficient use at a later time. On a commercial or industrial scale, capture and use BMPs are typically synonomous with cisterns, which can be implemented both above and below ground. Cisterns are sized to store a specified volume of water with no surface discharge until this volume is exceeded. The primary use of captured runoff is for subsurface drip irrigation purposes. The temporary storage of roof runoff reduces the runoff volume from a property and may reduce the peak runoff velocity for small, frequently occurring storms. In addition, by reducing the amount of stormwater runoff that flows overland into a stormwater conveyance system, less pollutants are transported through the conveyance system into local streams and the ocean. The onsite use of the harvested water for non-potable domestic purposes conserves City-supplied potable water and, where directed to unpaved surfaces, can recharge groundwater in local aquifers.



Cistern Example
Image Credit: AHBE Landscape Architects

Exhibit 3 - Catch Basin Connector Pipe Capacity Study

DESIGN SURVEY



Peak Flow Hydrologic Analysis

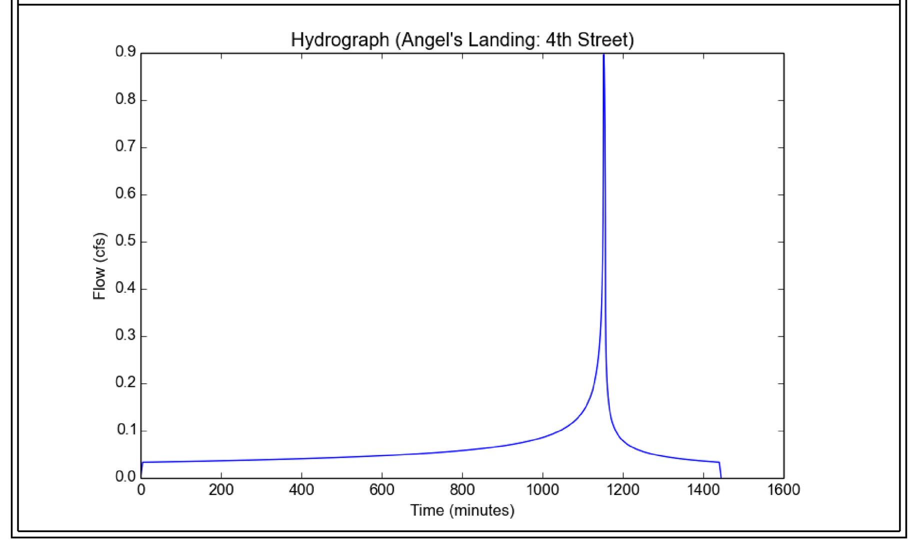
File location: C:/Users/sralston/Desktop/Angel's Landing - 4th Street.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	Angel's Landing
Subarea ID	4th Street
Area (ac)	0.283
Flow Path Length (ft)	358.0
Flow Path Slope (vft/hft)	0.107
50-yr Rainfall Depth (in)	5.9
Percent Impervious	1.0
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	3.5201
Undeveloped Runoff Coefficient (Cu)	0.8582
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.8966
Burned Peak Flow Rate (cfs)	0.8966
24-Hr Clear Runoff Volume (ac-ft)	0.1242
24-Hr Clear Runoff Volume (cu-ft)	5409.8297



Peak Flow Hydrologic Analysis

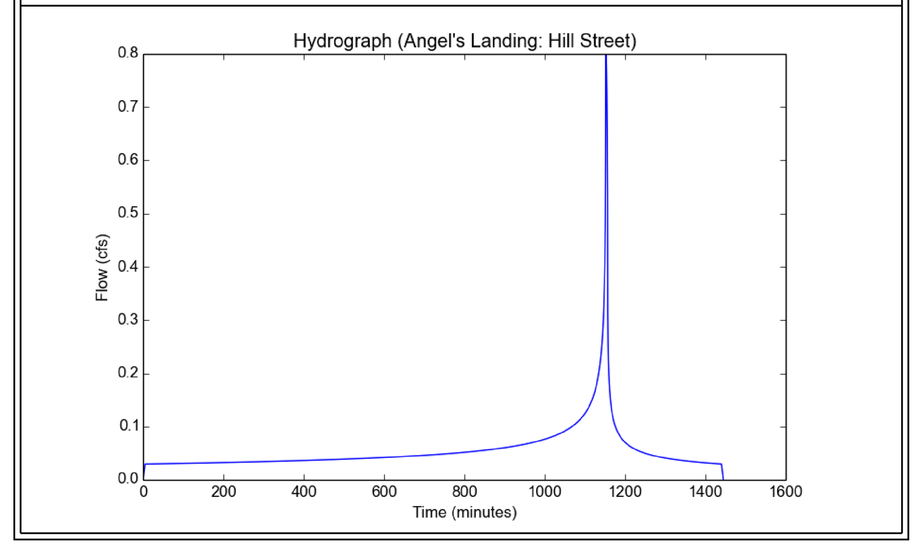
File location: C:/Users/sralston/Desktop/Angel's Landing - Hill Street.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	Angel's Landing
Subarea ID	Hill Street
Area (ac)	0.252
Flow Path Length (ft)	337.0
Flow Path Slope (vft/hft)	0.0228
50-yr Rainfall Depth (in)	5.9
Percent Impervious	1.0
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	3.5201
Undeveloped Runoff Coefficient (Cu)	0.8582
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.7984
Burned Peak Flow Rate (cfs)	0.7984
24-Hr Clear Runoff Volume (ac-ft)	0.1106
24-Hr Clear Runoff Volume (cu-ft)	4817.2335



18" RCP - 4th St

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.21950	%
Normal Depth	18.00	in
Diameter	18.00	in
Discharge	4.92	ft³/s

Results

Discharge	4.92	ft³/s
Normal Depth	18.00	in
Flow Area	1.77	ft²
Wetted Perimeter	4.71	ft
Hydraulic Radius	4.50	in
Top Width	0.00	ft
Critical Depth	0.85	ft
Percent Full	100.0	%
Critical Slope	0.00575	ft/ft
Velocity	2.78	ft/s
Velocity Head	0.12	ft
Specific Energy	1.62	ft
Froude Number	0.00	
Maximum Discharge	5.29	ft³/s
Discharge Full	4.92	ft³/s
Slope Full	0.00220	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Bentley Systems, Inc. Haestad Methods SolBentleyCFlowMaster V8i (SELECTseries 1) [08.11.01.03]
3/7/2019 10:46:08 AM 27 Siemons Company Drive Suite 200 W Watertown, CT 06795 USA +1-203-755-1666 Page 1 of 2

18" RCP - Hill St.

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.33580	%
Normal Depth	18.00	in
Diameter	18.00	in
Discharge	6.09	ft³/s

Results

Discharge	6.09	ft³/s
Normal Depth	18.00	in
Flow Area	1.77	ft²
Wetted Perimeter	4.71	ft
Hydraulic Radius	4.50	in
Top Width	0.00	ft
Critical Depth	0.95	ft
Percent Full	100.0	%
Critical Slope	0.00626	ft/ft
Velocity	3.44	ft/s
Velocity Head	0.18	ft
Specific Energy	1.68	ft
Froude Number	0.00	
Maximum Discharge	6.55	ft³/s
Discharge Full	6.09	ft³/s
Slope Full	0.00336	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Bentley Systems, Inc. Haestad Methods SolBentleyCFlowMaster V8i (SELECTseries 1) [08.11.01.03]
3/7/2019 10:46:58 AM 27 Siemons Company Drive Suite 200 W Watertown, CT 06795 USA +1-203-755-1666 Page 1 of 2

PIPE SEGMENT	FULL FLOW CAPACITY	FLOW FROM STREET	FLOW FROM PROJECT (6.89 cfs Total)
4th Street Storm Drain 18" RCP, S=0.2195%	4.92 cfs	0.90 cfs	4.02 cfs Max. (58.3% of project flow)
Hill Street Storm Drain 18" RCP, S=0.3358%	6.09 cfs	0.80 cfs	5.29 cfs Max. (76.8% of project flow)

NO.	DATE	REVISIONS
6		
5		
4		
3		
2		
1		

PROJECT #	1800264
DATE PREPARED	06/06/2018
DRAWN BY	DA/DB
CHECKED BY	JS

ANGELS LANDING, LOS ANGELES

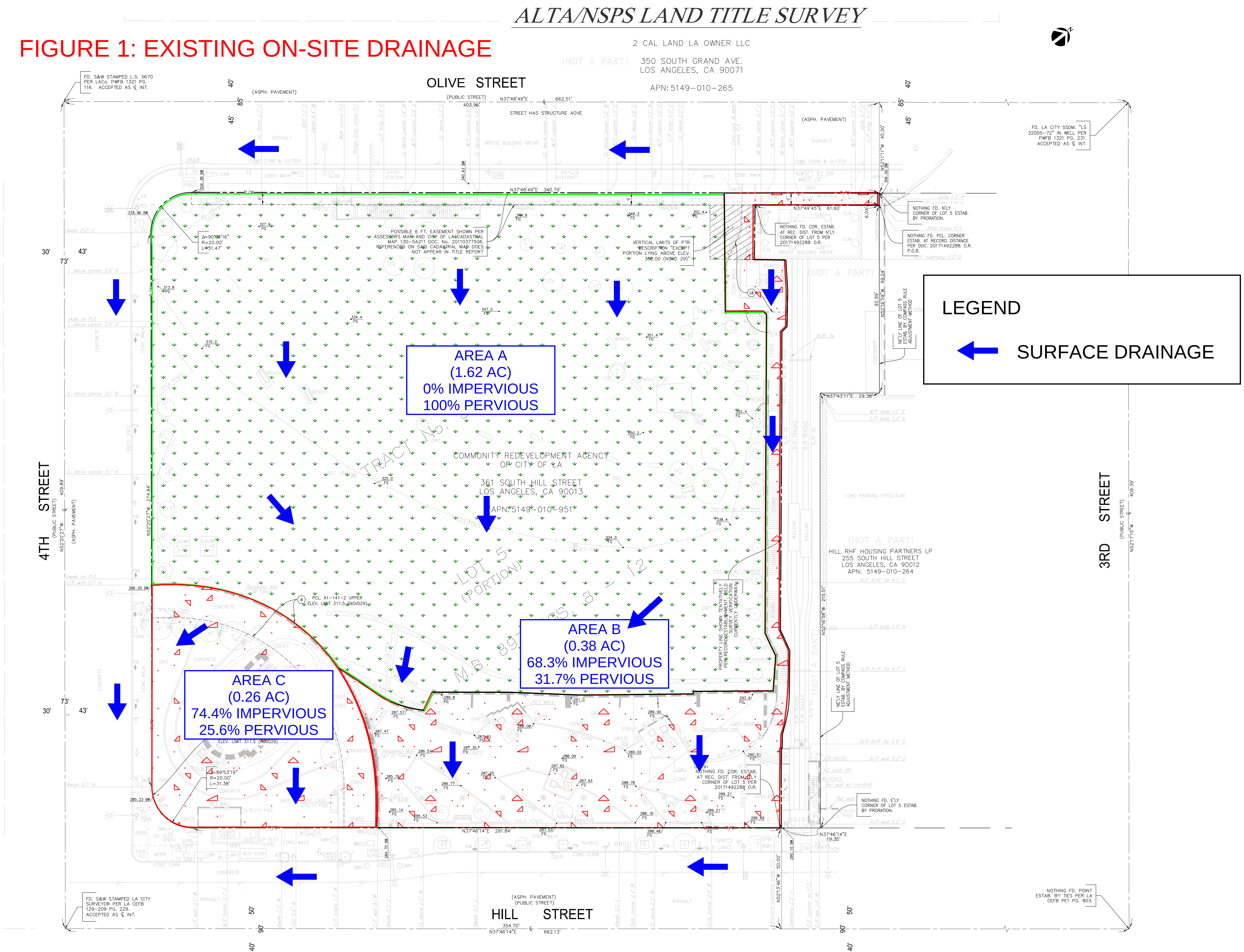
PREPARED FOR:

Mr. KEVIN ROBERTS
MACFARLANE DEVELOPMENT COMPANY
448 SOUTH HILL STREET, SUITE 408
LOS ANGELES, CA 90013

kpff
700 FLOWER ST., Suite 2100
Los Angeles, CA 90017
O: 213.418.0201
F: 213.266.5294
www.kpff.com

SHEET 3 OF 5
DESIGN SURVEY

FIGURE 1: EXISTING ON-SITE DRAINAGE



ALTA/NSPS LAND TITLE SURVEY

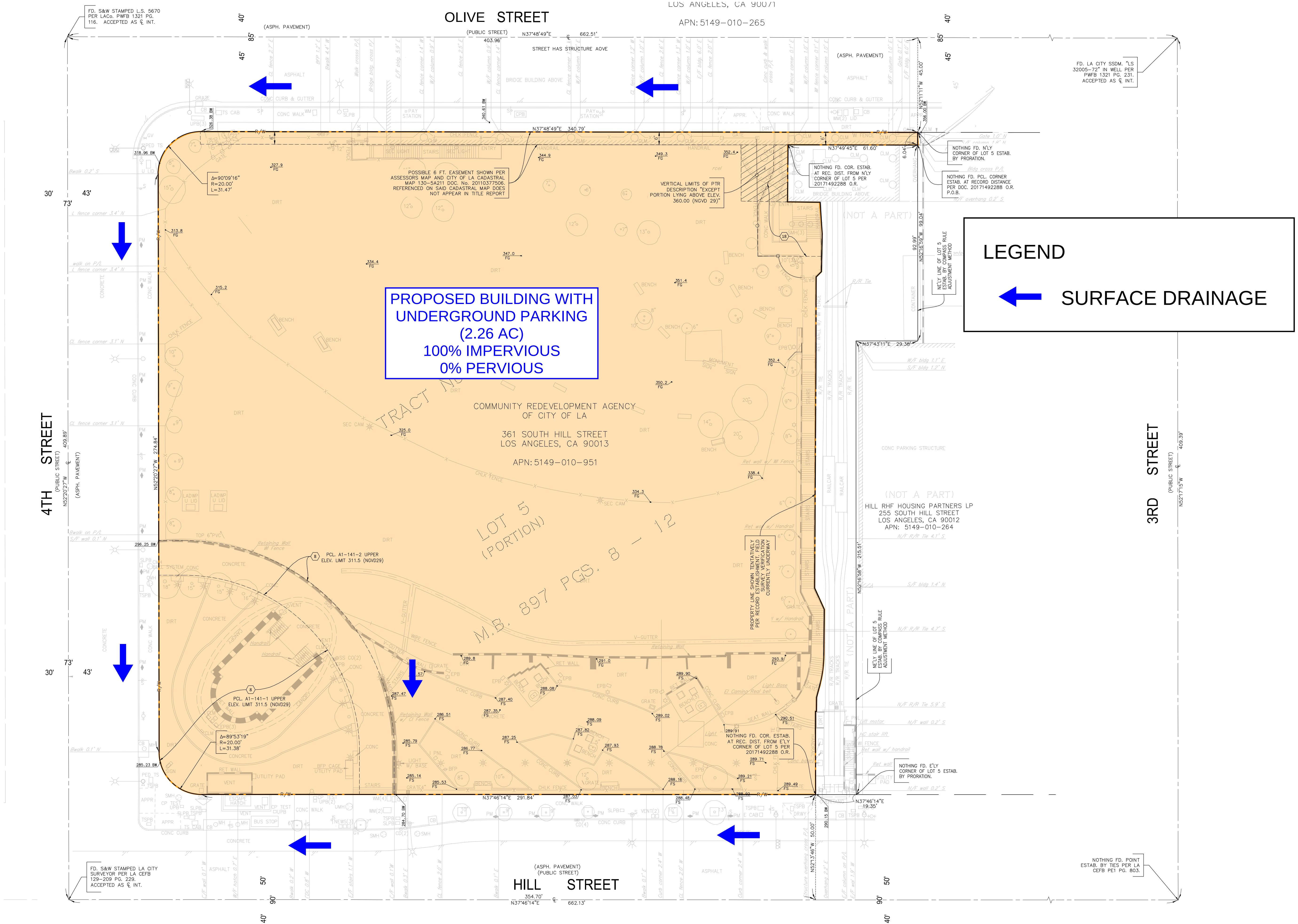


FIGURE 2: PROPOSED ON-SITE DRAINAGE

Figure 3 - Hydro-Calc Hydrology Results for Existing Site

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/Projects/2018/1800042 Angels Landing/ENGR/EIR/Water Resources Report/Appendix/HydroCalc - 50yr Existing On-
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Angels Landing
Subarea ID	Existing On-Site
Area (ac)	2.26
Flow Path Length (ft)	435.0
Flow Path Slope (vft/hft)	16.0
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.2
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	3.5201
Undeveloped Runoff Coefficient (Cu)	0.8582
Developed Runoff Coefficient (Cd)	0.8665
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.8936
Burned Peak Flow Rate (cfs)	6.8936
24-Hr Clear Runoff Volume (ac-ft)	0.3874
24-Hr Clear Runoff Volume (cu-ft)	16873.78

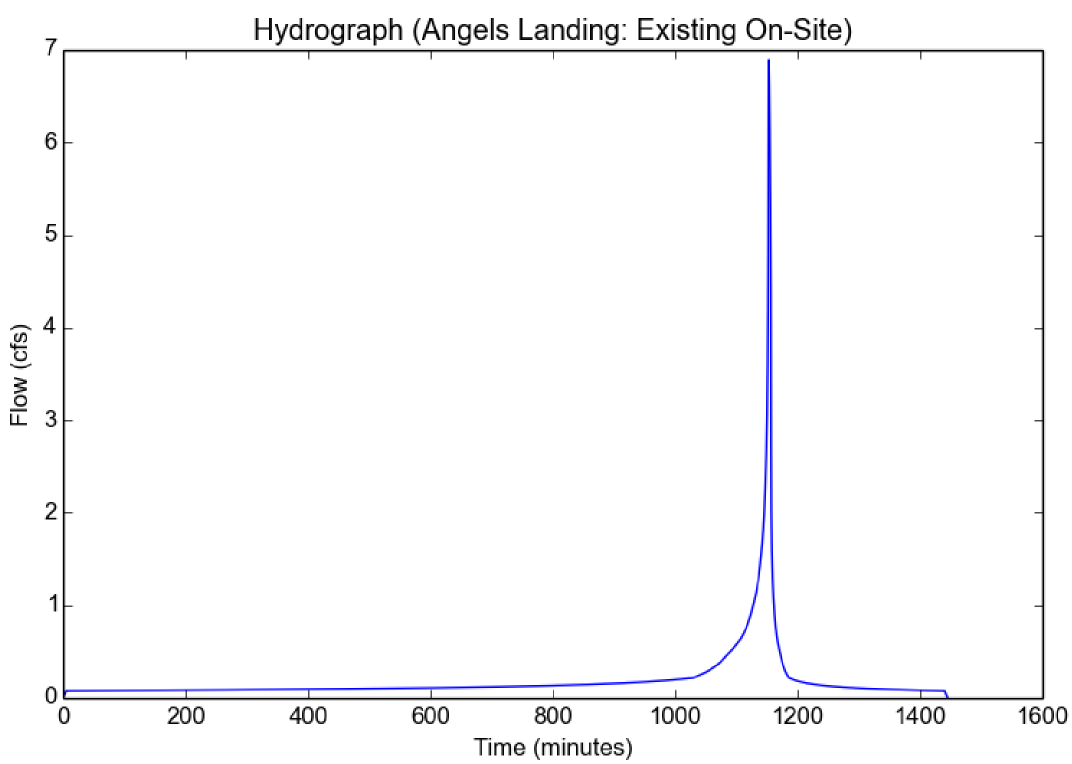


Figure 4 - Hydro-Calc Hydrology Results for Post-Project Site

Peak Flow Hydrologic Analysis

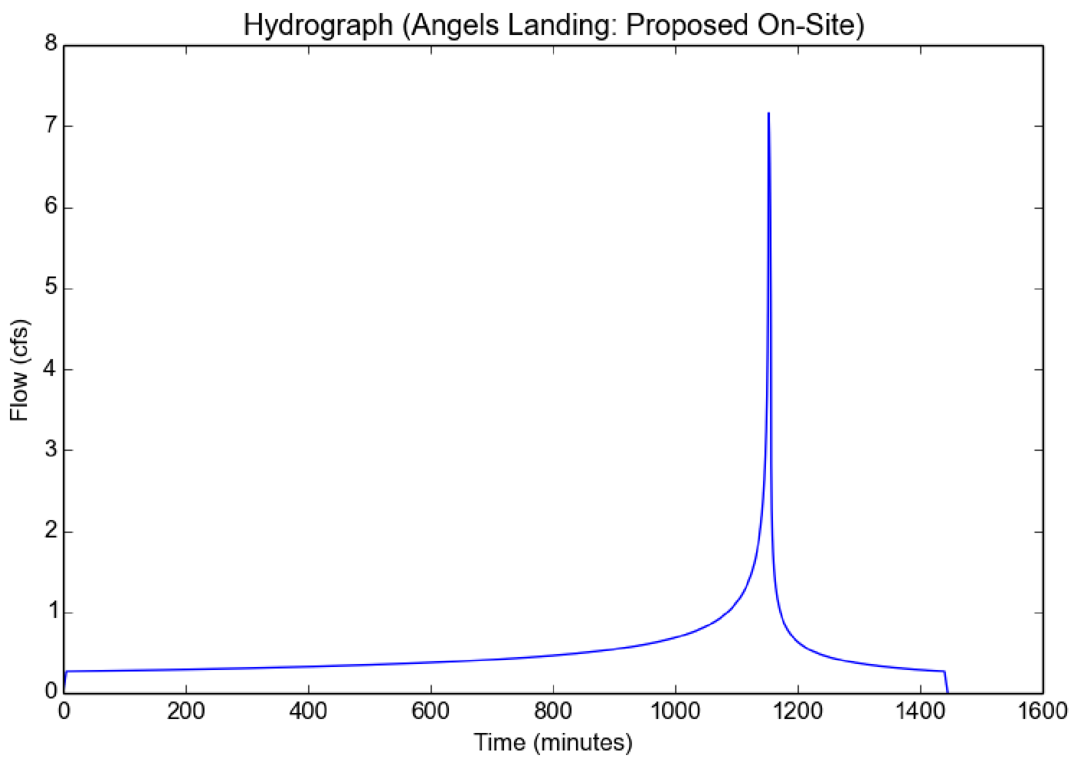
File location: //kpfflacivil.com/share/Projects/2018/1800042 Angels Landing/ENGR/EIR/Water Resources Report/Appendix/HydroCalc - 50yr Proposed O
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Angels Landing
Subarea ID	Proposed On-Site
Area (ac)	2.26
Flow Path Length (ft)	435.0
Flow Path Slope (vft/hft)	16.0
50-yr Rainfall Depth (in)	5.9
Percent Impervious	1.0
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

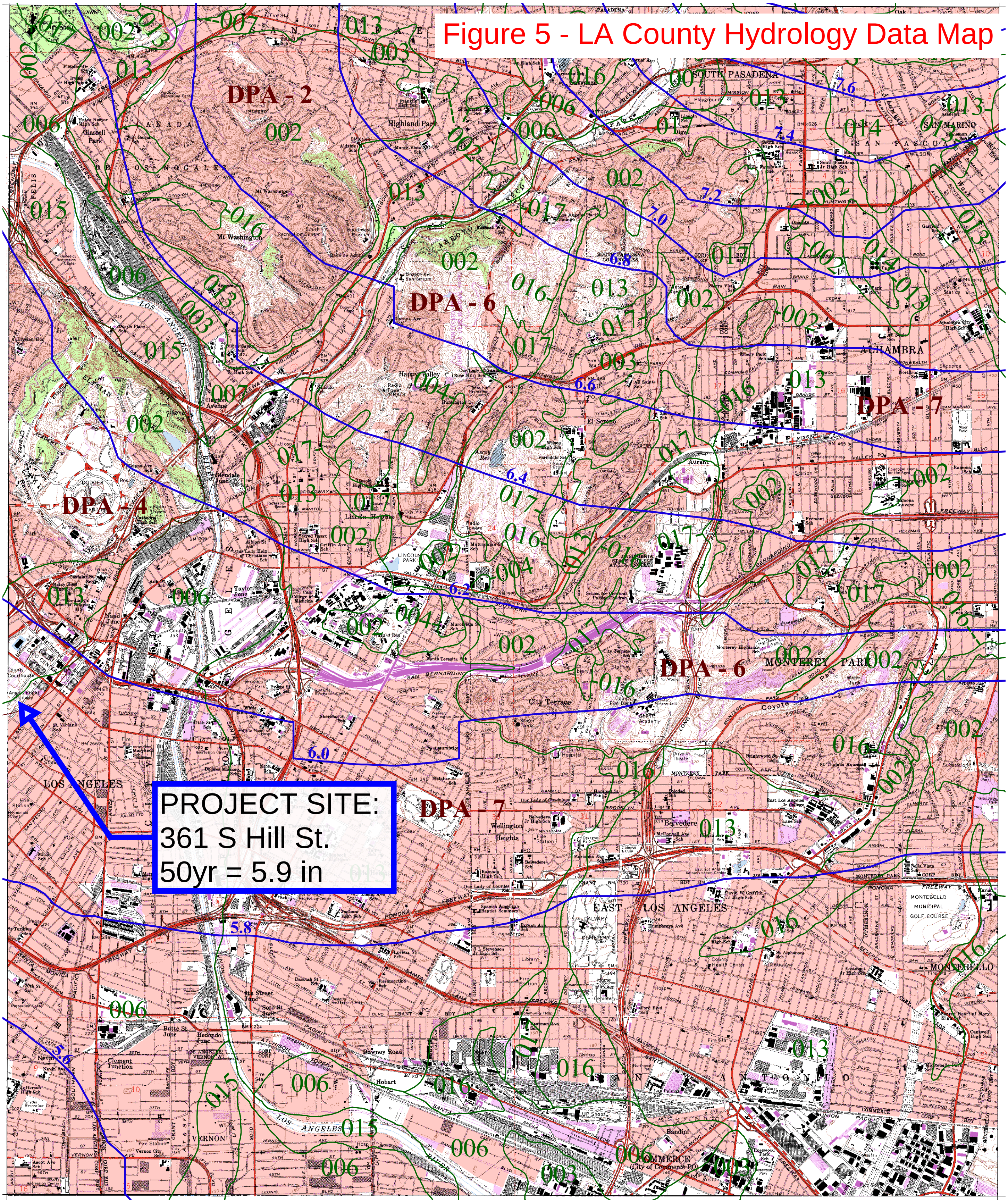
Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	3.5201
Undeveloped Runoff Coefficient (Cu)	0.8582
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.1599
Burned Peak Flow Rate (cfs)	7.1599
24-Hr Clear Runoff Volume (ac-ft)	0.9918
24-Hr Clear Runoff Volume (cu-ft)	43202.1735



34º 07' 30''

PASADENA 1-H1.29

-118º 15' 00''



HOLLYWOOD 1-H1.18

1-H1.20 EL MONTE

SOUTH GATE 1-H1.9

34º 00' 00''

-118º 07' 30''

N W E S

016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878

10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

LOS ANGELES
50-YEAR 24-HOUR ISOHYET

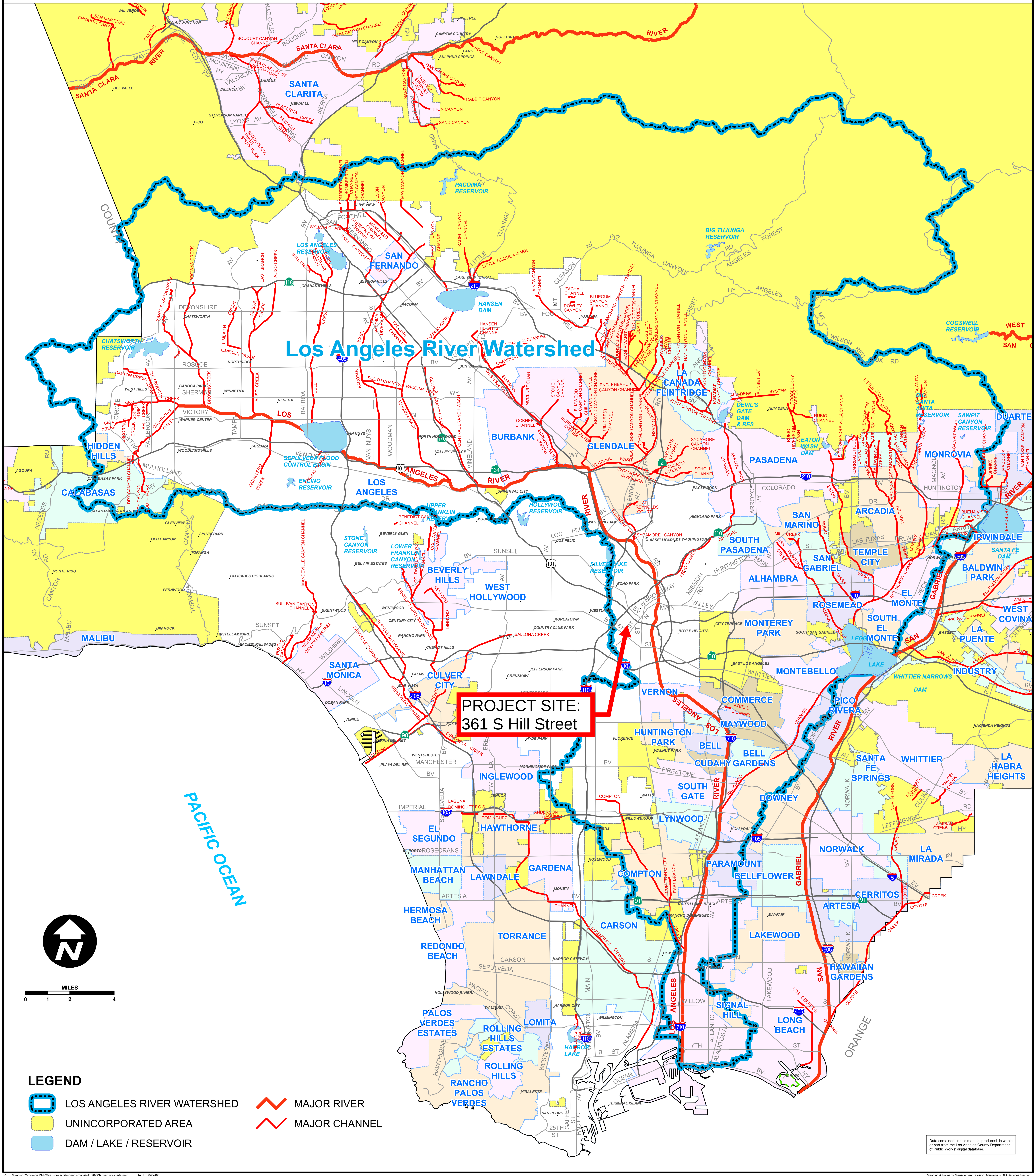
1-H1.19

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

COUNTY OF LOS ANGELES

LOS ANGELES RIVER WATERSHED

Figure 6 - Watershed Map



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

National Flood Hazard Layer FIRMette

FEMA

34°3'17.85"N

118°15'18.75"W

118°14'41.29"W

34°2'48.04"N

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

1:6,000

Legend

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

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

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

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

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

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

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

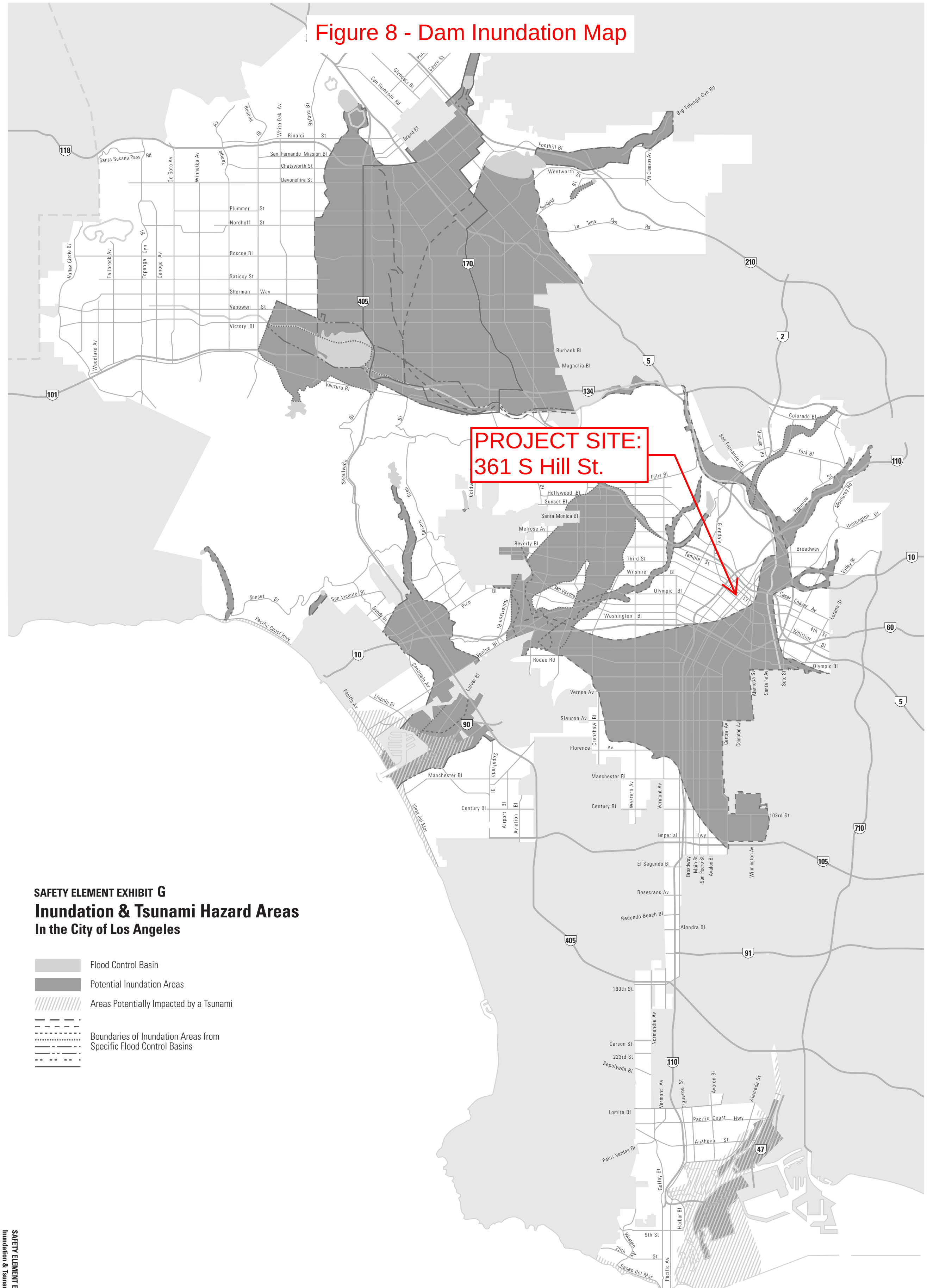
N

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/14/2018 at 7:32:46 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Figure 8 - Dam Inundation Map



SAFETY ELEMENT EXHIBIT G
Inundation & Tsunami Hazard Areas

Sources: Environmental Impact Report, Framework Element, Los Angeles City General Plan, May 1995; Technical Appendix to the Safety Element of the Los Angeles County General Plan Hazard Reducation in Los Angeles County, Volume 2, Plate 6, "Flood and Inundation Hazards" January 1990; California Environmental Quality Act of 1970 (CEQA), Public Resources Code Section 21000 *et. seq.* with guidelines as amended, 1992; California Government Code Title 7 chapter 3, article 5 section 65302(g), as amended 1993.

Prepared by the General Plan Framework Section • City of Los Angeles Planning Department • Citywide Graphics • March, 1994 • Council File No. 89-2104

NavigateLA Map

Figure 9 - Landslide and Liquefaction

L E G E N D

Geological Faults

Landslide

Liquefaction

100 50 0 100

Feet

This map is a user generated static output from an Intranet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate,current, or otherwise reliable.

1 : 1,667