Appendix O

Convention and Event Center Project Hydrology Technical Report

Convention Center and Event Center Project
Hydrology Technical Report
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1.0 INTRODUCTION

1.1 Project Description

The Convention and Event Center Project (hereafter referred to as the "Proposed Project") consists of the following three components: (1) expansion and modernization of the Los Angeles Convention Center (hereafter referred to as the "Convention Center"), (2) the construction of a new multi-use entertainment and sports facility (hereafter referred to as the "Event Center"), and (3) related parking and support facilities. The Proposed Project is located within an approximately 68-acre site that includes all of the existing Convention Center property, including the Bond Street Parking Lot and the Cherry Street Parking Garage, STAPLES Center, as well as the air space over Pico Boulevard and L A LIVE Way (hereafter referred to as the "Project Site"). The Project Site is generally bounded by the following major roadways: the I-110 Harbor Freeway to the west; Chick Hearn Court to the north; Figueroa Street to the east; and Venice Boulevard to the south.

With the implementation of the Proposed Project, the Project Site would function as a unified center for convention, sports and entertainment uses. The Proposed Project is proposed to be implemented through adoption of a new Specific Plan and Community Plan Amendment. Although the Specific Plan encompasses the entire Project Site, its primary focus would be on the regulation of the proposed buildings and related features, including signage, as well as the regulation of transportation and parking. In addition, notable elements of environmental sustainability would be comprehensively integrated into the Proposed Project and would be one of the key elements that would guide the design of the Proposed Project. Total building square footage to be constructed under the Proposed Project would be approximately 1.74 million square feet of net new gross floor area. A brief overview of each of the Proposed Project's three components is provided below.

The Proposed Project's first component would involve the demolition and replacement of the Convention Center's existing West and Petree Halls. The new structure (hereafter referred to as "New Hall"), would bridge over a portion of Pico Boulevard such that it would adjoin the Convention Center's existing South Hall and would consist of roughly the same amount of square footage as the former West and Petree Halls. While the total square footage would be comparable, the amount of functional space would substantially increase through a more efficient building design that among other benefits results in a substantial increase in contiguous floor space for the Convention Center.

The Proposed Project's second component is the development of the Event Center, a multi-purpose, entertainment and sports facility with a potentially retractable roof on the site of the former West and Petree Halls. The approximately 1,750,000 square-foot structure would include approximately 72,000 permanent seats with expandable seating capacity to approximately 76,250 seats for major marquee events, such as a Super Bowl. The Event Center would also be available for use as Convention Center exhibit and meeting room space, when not used for spectator events, providing roughly 245,650 square feet of rentable exhibition and meeting room space.

The Proposed Project's third component would involve the construction of new larger, more efficient parking facilities on the existing Bond Street Parking Lot and Cherry Street Garage sites. As the West Hall would be demolished, the existing 1,625 parking spaces under the West Hall would be removed by the Proposed Project. The existing Cherry Street Garage would be rebuilt and expanded from the existing 858 spaces to approximately 2,950 parking spaces. A new parking garage would be constructed on the existing Bond Street Parking Lot, which would increase parking on that site from approximately 283 to approximately 928 parking spaces. These improvements would result in a net increase of approximately 1,121 parking spaces. Additionally, above-ground pedestrian bridges would provide connectivity between these parking structures and the Event Center and New Hall, as well as to L A LIVE Way.

In addition to the above improvements, the Proposed Project includes up to approximately 100,000 square feet of renovations to the existing Concourse building. Changes to the Convention Center's existing South Hall would be limited to its interface with the proposed New Hall. Existing parking under the South Hall and in the Convention Center's Venice Garage would not be affected by the Proposed Project. Street vacations involving portions of Pico Boulevard, L A LIVE Way, Bond Street and 12th Street would also occur under the Proposed Project.

The Proposed Project also includes approximately 4,317 square feet of landscape areas associated with the Event Center Plaza, approximately 69,485 square feet of landscape areas for the Gil Lindsay Plaza, and approximately 40,656 square feet of landscape areas along L A LIVE Way.

1.2 Scope of Work

This report provides an evaluation of the existing conditions on and tributary to the Project Site, a comparison of the pre-developed and post-developed conditions, and a determination of the potential impacts of the Proposed Project. The purpose of this technical report is to determine the impact of the Proposed Project on surface water drainage in the vicinity of the Project Site.

1.3 Regulatory Framework

County of Los Angeles Hydrology Manual

Per the City's Special Order No. 007-1299, December 3, 1999, the City has adopted the Los Angeles County Department of Public Works Hydrology Manual as its basis of design for storm drainage facilities. The Los Angeles County Department of Public Works' 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 MS4 Permit and is enforced on all new developments that discharge directly into the County's

1. Los Angeles County Department of Public Works Hydrology Manual, January 2006, http://ladpw.org/wrd/publication/index.cfm, accessed October 19, 2011.

storm drain system. Any proposed drainage improvements of County owned storm drain facilities such as catch basins and storm drain lines requires the approval/review from the County Flood Control District department.

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, 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.

Low Impact Development

The City of Los Angeles Bureau of Sanitation, Watershed Protection Division would adopt the Low Impact Development (LID) standards as issued by the Los Angeles Regional Water Quality Control Board and the City of Los Angeles Department of Public Works. The City of Los Angeles LID Ordinance will conform to the regulations outlined in the NPDES Permit and SUSMP.

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 use 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. LID prioritizes the selection of BMPs used for a project in the following order:

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

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

- Require the use of LID standards and 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;

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

- Reduce erosion and hydrologic impacts downstream; and
- Enhance the recreational and aesthetic values in our communities.

City of Los Angeles Stormwater Program

Within the City, the National Pollutant Discharge Elimination System (NPDES) requirements mandate that stormwater Best Management Practices (BMPs) be implemented during Project construction into Storm Water Pollution Prevention Plans (SWPPPs) and during Project operation into Standard Urban Stormwater Management Plans (SUSMPs). The requirements are enforced through the City's plan review and approval process. During the review process, projects plans are reviewed for compliance with the City's General Plans, zoning ordinances, and other applicable local ordinances and codes, including stormwater requirements. Plans and specifications are reviewed to ensure that the appropriate BMPs are incorporated to address stormwater pollution prevention goals.

The purposes of the SWPPP are to identify potential pollutant sources that may affect the quality of discharge associated with construction activity, identify non-stormwater discharges, and design the use and placement of BMPs to effectively prohibit the entry of pollutants from the project site into the public storm drain system during construction.

The purpose of SUSMP is to reduce the discharge of pollutants in stormwater by outlining BMPs which must be incorporated into the design plans of new development and redevelopment. The SUSMP provisions that are applicable to new commercial developments include, but are not limited to, the following:[3]

- Peak Stormwater Runoff Discharge Rate: Post-development peak stormwater runoff discharge rates shall not exceed the estimated pre-development rate for developments where the increased peak stormwater discharge rate will result in increased potential for downstream erosion.

2.0 ENVIRONMENTAL SETTING

2.1 Regional Conditions

The Project Site is located within the greater Los Angeles area and, specifically, the Ballona Creek watershed. Ballona Creek is a nine-mile long flood protection channel that drains the Los Angeles basin, from the Santa Monica Mountains on the north, the Harbor Freeway (110) on the east [a small portion of the watershed extends east of the Harbor Freeway, which includes the Project Site], and the Baldwin Hills on the south. The Ballona Creek Watershed totals about 130 square miles. The major tributaries to the Ballona Creek include Centinela Creek, Sepulveda Canyon Channel, Benedict Canyon Channel, and numerous storm drains. Ballona Creek is designed to discharge to Santa Monica Bay at approximately

[3] City of Los Angeles Stormwater Program website, http://www.lastormwater.org/siteorg/businesses/susmp/industrial.htm; http://www.lastormwater.org/siteorg/businesses/susmp/housing.htm; accessed August 2, 2009.

71,400 cubic feet per second from a 50-year frequency storm event. The Ballona Creek watershed is comprised of all or parts of the Cities of Beverly Hills, Culver City, Inglewood, Los Angeles, Santa Monica, West Hollywood, and unincorporated Los Angeles County.[4]

The Project Site is located within the City of Los Angeles (City); drainage collection, treatment and conveyance is 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.[5] The City's CEQA Threshold Guide, however, establishes the 50-year frequency design storm event as the threshold to analyze potential impacts on surface water hydrology as a result of development. To provide a more conservative analysis, this report analyzed the larger storm event threshold, the 50-year frequency design storm event.

2.2 Local Area Conditions

The Project Site is located in downtown Los Angeles and is bounded on the west by the Harbor Freeway (110), on the north by Chick Hearn Court, on the east by Figueroa Street and on the south by Venice Boulevard. As shown in Figure 1 (Existing Project Site Tributary Areas), there are three tributary areas that contribute storm water runoff to and from the Project Site. Storm water runoff from on and off of the Project Site is conveyed through and within the Project Site by three existing storm drains, which are tributary to Ballona Creek. These include a 54-inch storm drain located near the intersection of Venice Boulevard and the I-10 off-ramp, a 42-inch storm drain main located adjacent to the Cherry Street Parking Garage, and a 33-inch storm drain main located adjacent to the Bond Street Parking Lot. Tributary areas that drain into these storm drains include off-site tributary area T-1 encompassing an area of 246.06 acres including most of the eastern half of the Project Site and extending off-site; tributary area T-2 encompassing an area of 26.98 acres including a portion of the West Hall and extending off-site; and tributary area T-3 encompassing an area of 19.09 acres including most of the western portion of the Project Site including the Bond Street Parking Lot and the Cherry Street Parking Garage and extending off-site. The 54-inch storm drain main collects surface water runoff from tributary area T-1. The 42-inch storm drain main collects surface water runoff from tributary area T-2. The 33-inch storm drain main collects surface water runoff from tributary area T-3.

2.3 Onsite Conditions

The existing Project Site is generally flat and is covered by approximately 94 percent of impervious surfaces including buildings, surface parking lots, and city streets. As described above, the Project Site falls within tributary areas T-1, T-2 and T-3, with the majority of the

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[4] LACDPW. LACDPW: Ballona Creek Watershed. 5 July 2011 <http://ladpw.org/wmd/watershed/bc/>.

[5] LACDPW. "Los Angeles County Hydrology Manual." 2006.

Proposed Project residing within tributary areas T-1 and T-3. As shown in Figure 2, based on the City of Los Angeles Drainage Maps, the Project Site is further divided into seven drainage basin sub-areas. Existing runoff flows during a 50-year storm event for the seven drainage basin sub-areas of the Project Site are provided in Table 1.

Table 1 - Existing Onsite Basin Stormwater Runoff Calculations		
Drainage Basin	Area (Acres) [a]	Q50 (cfs) (volumetric flow rate measured in cubic feet per second)
T-1A	7.67	15.36
T-1B	9.43	19.72
T-1C	25.69	46.41
T-2A	5.89	12.90
T-2B	1.87	4.54
T-2C	3.22	7.05
T-3A	17.96	29.09
[a] Areas represented in the table include 3.73 acres of public streets, which accounts for the difference in acreage from the project description.		

2.4 Flood Zone

According to the Flood Insurance Rate Map from the Federal Emergency Management Agency (FEMA), the potential for flooding is minimal as the Project Site is within flood Zone X. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.[6]

3.0 METHODOLOGY

The analysis of the Project includes the 50-year 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**

[6] FEMA. FEMA Map Service Center - FEMA Flood Zone Designations. 13 July 2011 <http://www.msc.fema.gov/webapp/wcs/stores/servlet/info?storeId=10001&catalogId=10001&langId=-1&content=floodZones&title=FEMA%20Flood%20Zone%20Designations>.

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.

The Los Angeles County of Department of Public Works developed a time of concentration calculator, Tc Calculator (*TC_calc_depth.xls, July 2006*), to automate time of concentration calculations as well as the peak runoff rates and volumes using the Modified Rational Method design criteria as outlined in the Hydrology Manual. The data input requirements include: sub-area size, soil type, land use, flow path length, flow path slope and rainfall isohyet. The Tc Calculator was used to calculate the storm water peak runoff flow rate for the Proposed Project conditions by evaluating an individual sub-area independent of all adjacent subareas. See Figure 4 for the Tc Calculator results.

4.0 SIGNIFICANCE THRESHOLDS

The City of Los Angeles CEQA Thresholds Guide states that a project would normally have a significant impact on surface water hydrology if it would:

- Cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources;
- Substantially reduce or increase the amount of surface water in a water body; or
- Result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow.

5.0 PROJECT DESIGN FEATURES

Standard Urban Stormwater Mitigation Plan (SUSMP)

The Project applicant will be required to implement a SUSMP, which will outline the stormwater treatment measures or post-construction Best Management Practices (BMPs) required to control pollutants associated with storm events up to the 3/4-inch precipitation level. In accordance with the City of Los Angeles, Watershed Protection Division Infiltration Requirements & Guidelines, the first priority for BMP selection related to storm water treatment is infiltration systems, when feasible. Infiltration systems are preferred as they provide for percolation and infiltration of the storm water into the ground, which not only reduces the volume of storm water runoff entering into the Municipal Separate Storm Sewer Systems (MS4), but in some cases, can contribute to groundwater recharge.

Infiltration may not be feasible due to sites having low permeability or impervious soils, sites with groundwater within 10 feet of existing grade or sites with steep slopes.[7] The second priority for BMP selection is biotreatment and filtration. BMPs such as bioswales, bioretention cells, etc. are acceptable forms of treatment to meet this second tier treatment level.

Low Impact Development (LID)

The Project will also comply with the Low Impact Development (LID) Standards which are intended to promote 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 capture and reuse BMPs or biofiltration BMPs that will store, evaporate, detain, and/or treat runoff may be used.[8]

- Infiltration refers to the physical process of percolation, or downward seepage, of water through a soil's pore space. As water infiltrates, the natural filtration, adsorption, and biological decomposition properties of soils, plant roots, and micro-organisms work to remove pollutants prior to the water recharging the underlying groundwater. Infiltration BMPs include infiltration basins, infiltration trenches, infiltration galleries, bioretention without an underdrain, dry wells, and permeable pavement. Infiltration can provide multiple benefits, including pollutant removal, peak flow control, groundwater recharge, and flood control. However, conditions that can limit the use of infiltration include soil properties, proximity to building foundations and other infrastructure, geotechnical hazards (e.g. liquefaction, landslides), and potential adverse impacts on groundwater quality (e.g. industrial pollutant source areas, contaminated soils, groundwater plumes). To ensure that infiltration would be physically feasible and desirable (i.e., not have adverse impacts), a categorical screening of site feasibility criteria must be completed prior to the use of infiltration BMPs.

- 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 synonymous 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

[7] City of Los Angeles Watershed Protection Division. "City of Los Angeles Standard Urban Stormwater Mitigation Plan Infiltration Requirements & Guidelines." n.d.

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

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.

- Biofiltration BMPs are landscaped facilities that capture and treat stormwater runoff through a variety of physical and biological treatment processes. Facilities normally consist of a ponding area, mulch layer, planting soils, plants, and in some cases, an underdrain. Runoff that passes through a biofiltration system is treated by the natural adsorption and filtration characteristics of the plants, soils, and microbes with which the water contacts. Biofiltration BMPs include vegetated swales, filter strips, planter boxes, high flow biotreatment units, bio-infiltration facilities, and bioretention facilities with underdrains. Biofiltration can provide multiple benefits, including pollutant removal, peak flow control, and low amounts of volume reduction through infiltration and evapotranspiration.

6.0 PROJECT IMPACTS

6.1 Construction

Construction activities for the Proposed Project would include the removal of the existing West Hall building, parking areas, plazas/paving and landscaping as well as grading and excavation. It is anticipated that up to approximately 866,900 cubic yards of soil would be graded and exported to construct the Proposed Project. Such activities have the potential to temporarily alter existing drainage patterns and flows by exposing the underlying soils and making the Project Site temporarily more permeable. 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 Proposed Project would be required to obtain coverage under the NPDES General Construction stormwater permit. In accordance with the requirements of this permit, the Proposed Project would implement a SWPPP that would specify 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 to the maximum extent feasible. In addition, the Proposed Project would be required to comply with 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 Proposed Project would not cause flooding, substantially increase or decrease the amount of surface water in a water body, or result in a permanent, adverse change to the movement of surface water. As such, construction-related impacts to hydrology would be less than significant.

In addition, new storm drain connections are proposed to support development and would be in place and functioning as development progresses to serve their respective catchments.

Installation of the new connections would primarily occur on-site and the new connections would be sized appropriately to convey runoff to the existing storm drain piping network in accordance with City standards. Therefore, construction-related impacts associated with stormwater infrastructure improvements would be less than significant.

6.2 Operations

The Project will increase the amount of pervious landscaped area by nearly an acre. Thus, the impervious area of the Project Site will decrease slightly from approximately 94% to approximately 93% after implementation of the Proposed Project.

Table 4 shows the proposed 50-year frequency design storm event peak flow rate for each drainage basin within the Project Site. A comparison of the peak flow rates shows there is no incremental impact from the existing to the proposed condition. Runoff would continue to follow the same discharge paths and drain to the same outlet pipes as the existing condition. Consequently, the Proposed Project would not cause on or off-site flooding during the 50-year developed storm event, would not substantially reduce or increase the amount of surface water in a water body, or result in a permanent adverse change to the movement of surface water, and the capacity of the existing storm drain system would not be impacted.

Table 2 - Proposed Project Onsite Basin Stormwater Runoff Calculations

Drainage Basin	Area (Acres) [b]	Q50 (cfs)	Incremental Increase from Existing to Proposed Condition[a]
T-1A	7.67	15.36	0%
T-1B	9.43	19.72	0%
T-1C	25.69	46.41	0%
T-2A	5.89	12.90	0%
T-2B	1.87	4.54	0%
T-2C	3.22	7.05	0%
T-3A	17.96	29.09	0%

[a] Analysis from Tc Calculator shows that a slight decrease in impervious surface area (from 94% to 93%) resulting from the existing to the Proposed Project condition results in a small, negligible decrease in the peak flow rate. Due to numeric rounding limitations within the software, the incremental increase is shown as zero.

[b] Areas represented in the table include 3.73 acres of public streets, which accounts for the difference in acreage from the project description.

Because the Proposed Project peak flow rates are unchanged from the existing peak flow rates, no detention facilities are required for hydrologic purposes. New storm drain connections are proposed to collect runoff from building roof drains and site catch basins serving the Proposed Project. The new pipes will be sized appropriately to convey runoff to the existing storm drain piping network. Proposed Project impacts related to storm water infrastructure improvements would be less than significant.

Even though there is a negligible decrease in peak flow rate from the existing conditions, the Project Applicant would prepare and implement SUSMP and LID requirements throughout the operational life of the Proposed Project. The SUSMP requirements for the Project Site would outline the stormwater treatment measures or post-construction BMPs required to control pollutants associated with storm events up to the 0.75-inch precipitation level, per the City's Stormwater Program. The BMPs to be implemented with the Proposed Project would ensure that at a minimum no increase in flows would result with the Proposed Project. Therefore, as the Proposed Project would not impact the existing storm drain system serving the Project Site and as runoff would continue to follow the same discharge paths and drain to the same storm drains, potential impacts to hydrology would be less than significant.

6.3 Cumulative Impacts

The geographic context for the cumulative impact analysis on surface water hydrology is the Ballona Creek watershed. The Proposed Project in conjunction with forecasted 2017 growth in the Ballona Creek watershed (inclusive of the related projects) would cumulatively increase stormwater runoff flows potentially resulting in cumulative impacts to surface water hydrology. However, in accordance with City requirements, related projects and other future development projects would be required to implement BMPs such that post-development peak stormwater runoff discharge rates would not exceed the estimated pre-development rates. Furthermore, the City of Los Angeles Department of Public Works would review each future development project on a case-by-case basis to ensure sufficient local and regional drainage capacity is available to accommodate stormwater runoff. Therefore, cumulative impacts on surface water hydrology would be less than significant.

7.0 LEVEL OF SIGNIFICANCE

Based on the analysis contained in this report, no significant impacts to hydrology have been identified for the Proposed Project.

REFERENCES

FEMA. FEMA Map Service Center - FEMA Flood Zone Designations. 13 July 2011 <http://www.msc.fema.gov/webapp/wcs/stores/servlet/info?storeId=10001&catalogId=10001&langId=-1&content=floodZones&title=FEMA%20Flood%20Zone%20Designations>.

LACDPW. LACDPW: Ballona Creek Watershed. 5 July 2011 <http://ladpw.org/wmd/watershed/bc/>.

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City of Los Angeles Watershed Protection Division. "City of Los Angeles Standard Urban Stormwater Mitigation Plan Infiltration Requirements & Guidelines." n.d.

City of Los Angeles. "Low Impact Development Best Management Practices Handbook." June, 2011

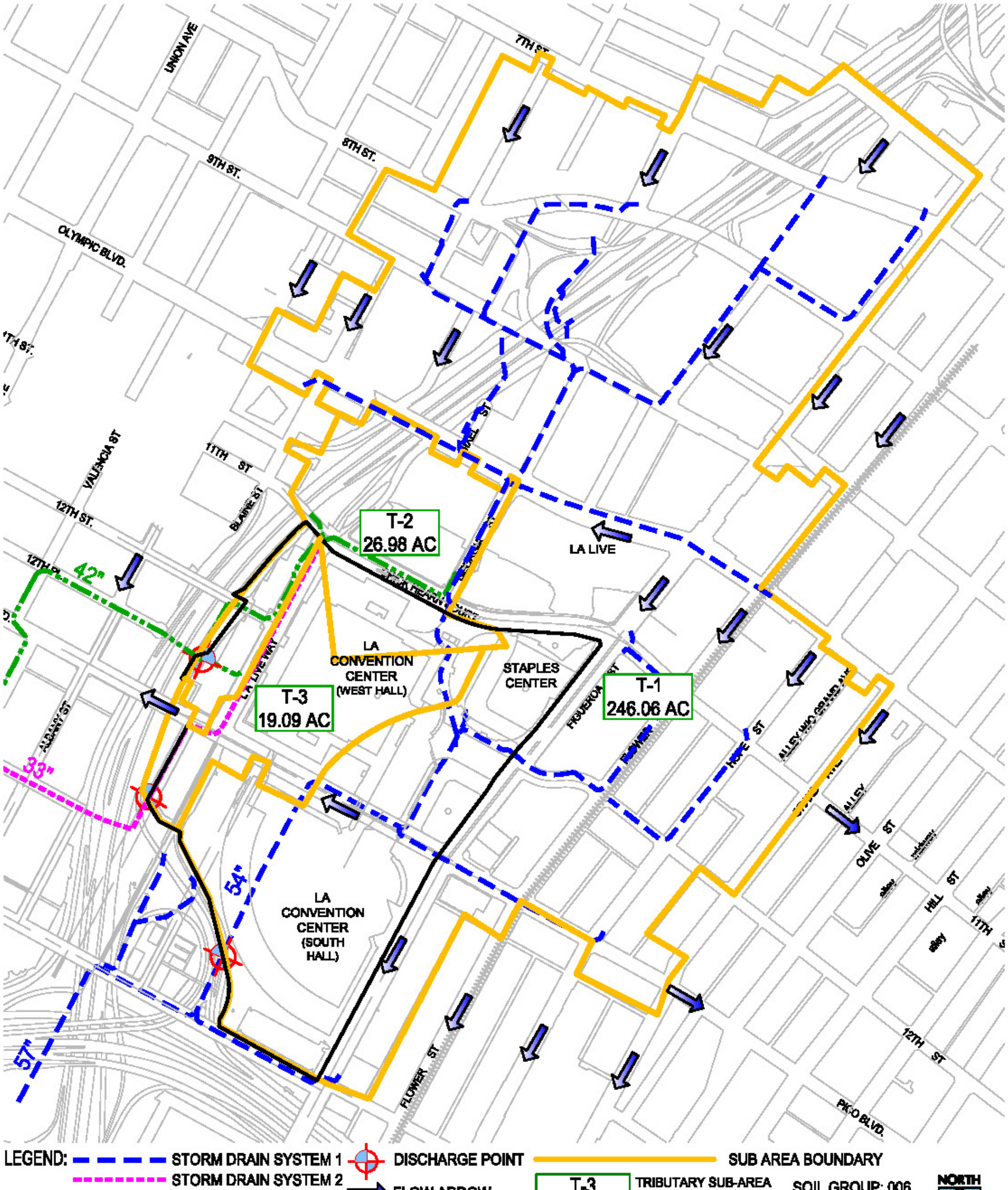


FIGURE-1

EXISTING PROJECT SITE TRIBUTARY AREAS

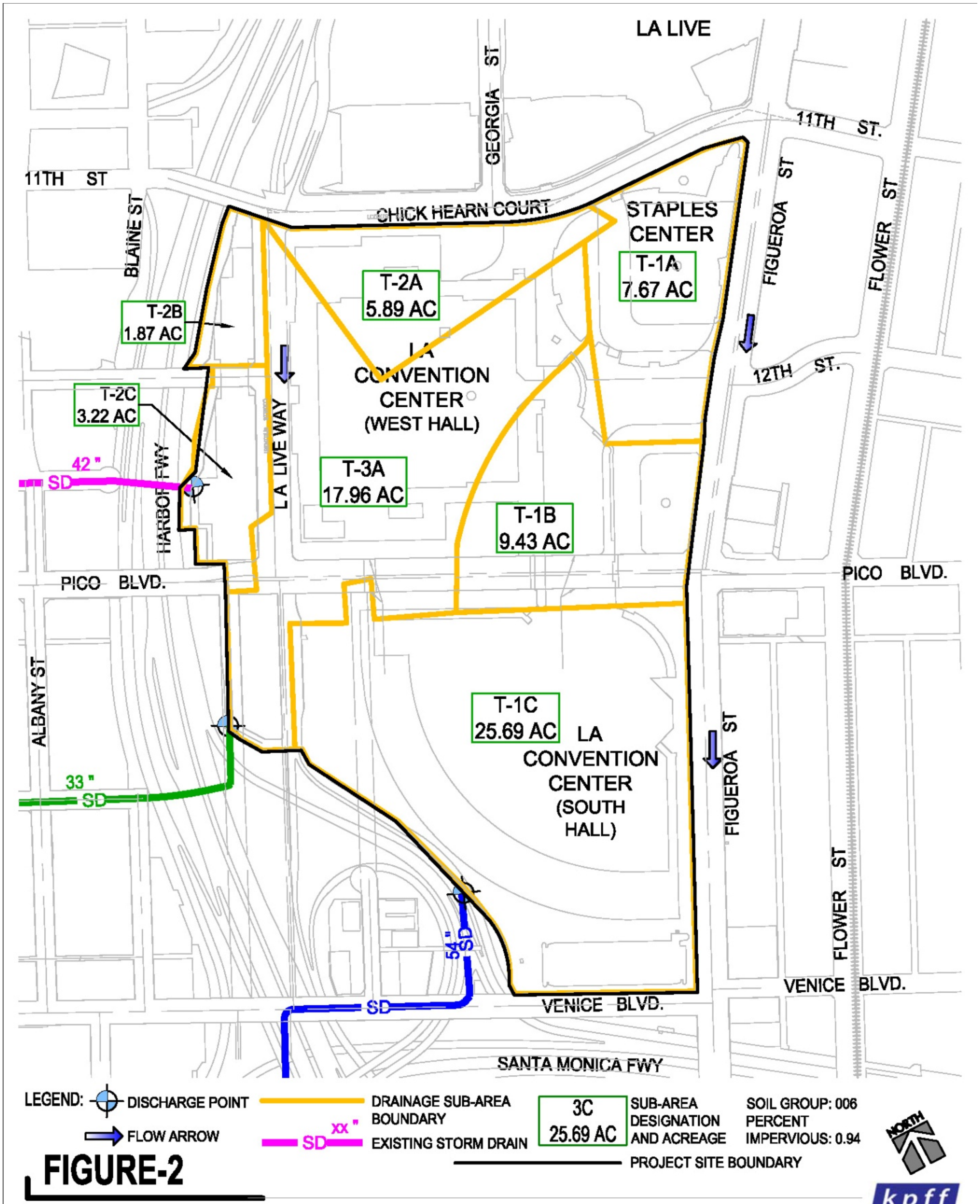


FIGURE-2

HYDROLOGY EXISTING CONDITIONS

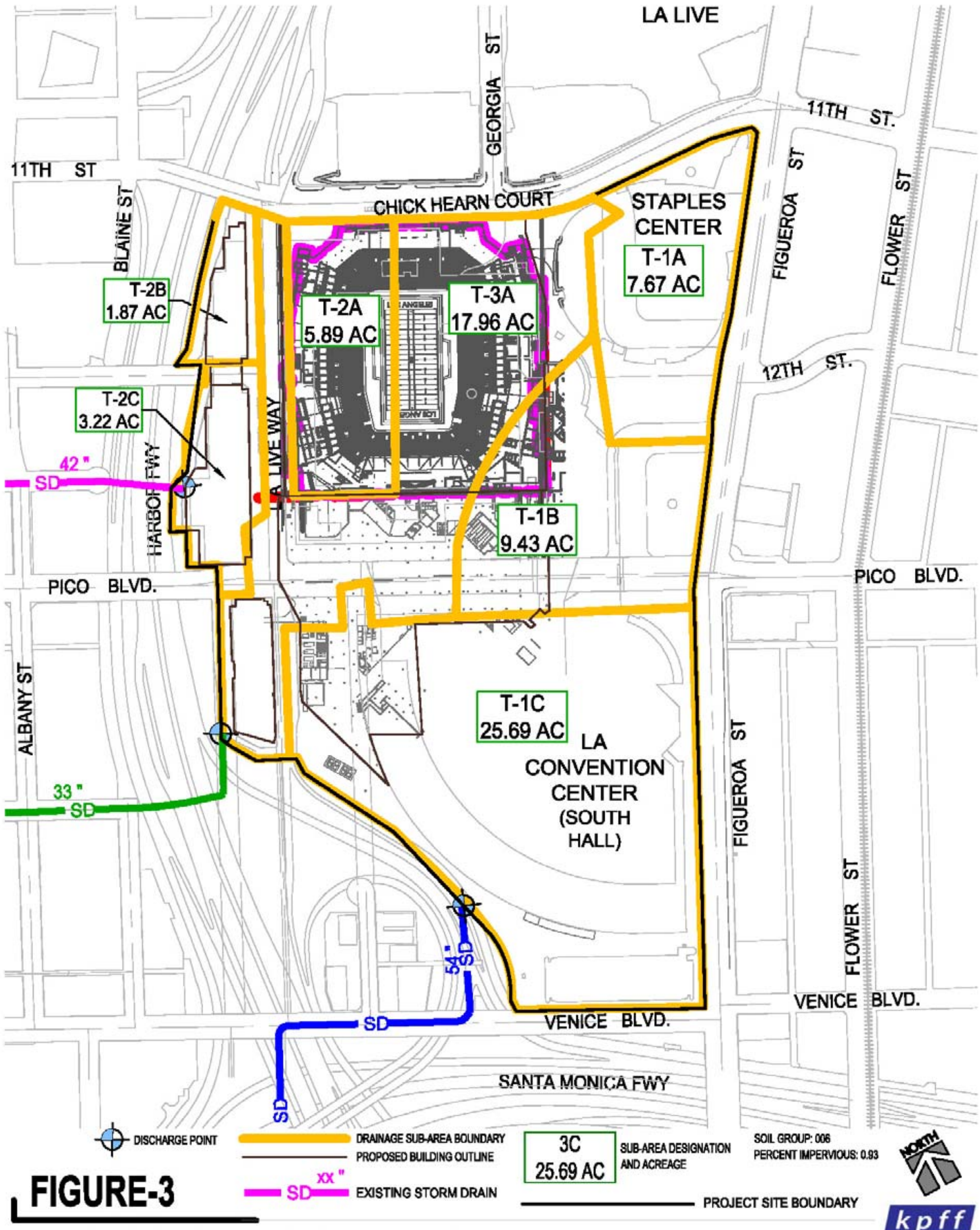


FIGURE-3

HYDROLOGY PROPOSED PROJECT CONDITIONS

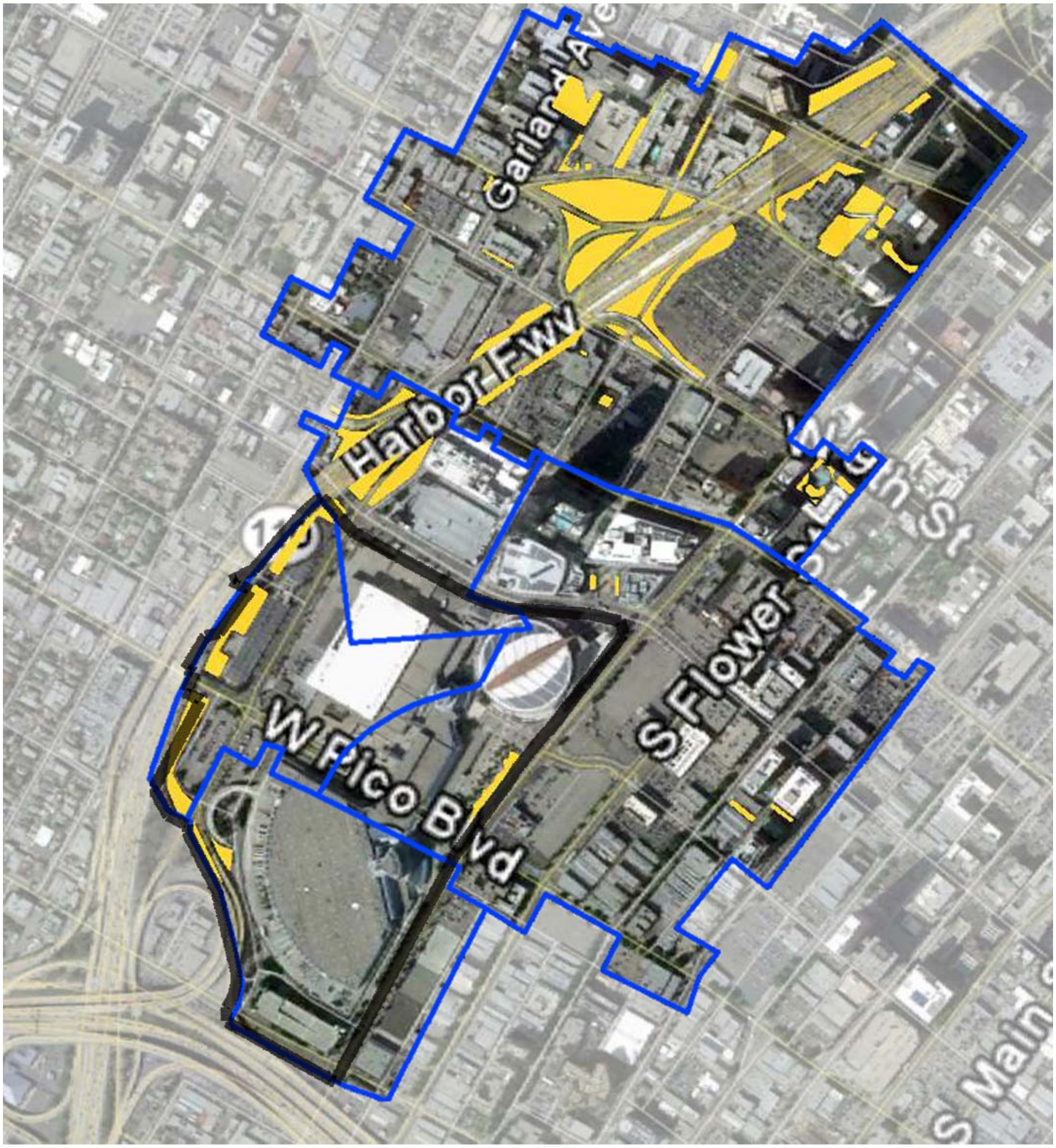
Figure-4 - Tc Calculator Results

Existing Onsite Basin Flow Results

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flow rate (cfs)
Exist	T-1A	7.67	0.94	50	6	1024	0.0058	5.7	12	2.25	0.76	0.89	15.36
Exist	T-1B	9.43	0.94	50	6	834	0.0058	5.7	11	2.35	0.77	0.89	19.72
Exist	T-1C	25.69	0.94	50	6	1348	0.0058	5.7	15	2.03	0.74	0.89	46.41
Exist	T-2A	5.89	0.94	50	6	737	0.0058	5.7	10	2.46	0.78	0.89	12.9
Exist	T-2B	1.87	0.94	50	6	503	0.0058	5.7	8	2.73	0.8	0.89	4.54
Exist	T-2C	3.22	0.94	50	6	670	0.0058	5.7	10	2.46	0.78	0.89	7.05
Exist	T-3A	17.96	0.94	50	6	1946	0.0058	5.7	19	1.82	0.71	0.89	29.09

Proposed Project Onsite Basin Flow Results

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flow rate (cfs)
Prop	T-1A	7.67	0.93	50	6	1024	0.0058	5.7	12	2.25	0.76	0.89	15.36
Prop	T-1B	9.43	0.93	50	6	834	0.0058	5.7	11	2.35	0.77	0.89	19.72
Prop	T-1C	25.69	0.93	50	6	1348	0.0058	5.7	15	2.03	0.74	0.89	46.41
Prop	T-2A	5.89	0.93	50	6	737	0.0058	5.7	10	2.46	0.78	0.89	12.9
Prop	T-2B	1.87	0.93	50	6	503	0.0058	5.7	8	2.73	0.8	0.89	4.54
Prop	T-2C	3.22	0.93	50	6	670	0.0058	5.7	10	2.46	0.78	0.89	7.05
Prop	T-3A	17.96	0.93	50	6	1946	0.0058	5.7	19	1.82	0.71	0.89	29.09



LEGEND: SUB AREA BOUNDARY — LANDSCAPE AREA — PROJECT SITE BOUNDARY

NORTH

kpff

FIGURE-5

EXISTING LANDSCAPE AREAS WITHIN THE PROJECT SITE WATERSHED AREA