Appendix M Pacific Oaks Commerce Center WQMP

Appendices

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Preliminary Water Quality Management Plan

For:

Pacific Oaks Commerce Center

APNS: 0301-201-40, 0301-201-41, 0301-201-42, 0301-211-10, 0301-211-12, 0301-201-26, 0301-191-21

Prepared for:

Palmer General Corporation

32335 Live Oak Canyon Rd

Redlands, CA 92373

(909) 534-6958

Prepared by:

Kimley-Horn and Associates

1100 Town and Country Rd, Suite 700

Orange, CA 92868

(714) 705-1374

Submittal Date: 12/23/2022

Revision Date: _____

Approval Date:_____

Project Owner's Certification

This Water Quality Management Plan (WQMP) has been prepared for Palmer General Corporation by Kimley-Horn and Associates. The WQMP is intended to comply with the requirements of the City of Yucaipa and the NPDES Areawide Stormwater Program requiring the preparation of a WQMP. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with San Bernardino County's Municipal Storm Water Management Program and the intent of the NPDES Permit for San Bernardino County and the incorporated cities of San Bernardino County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors in interest and the city/county shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity.

"I certify under a penalty of law that the provisions (implementation, operation, maintenance, and funding) of the WQMP have been accepted and that the plan will be transferred to future successors."

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Project Data			
Permit/Application Number(s):	TBD	Grading Permit Number(s):	TBD
Tract/Parcel Map Number(s):	TBD	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APNS: 0301-201-40, 0301-201-41, 0301-201-42, 0301-211-10, 0301-211-12, 0301-201-26, 0301-191-21

Owner's Signature		
Owner Name:		
Title		
Company	Palmer General Corporation	
Address	32335 Live Oak Canyon Rd, Redlands, CA 92373	
Email		
Telephone #	(909) 564-6958	
Signature	Date	

Preparer's Certification

Project Data			
Permit/Application Number(s):	TBD	Grading Permit Number(s):	TBD
Tract/Parcel Map Number(s):	TBD	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APNS: 0301-201-40, 0301-201-41, 0301-201-42, 0301-211-10, 0301-211-12, 0301-201-26, 0301-191-21

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan were prepared under my oversight and meet the requirements of Regional Water Quality Control Board Order No. R8-2010-0036."

Engineer: Jacob Glaze, P.E., QSD		PE Stamp Below
Title	Project Manager	
Company	Kimley-Horn and Associates	
Address	1100 Town and Country Rd, Suite 700 Orange, CA 92868	
Email	Jacob.Glaze@kimley-horn.com	
Telephone #	(714) 705-1374	
Signature		
Date		

Table of Contents

Forms

Section 1 Discretionary Permit(s)

Form 1-1 Project Information					
Project Name	Palmer General Corporation				
Project Owner Contact Name:					
Mailing Address:	32335 Live Oak Canyon Rd Redlands, CA 92373	E-mail Address:		Telephone:	(909) 534-6958
Permit/Application Number(s):	TBD		Tract/Parcel Map Number(s):	TBD	
Additional Information/ Comments:	N/A				
Description of Project:	The project site is located southwest of the intersection between Live Oak Canyon Road and the I-10 and is bounded by Live Oak Canyon Road to the West, an existing farm to the North, the I-10 to the East, and undeveloped land to the South. The entire project site measures approximately 323.99 acres and will be developed in phases. The project intends to develop the site into two new industrial complexes. The existing project site is vacant, undeveloped land with poor coverage. The soils have a hydrologic soil group classification of "B", and the topography of the project site shows that runoff within the site primarily sheet flows towards the west and confluences into the Yucaipa Creek. The proposed site is considered an industrial development and intends to develop approximately 323.99 acres into two industrial buildings, parking areas, loading docks, drive aisles, and landscape areas. Towards the western portion of the site will be an undeveloped parcel used to store excess cut from the development. Stormwater runoff within the disturbed areas will be collected by nearby catch basins and conveyed to a diversion structure that directs low flows into a hydrodynamic separator for pretreatment. Pretreated flows will then be routed into an Underground CMP Detention System where it will be temporarily detained and released at a mitigated flowrate towards a Modular Wetland System for treatment prior to discharging offsite. In the case of larger storm events, high flows will bypass the detention system and be diverted directly offsite through the diversion structure. Refer to the Post-Development Exhibit in Section 6.1 for more information. Due to the surrounding area being largely undeveloped, the project site naturally receives offsite runon from the eastern area. To maintain existing drainage patterns, the project proposes to collect and route offsite drainage across the site through a storm drain placed along the proposed public road. Offsite runon entering the public storm drain will continue flowing west and ultimately outlet near the westerly property line.				

Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.	N/A

Section 2 Project Description

2.1 Project Information

This section of the WQMP should provide the information listed below. The information provided for Conceptual/ Preliminary WQMP should give sufficient detail to identify the major proposed site design and LID BMPs and other anticipated water quality features that impact site planning. Final Project WQMP must specifically identify all BMP incorporated into the final site design and provide other detailed information as described herein.

The purpose of this information is to help determine the applicable development category, pollutants of concern, watershed description, and long term maintenance responsibilities for the project, and any applicable water quality credits. This information will be used in conjunction with the information in Section 3, Site Description, to establish the performance criteria and to select the LID BMP or other BMP for the project or other alternative programs that the project will participate in, which are described in Section 4.

Form 2.1-1 Description of Proposed Project

1 Development Category (Select all that apply):

☐ Significant re-development involving the addition or replacement of 5,000 ft² or more of impervious surface on an already developed site	☒ New development involving the creation of 10,000 ft² or more of impervious surface collectively over entire site	☐ Automotive repair shops with standard industrial classification (SIC) codes 5013, 5014, 5541, 7532- 7534, 7536-7539	☐ Restaurants (with SIC code 5812) where the land area of development is 5,000 ft² or more
☒ Hillside developments of 5,000 ft² or more which are located on areas with known erosive soil conditions or where the natural slope is 25 percent or more	☐ Developments of 2,500 ft² of impervious surface or more adjacent to (within 200 ft) or discharging directly into environmentally sensitive areas or waterbodies listed on the CWA Section 303(d) list of impaired waters.	☒ Parking lots of 5,000 ft² or more exposed to storm water	☐ Retail gasoline outlets that are either 5,000 ft² or more, or have a projected average daily traffic of 100 or more vehicles per day

☐ Non-Priority / Non-Category Project *May require source control LID BMPs and other LIP requirements. Please consult with local jurisdiction on specific requirements*.

2 Project Area (ft2):	14,113,065	**3** Number of Dwelling Units:	0	**4** SIC Code:	4225

5 Is Project going to be phased? Yes ☒ No ☐ *If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.*

6 Does Project include roads? Yes ☒ No ☐ *If yes, ensure that applicable requirements for transportation projects are addressed (see Appendix A of TGD for WQMP)*

2.2 Property Ownership/Management

Describe the ownership/management of all portions of the project and site. State whether any infrastructure will transfer to public agencies (City, County, Caltrans, etc.) after project completion. State if a homeowners or property owners association will be formed and be responsible for the long-term maintenance of project stormwater facilities. Describe any lot-level stormwater features that will be the responsibility of individual property owners.

Form 2.2-1 Property Ownership/Management

Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:

All proposed BMP's for the project site will be maintained by Palmer General Corporation with shared maintenance responsibilities with the future parcel owners. Long term maintenance of the property, which will include maintenance of all stormwater BMPs and facilities will be memorialized through a CC&R to be prepared as part of this project.

Maintenance of the WQMP facilities will be the responsibility of the property owner:

Palmer General Corporation
32335 Live Oak Canyon Road
Redlands, CA 92373
Phone: (909) 534-6958

The owner may choose to contract the appropriate employers for the maintenance of stormwater to whom will provide the proper equipment if the current owners do not have the proper equipment and/or knowledge to do so.

Any future property owner(s) will succeed Palmer General Corporation as the entity responsible for long term maintenance.

No infrastructure will be transferred to a public agency after completion.

2.3 Potential Stormwater Pollutants

Determine and describe expected stormwater pollutants of concern based on land uses and site activities (refer to Table 3-3 in the TGD for WQMP).

Form 2.3-1 Pollutants of Concern			
Pollutant	Please check: E=Expected, N=Not Expected		Additional Information and Comments
Pathogens (Bacterial / Virus)	E ☒	N ☐	Wild Bird and Pet Waste, Garbage
Nutrients - Phosphorous	E ☒	N ☐	Fertilizers, Food Waste, & Garbage
Nutrients - Nitrogen	E ☒	N ☐	Fertilizer & Waste
Noxious Aquatic Plants	E ☐	N ☒	The proposed development does not include any areas where water will be standing long enough to allow the growth of aquatic plants.
Sediment	E ☒	N ☐	Driveways, Rooftops, Sidewalks, Paved Areas, & Landscape
Metals	E ☒	N ☐	Cars, Trucks, & Parking Areas
Oil and Grease	E ☒	N ☐	Leaking Vehicles & Parking Areas
Trash/Debris	E ☒	N ☐	Poorly managed trash containers & parking areas
Pesticides / Herbicides	E ☒	N ☐	Landscape Areas
Organic Compounds	E ☒	N ☐	Cars & Trucks
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	

2.4 Water Quality Credits

A water quality credit program is applicable for certain types of development projects if it is not feasible to meet the requirements for on-site LID. Proponents for eligible projects, as described below, can apply for water quality credits that would reduce project obligations for selecting and sizing other treatment BMP or participating in other alternative compliance programs. Refer to Section 6.2 in the TGD for WQMP to determine if water quality credits are applicable for the project.

Form 2.4-1 Water Quality Credits

1 Project Types that Qualify for Water Quality Credits: *Select all that apply*

☐ Redevelopment projects that reduce the overall impervious footprint of the project site. [Credit = % impervious reduced]	Higher density development projects ☐ Vertical density [20%] ☐ 7 units/ acre [5%]	☐ Mixed use development, (combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that demonstrate environmental benefits not realized through single use projects) [20%]	☐ Brownfield redevelopment (redevelop real property complicated by presence or potential of hazardous contaminants) [25%]
☐ Redevelopment projects in established historic district, historic preservation area, or similar significant core city center areas [10%]	☐ Transit-oriented developments (mixed use residential or commercial area designed to maximize access to public transportation) [20%]	☐ In-fill projects (conversion of empty lots & other underused spaces < 5 acres, substantially surrounded by urban land uses, into more beneficially used spaces, such as residential or commercial areas) [10%]	☐ Live-Work developments (variety of developments designed to support residential and vocational needs) [20%]

2 Total Credit % *(Total all credit percentages up to a maximum allowable credit of 50 percent)*

Description of Water Quality Credit Eligibility (if applicable)	N/A

Section 3 Site and Watershed Description

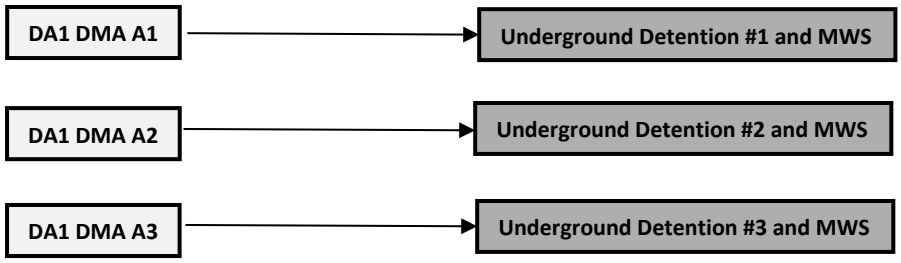
Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and sub-watershed DMAs) is conveyed to the site outlet(s). Refer to Section 3.2 in the TGD for WQMP. The form below is provided as an example. Then complete Forms 3.2 and 3.3 for each DA on the project site. ***If the project has more than one drainage area for stormwater management, then complete additional versions of these forms for each DA / outlet.***

Form 3-1 Site Location and Hydrologic Features

Site coordinates *take GPS measurement at approximate center of site*	Latitude 34.01204	Longitude -117.0983	Thomas Bros Map page 649

1 San Bernardino County climatic region: ☒ Valley ☐ Mountain

2 Does the site have more than one drainage area (DA): Yes☒ No☐ *If no, proceed to Form 3-2. If yes, then use this form to show a conceptual schematic describing DMAs and hydrologic feature connecting DMAs to the site outlet(s). An example is provided below that can be modified for proposed project or a drawing clearly showing DMA and flow routing may be attached*



Example only – modify for project specific WQMP using additional form

Conveyance	Briefly describe on-site drainage features to convey runoff that is not retained within a DMA
DA1 DMA A to Underground Detention #1 and MWS	Stormwater runoff sheet flows into nearby catch basins and is routed to an underground detention basin and modular wetland system for treatment.
DA1 DMA A to Underground Detention #2 and MWS	Stormwater runoff sheet flows into nearby catch basins and is routed to an underground detention basin and modular wetland system for treatment.
DA1 DMA A to Underground Detention #3 and MWS	Stormwater runoff sheet flows into nearby catch basins and is routed to an underground detention basin and modular wetland system for treatment.
DA2 to Outlet 2	

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1

For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA A1	DMA A2	DMA A3	DMA A4
1 DMA drainage area (ft^2)	474,231	898,261	1,161,199	2,108,245
2 Existing site impervious area (ft^2)	0	0	0	0
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	II	II	II	II
4 Hydrologic soil group *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	B	B	B	B
5 Longest flowpath length (ft)	738	2036	1273	1929
6 Longest flowpath slope (ft/ft)	0.236	0.095	0.115	0.092
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*	Undeveloped (Annual Grass, Poor)	Undeveloped (Annual Grass, Poor)	Undeveloped (Annual Grass, Poor)	Undeveloped (Annual Grass, Poor)
8 Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating*	Poor	Poor	Poor	Poor

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1 (use only as needed for additional DMA w/in DA 1)				
For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA A5	DMA A6	DMA A7	DMA H
1 DMA drainage area (ft^2)	3,731,265	3,909,321	1,830,544	
2 Existing site impervious area (ft^2)	0	0	0	
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	II	II	II	
4 Hydrologic soil group *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	B	B	B	
5 Longest flowpath length (ft)	4,966	3,015	1,431	
6 Longest flowpath slope (ft/ft)	0.050	0.050	0.077	
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*	Undeveloped (Annual Grass, Poor)	Undeveloped (Annual Grass, Poor)	Undeveloped (Annual Grass, Poor)	
8 Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating*	Poor	Poor	Poor	

Form 3-3 Watershed Description for Drainage Area

Receiving waters *Refer to Watershed Mapping Tool - http://permitrack.sbcounty.gov/wap/ See 'Drainage Facilities" link at this website*	Yucaipa Creek San Timoteo River Reach 2 San Timoteo Creek Reach 1A Santa Ana River, Reach 4 Santa Ana River, Reach 3 Prado Basin
Applicable TMDLs *Refer to Local Implementation Plan*	**Yucaipa Creek** N/A **San Timoteo River Reach 2** N/A **San Timoteo Creek Reach 1A** N/A **Santa Ana River, Reach 4** N/A **Santa Ana River, Reach 3** Indicator Bacteria **Prado Basin** N/A
303(d) listed impairments *Refer to Local Implementation Plan and Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/ and State Water Resources Control Board website – http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml*	**Yucaipa Creek** N/A **San Timoteo River Reach 2** Indicator Bacteria **San Timoteo Creek Reach 1A** Indicator Bacteria **Santa Ana River, Reach 4** Indicator Bacteria **Santa Ana River, Reach 3** Copper, Lead, Indicator Bacteria **Prado Basin** pH
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	Coastal Sage Scrub

Unlined Downstream Water Bodies *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	Yucaipa Creek San Timoteo River Portions of the Santa Ana River
Hydrologic Conditions of Concern	☒ Yes *Complete Hydrologic Conditions of Concern (HCOC) Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-10 in submittal* ☐ No
Watershed–based BMP included in a RWQCB approved WAP	☐ Yes *Attach verification of regional BMP evaluation criteria in WAP* • *More Effective than On-site LID* • *Remaining Capacity for Project DCV* • *Upstream of any Water of the US* • *Operational at Project Completion* • *Long-Term Maintenance Plan* ☒ No

Section 4 Best Management Practices (BMP)

4.1 Source Control BMP

4.1.1 Pollution Prevention

Non-structural and structural source control BMP are required to be incorporated into all new development and significant redevelopment projects. Form 4.1-1 and 4.1-2 are used to describe specific source control BMPs used in the WQMP or to explain why a certain BMP is not applicable. Table 7-3 of the TGD for WQMP provides a list of applicable source control BMP for projects with specific types of potential pollutant sources or activities. The source control BMP in this table must be implemented for projects with these specific types of potential pollutant sources or activities.

The preparers of this WQMP have reviewed the source control BMP requirements for new development and significant redevelopment projects. The preparers have also reviewed the specific BMP required for project as specified in Forms 4.1-1 and 4.1-2. All applicable non-structural and structural source control BMP shall be implemented in the project.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N1	Education of Property Owners, Tenants and Occupants on Stormwater BMPs	☒	☐	The current owner/developer and future owners and their POA shall be familiar with the contents of this WQMP and County & City ordinances and brochures and furnish copies of these documents to all future property owners.
N2	Activity Restrictions	☒	☐	Property owners and their tenants or occupants shall not be allowed to discharge chemicals, chemical residues, wastewater or other prohibited discharges listed in the City Stormwater Ordinance, to the outside, paved areas of the site, or store chemicals or other pollutant sources in non-spill containers or covered facilities as stipulated in the CC&Rs.
N3	Landscape Management BMPs	☒	☐	The POA and their landscape maintenance contractor shall inspect the irrigation system, plant health, and erosion problems after each landscape procedure and shall report all repairs and problems to the POA.
N4	BMP Maintenance	☒	☐	The POA shall inspect for standing water in underground chamber systems, 48 hours after significant storm events. BMP maintenance shall be performed per the schedule in Form 5-1, as needed to restore free drainage and maintain all other Source Control BMPs.
N5	Title 22 CCR Compliance (How development will comply)	☒	☐	The POA will file appropriate hazardous material disclosures, if any storage is conducted, and must comply with all Title 22 CCR, Chapter 29 regulations.
N6	Local Water Quality Ordinances	☒	☐	The POA shall ensure that all maintenance activities at the site comply with the City Stormwater Ordinance, through the implementation of BMPs.
N7	Spill Contingency Plan	☒	☐	Building operators shall prepare specific plans based on materials on site for the cleanup of spills. Plans shall mandate stock piling of cleanup materials, notification of agencies, disposal, documentation, etc.
N8	Underground Storage Tank Compliance	☒	☐	The proposed development does not include underground storage of materials.

Form 4.1-1 Non-Structural Source Control BMPs				
N9	Hazardous Materials Disclosure Compliance	☐	☒	The current owner and the future POA shall prohibit the storage of hazardous materials.

Form 4.1-1 Non-Structural Source Control BMPs				
Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N10	Uniform Fire Code Implementation	☒	☐	The current owners or future POA shall require all fire code requirements to be implemented at this project site.
N11	Litter/Debris Control Program	☒	☐	The property owners, POA and their contractor shall pick up litter and sweep and clean the existing trash enclosure weekly. The trash enclosures is designed to divert all flows around the dumpsters and shall be roofed. The HOA shall contract with a refuse company to have the dumpsters emptied on a weekly basis, at a minimum.
N12	Employee Training	☒	☐	The POA shall require all maintenance contractors to train their employees in stormwater BMP implementation.
N13	Housekeeping of Loading Docks	☒	☐	Dock areas shall be swept regularly with litter control and cleanup procedures eliminating the use of water.
N14	Catch Basin Inspection Program	☒	☐	The on-site catch basins shall be inspected monthly during the rainy season (October-May) and before and after each storm to ensure proper operation. The HOA shall contract with a qualified landscape contractor to inspect and clean out accumulation of trash, litter, and sediment and check for evidence of illegal dumping of waste materials into on-site storm drains.
N15	Vacuum Sweeping of Private Streets and Parking Lots	☒	☐	The paved areas and common open areas of the project site shall be swept and cleaned weekly by the POA's contractor.
N16	Other Non-structural Measures for Public Agency Projects	☐	☒	This development is not a part of a Public Agency Project.

Form 4.1-1 Non-Structural Source Control BMPs				
N17	Comply with all other applicable NPDES permits	☒	☐	The developer of this site shall comply with all BMP implementation requirements of the City for stormwater discharge during construction of this project and shall file for a permit coverage under the Statewide General Construction Stormwater Permit, prior to beginning construction/grading activities at this site. Following occupancy, owners, tenants, and POA shall comply with SB County MS4 Permit requirements, enforced by the City.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S1	Provide storm drain system stencilling and signage (CASQA New Development BMP Handbook SD-13)	☒	☐	A painted message "No Dumping-Drains to River" shall be placed on each catch basin by the developer. The message shall be inspected annually & repainted as necessary by the POA.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)	☐	☒	This development does not include the storage of materials outdoors.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	☒	☐	Stormwater flows are diverted away from the trash enclosure. All dumpsters shall have working lids which shall be kept closed at all times. Trash enclosures shall comply with CASQA SD-32 and shall have doors and a solid roof.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (Statewide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12)	☒	☐	The irrigation system will include devices to prevent low head drainage, overspray, and run off through the use of pressure regulating devices, check valves, rain shutoff valves, flow sensors, pressure drop sensors, proper spacing, low precipitation emissions devices and ET or weather-based controllers. Landscape and irrigation shall be consistent with the State Model Water Efficient Landscape Ordinance and the City landscape development standards. Plants installed will be arranged according to similar hydrozones and meet the required water budget for the site. Shade trees shall be used to intercept rainwater and reduce heat gain on paving.
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement	☒	☐	All landscaped areas shall comply with depressed grading requirements by finish grading to a minimum of 1" below pavement grades or top of curb.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)	☒	☐	All slopes shall be hard lined, rip-rapped or vegetated to provide erosion protection and prevent sediment transport.
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)	☒	☐	Unloading of truck trailers at docks will occur under the cover of the building. It is not feasible to cover the entire loading area as it would be cost prohibitive. Project will incorporate dock high rollup doors and sweeping activites at the outside of the building.

S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)	☐	☒	Maintenance bays are not proposed as a part of this development, and no maintenance activities will be allowed on site.
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	Vehicle wash areas are not provided as part of this development and outdoor vehicle/equipment washing shall be prohibited by the owners and their POA..
S10	Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36)	☐	☒	Outdoor processing is not associated with the proposed development.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S11	Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	Outdoor equipment is not associated with the proposed development.
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)	☐	☒	Fueling areas are not included as part of the proposed development.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	☒	☐	Landscape plans to include deep rooted, drought tolerant plan species selected for erosion control
S14	Wash water control for food preparation areas	☐	☒	The proposed development does not include food preparation areas.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	☐	☒	The proposed development does not include community car wash areas.

4.1.2 Preventative LID Site Design Practices

Site design practices associated with new LID requirements in the MS4 Permit should be considered in the earliest phases of a project. Preventative site design practices can result in smaller DCV for LID BMP and hydromodification control BMP by reducing runoff generation. Describe site design and drainage plan including:

- A narrative of site design practices utilized or rationale for not using practices
- A narrative of how site plan incorporates preventive site design practices
- Include an attached Site Plan layout which shows how preventative site design practices are included in WQMP

Refer to Section 5.2 of the TGD for WQMP for more details.

Form 4.1-3 Preventative LID Site Design Practices Checklist

Site Design Practices *If yes, explain how preventative site design practice is addressed in project site plan. If no, other LID BMPs must be selected to meet targets*
Minimize impervious areas: Yes ☒ No ☐ Explanation: Impervious areas will be minimized to the maximum extent practicable. The proposed development requires large areas for loading docks and the building footprint.
Maximize natural infiltration capacity: Yes ☒ No ☐ Explanation: All pervious areas will be below adjacent impervious areas to maximize natural infiltration, and the project site utilizes underground infiltration chambers to maximize natural infiltration.
Preserve existing drainage patterns and time of concentration: Yes ☐ No ☒ Explanation: Most of the existing drainage patterns are preserved, but alteration of the existing grading was necessary to design the proposed development. The existing site is already entirely developed, and the time of concentration was preserved to the maximum extent practicable via underground infiltration chambers.
Disconnect impervious areas: Yes ☒ No ☐ Explanation: Most areas are run through landscape areas prior to entering the storm drain system. Roof areas will be conveyed through adjacent landscaping, where feasible.
Protect existing vegetation and sensitive areas: Yes ☐ No ☒ Explanation: Native vegetation has already been mostly removed, and the existing area will not be preserved.
Re-vegetate disturbed areas: Yes ☒ No ☐ Explanation: Any remaining areas that are disturbed will be stabilized with landscaping, prior to project completion.
Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐ Explanation: Landscaping areas will be staked off after rough grading has been completed to prevent excessive compaction. The areas under the detention BMPs shall be native, uncompacted material.
Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: Yes ☐ No ☒ Explanation: Utilization of vegetated drainage swales is not feasible for the proposed development due to the proposed site plan and grading.
Stake off areas that will be used for landscaping to minimize compaction during construction : Yes ☒ No ☐ Explanation: Landscaping areas will be staked off after rough grading has been completed to prevent excessive compaction.

4.2 Project Performance Criteria

The purpose of this section of the Project WQMP is to establish targets for post-development hydrology based on performance criteria specified in the MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection of any downstream waterbody segments with a HCOC. ***If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.***

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), the San Bernardino County Stormwater Program requires use of the P_6 method (MS4 Permit Section XI.D.6a.ii) – Form 4.2-1
- For HCOC pre- and post-development hydrologic calculation, the San Bernardino County Stormwater Program requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 mi^2), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for HCOC performance criteria.

Refer to Section 4 in the TGD for WQMP for detailed guidance and instructions.

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA A1)

1 Project area DA 1 (ft^2): 2,395,846	**2** Imperviousness after applying preventative site design practices (Imp%): 78.7	**3** Runoff Coefficient (Rc): _0.584 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.521 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 0.771 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 176,693 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA A2)

1 Project area DA 1 (ft^2): 825,588	**2** Imperviousness after applying preventative site design practices (Imp%): 66.1	**3** Runoff Coefficient (Rc): _0.459 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.521 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.771

*P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*

6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*	24-hrs ☐ 48-hrs ☒

7 Compute design capture volume, DCV (ft^3): 47,782

*DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*
Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA A3)

1 Project area DA 1 (ft^2): 2,525,082	**2** Imperviousness after applying preventative site design practices (Imp%): 79.8	**3** Runoff Coefficient (Rc): _0.596 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.521 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.771

*P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*

6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*	24-hrs ☐ 48-hrs ☒

7 Compute design capture volume, DCV (ft^3): 190,063

*DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*
Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2

Form 4.2-2 Summary of HCOC Assessment (DA 1)

Does project have the potential to cause or contribute to an HCOC in a downstream channel: Yes ☒ No ☐

Go to: *http://permitrack.sbcounty.gov/wap/*

If "Yes", then complete HCOC assessment of site hydrology for 2yr storm event using Forms 4.2-3 through 4.2-5 and insert results below

(Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual)

If "No," then proceed to Section 4.3 Project Conformance Analysis

Condition	Runoff Volume (ft^3)	Time of Concentration (min)	Peak Runoff (cfs)
Pre-developed	**1** 217,957 *Form 4.2-3 Item 12*	**2** 51.46 *Form 4.2-4 Item 13*	**3** 86.93 *Form 4.2-5 Item 10*
Post-developed	**4** 876,157 *Form 4.2-3 Item 13*	**5** 25.35 *Form 4.2-4 Item 14*	**6** 211.30 *Form 4.2-5 Item 14*
Difference	**7** 658,200 *Item 4 – Item 1*	**8** 26.11 *Item 2 – Item 5*	**9** 124.37 *Item 6 – Item 3*
Difference (as % of pre-developed)	**10** 302% *Item 7 / Item 1*	**11** 51% *Item 8 / Item 2*	**12** 243% *Item 9 / Item 3*

AES is a computer software analysis that can be utilized to assess HCOC and replace Forms 4.2-3 through 4.2-5. The methodology for the program is based off of the San Bernardino County Hydrology Manual. A HCOC summary is provided on the following page and the calculations can be found in Section 6.4.4.

Summary of HCOC Assessment		
	2-Year, 24-Hour Runoff Volume (CF)	2-Year Peak Flow (CFS)
Pre-Development Condition	217,957	86.93
Post-Development Condition	876,157	211.3
HCOC Requirement *0.95*(Post-Development) – Pre-Development*	614,392	113.81 (To decrease peak flows by) 97.50 (Allowable discharge rate)
DCV *Form 4.2-1*	414,538	-
Notes	Per a preliminary analysis, infiltration will not be feasible for this site due to geotechnical hazards. Therefore, the project will comply with the HCOC requirements by treating the required DCV and attenuating the peak flow rate prior to discharging offsite.	

4.3 Project Conformance Analysis

Complete the following forms for each project site DA to document that the proposed LID BMPs conform to the project DCV developed to meet performance criteria specified in the MS4 Permit (WQMP Template Section 4.2). For the LID DCV, the forms are ordered according to hierarchy of BMP selection as required by the MS4 Permit (see Section 5.3.1 in the TGD for WQMP). The forms compute the following for on-site LID BMP:

- Site Design and Hydrologic Source Controls (Form 4.3-2)
- Retention and Infiltration (Form 4.3-3)
- Harvested and Use (Form 4.3-4) or
- Biotreatment (Form 4.3-5).

At the end of each form, additional fields facilitate the determination of the extent of mitigation provided by the specific BMP category, allowing for use of the next category of BMP in the hierarchy, if necessary.

The first step in the analysis, using Section 5.3.2.1 of the TGD for WQMP, is to complete Forms 4.3-1 and 4.3-3) to determine if retention and infiltration BMPs are infeasible for the project. For each feasibility criterion in Form 4.3-1, if the answer is "Yes," provide all study findings that includes relevant calculations, maps, data sources, etc. used to make the determination of infeasibility.

Next, complete Forms 4.3-2 and 4.3-4 to determine the feasibility of applicable HSC and harvest and use BMPs, and, if their implementation is feasible, the extent of mitigation of the DCV.

If no site constraints exist that would limit the type of BMP to be implemented in a DA, evaluate the use of combinations of LID BMPs, including all applicable HSC BMPs to maximize on-site retention of the DCV. If no combination of BMP can mitigate the entire DCV, implement the single BMP type, or combination of BMP types, that maximizes on-site retention of the DCV within the minimum effective area.

If the combination of LID HSC, retention and infiltration, and harvest and use BMPs are unable to mitigate the entire DCV, then biotreatment BMPs may be implemented by the project proponent. If biotreatment BMPs are used, then they must be sized to provide sufficient capacity for effective treatment of the remainder of the volume-based performance criteria that cannot be achieved with LID BMPs (TGD for WQMP Section 5.4.4.2). **Under no circumstances shall any portion of the DCV be released from the site without effective mitigation and/or treatment**.

Form 4.3-1 Infiltration BMP Feasibility (DA 1)

Feasibility Criterion – Complete evaluation for each DA on the Project Site

[1] Would infiltration BMP pose significant risk for groundwater related concerns? Yes ☐ No ☒
Refer to Section 5.3.2.1 of the TGD for WQMP

If Yes, Provide basis: (attach)

[2] Would installation of infiltration BMP significantly increase the risk of geotechnical hazards? Yes ☒ No ☐
(Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert):

- The location is less than 50 feet away from slopes steeper than 15 percent
- The location is less than eight feet from building foundations or an alternative setback.
- A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.

If Yes, Provide basis: Geotechnical study is being coordinated to confirm geotechnical hazards of infiltration. Per a preliminary analysis, the site is surrounded by steep slopes with shallow bedrock. A Geotechnical Study will be included during Final Engineering.

[3] Would infiltration of runoff on a Project site violate downstream water rights? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[4] Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils? Yes ☒ No ☐

If Yes, Provide basis: Per a preliminary Geotechnical analysis, the site is surrounded by steep slopes with shallow bedrock and will not be suitable for infiltration. Geotechnical study will be included during Final Engineering.

[5] Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[6] Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses? Yes ☐ No ☒
See Section 3.5 of the TGD for WQMP and WAP

If Yes, Provide basis: (attach)

[7] Any answer from Item 1 through Item 3 is "Yes": Yes ☒ No ☐
If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Harvest and Use BMP. If no, then proceed to Item 8 below.

[8] Any answer from Item 4 through Item 6 is "Yes": Yes ☒ No ☐
If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Hydrologic Source Control BMP.
If no, then proceed to Item 9, below.

[9] All answers to Item 1 through Item 6 are "No":
Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP.
Proceed to Form 4.3-2, Hydrologic Source Control BMP.

4.3.1 Site Design Hydrologic Source Control BMP

Section XI.E. of the Permit emphasizes the use of LID preventative measures; and the use of LID HSC BMPs reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable HSC shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of HSC, if a project cannot feasibly meet BMP sizing requirements or cannot fully address HCOCs, feasibility of all applicable HSC must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design HSC BMP. Refer to Section 5.4.1 in the TGD for more detailed guidance.

Form 4.3-2 Site Design Hydrologic Source Control BMPs (DA 1)

1 Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☐ No ☒ *If yes, complete Items 2-5; If no, proceed to Item 6*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Total impervious area draining to pervious area (ft^2)			
3 Ratio of pervious area receiving runoff to impervious area			
4 Retention volume achieved from impervious area dispersion (ft^3) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff*			
5 Sum of retention volume achieved from impervious area dispersion (ft^3):	$V_{retention}$ *=Sum of Item 4 for all BMPs*		
6 Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☒ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
7 Ponding surface area (ft^2)			
8 Ponding depth (ft)			
9 Surface area of amended soil/gravel (ft^2)			
10 Average depth of amended soil/gravel (ft)			
11 Average porosity of amended soil/gravel			
12 Retention volume achieved from on-lot infiltration (ft^3) $V_{retention}$ *= (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)*			
13 Runoff volume retention from on-lot infiltration (ft^3):	$V_{retention}$ *=Sum of Item 12 for all BMPs*		

Form 4.3-2 cont. Site Design Hydrologic Source Control BMPs (DA 1)

14 Implementation of evapotranspiration BMP (green, brown, or blue roofs): Yes ☐ No ☒ *If yes, complete Items 15-20. If no, proceed to Item 21*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
15 Rooftop area planned for ET BMP (ft^2)			
16 Average wet season ET demand (in/day) *Use local values, typical ~ 0.1*			
17 Daily ET demand (ft^3/day) *Item 15 * (Item 16 / 12)*			
18 Drawdown time (hrs) *Copy Item 6 in Form 4.2-1*			
19 Retention Volume (ft^3) $V_{retention}$ *= Item 17 * (Item 18 / 24)*			
20 Runoff volume retention from evapotranspiration BMPs (ft^3):	$V_{retention}$ *=Sum of Item 19 for all BMPs*		
21 Implementation of Street Trees: Yes ☐ No ☒ *If yes, complete Items 22-25. If no, proceed to Item 26*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
22 Number of Street Trees			
23 Average canopy cover over impervious area (ft^2)			
24 Runoff volume retention from street trees (ft^3) $V_{retention}$ *= Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches*			
25 Runoff volume retention from street tree BMPs (ft^3):	$V_{retention}$ *= Sum of Item 24 for all BMPs*		
26 Implementation of residential rain barrel/cisterns: Yes ☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
27 Number of rain barrels/cisterns			
28 Runoff volume retention from rain barrels/cisterns (ft^3) $V_{retention}$ *= Item 27 * 3*			
29 Runoff volume retention from residential rain barrels/Cisterns (ft3):	$V_{retention}$ *=Sum of Item 28 for all BMPs*		
30 Total Retention Volume from Site Design Hydrologic Source Control BMPs:	*Sum of Items 5, 13, 20, 25 and 29*		

4.3.2 Infiltration BMPs

Infiltration BMPs were not considered since infiltration is not feasible for the project site.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*			
BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*			
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*			
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*			
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*			
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*			
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*			
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*			
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*			
10 Amended soil porosity			
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*			
12 Gravel porosity			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*			
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*			
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*			
16 Total Retention Volume from LID Infiltration BMPs: *(Sum of Items 14 and 15 for all infiltration BMP included in plan)*			
17 Fraction of DCV achieved with infiltration BMP: % *Retention% = Item 16 / Form 4.2-1 Item 7*			
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☐ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*			

4.3.3 Harvest and Use BMP

Harvest and use BMP may be considered if the full LID DCV cannot be met by maximizing infiltration BMPs. Use Form 4.3-4 to compute on-site retention of runoff from proposed harvest and use BMPs.

Volume retention estimates for harvest and use BMPs are sensitive to the on-site demand for captured stormwater. Since irrigation water demand is low in the wet season, when most rainfall events occur in San Bernardino County, the volume of water that can be used within a specified drawdown period is relatively low. The bottom portion of Form 4.3-4 facilitates the necessary computations to show infeasibility if a minimum incremental benefit of 40 percent of the LID DCV would not be achievable with MEP implementation of on-site harvest and use of stormwater (Section 5.5.4 of the TGD for WQMP).

Form 4.3-4 Harvest and Use BMPs (DA 1)

1 Remaining LID DCV not met by site design HSC or infiltration BMP (ft^3):
V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16

BMP Type(s) *Compute runoff volume retention from proposed harvest and use BMP (Select BMPs from Table 5-4 of the TGD for WQMP) - Use additional forms for more BMPs*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Describe cistern or runoff detention facility			
3 Storage volume for proposed detention type (ft^3) *Volume of cistern*			
4 Landscaped area planned for use of harvested stormwater (ft^2)			
5 Average wet season daily irrigation demand (in/day) Use local values, typical ~ 0.1 in/day			
6 Daily water demand (ft^3/day) *Item 4 * (Item 5 / 12)*			
7 Drawdown time (hrs) *Copy Item 6 from Form 4.2-1*			
8 Retention Volume (ft^3) *$V_{retention}$ = Minimum of (Item 3) or (Item 6 * (Item 7 / 24))*			

9 Total Retention Volume (ft^3) from Harvest and Use BMP *Sum of Item 8 for all harvest and use BMP included in plan*

10 Is the full DCV retained with a combination of LID HSC, retention and infiltration, and harvest & use BMPs? Yes ☐ No ☐

If yes, demonstrate conformance using Form 4.3-10. If no, then re-evaluate combinations of all LID BMP and optimize their implementation such that the maximum portion of the DCV is retained on-site (using a single BMP type or combination of BMP types). If the full DCV cannot be mitigated after this optimization process, proceed to Section 4.3.4.

4.3.4 Biotreatment BMP

Biotreatment BMPs may be considered if the full LID DCV cannot be met by maximizing retention and infiltration, and harvest and use BMPs. A key consideration when using biotreatment BMP is the effectiveness of the proposed BMP in addressing the pollutants of concern for the project (see Table 5-5 of the TGD for WQMP).

Use Form 4.3-5 to summarize the potential for volume based and/or flow based biotreatment options to biotreat the remaining unmet LID DCV w. Biotreatment computations are included as follows:

- Use Form 4.3-6 to compute biotreatment in small volume based biotreatment BMP (e.g. bioretention w/underdrains);
- Use Form 4.3-7 to compute biotreatment in large volume based biotreatment BMP (e.g. constructed wetlands);
- Use Form 4.3-8 to compute sizing criteria for flow-based biotreatment BMP (e.g. bioswales)

Form 4.3-5 Selection and Evaluation of Biotreatment BMP (DA A1)

<table>
<tr><td colspan="2">1 Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft³): 176,693 Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9</td><td colspan="2">List pollutants of concern Copy from Form 2.3-1.
Pathogens (Baterial/Virus)
Nutrients - Phosphorous
Nutrients - Nitrogen
Sediment
Metals
Oil and Grease
Trash/Debris
Pesticides/Herbicides
Organic Compounds</td></tr>
<tr><td rowspan="2">2 Biotreatment BMP Selected
(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)</td><td>Volume-based biotreatment
Use Forms 4.3-6 and 4.3-7 to compute treated volume</td><td>Flow-based biotreatment
Use Form 4.3-8 to compute treated volume</td></tr>
<tr><td>☐ Bioretention with underdrain
☐ Planter box with underdrain
☐ Constructed wetlands
☐ Wet extended detention
☐ Dry extended detention</td><td>☐ Vegetated swale
☐ Vegetated filter strip
☒ Proprietary biotreatment (Volume)</td></tr>
<tr><td>3 Volume biotreated in volume based biotreatment BMP (ft³): 176,693 Form 4.3-6 Item 15 + Form 4.3-7 Item 13</td><td>4 Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft³): 0 Item 1 – Item 3</td><td>5 Remaining fraction of LID DCV for sizing flow based biotreatment BMP: 0% Item 4 / Item 1</td></tr>
<tr><td colspan="3">6 Flow-based biotreatment BMP capacity provided (cfs): Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)</td></tr>
<tr><td colspan="3">7 Metrics for MEP determination:
• Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☐ If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.</td></tr>
</table>

Form 4.3-5 Selection and Evaluation of Biotreatment BMP (DA A2)

1 Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft^3): 47,782 *Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9*	List pollutants of concern *Copy from Form 2.3-1.* Pathogens (Baterial/Virus) Nutrients - Phosphorous Nutrients - Nitrogen Sediment Metals Oil and Grease Trash/Debris Pesticides/Herbicides Organic Compounds

2 Biotreatment BMP Selected *(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)*	Volume-based biotreatment *Use Forms 4.3-6 and 4.3-7 to compute treated volume*	Flow-based biotreatment *Use Form 4.3-8 to compute treated volume*
	☐ Bioretention with underdrain ☐ Planter box with underdrain ☐ Constructed wetlands ☐ Wet extended detention ☐ Dry extended detention	☐ Vegetated swale ☐ Vegetated filter strip ☒ Proprietary biotreatment (Volume)

3 Volume biotreated in volume based biotreatment BMP (ft^3): 47,782 *Form 4.3-6 Item 15 + Form 4.3-7 Item 13*	**4** Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft^3): 0 *Item 1 – Item 3*	**5** Remaining fraction of LID DCV for sizing flow based biotreatment BMP: 0% *Item 4 / Item 1*

6 Flow-based biotreatment BMP capacity provided (cfs): *Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)*

7 Metrics for MEP determination:

- Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☐ *If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.*

Form 4.3-5 Selection and Evaluation of Biotreatment BMP (DA A3)

1 Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft^3): 190,063 *Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9*	List pollutants of concern *Copy from Form 2.3-1.* Pathogens (Baterial/Virus) Nutrients - Phosphorous Nutrients - Nitrogen Sediment Metals Oil and Grease Trash/Debris Pesticides/Herbicides Organic Compounds

2 Biotreatment BMP Selected *(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)*	Volume-based biotreatment *Use Forms 4.3-6 and 4.3-7 to compute treated volume*	Flow-based biotreatment *Use Form 4.3-8 to compute treated volume*
	☐ Bioretention with underdrain ☐ Planter box with underdrain ☐ Constructed wetlands ☐ Wet extended detention ☐ Dry extended detention	☐ Vegetated swale ☐ Vegetated filter strip ☒ Proprietary biotreatment (Volume)

3 Volume biotreated in volume based biotreatment BMP (ft^3): 190,063 *Form 4.3-6 Item 15 + Form 4.3-7 Item 13*	**4** Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft^3): 0 *Item 1 – Item 3*	**5** Remaining fraction of LID DCV for sizing flow based biotreatment BMP: 0% *Item 4 / Item 1*

6 Flow-based biotreatment BMP capacity provided (cfs): *Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)*

7 Metrics for MEP determination:

- Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☐ *If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.*

Form 4.3-6 Volume Based Biotreatment (DA 1) – Bioretention and Planter Boxes with Underdrains

Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA 1 DMA A1 BMP Type Underground Detention + Modular Wetland System	DA 1 DMA A2 BMP Type Underground Detention + Modular Wetland System	DA 1 DMA A3 BMP Type Underground Detention + Modular Wetland System *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*			
2 Amended soil infiltration rate *Typical ~ 5.0*			
3 Amended soil infiltration safety factor *Typical ~ 2.0*			
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*			
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*			
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*			
8 Amended soil surface area (ft^2)			
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
10 Amended soil porosity, *n*			
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
12 Gravel porosity, *n*			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*			
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	176,693	47,782	190,063
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 414,538 *Sum of Item 14 for all volume-based BMPs included in this form*			

4.3.5 Conformance Summary

Complete Form 4.3-9 to demonstrate how on-site LID DCV is met with proposed site design hydrologic source control, infiltration, harvest and use, and/or biotreatment BMP. The bottom line of the form is used to describe the basis for infeasibility determination for on-site LID BMP to achieve full LID DCV, and provides methods for computing remaining volume to be addressed in an alternative compliance plan. If the project has more than one outlet, then complete additional versions of this form for each outlet.

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA A1)

1 Total LID DCV for the Project DA-1 (ft^3): 176,693 *Copy Item 7 in Form 4.2-1*

2 On-site retention with site design hydrologic source control LID BMP (ft^3): 0 *Copy Item 30 in Form 4.3-2*

3 On-site retention with LID infiltration BMP (ft^3): 0 *Copy Item 16 in Form 4.3-3*

4 On-site retention with LID harvest and use BMP (ft^3): 0 *Copy Item 9 in Form 4.3-4*

5 On-site biotreatment with volume based biotreatment BMP (ft^3): 176,693 *Copy Item 3 in Form 4.3-5*

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *Copy Item 6 in Form 4.3-5*

7 LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☐ No ☒
  If yes, sum of Items 2, 3, and 4 is greater than Item 1
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☒
  If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☒ No ☐
  If yes, Form 4.3-1 Items 7 and 8 were both checked yes

8 If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, V_{alt} *= (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA A2)

1 Total LID DCV for the Project DA-1 (ft^3): 47,782 *Copy Item 7 in Form 4.2-1*

2 On-site retention with site design hydrologic source control LID BMP (ft^3): 0 *Copy Item 30 in Form 4.3-2*

3 On-site retention with LID infiltration BMP (ft^3): 0 *Copy Item 16 in Form 4.3-3*

4 On-site retention with LID harvest and use BMP (ft^3): 0 *Copy Item 9 in Form 4.3-4*

5 On-site biotreatment with volume based biotreatment BMP (ft^3): 47,782 *Copy Item 3 in Form 4.3-5*

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *Copy Item 6 in Form 4.3-5*

7 LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☐ No ☒
  If yes, sum of Items 2, 3, and 4 is greater than Item 1
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☒
  If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☒ No ☐
  If yes, Form 4.3-1 Items 7 and 8 were both checked yes

8 If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  *Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, V_{alt} = (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA A3)

1 Total LID DCV for the Project DA-1 (ft^3): 190,063 *Copy Item 7 in Form 4.2-1*

2 On-site retention with site design hydrologic source control LID BMP (ft^3): 0 *Copy Item 30 in Form 4.3-2*

3 On-site retention with LID infiltration BMP (ft^3): 0 *Copy Item 16 in Form 4.3-3*

4 On-site retention with LID harvest and use BMP (ft^3): 0 *Copy Item 9 in Form 4.3-4*

5 On-site biotreatment with volume based biotreatment BMP (ft^3): 190,063 *Copy Item 3 in Form 4.3-5*

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *Copy Item 6 in Form 4.3-5*

7 LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☐ No ☒
  If yes, sum of Items 2, 3, and 4 is greater than Item 1
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☒
  If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☒ No ☐
  If yes, Form 4.3-1 Items 7 and 8 were both checked yes

8 If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  *Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, V_{alt} = (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed

4.3.6 Hydromodification Control BMP

Use Form 4.3-10 to compute the remaining runoff volume retention, after LID BMP are implemented, needed to address HCOC, and the increase in time of concentration and decrease in peak runoff necessary to meet targets for protection of waterbodies with a potential HCOC. Describe hydromodification control BMP that address HCOC, which may include off-site BMP and/or in-stream controls. Section 5.6 of the TGD for WQMP provides additional details on selection and evaluation of hydromodification control BMP.

Form 4.3-10 Hydromodification Control BMPs (DA 1)

1 Volume reduction needed for HCOC performance criteria (ft^3): 614,392 *(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1*	**2** On-site retention with site design hydrologic source control, infiltration, and harvest and use LID BMP (ft^3): 0 *Sum of Form 4.3-9 Items 2, 3, and 4 Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving HCOC volume reduction*
3 Remaining volume for HCOC volume capture (ft^3): 614,392 *Item 1 – Item 2*	**4** Volume capture provided by incorporating additional on-site or off-site retention BMPs (ft^3): *Existing downstream BMP may be used to demonstrate additional volume capture (if so, attach to this WQMP a hydrologic analysis showing how the additional volume would be retained during a 2-yr storm event for the regional watershed)*

5 If Item 4 is less than Item 3, incorporate in-stream controls on downstream waterbody segment to prevent impacts due to hydromodification ☐ *Attach in-stream control BMP selection and evaluation to this WQMP*

6 Is Form 4.2-2 Item 11 less than or equal to 5%: Yes ☐ No ☒

If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:

- Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site or off-site retention BMP ☒
  BMP upstream of a waterbody segment with a potential HCOC may be used to demonstrate increased time of concentration through hydrograph attenuation (if so, show that the hydraulic residence time provided in BMP for a 2-year storm event is equal or greater than the addition time of concentration requirement in Form 4.2-4 Item 15)
- Increase time of concentration by preserving pre-developed flow path and/or increase travel time by reducing slope and increasing cross-sectional area and roughness for proposed on-site conveyance facilities ☐
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

7 Form 4.2-2 Item 12 less than or equal to 5%: Yes ☐ No ☒

If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:

- Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site or off-site retention BMPs ☒
  BMPs upstream of a waterbody segment with a potential HCOC may be used to demonstrate additional peak runoff reduction through hydrograph attenuation (if so, attach to this WQMP, a hydrograph analysis showing how the peak runoff would be reduced during a 2-yr storm event)
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

HCOC Calculation Summary Table

	2-Year Time of Concentration (Min)	2-Year Peak Runoff (cfs)	2-Year, 24-Hour Runoff Volume (CF)
Pre-Development Condition	51.46	86.93	217,957
Post-Development Condition without BMPs	25.35	211.30	876,157
Post-Development Condition with BMPs	N/A	59.14 *(Entire Site)*	N/A *(Infiltration Infeasible)*
HCOC Requirement *0.95*(Post-Development) - Pre-Development*	23.54 *(Additional time that must be provided)*	113.81 *(Amount of runoff to mitigate)*	N/A *(Infiltration Infeasible)*
Notes	The project will utilize detention basins to increase the time of concentration	To comply with HCOC requirements, the allowable for rate for a 2-year storm is 211.30-113.81 = 97.50 cfs. The project will utilize detention basins in DAs A1-A3 to mitigate peak flows for the areas to be developed.	Onsite retention is infeasible for this project.

4.4 Alternative Compliance Plan (if applicable)

Describe an alternative compliance plan (if applicable) for projects not fully able to infiltrate, harvest and use, or biotreat the DCV via on-site LID practices. A project proponent must develop an alternative compliance plan to address the remainder of the LID DCV. Depending on project type some projects may qualify for water quality credits that can be applied to reduce the DCV that must be treated prior to development of an alternative compliance plan (see Form 2.4-1, Water Quality Credits). Form 4.3-9 Item 8 includes instructions on how to apply water quality credits when computing the DCV that must be met through alternative compliance. Alternative compliance plans may include one or more of the following elements:

- On-site structural treatment control BMP - All treatment control BMP should be located as close to possible to the pollutant sources and should not be located within receiving waters;
- Off-site structural treatment control BMP - Pollutant removal should occur prior to discharge of runoff to receiving waters;
- Urban runoff fund or In-lieu program, if available

Depending upon the proposed alternative compliance plan, approval by the executive officer may or may not be required (see Section 6 of the TGD for WQMP).

Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

All BMP included as part of the project WQMP are required to be maintained through regular scheduled inspection and maintenance (refer to Section 8, Post Construction BMP Requirements, in the TGD for WQMP). Fully complete Form 5-1 summarizing all BMP included in the WQMP. Attach additional forms as needed. The WQMP shall also include a detailed Operation and Maintenance Plan for all BMP and may require a Maintenance Agreement (consult the jurisdiction's LIP). If a Maintenance Agreement is required, it must also be attached to the WQMP.

Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
Onsite storm drain catch basins	Property Owner	Onsite catch basins shall be inspected quarterly for debris buildup and evidence of illegal dumping and shall be cleaned whenever debris/sediment accumulates. Removal can be accomplished by vac-truck or other equally effective methods.	Quarterly
Underground Detention System	Property Owner	Regular inspections of system to oberserve sediment build up and infiltration capacity. Cleaning of accumulated trash, debris, and sediments as determined by inspections. Cleaning is recommended during dry weather. See manufacturer recommendations for additional maintenance activities.	Monthly and within 48 hours following a significant storm event to verify there is no standing water in the chambers
Modular Wetland System	Property Owner	Inspect pre-treatment, biofiltration, and discharge chambers to ensure that there is no blockage and excess sediments. See manufacturer recommendations for additional maintenance activities.	Every 6 months prior to the wet season and 48 hours following a storm event.
Hydrodynamic Separator	Property Owner	Visual inspection and debris removed quarterly per manufacturer recommendations.	Quarterly
Pump	Property Owner	Clean pump and remove debris. See manufacturer recommendationsi for additional maintenance activities.	Quarterly
Landscape Maintenance	Property Owner	Maintain landscape area vegetation, slope protection and grades, adjacent to hardscape and prevent discharge of landscape maintenance waste into storm drains.	Weekly

Litter Control	Property Owner	Maintain roofed waste collection areas and vacuum-sweep drive aisles and parking areas to remove potential stormwater contamination before anticipated storm events.	Weekly/Monthly
Anti-Dumping Stenciling & Signage	Property Owner	Visual inspection and replacement of damaged or illegible stenciling and signage over on-site catch basins	Annually
Vacuum Sweep Private Streets and Parking Lots	Property Owner	Streets, parking areas and alleyways within the project shall be vacuum swept at a minimum frequency monthly.	Monthly
Trash Enclosure Design and Maintenance	Property Owner	Trash enclosure shall be constructed with a solid, canopy style roof and shall be set on a raised concrete pad, to prevent stormwater runon and the enclosure shall be swept at least once per week. Maintain area clean of trash and debris at all times.	Weekly
Irrigation System	Property Owner	Check and repair the irrigation system. Verify there are no leaks or runoff from landscaped areas. Adjust irrigation heads and system run times as necessary to prevent overwater of vegetation, overspray or run-off from landscape areas and to ensure the health and aesthetic quality of the landscape.	Weekly

Section 6 WQMP Attachments

6.1. Site Plan and Drainage Plan

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural Source Control BMP locations
- Site Design Hydrologic Source Control BMP locations
- LID BMP details
- Drainage delineations and flow information
- Drainage connections

6.2 Electronic Data Submittal

Minimum requirements include submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open. If the local jurisdiction requires specialized electronic document formats (as described in their local Local Implementation Plan), this section will describe the contents (e.g., layering, nomenclature, geo-referencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

6.3 Post Construction

Attach all O&M Plans and Maintenance Agreements for BMP to the WQMP.

6.4 Other Supporting Documentation

- 6.4.1 Vicinity Map
- 6.4.2 WAP Report
- 6.4.3 NOAA Precipitation Data
- 6.4.4 HCOC Map and Calculations
- 6.4.5 BMP Sizing Calculations
- 6.4.6 Geotechnical Report
- 6.4.7 Education Materials
- 6.4.8 Construction Plans
- 6.4.9 Preliminary WQMP

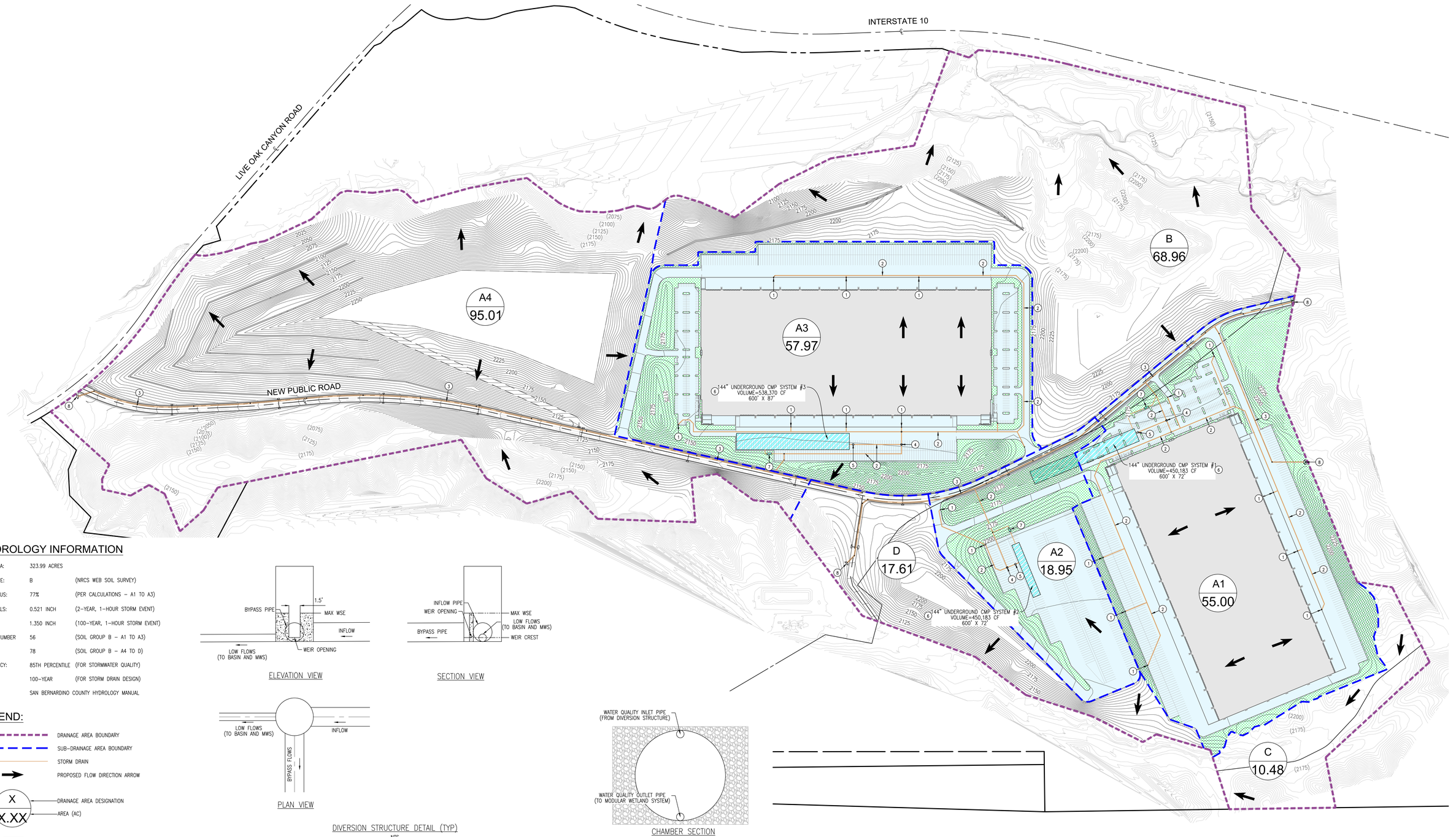
Section 6.1 Site and Drainage Plan

CITY OF YUCAIPA

POST-DEVELOPMENT WQMP EXHIBIT

FOR

PACIFIC COMMERCE CENTER



HYDROLOGY INFORMATION

SITE AREA:	323.99 ACRES	
SOIL TYPE:	B	(NRCS WEB SOIL SURVEY)
IMPERVIOUS:	77%	(PER CALCULATIONS – A1 TO A3)
ISOHYETALS:	0.521 INCH	(2–YEAR, 1–HOUR STORM EVENT)
	1.350 INCH	(100–YEAR, 1–HOUR STORM EVENT)
CURVE NUMBER	56	(SOIL GROUP B – A1 TO A3)
	78	(SOIL GROUP B – A4 TO D)
FREQUENCY:	85TH PERCENTILE	(FOR STORMWATER QUALITY)
	100–YEAR	(FOR STORM DRAIN DESIGN)
METHOD:	SAN BERNARDINO COUNTY HYDROLOGY MANUAL	

ELEVATION VIEW

SECTION VIEW

PLAN VIEW

DIVERSION STRUCTURE DETAIL (TYP)

NTS

CHAMBER SECTION

NTS

LEGEND:

- DRAINAGE AREA BOUNDARY
- SUB–DRAINAGE AREA BOUNDARY
- STORM DRAIN
- PROPOSED FLOW DIRECTION ARROW
- X / X.XX — DRAINAGE AREA DESIGNATION / AREA (AC)
- A=X.XX — SUB–DRAINAGE AREA (AC)
- DISTURBED AREA

DRAINAGE NOTES:

1. PROPOSED ONSITE CATCH BASIN WITH FILTER INSERT
2. PROPOSED STORM DRAIN PIPE PRIVATE MAINTAINED
3. PROPOSED PUBLIC STORM DRAIN (OFFSITE RUN–ON)
4. PROPOSED DIVERSION STRUCTURE
5. PROPOSED BMP – HYDRODYNAMIC SEPARATOR
6. PROPOSED BMP – UNDERGROUND DETENTION BASIN
7. PROPOSED BMP – MODULAR WETLAND SYSTEM
8. PROPOSED HEADWALL AND RIPRAP

WQMP SUMMARY

DRAINAGE AREA NO.	TRIBUTARY AREA (SF)	TRIBUTARY AREA (AC)	IMPERVIOUS RATIO	RUNOFF COEFFICIENT	DCV (CF)	TREATMENT PROVIDED (CF)	DETENTION PROVIDED (CF)
A1	2,395,846	55.00	0.79	66.39	176,693	184,599 (MODULAR WETLAND SYSTEM)	450,183 (UNDERGROUND 144" CMP #1)
A2	825,588	18.95	0.66	22.01	47,782	50,434 (MODULAR WETLAND SYSTEM)	137,857 (UNDERGROUND 144" CMP #2)
A3	2,525,082	57.97	0.80	72.17	190,063	196,739 (MODULAR WETLAND SYSTEM)	538,370 (UNDERGROUND 144" CMP #3)
A4	4,138,851	95.01	0.00	–	–	–	–
B	3,004,030	68.96	0.00	–	–	–	–
C	456,643	10.48	0.00	–	–	–	–
D	767,026	17.61	0.00	–	–	–	–
TOTAL	14,113,066	323.99	0.32		414,538	742,180	1,126,410

NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

PREPARED BY:
Kimley»Horn

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PACIFIC COMMERCE CENTER

POST-DEVELOPMENT WQMP EXHIBIT

LIVE OAK CANYON ROAD

CITY OF YUCAIPA

DATE: DEC 2022

SHEET 1 OF 1

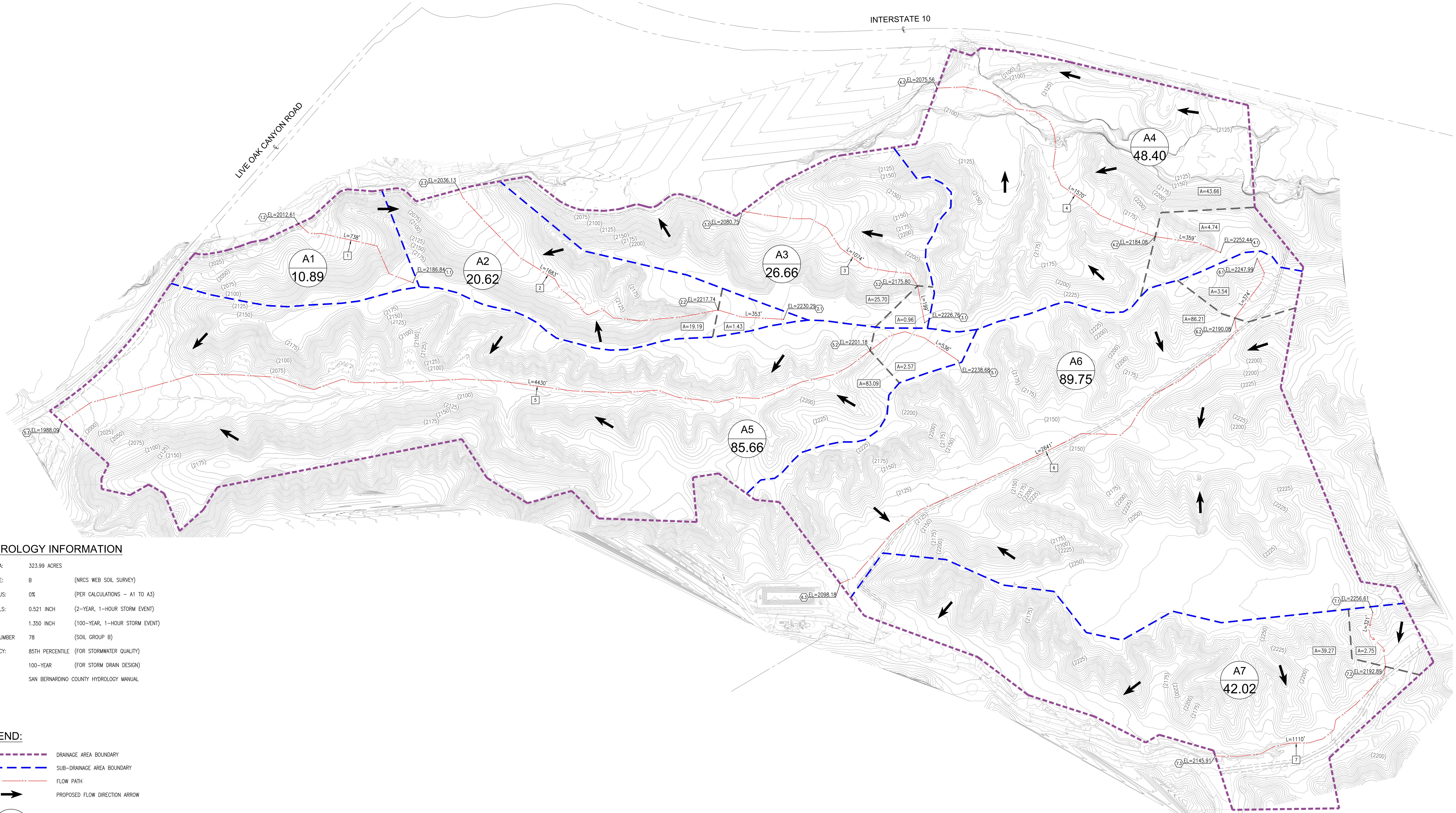
12/23/2022

CITY OF YUCAIPA

PRE-DEVELOPMENT HYDROLOGY EXHIBIT

FOR

PACIFIC COMMERCE CENTER



HYDROLOGY INFORMATION

SITE AREA:	323.99 ACRES	
SOIL TYPE:	B	(NRCS WEB SOIL SURVEY)
IMPERVIOUS:	0%	(PER CALCULATIONS – A1 TO A3)
ISOHYETALS:	0.521 INCH	(2-YEAR, 1-HOUR STORM EVENT)
	1.350 INCH	(100-YEAR, 1-HOUR STORM EVENT)
CURVE NUMBER	78	(SOIL GROUP B)
FREQUENCY:	85TH PERCENTILE	(FOR STORMWATER QUALITY)
	100-YEAR	(FOR STORM DRAIN DESIGN)
METHOD:	SAN BERNARDINO COUNTY HYDROLOGY MANUAL	

LEGEND:

- DRAINAGE AREA BOUNDARY
- SUB-DRAINAGE AREA BOUNDARY
- FLOW PATH
- PROPOSED FLOW DIRECTION ARROW
- X — DRAINAGE AREA DESIGNATION
- X.XX — AREA (AC)
- A=X.XX — SUB-DRAINAGE AREA (AC)
- 1 — STREAM #
- 1.1 — NODE

HYDROLOGY SUMMARY

DRAINAGE AREA NO.	TRIBUTARY AREA (SF)	TRIBUTARY AREA (AC)	IMPERVIOUS RATIO	Q_2 (CFS)	V_2 (CF)	Q_{100} (CFS)	V_{100} (CF)
A1	474,231	10.89	0.00	8.59	8,943	37.40	178,683
A2	898,261	20.62	0.00	5.30	14,484	49.06	339,637
A3	1,161,199	26.66	0.00	17.45	21,658	92.52	437,103
A4	2,108,245	48.40	0.00	20.28	35,162	136.81	794,260
A5	3,731,265	85.66	0.00	1.79	49,449	146.21	1,412,951
A6	3,909,321	89.75	0.00	13.06	55,138	198.73	1,476,453
A7	1,830,544	42.02	0.00	20.46	33,123	125.45	690,544
TOTAL	14,113,066	323.99	0.00	86.93	217,957	786.18	5,329,631

GRAPHIC SCALE IN FEET

0 100 200 400

PREPARED BY:

Kimley»Horn

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PACIFIC COMMERCE CENTER

PRE-DEVELOPMENT HYDROLOGY EXHIBIT

LIVE OAK CANYON ROAD

CITY OF YUCAIPA

DATE: DEC 2022

SHEET 1 OF 1

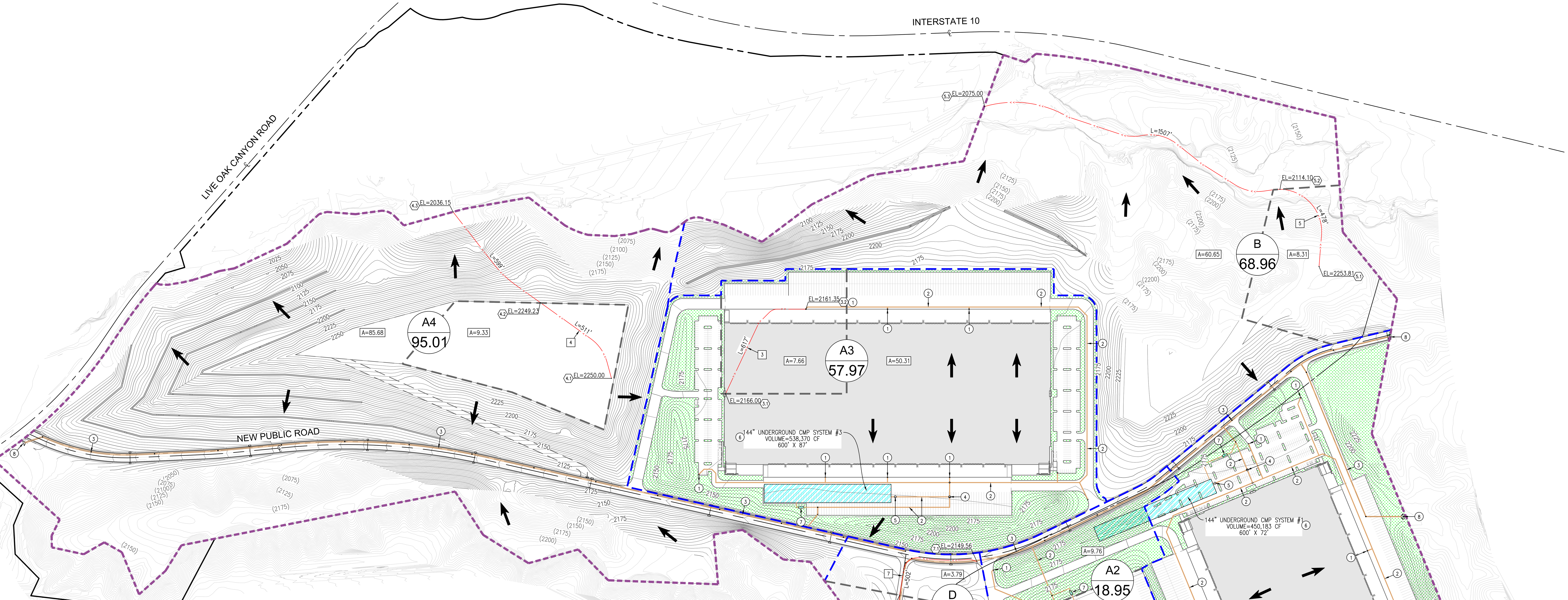
12/27/2022

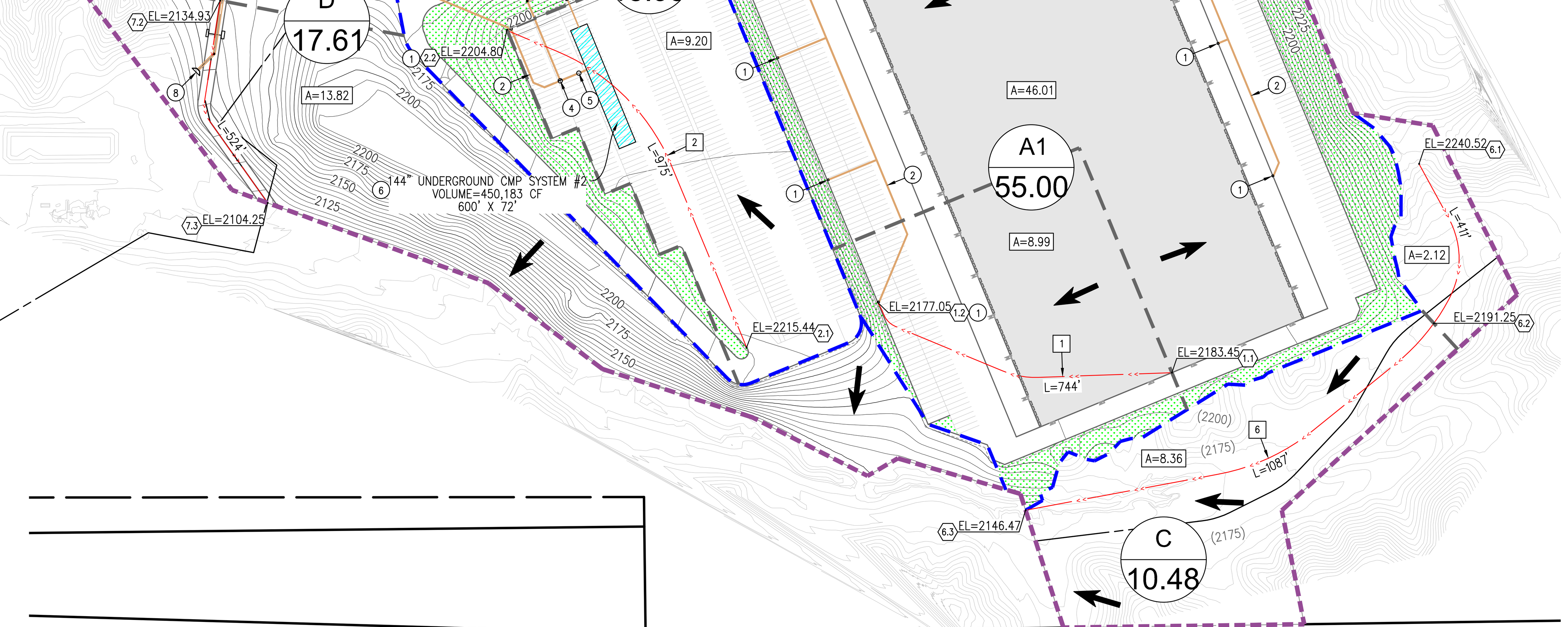
CITY OF YUCAIPA

POST-DEVELOPMENT HYDROLOGY EXHIBIT

FOR

PACIFIC COMMERCE CENTER





HYDROLOGY INFORMATION

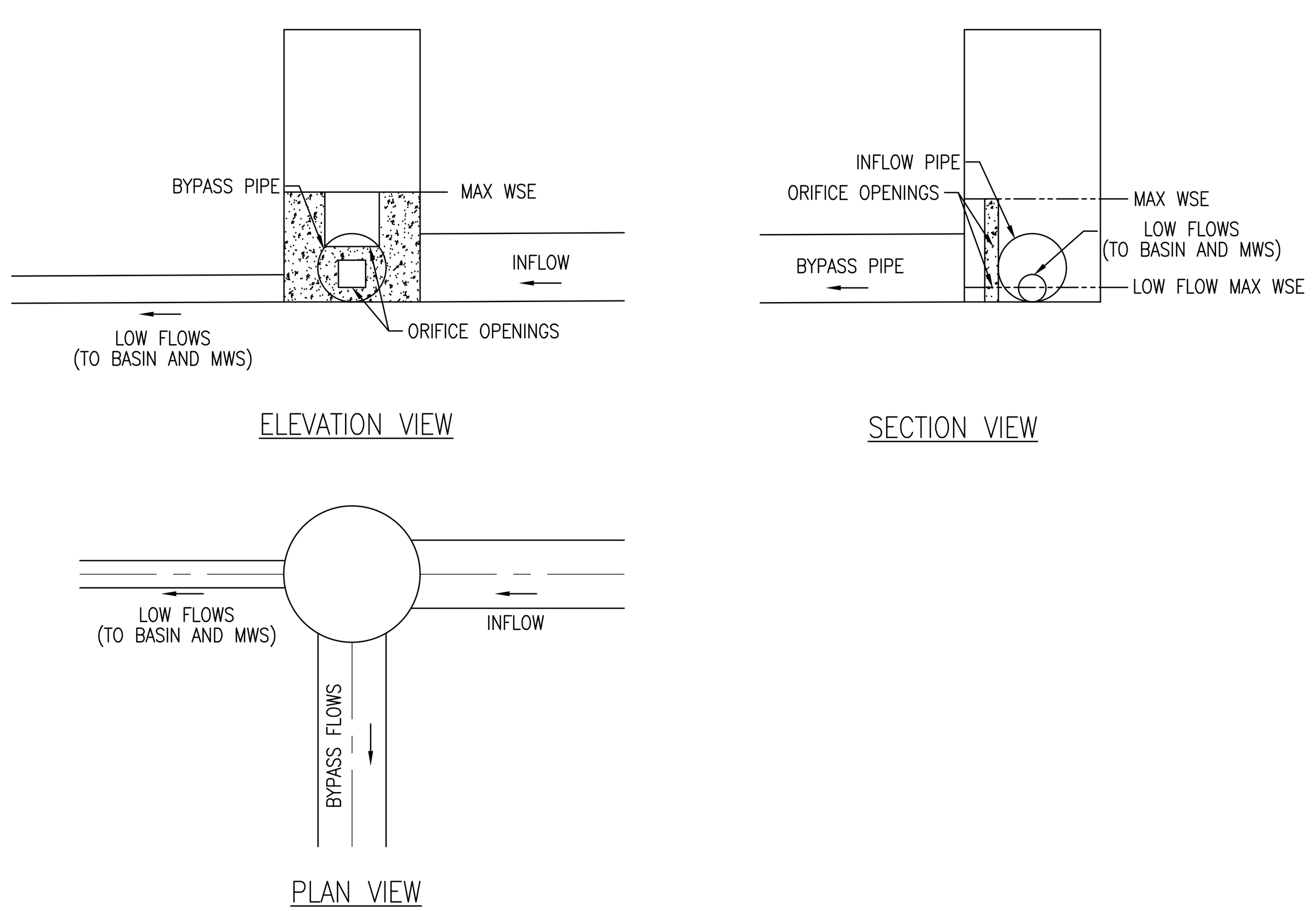
SITE AREA:	323.99 ACRES	
SOIL TYPE:	B	(NRCS WEB SOIL SURVEY)
IMPERVIOUS:	77%	(PER CALCULATIONS – A1 TO A3)
ISOHYETALS:	0.521 INCH	(2-YEAR, 1-HOUR STORM EVENT)
	1.350 INCH	(100-YEAR, 1-HOUR STORM EVENT)
CURVE NUMBER	56	(SOIL GROUP B – A1 TO A3)
	78	(SOIL GROUP B – A4 TO D)
FREQUENCY:	85TH PERCENTILE	(FOR STORMWATER QUALITY)
	100-YEAR	(FOR STORM DRAIN DESIGN)
METHOD:	SAN BERNARDINO COUNTY HYDROLOGY MANUAL	

LEGEND:

- DRAINAGE AREA BOUNDARY
- SUB-DRAINAGE AREA BOUNDARY
- FLOW PATH
- STORM DRAIN
- PROPOSED FLOW DIRECTION ARROW
- X / X.XX — DRAINAGE AREA DESIGNATION / AREA (AC)
- A=X.XX — SUB-DRAINAGE AREA (AC)
- 1 — STREAM #
- 1.1 — NODE

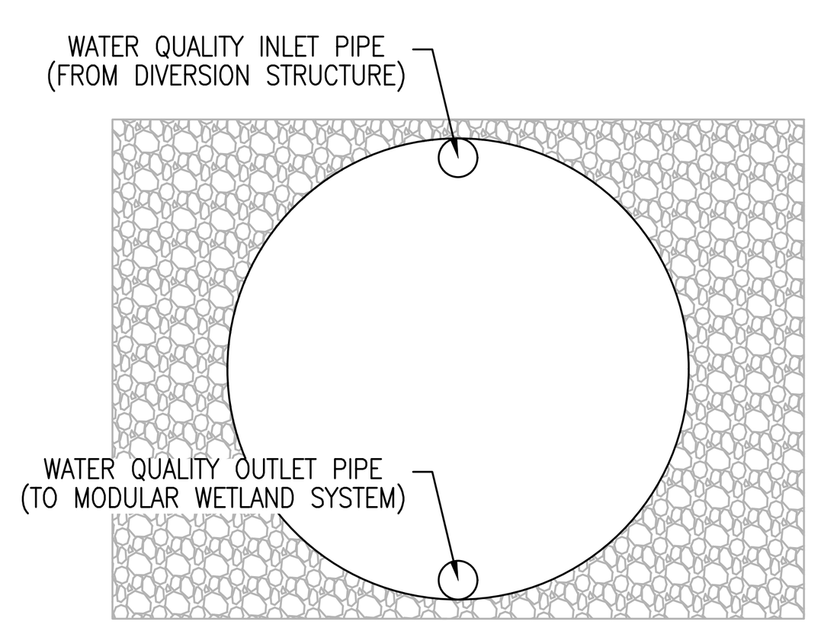
DRAINAGE NOTES:

1. PROPOSED ONSITE CATCH BASIN WITH FILTER INSERT
2. PROPOSED STORM DRAIN PIPE PRIVATE MAINTAINED
3. PROPOSED PUBLIC STORM DRAIN (OFFSITE RUN-ON)
4. PROPOSED DIVERSION STRUCTURE
5. PROPOSED BMP – HYDRODYNAMIC SEPARATOR
6. PROPOSED BMP – UNDERGROUND DETENTION BASIN
7. PROPOSED BMP – MODULAR WETLAND SYSTEM
8. PROPOSED HEADWALL AND RIPRAP



DIVERSION STRUCTURE DETAIL (TYP)

NTS



CHAMBER SECTION

NTS

HYDROLOGY SUMMARY								
DRAINAGE AREA NO.	TRIBUTARY AREA (SF)	TRIBUTARY AREA (AC)	IMPERVIOUS RATIO	Q_2 (CFS)	V_2 (CF)	Q_{100} (CFS)	V_{100} (CF)	DETENTION PROVIDED (CF)
A1	2,395,846	55.00	0.79	66.39	314,277	182.01	921,542	450,183 (UNDERGROUND 144" CMP #1)
A2	825,588	18.95	0.66	22.01	91,419	60.48	300,769	137,857 (UNDERGROUND 144" CMP #1)
A3	2,525,082	57.97	0.80	72.17	336,484	197.53	977,434	538,370 (UNDERGROUND 144" CMP #1)
A4	4,138,851	95.01	0.00	17.76	61,968	182.33	1,558,607	–
B	3,004,030	68.96	0.00	22.64	50,874	179.72	1,132,068	–
C	456,643	10.48	0.00	3.21	7,623	26.46	172,532	–
D	767,026	17.61	0.00	7.12	13,512	45.51	57,604	–
TOTAL (A1 TO A3)	5,746,516	131.92	0.77	160.57	742,180	440.02	2,199,745	–
TOTAL	14,113,066	323.99	0.32	211.30	876,157	874.04	5,120,556	–

NORTH

GRAPHIC SCALE IN FEET

0 100 200 400

PREPARED BY:

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PACIFIC COMMERCE CENTER

POST-DEVELOPMENT HYDROLOGY EXHIBIT

LIVE OAK CANYON ROAD

CITY OF YUCAIPA

DATE: DEC 2022

SHEET 1 OF 1

12/27/2022

Section 6.2 Electronic Data Submittal

To be prepared in Final Engineering

Section 6.3 Post Construction

To be prepared in Final Engineering

Section 6.4 Other Supporting Documentation

- 6.4.1 Vicinity Map
- 6.4.2 WAP Report
- 6.4.3 NOAA Precipitation Data
- 6.4.4 HCOC Map and Calculations
- 6.4.5 BMP Sizing Calculations
- 6.4.6 Geotechnical Report
- 6.4.7 Educational Materials
- 6.4.8 Construction Plans
- 6.4.9 Preliminary WQMP

Section 6.4.1 Vicinity Map


Vicinity Map
Live Oak Canyon Farm
Project Site
M-57
Google Earth
5000 ft
N

Section 6.4.2 WAP Report

WQMP Project Report

County of San Bernardino Stormwater Program

Santa Ana River Watershed Geodatabase

Wednesday, December 21, 2022

Note: The information provided in this report and on the Stormwater Geodatabase for the County of San Bernardino Stormwater Program is intended to provide basic guidance in the preparation of the applicant's Water Quality Management Plan (WQMP) and should not be relied upon without independent verification.

Project Site Parcel Number(s):	030122101, 030120103, 030120116, 030120115, 030120120, 030120108, 030119111, 030121108, 030120128, 031807112, 031811106, 031819236, 031823501, 031821227, 031821214, 031821218, 031823510, 031821209, 031821211, 031821212, 031821306, 031823148, 031821228, 031821225, 031821110, 031821409, 031821309, 031822226, 031822224, 031822228, 031822212, 031822214, 031821103, 031821402, 031821405, 031821107, 031811102, 030121102, 030122107, 030120123, 030119111, 030120121, 030122110, 030122106, 030119118, 030121110, 030121109, 030122109, 030122105, 030120127, 031811114, 031811110, 031819105, 031811105, 031821303, 031821208, 031821308, 031823516, 031821311, 031821310, 031821305, 031823513, 031821217, 031821307, 031821219, 031821104, 031822221, 031821314, 031822227, 031822223, 031819106, 031819271, 031821410, 031821408, 031819237, 031811115, 031807107, 030119106, 030118320, 030118211, 030120135, 030120133, 030120135, 030120126, 030119115, 030119112, 030121108, 030121105, 030121108, 030120129, 031819286, 031811109, 031811107, 031811104, 031823511, 031823538, 031821204, 031821210, 031823515, 031821215, 031821407, 031821111, 031822222, 031822213, 031819104, 031821102, 031821403, 031821108, 031819285
Project Site Acreage:	1299.326
HCOC Exempt Area:	No
Closest Receiving Waters: (Applicant to verify based on local drainage facilities and topography.)	**System Number** - 608 **Facility Name** - Wildwood Creek **Owner** - OTHERS
Closest channel segment's susceptibility to Hydromodification:	High (Default)
Highest downstream hydromodification susceptibility:	High
Is this drainage segment subject to TMDLs?	No
Are there downstream drainage segments subject to TMDLs?	No
Is this drainage segment a 303d listed stream?	No
Are there 303d listed streams downstream?	Yes
Are there unlined downstream waterbodies?	No
Project Site Onsite Soil Group(s):	A, B, C
Environmentally Sensitive Areas within 200':	Coastal Sage Scrub
Groundwater Depth (FT):	-302
Parcels with potential septic tanks within 1000':	Yes
Known Groundwater Contamination Plumes within 1000':	No
Studies and Reports Related to Project Site:	CSDP 4 CALC SHEET FOR HYDRO CSDP 4 Hydrological Design Criteria CSDP 5 CALC SHEET FOR HYDRO CSDP 5 SBVMWD High Groundwater / Pressure Zone Area

Section 6.4.3 NOAA Precipitation Data

NOAA Atlas 14, Volume 6, Version 2
Location name: Yucaipa, California, USA*
Latitude: 34.0089°, Longitude: -117.0858°
Elevation: 2157.18 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.107 (0.089-0.130)	0.139 (0.115-0.169)	0.182 (0.151-0.221)	0.218 (0.180-0.268)	0.271 (0.215-0.345)	0.314 (0.244-0.408)	0.360 (0.273-0.479)	0.410 (0.302-0.562)	0.483 (0.341-0.691)	0.544 (0.371-0.806)
10-min	0.154 (0.128-0.187)	0.199 (0.165-0.242)	0.261 (0.216-0.317)	0.313 (0.257-0.385)	0.389 (0.309-0.494)	0.450 (0.350-0.585)	0.516 (0.391-0.687)	0.588 (0.433-0.806)	0.693 (0.489-0.990)	0.780 (0.532-1.16)
15-min	0.186 (0.155-0.226)	0.240 (0.200-0.292)	0.315 (0.261-0.384)	0.379 (0.311-0.465)	0.470 (0.373-0.597)	0.544 (0.423-0.707)	0.624 (0.473-0.831)	0.711 (0.524-0.975)	0.837 (0.591-1.20)	0.943 (0.643-1.40)
30-min	0.278 (0.231-0.337)	0.359 (0.298-0.436)	0.470 (0.390-0.572)	0.565 (0.465-0.694)	0.701 (0.557-0.891)	0.812 (0.632-1.06)	0.931 (0.706-1.24)	1.06 (0.782-1.45)	1.25 (0.882-1.79)	1.41 (0.959-2.09)
60-min	0.404 (0.336-0.490)	0.521 (0.434-0.633)	0.683 (0.566-0.832)	0.821 (0.675-1.01)	1.02 (0.809-1.29)	1.18 (0.917-1.53)	1.35 (1.03-1.80)	1.54 (1.14-2.11)	1.82 (1.28-2.60)	2.04 (1.39-3.03)
2-hr	0.583 (0.486-0.708)	0.747 (0.621-0.907)	0.968 (0.803-1.18)	1.15 (0.949-1.42)	1.42 (1.13-1.80)	1.63 (1.26-2.11)	1.85 (1.40-2.46)	2.08 (1.54-2.86)	2.42 (1.71-3.46)	2.69 (1.83-3.99)
3-hr	0.725 (0.603-0.879)	0.924 (0.768-1.12)	1.19 (0.989-1.45)	1.42 (1.17-1.74)	1.73 (1.38-2.20)	1.98 (1.54-2.57)	2.24 (1.70-2.99)	2.52 (1.86-3.45)	2.90 (2.05-4.15)	3.21 (2.19-4.76)
6-hr	1.05 (0.870-1.27)	1.33 (1.11-1.61)	1.71 (1.42-2.08)	2.02 (1.66-2.48)	2.46 (1.95-3.12)	2.80 (2.18-3.64)	3.15 (2.39-4.20)	3.52 (2.60-4.83)	4.03 (2.85-5.77)	4.44 (3.03-6.58)
12-hr	1.41 (1.18-1.71)	1.80 (1.50-2.19)	2.32 (1.93-2.83)	2.75 (2.26-3.38)	3.33 (2.65-4.24)	3.79 (2.95-4.92)	4.25 (3.23-5.66)	4.73 (3.49-6.49)	5.40 (3.81-7.72)	5.91 (4.03-8.76)
24-hr	1.89 (1.68-2.18)	2.44 (2.16-2.82)	3.17 (2.79-3.66)	3.76 (3.29-4.38)	4.57 (3.87-5.50)	5.19 (4.31-6.38)	5.83 (4.72-7.34)	6.49 (5.12-8.40)	7.39 (5.59-9.95)	8.09 (5.92-11.3)
2-day	2.31 (2.04-2.66)	3.02 (2.67-3.49)	3.98 (3.51-4.60)	4.77 (4.18-5.57)	5.87 (4.97-7.08)	6.74 (5.59-8.29)	7.64 (6.19-9.62)	8.57 (6.76-11.1)	9.88 (7.48-13.3)	10.9 (7.99-15.2)
3-day	2.47 (2.18-2.84)	3.28 (2.90-3.78)	4.38 (3.86-5.07)	5.31 (4.64-6.19)	6.62 (5.61-7.98)	7.68 (6.37-9.44)	8.78 (7.11-11.1)	9.96 (7.85-12.9)	11.6 (8.80-15.7)	13.0 (9.49-18.1)
4-day	2.67 (2.36-3.07)	3.57 (3.16-4.12)	4.80 (4.24-5.56)	5.86 (5.12-6.83)	7.35 (6.23-8.85)	8.55 (7.10-10.5)	9.83 (7.96-12.4)	11.2 (8.82-14.5)	13.1 (9.94-17.7)	14.7 (10.8-20.5)
7-day	3.06 (2.71-3.53)	4.12 (3.64-4.75)	5.56 (4.90-6.43)	6.78 (5.93-7.90)	8.51 (7.21-10.2)	9.90 (8.21-12.2)	11.4 (9.20-14.3)	12.9 (10.2-16.7)	15.1 (11.5-20.4)	16.9 (12.4-23.6)
10-day	3.33 (2.95-3.84)	4.48 (3.96-5.17)	6.06 (5.35-7.01)	7.40 (6.47-8.63)	9.29 (7.87-11.2)	10.8 (8.96-13.3)	12.4 (10.0-15.6)	14.1 (11.1-18.2)	16.5 (12.5-22.2)	18.4 (13.5-25.7)
20-day	4.11 (3.64-4.74)	5.58 (4.93-6.44)	7.58 (6.68-8.77)	9.27 (8.11-10.8)	11.7 (9.87-14.0)	13.6 (11.3-16.7)	15.6 (12.6-19.6)	17.7 (14.0-22.9)	20.7 (15.7-27.9)	23.1 (16.9-32.2)
30-day	4.89 (4.33-5.63)	6.64 (5.87-7.66)	9.03 (7.96-10.4)	11.0 (9.66-12.9)	13.9 (11.8-16.7)	16.2 (13.4-19.9)	18.6 (15.1-23.4)	21.1 (16.7-27.3)	24.7 (18.7-33.3)	27.6 (20.2-38.4)
45-day	5.86 (5.19-6.75)	7.94 (7.02-9.17)	10.8 (9.51-12.5)	13.2 (11.5-15.4)	16.6 (14.1-20.0)	19.3 (16.0-23.8)	22.2 (18.0-27.9)	25.2 (19.9-32.6)	29.5 (22.3-39.7)	32.9 (24.1-45.9)
60-day	6.83 (6.05-7.87)	9.21 (8.15-10.6)	12.5 (11.0-14.4)	15.2 (13.3-17.8)	19.1 (16.2-23.1)	22.3 (18.5-27.4)	25.5 (20.7-32.2)	29.0 (22.9-37.6)	33.9 (25.7-45.7)	37.9 (27.7-52.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

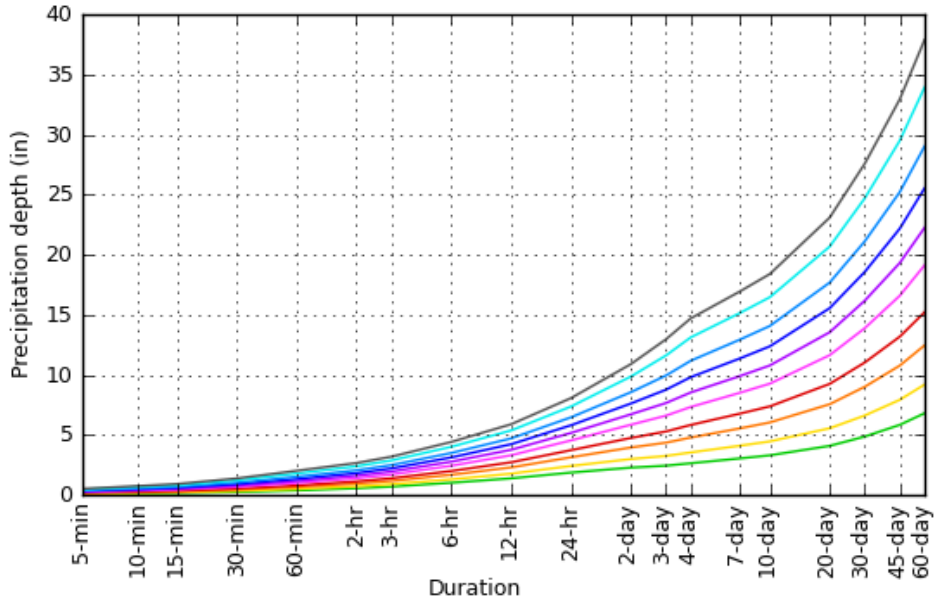
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

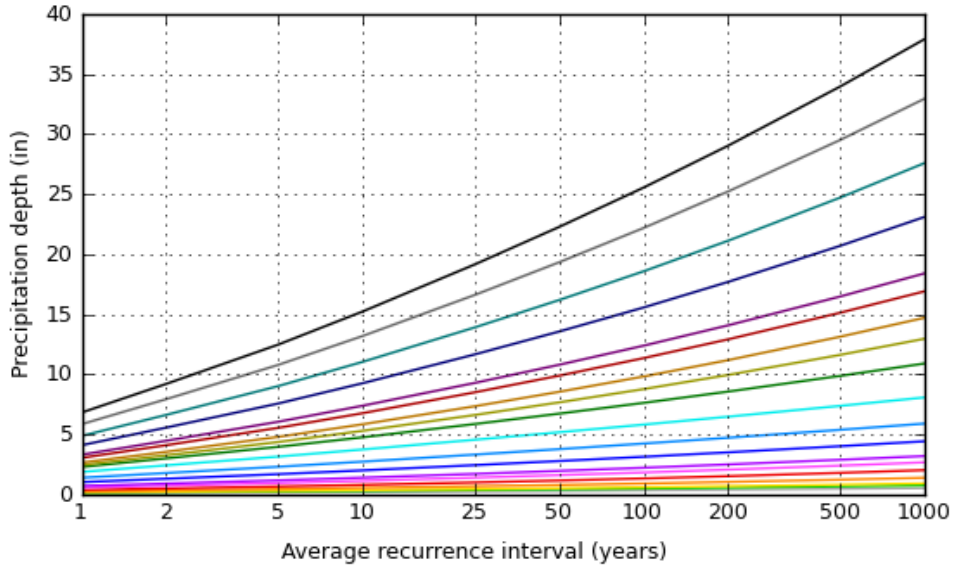
Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 34.0089°, Longitude: -117.0858°





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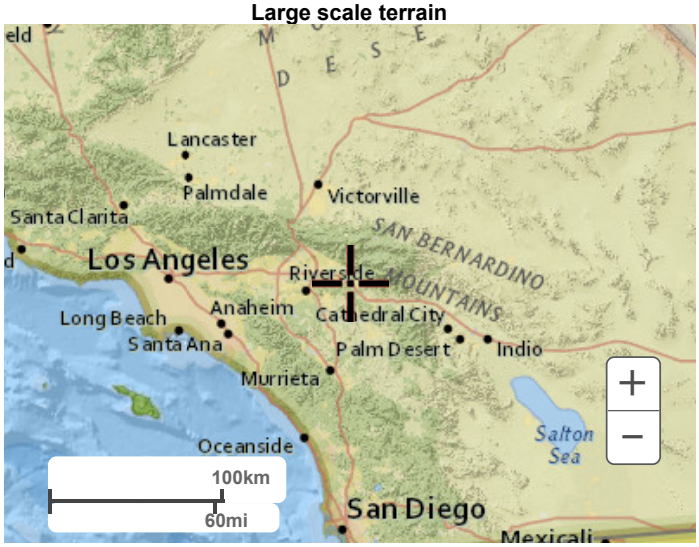
Back to Top

Maps & aerials

Small scale terrain

Large scale terrain



Large scale map

Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Section 6.4.4 HCOC Map and Calculations

HCOC Exemption Map
2-Year Rational Method Calculations
2-Year Unit Hydrograph Calculations
2-Year Basin Routing Analysis


STORMWATER FACILITY MAPPING TOOL
TOC
Find City
CITY OF YUCAIPA
Locate
Clear
Clear All
Metadata
SBCFCD Zones
Thomas Brothers Index
Stormwater Data
Drainage Facilities
EHM
Santa Ana River
Non-EHM (low)
Non-EHM (medium)
Non-EHM (high)
Non-EHM (default-high)
2006 - 303d/TMDL
Water Storage Facility
Interim
Ultimate
Other
Drainage Area Boundaries
HCOC Exempt Areas
City Storm Drains
Ground Water Basins
Ground Water Contours
Septic
Plumes
Soils
As-Built Plans
Hydromod Field Observations
Habitat/Species
Project Site
Not HCOC Exempt

Section 6.4.4 HCOC Map and Calculations

2-Year Rational Method Calculations

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2011 Advanced Engineering Software (aes)
             Ver. 18.0  Release Date: 07/01/2011  License ID 1499

                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                                 *
* RATIONAL METHOD                                                         *
* PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A1                                        *
 **************************************************************************

  FILE NAME: 2PRRA1.DAT
  TIME/DATE OF STUDY: 16:49 12/27/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   737.61
  ELEVATION DATA: UPSTREAM(FEET) =   2186.84  DOWNSTREAM(FEET) =   2012.61

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.832
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.542
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B       10.89      0.67     1.000    61    9.83
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      8.59
  TOTAL AREA(ACRES) =     10.89   PEAK FLOW RATE(CFS) =      8.59
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       10.9  TC(MIN.) =      9.83
  EFFECTIVE AREA(ACRES) =     10.89  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       8.59
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                                *
* RATIONAL METHOD                                                        *
* PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A2                             *
 ************************************************************************

  FILE NAME: 2PRRA2.DAT
  TIME/DATE OF STUDY: 17:18 12/27/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   352.99
  ELEVATION DATA: UPSTREAM(FEET) =   2230.29  DOWNSTREAM(FEET) =   2217.74

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.693
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.466
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        1.43      0.67     1.000    61   10.69
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.03
  TOTAL AREA(ACRES) =      1.43   PEAK FLOW RATE(CFS) =      1.03

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2217.74  DOWNSTREAM(FEET) =   2036.13
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1682.94   CHANNEL SLOPE =  0.1079
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.952
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B       19.19      0.67     1.000    61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.49
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =  11.28
  Tc(MIN.) =   21.98
  SUBAREA AREA(ACRES) =    19.19       SUBAREA RUNOFF(CFS) =    4.94
  EFFECTIVE AREA(ACRES) =     20.62     AREA-AVERAGED Fm(INCH/HR) =   0.67
  AREA-AVERAGED Fp(INCH/HR) =   0.67  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       20.6         PEAK FLOW RATE(CFS) =       5.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.59
  LONGEST FLOWPATH FROM NODE      2.10 TO NODE      2.30 =    2035.93 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       20.6  TC(MIN.) =     21.98
  EFFECTIVE AREA(ACRES) =     20.62  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       5.30
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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                          Analysis prepared by:

                       Kimley-Horn and Associates, Inc.
                              765 The City Drive
                                  Suite 200
                               Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                                *
* RATIONAL METHOD                                                        *
* PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A3                             *
 ************************************************************************

  FILE NAME: 2PRRA3.DAT
  TIME/DATE OF STUDY: 17:20 12/27/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   198.58
  ELEVATION DATA: UPSTREAM(FEET) =   2226.76  DOWNSTREAM(FEET) =   2175.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.721
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.134
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        0.96      0.67     1.000    61    5.72
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.27
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2175.80  DOWNSTREAM(FEET) =   2080.75
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1074.00   CHANNEL SLOPE =  0.0885
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.393
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B       25.70      0.67     1.000    61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.02
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   5.93
  Tc(MIN.) =   11.65
  SUBAREA AREA(ACRES) =    25.70       SUBAREA RUNOFF(CFS) =   16.82
  EFFECTIVE AREA(ACRES) =     26.66     AREA-AVERAGED Fm(INCH/HR) =   0.67
  AREA-AVERAGED Fp(INCH/HR) =   0.67  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       26.7         PEAK FLOW RATE(CFS) =      17.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.48
  LONGEST FLOWPATH FROM NODE      3.10 TO NODE      3.30 =    1272.58 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       26.7  TC(MIN.) =     11.65
  EFFECTIVE AREA(ACRES) =     26.66  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      17.45
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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******************************************************************************
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                          Analysis prepared by:

                       Kimley-Horn and Associates, Inc.
                              765 The City Drive
                                  Suite 200
                               Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                                 *
* RATIONAL METHOD                                                         *
* PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A4                              *
 *************************************************************************

  FILE NAME: 2PRRA4.DAT
  TIME/DATE OF STUDY: 17:21 12/27/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   359.20
  ELEVATION DATA: UPSTREAM(FEET) =   2252.44  DOWNSTREAM(FEET) =   2184.08

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.698
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.786
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        4.74      0.67     1.000    61    7.70
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.78
  TOTAL AREA(ACRES) =      4.74   PEAK FLOW RATE(CFS) =      4.78

****************************************************************************
  FLOW PROCESS FROM NODE      4.20 TO NODE      4.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2184.08  DOWNSTREAM(FEET) =   2075.56
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1570.23   CHANNEL SLOPE =  0.0691
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.131
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B       43.66      0.67     1.000    61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.97
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.98
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   8.78
  Tc(MIN.) =   16.47
  SUBAREA AREA(ACRES) =    43.66       SUBAREA RUNOFF(CFS) =   18.29
  EFFECTIVE AREA(ACRES) =     48.40     AREA-AVERAGED Fm(INCH/HR) =   0.67
  AREA-AVERAGED Fp(INCH/HR) =   0.67  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       48.4         PEAK FLOW RATE(CFS) =      20.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   3.16
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.30 =    1929.43 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       48.4  TC(MIN.) =     16.47
  EFFECTIVE AREA(ACRES) =     48.40  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      20.28
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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                          Analysis prepared by:

                       Kimley-Horn and Associates, Inc.
                              765 The City Drive
                                  Suite 200
                               Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                                *
* RATIONAL METHOD                                                        *
* PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A5                             *
 ************************************************************************

  FILE NAME: 2PRRA5.DAT
  TIME/DATE OF STUDY: 17:23 12/27/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   536.20
  ELEVATION DATA: UPSTREAM(FEET) =   2238.68  DOWNSTREAM(FEET) =   2201.18

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.039
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.439
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        2.57      0.67     1.000    61   11.04
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.79
  TOTAL AREA(ACRES) =      2.57   PEAK FLOW RATE(CFS) =      1.79

****************************************************************************
  FLOW PROCESS FROM NODE      5.20 TO NODE      5.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2201.18  DOWNSTREAM(FEET) =   1988.09
  CHANNEL LENGTH THRU SUBAREA(FEET) =  4430.41   CHANNEL SLOPE =  0.0481
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.571
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B       83.09      0.67     1.000    61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.83
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =  40.42
  Tc(MIN.) =   51.46
  SUBAREA AREA(ACRES) =    83.09       SUBAREA RUNOFF(CFS) =    0.00
  EFFECTIVE AREA(ACRES) =     85.66     AREA-AVERAGED Fm(INCH/HR) =   0.67
  AREA-AVERAGED Fp(INCH/HR) =   0.67  AREA-AVERAGED Ap =   1.00
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =       85.7         PEAK FLOW RATE(CFS) =       1.79
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.30 =    4966.61 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       85.7  TC(MIN.) =     51.46
  EFFECTIVE AREA(ACRES) =     85.66  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       1.79
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
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                          Analysis prepared by:

                       Kimley-Horn and Associates, Inc.
                              765 The City Drive
                                  Suite 200
                               Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                                *
* RATIONAL METHOD                                                        *
* PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A6                             *
 ************************************************************************

  FILE NAME: 2PRRA6.DAT
  TIME/DATE OF STUDY: 17:25 12/27/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      6.10 TO NODE      6.20 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   373.53
  ELEVATION DATA: UPSTREAM(FEET) =   2247.99  DOWNSTREAM(FEET) =   2190.08

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.147
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.726
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        3.54      0.67     1.000    61    8.15
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.38
  TOTAL AREA(ACRES) =      3.54   PEAK FLOW RATE(CFS) =      3.38

****************************************************************************
  FLOW PROCESS FROM NODE      6.20 TO NODE      6.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2190.08  DOWNSTREAM(FEET) =   2098.18
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2640.80   CHANNEL SLOPE =  0.0348
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.828
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B       86.21      0.67     1.000    61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.74
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.25
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =  19.59
  Tc(MIN.) =   27.74
  SUBAREA AREA(ACRES) =    86.21       SUBAREA RUNOFF(CFS) =   12.55
  EFFECTIVE AREA(ACRES) =     89.75     AREA-AVERAGED Fm(INCH/HR) =   0.67
  AREA-AVERAGED Fp(INCH/HR) =   0.67  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       89.8         PEAK FLOW RATE(CFS) =      13.06

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   2.28
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.30 =    3014.33 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       89.8  TC(MIN.) =     27.74
  EFFECTIVE AREA(ACRES) =     89.75  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      13.06
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
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                          Analysis prepared by:

                       Kimley-Horn and Associates, Inc.
                              765 The City Drive
                                  Suite 200
                               Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                                *
* RATIONAL METHOD                                                        *
* PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A7                             *
 ************************************************************************

  FILE NAME: 2PRRA7.DAT
  TIME/DATE OF STUDY: 17:26 12/27/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.76
  ELEVATION DATA: UPSTREAM(FEET) =   2256.61  DOWNSTREAM(FEET) =   2192.89

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.295
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.845
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    B        2.75      0.67     1.000    61    7.29
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.92
  TOTAL AREA(ACRES) =      2.75   PEAK FLOW RATE(CFS) =      2.92

****************************************************************************
  FLOW PROCESS FROM NODE      7.20 TO NODE      7.30 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2192.89  DOWNSTREAM(FEET) =   2145.91
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1110.18   CHANNEL SLOPE =  0.0423
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.207
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    B       39.27      0.67     1.000    61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.47
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   7.50
  Tc(MIN.) =   14.79
  SUBAREA AREA(ACRES) =    39.27       SUBAREA RUNOFF(CFS) =   19.12
  EFFECTIVE AREA(ACRES) =     42.02     AREA-AVERAGED Fm(INCH/HR) =   0.67
  AREA-AVERAGED Fp(INCH/HR) =   0.67  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       42.0         PEAK FLOW RATE(CFS) =      20.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   2.68
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =    1430.94 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       42.0  TC(MIN.) =     14.79
  EFFECTIVE AREA(ACRES) =     42.02  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      20.46
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
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                          Analysis prepared by:

                     Kimley-Horn and Associates, Inc.
                            765 The City Drive
                                Suite 200
                             Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                               *
* RATIONAL METHOD                                                       *
* POST DEVELOPMENT, 2-YEAR STORM EVENT, DA A1
       *
 **************************************************************************

  FILE NAME: 2PORA1.DAT
  TIME/DATE OF STUDY: 21:03 12/22/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   744.09
ELEVATION DATA: UPSTREAM(FEET) =   2183.45  DOWNSTREAM(FEET) =   2177.05

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.082
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.435
SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                B        8.99      0.94     0.100    36   11.08
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.94
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =     10.85
TOTAL AREA(ACRES) =      8.99   PEAK FLOW RATE(CFS) =     10.85

****************************************************************************
FLOW PROCESS FROM NODE      1.20 TO NODE      1.20 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   11.08
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.435
SUBAREA LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                B       46.01      0.94     0.100    36
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.94
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =   46.01      SUBAREA RUNOFF(CFS) =   55.54
EFFECTIVE AREA(ACRES) =     55.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.94  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =       55.0       PEAK FLOW RATE(CFS) =      66.39
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =       55.0  TC(MIN.) =     11.08
EFFECTIVE AREA(ACRES) =     55.00  AREA-AVERAGED Fm(INCH/HR)=  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.94  AREA-AVERAGED Ap = 0.100
PEAK FLOW RATE(CFS)   =      66.39
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

```
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                          Analysis prepared by:

                     Kimley-Horn and Associates, Inc.
                            765 The City Drive
                                Suite 200
                             Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                               *
* RATIONAL METHOD                                                       *
* POST DEVELOPMENT, 2-YEAR STORM EVENT, DA A2
       *
 **************************************************************************

  FILE NAME: 2PORA2.DAT
  TIME/DATE OF STUDY: 21:02 12/22/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
 FLOW PROCESS FROM NODE      2.10 TO NODE      2.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   974.96
 ELEVATION DATA: UPSTREAM(FEET) =   2215.44  DOWNSTREAM(FEET) =   2204.80

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.773
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.384
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        9.76      0.94     0.100    36   11.77
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.94
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =     11.33
 TOTAL AREA(ACRES) =      9.76   PEAK FLOW RATE(CFS) =     11.33

****************************************************************************
 FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.77
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.384
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        9.20      0.94     0.100    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.94
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    9.20      SUBAREA RUNOFF(CFS) =   10.68
 EFFECTIVE AREA(ACRES) =     18.96   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.94  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =       19.0       PEAK FLOW RATE(CFS) =      22.01
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       19.0  TC(MIN.) =     11.77
 EFFECTIVE AREA(ACRES) =     18.96  AREA-AVERAGED Fm(INCH/HR)=  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.94  AREA-AVERAGED Ap = 0.100
 PEAK FLOW RATE(CFS)   =      22.01
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                          Analysis prepared by:

                     Kimley-Horn and Associates, Inc.
                            765 The City Drive
                                Suite 200
                             Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                               *
* RATIONAL METHOD                                                       *
* POST DEVELOPMENT, 2-YEAR STORM EVENT, DA A3
       *
 **************************************************************************

  FILE NAME: 2PORA3.DAT
  TIME/DATE OF STUDY: 21:04 12/22/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   617.28
ELEVATION DATA: UPSTREAM(FEET) =   2166.00  DOWNSTREAM(FEET) =   2161.35

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.560
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.477
SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                B        7.66      0.94     0.100    36   10.56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.94
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =      9.54
TOTAL AREA(ACRES) =      7.66   PEAK FLOW RATE(CFS) =      9.54

****************************************************************************
FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.56
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.477
SUBAREA LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                B       50.31      0.94     0.100    36
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.94
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =   50.31      SUBAREA RUNOFF(CFS) =   62.63
EFFECTIVE AREA(ACRES) =     57.97   AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.94  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =       58.0       PEAK FLOW RATE(CFS) =      72.17
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =       58.0  TC(MIN.) =     10.56
EFFECTIVE AREA(ACRES) =     57.97  AREA-AVERAGED Fm(INCH/HR)=  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.94  AREA-AVERAGED Ap = 0.100
PEAK FLOW RATE(CFS)   =      72.17
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

```
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                          Analysis prepared by:

                     Kimley-Horn and Associates, Inc.
                            765 The City Drive
                                Suite 200
                             Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                               *
* RATIONAL METHOD                                                       *
* POST DEVELOPMENT, 2-YEAR STORM EVENT, DA A4
       *
 **************************************************************************

  FILE NAME: 2PORA4.DAT
  TIME/DATE OF STUDY: 21:09 12/22/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
 FLOW PROCESS FROM NODE      4.10 TO NODE      4.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   511.33
 ELEVATION DATA: UPSTREAM(FEET) =   2250.00  DOWNSTREAM(FEET) =   2249.23

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.339
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.918
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "GRASS"                    B        9.33      0.67     1.000    61   23.34
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      2.12
 TOTAL AREA(ACRES) =      9.33   PEAK FLOW RATE(CFS) =      2.12

****************************************************************************
 FLOW PROCESS FROM NODE      4.20 TO NODE      4.30 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   2249.23  DOWNSTREAM(FEET) =   2036.15
 CHANNEL LENGTH THRU SUBAREA(FEET) =   599.32   CHANNEL SLOPE =  0.3555
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.874
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "GRASS"                    B       85.68      0.67     1.000    61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.19
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.97
 AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   2.01
 Tc(MIN.) =   25.35
 SUBAREA AREA(ACRES) =    85.68       SUBAREA RUNOFF(CFS) =   16.01
 EFFECTIVE AREA(ACRES) =     95.01     AREA-AVERAGED Fm(INCH/HR) =   0.67
 AREA-AVERAGED Fp(INCH/HR) =   0.67  AREA-AVERAGED Ap =   1.00
```

```
  TOTAL AREA(ACRES) =       95.0         PEAK FLOW RATE(CFS) =      17.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   5.66
  LONGEST FLOWPATH FROM NODE      4.10 TO NODE      4.30 =    1110.65 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       95.0  TC(MIN.) =     25.35
  EFFECTIVE AREA(ACRES) =     95.01  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      17.76
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
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                          Analysis prepared by:

                     Kimley-Horn and Associates, Inc.
                            765 The City Drive
                                Suite 200
                             Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                               *
* RATIONAL METHOD                                                       *
* POST DEVELOPMENT, 2-YEAR STORM EVENT, DA B
       *
 **************************************************************************

  FILE NAME: 2PORB.DAT
  TIME/DATE OF STUDY: 21:11 12/22/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
 FLOW PROCESS FROM NODE      5.10 TO NODE      5.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   477.56
 ELEVATION DATA: UPSTREAM(FEET) =   2253.81  DOWNSTREAM(FEET) =   2114.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.916
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.756
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "GRASS"                    B        8.31      0.67     1.000    61    7.92
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      8.15
 TOTAL AREA(ACRES) =      8.31   PEAK FLOW RATE(CFS) =      8.15

****************************************************************************
 FLOW PROCESS FROM NODE      5.20 TO NODE      5.30 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   2114.10  DOWNSTREAM(FEET) =   2075.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1506.57   CHANNEL SLOPE =  0.0260
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.031
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "GRASS"                    B       60.65      0.67     1.000    61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.88
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.22
 AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =  11.32
 Tc(MIN.) =   19.24
 SUBAREA AREA(ACRES) =    60.65       SUBAREA RUNOFF(CFS) =   19.92
 EFFECTIVE AREA(ACRES) =     68.96     AREA-AVERAGED Fm(INCH/HR) =   0.67
 AREA-AVERAGED Fp(INCH/HR) =   0.67  AREA-AVERAGED Ap =   1.00
```

```
  TOTAL AREA(ACRES) =       69.0         PEAK FLOW RATE(CFS) =      22.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   2.28
  LONGEST FLOWPATH FROM NODE      5.10 TO NODE      5.30 =    1984.13 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       69.0  TC(MIN.) =     19.24
  EFFECTIVE AREA(ACRES) =     68.96  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      22.64
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
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                          Analysis prepared by:

                     Kimley-Horn and Associates, Inc.
                            765 The City Drive
                                Suite 200
                             Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                               *
* RATIONAL METHOD                                                       *
* POST DEVELOPMENT, 2-YEAR STORM EVENT, DA C
       *
 **************************************************************************

  FILE NAME: 2PORC.DAT
  TIME/DATE OF STUDY: 21:13 12/22/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
 FLOW PROCESS FROM NODE      6.10 TO NODE      6.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   410.53
 ELEVATION DATA: UPSTREAM(FEET) =   2240.52  DOWNSTREAM(FEET) =   2191.25

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.905
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.637
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "GRASS"                    B        2.12      0.67     1.000    61    8.91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      1.85
 TOTAL AREA(ACRES) =      2.12   PEAK FLOW RATE(CFS) =      1.85

****************************************************************************
 FLOW PROCESS FROM NODE      6.20 TO NODE      6.30 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   2191.25  DOWNSTREAM(FEET) =   2146.47
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1087.24   CHANNEL SLOPE =  0.0412
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.006
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "GRASS"                    B        8.36      0.67     1.000    61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.63
 AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =  11.13
 Tc(MIN.) =   20.04
 SUBAREA AREA(ACRES) =     8.36       SUBAREA RUNOFF(CFS) =    2.56
 EFFECTIVE AREA(ACRES) =     10.48     AREA-AVERAGED Fm(INCH/HR) =   0.67
 AREA-AVERAGED Fp(INCH/HR) =   0.67  AREA-AVERAGED Ap =   1.00
```

```
  TOTAL AREA(ACRES) =       10.5         PEAK FLOW RATE(CFS) =       3.21

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE      6.10 TO NODE      6.30 =    1497.77 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       10.5  TC(MIN.) =     20.04
  EFFECTIVE AREA(ACRES) =     10.48  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       3.21
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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                          Analysis prepared by:

                     Kimley-Horn and Associates, Inc.
                            765 The City Drive
                                Suite 200
                             Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* PACIFIC COMMERCE CENTER                                               *
* RATIONAL METHOD                                                       *
* POST DEVELOPMENT, 2-YEAR STORM EVENT, DA D
       *
 **************************************************************************

  FILE NAME: 2PORD.DAT
  TIME/DATE OF STUDY: 21:15 12/22/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.5210

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
 FLOW PROCESS FROM NODE      7.10 TO NODE      7.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   502.23
 ELEVATION DATA: UPSTREAM(FEET) =   2149.58  DOWNSTREAM(FEET) =   2134.93

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.810
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.316
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "GRASS"                    B        3.79      0.67     1.000    61   12.81
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      2.22
 TOTAL AREA(ACRES) =      3.79   PEAK FLOW RATE(CFS) =      2.22

****************************************************************************
 FLOW PROCESS FROM NODE      7.20 TO NODE      7.30 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   2134.93  DOWNSTREAM(FEET) =   2104.25
 CHANNEL LENGTH THRU SUBAREA(FEET) =   523.89   CHANNEL SLOPE =  0.0586
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.116
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "GRASS"                    B       13.82      0.67     1.000    61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.67
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.05
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.15
 AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   4.06
 Tc(MIN.) =   16.87
 SUBAREA AREA(ACRES) =    13.82       SUBAREA RUNOFF(CFS) =    5.59
 EFFECTIVE AREA(ACRES) =     17.61     AREA-AVERAGED Fm(INCH/HR) =   0.67
 AREA-AVERAGED Fp(INCH/HR) =   0.67  AREA-AVERAGED Ap =   1.00
```

```
  TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =       7.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.32
  LONGEST FLOWPATH FROM NODE      7.10 TO NODE      7.30 =    1026.12 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       17.6  TC(MIN.) =     16.87
  EFFECTIVE AREA(ACRES) =     17.61  AREA-AVERAGED Fm(INCH/HR)=  0.67
  AREA-AVERAGED Fp(INCH/HR) =  0.67  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       7.12
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Section 6.4.4 HCOC Map and Calculations

2-Year Unit Hydrograph Calculations

```
******************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A1
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   10.89
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) =  9.83
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.21
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     2.01

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.11      0.0001      0.03  Q         .         .         .         .
  0.27      0.0006      0.03  Q         .         .         .         .
  0.44      0.0010      0.03  Q         .         .         .         .
  0.60      0.0014      0.03  Q         .         .         .         .
  0.76      0.0019      0.03  Q         .         .         .         .
  0.93      0.0023      0.03  Q         .         .         .         .
  1.09      0.0028      0.03  Q         .         .         .         .
  1.25      0.0032      0.03  Q         .         .         .         .
  1.42      0.0037      0.03  Q         .         .         .         .
  1.58      0.0041      0.03  Q         .         .         .         .
  1.75      0.0046      0.03  Q         .         .         .         .
  1.91      0.0050      0.03  Q         .         .         .         .
  2.07      0.0055      0.03  Q         .         .         .         .
  2.24      0.0060      0.03  Q         .         .         .         .
  2.40      0.0064      0.03  Q         .         .         .         .
  2.57      0.0069      0.03  Q         .         .         .         .
  2.73      0.0074      0.04  Q         .         .         .         .
  2.89      0.0079      0.04  Q         .         .         .         .
  3.06      0.0083      0.04  Q         .         .         .         .
  3.22      0.0088      0.04  Q         .         .         .         .
  3.38      0.0093      0.04  Q         .         .         .         .
```

3.55	0.0098	0.04	Q	.	.	.	.
3.71	0.0103	0.04	Q	.	.	.	.
3.88	0.0108	0.04	Q	.	.	.	.
4.04	0.0113	0.04	Q	.	.	.	.
4.20	0.0118	0.04	Q	.	.	.	.
4.37	0.0123	0.04	Q	.	.	.	.
4.53	0.0128	0.04	Q	.	.	.	.
4.70	0.0134	0.04	Q	.	.	.	.
4.86	0.0139	0.04	Q	.	.	.	.
5.02	0.0144	0.04	Q	.	.	.	.
5.19	0.0149	0.04	Q	.	.	.	.
5.35	0.0155	0.04	Q	.	.	.	.
5.51	0.0160	0.04	Q	.	.	.	.
5.68	0.0166	0.04	Q	.	.	.	.
5.84	0.0171	0.04	Q	.	.	.	.
6.01	0.0177	0.04	Q	.	.	.	.
6.17	0.0182	0.04	Q	.	.	.	.
6.33	0.0188	0.04	Q	.	.	.	.
6.50	0.0194	0.04	Q	.	.	.	.
6.66	0.0199	0.04	Q	.	.	.	.
6.83	0.0205	0.04	Q	.	.	.	.
6.99	0.0211	0.04	Q	.	.	.	.
7.15	0.0217	0.04	Q	.	.	.	.
7.32	0.0223	0.04	Q	.	.	.	.
7.48	0.0229	0.04	Q	.	.	.	.
7.64	0.0235	0.05	Q	.	.	.	.
7.81	0.0241	0.05	Q	.	.	.	.
7.97	0.0248	0.05	Q	.	.	.	.
8.14	0.0254	0.05	Q	.	.	.	.
8.30	0.0260	0.05	Q	.	.	.	.
8.46	0.0267	0.05	Q	.	.	.	.
8.63	0.0273	0.05	Q	.	.	.	.
8.79	0.0280	0.05	Q	.	.	.	.
8.96	0.0287	0.05	Q	.	.	.	.
9.12	0.0293	0.05	Q	.	.	.	.
9.28	0.0300	0.05	Q	.	.	.	.
9.45	0.0307	0.05	Q	.	.	.	.
9.61	0.0314	0.05	Q	.	.	.	.
9.77	0.0322	0.05	Q	.	.	.	.
9.94	0.0329	0.05	Q	.	.	.	.
10.10	0.0336	0.05	Q	.	.	.	.
10.27	0.0344	0.06	Q	.	.	.	.
10.43	0.0352	0.06	Q	.	.	.	.
10.59	0.0359	0.06	Q	.	.	.	.
10.76	0.0367	0.06	Q	.	.	.	.
10.92	0.0375	0.06	Q	.	.	.	.
11.09	0.0383	0.06	Q	.	.	.	.
11.25	0.0392	0.06	Q	.	.	.	.
11.41	0.0400	0.06	Q	.	.	.	.
11.58	0.0409	0.06	Q	.	.	.	.
11.74	0.0418	0.07	Q	.	.	.	.
11.90	0.0427	0.07	Q	.	.	.	.
12.07	0.0436	0.07	Q	.	.	.	.
12.23	0.0446	0.08	Q	.	.	.	.
12.40	0.0458	0.09	Q	.	.	.	.
12.56	0.0470	0.09	Q	.	.	.	.
12.72	0.0482	0.09	Q	.	.	.	.
12.89	0.0494	0.09	Q	.	.	.	.
13.05	0.0506	0.09	Q	.	.	.	.
13.21	0.0519	0.10	Q	.	.	.	.
13.38	0.0533	0.10	Q	.	.	.	.
13.54	0.0546	0.10	Q	.	.	.	.
13.71	0.0560	0.11	Q	.	.	.	.
13.87	0.0575	0.11	Q	.	.	.	.
14.03	0.0590	0.11	Q	.	.	.	.
14.20	0.0606	0.12	Q	.	.	.	.
14.36	0.0622	0.12	Q	.	.	.	.
14.53	0.0639	0.13	Q	.	.	.	.
14.69	0.0656	0.13	Q	.	.	.	.

```
  14.85      0.0675      0.14  Q         .         .         .         .
  15.02      0.0695      0.15  Q         .         .         .         .
  15.18      0.0716      0.17  Q         .         .         .         .
  15.34      0.0739      0.18  Q         .         .         .         .
  15.51      0.0766      0.21  Q         .         .         .         .
  15.67      0.0795      0.23  Q         .         .         .         .
  15.84      0.0831      0.30  .Q        .         .         .         .
  16.00      0.0878      0.39  .Q        .         .         .         .
  16.16      0.1267      5.37  .         .         .Q        .         .
  16.33      0.1648      0.26  .Q        .         .         .         .
  16.49      0.1679      0.19  Q         .         .         .         .
  16.66      0.1702      0.16  Q         .         .         .         .
  16.82      0.1722      0.14  Q         .         .         .         .
  16.98      0.1740      0.12  Q         .         .         .         .
  17.15      0.1756      0.11  Q         .         .         .         .
  17.31      0.1771      0.11  Q         .         .         .         .
  17.47      0.1785      0.10  Q         .         .         .         .
  17.64      0.1798      0.10  Q         .         .         .         .
  17.80      0.1811      0.09  Q         .         .         .         .
  17.97      0.1823      0.09  Q         .         .         .         .
  18.13      0.1834      0.08  Q         .         .         .         .
  18.29      0.1844      0.07  Q         .         .         .         .
  18.46      0.1853      0.06  Q         .         .         .         .
  18.62      0.1861      0.06  Q         .         .         .         .
  18.79      0.1870      0.06  Q         .         .         .         .
  18.95      0.1877      0.06  Q         .         .         .         .
  19.11      0.1885      0.06  Q         .         .         .         .
  19.28      0.1893      0.05  Q         .         .         .         .
  19.44      0.1900      0.05  Q         .         .         .         .
  19.60      0.1907      0.05  Q         .         .         .         .
  19.77      0.1914      0.05  Q         .         .         .         .
  19.93      0.1920      0.05  Q         .         .         .         .
  20.10      0.1927      0.05  Q         .         .         .         .
  20.26      0.1933      0.05  Q         .         .         .         .
  20.42      0.1939      0.05  Q         .         .         .         .
  20.59      0.1945      0.04  Q         .         .         .         .
  20.75      0.1951      0.04  Q         .         .         .         .
  20.92      0.1957      0.04  Q         .         .         .         .
  21.08      0.1963      0.04  Q         .         .         .         .
  21.24      0.1968      0.04  Q         .         .         .         .
  21.41      0.1974      0.04  Q         .         .         .         .
  21.57      0.1979      0.04  Q         .         .         .         .
  21.73      0.1984      0.04  Q         .         .         .         .
  21.90      0.1990      0.04  Q         .         .         .         .
  22.06      0.1995      0.04  Q         .         .         .         .
  22.23      0.2000      0.04  Q         .         .         .         .
  22.39      0.2005      0.04  Q         .         .         .         .
  22.55      0.2010      0.04  Q         .         .         .         .
  22.72      0.2015      0.04  Q         .         .         .         .
  22.88      0.2019      0.04  Q         .         .         .         .
  23.04      0.2024      0.03  Q         .         .         .         .
  23.21      0.2029      0.03  Q         .         .         .         .
  23.37      0.2033      0.03  Q         .         .         .         .
  23.54      0.2038      0.03  Q         .         .         .         .
  23.70      0.2042      0.03  Q         .         .         .         .
  23.86      0.2047      0.03  Q         .         .         .         .
  24.03      0.2051      0.03  Q         .         .         .         .
  24.19      0.2053      0.00  Q         .         .         .         .
 ----------------------------------------------------------------------------
-------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated               Duration
        Peak Flow Rate                    (minutes)
    ======================                =========
              0%                           1445.0
             10%                              9.8
```

20%	9.8
30%	9.8
40%	9.8
50%	9.8
60%	9.8
70%	9.8
80%	9.8
90%	9.8

```
******************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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             Ver. 18.0  Release Date: 05/01/2011  License ID 1499

                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A2
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   20.62
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) = 21.98
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.33
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     3.86

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.25      0.0006      0.06  Q         .         .         .         .
  0.61      0.0025      0.06  Q         .         .         .         .
  0.98      0.0043      0.06  Q         .         .         .         .
  1.35      0.0062      0.06  Q         .         .         .         .
  1.71      0.0081      0.06  Q         .         .         .         .
  2.08      0.0100      0.06  Q         .         .         .         .
  2.45      0.0120      0.07  Q         .         .         .         .
  2.81      0.0140      0.07  Q         .         .         .         .
  3.18      0.0160      0.07  Q         .         .         .         .
  3.54      0.0181      0.07  Q         .         .         .         .
  3.91      0.0202      0.07  Q         .         .         .         .
  4.28      0.0223      0.07  Q         .         .         .         .
  4.64      0.0245      0.07  Q         .         .         .         .
  5.01      0.0267      0.07  Q         .         .         .         .
  5.38      0.0289      0.07  Q         .         .         .         .
  5.74      0.0312      0.08  Q         .         .         .         .
  6.11      0.0335      0.08  Q         .         .         .         .
  6.48      0.0359      0.08  Q         .         .         .         .
  6.84      0.0383      0.08  Q         .         .         .         .
  7.21      0.0408      0.08  Q         .         .         .         .
  7.57      0.0433      0.09  Q         .         .         .         .
```

7.94	0.0459	0.09	Q	.	.	.	.
8.31	0.0486	0.09	Q	.	.	.	.
8.67	0.0513	0.09	Q	.	.	.	.
9.04	0.0541	0.09	Q	.	.	.	.
9.41	0.0570	0.10	Q	.	.	.	.
9.77	0.0600	0.10	Q	.	.	.	.
10.14	0.0631	0.10	Q	.	.	.	.
10.51	0.0662	0.11	Q	.	.	.	.
10.87	0.0695	0.11	Q	.	.	.	.
11.24	0.0729	0.12	Q	.	.	.	.
11.60	0.0765	0.12	Q	.	.	.	.
11.97	0.0802	0.13	Q	.	.	.	.
12.34	0.0843	0.14	Q	.	.	.	.
12.70	0.0889	0.17	Q	.	.	.	.
13.07	0.0941	0.17	Q	.	.	.	.
13.44	0.0995	0.19	Q	.	.	.	.
13.80	0.1053	0.19	Q	.	.	.	.
14.17	0.1115	0.22	Q	.	.	.	.
14.53	0.1182	0.23	Q	.	.	.	.
14.90	0.1256	0.26	.Q	.	.	.	.
15.27	0.1340	0.29	.Q	.	.	.	.
15.63	0.1444	0.39	.Q	.	.	.	.
16.00	0.1580	0.50	. Q	.	.	.	.
16.37	0.2120	3.06	.	. Q	.	.	.
16.73	0.2633	0.33	.Q	.	.	.	.
17.10	0.2720	0.24	Q	.	.	.	.
17.47	0.2788	0.20	Q	.	.	.	.
17.83	0.2846	0.18	Q	.	.	.	.
18.20	0.2897	0.16	Q	.	.	.	.
18.56	0.2941	0.12	Q	.	.	.	.
18.93	0.2976	0.11	Q	.	.	.	.
19.30	0.3009	0.10	Q	.	.	.	.
19.66	0.3040	0.10	Q	.	.	.	.
20.03	0.3069	0.09	Q	.	.	.	.
20.40	0.3096	0.09	Q	.	.	.	.
20.76	0.3122	0.08	Q	.	.	.	.
21.13	0.3147	0.08	Q	.	.	.	.
21.49	0.3171	0.08	Q	.	.	.	.
21.86	0.3194	0.07	Q	.	.	.	.
22.23	0.3216	0.07	Q	.	.	.	.
22.59	0.3237	0.07	Q	.	.	.	.
22.96	0.3257	0.07	Q	.	.	.	.
23.33	0.3277	0.06	Q	.	.	.	.
23.69	0.3297	0.06	Q	.	.	.	.
24.06	0.3315	0.06	Q	.	.	.	.
24.43	0.3325	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1450.7
10%	87.9
20%	22.0
30%	22.0
40%	22.0
50%	22.0
60%	22.0
70%	22.0
80%	22.0
90%	22.0

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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             Ver. 18.0  Release Date: 05/01/2011  License ID 1499

                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A3
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   26.66
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) = 11.65
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

--------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.50
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     4.92

**************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------
  0.08      0.0000      0.00  Q         .         .         .         .
  0.27      0.0006      0.08  Q         .         .         .         .
  0.47      0.0019      0.08  Q         .         .         .         .
  0.66      0.0032      0.08  Q         .         .         .         .
  0.86      0.0044      0.08  Q         .         .         .         .
  1.05      0.0057      0.08  Q         .         .         .         .
  1.24      0.0070      0.08  Q         .         .         .         .
  1.44      0.0083      0.08  Q         .         .         .         .
  1.63      0.0096      0.08  Q         .         .         .         .
  1.83      0.0110      0.08  Q         .         .         .         .
  2.02      0.0123      0.08  Q         .         .         .         .
  2.21      0.0136      0.08  Q         .         .         .         .
  2.41      0.0150      0.08  Q         .         .         .         .
  2.60      0.0164      0.09  Q         .         .         .         .
  2.80      0.0177      0.09  Q         .         .         .         .
  2.99      0.0191      0.09  Q         .         .         .         .
  3.19      0.0205      0.09  Q         .         .         .         .
  3.38      0.0220      0.09  Q         .         .         .         .
  3.57      0.0234      0.09  Q         .         .         .         .
  3.77      0.0248      0.09  Q         .         .         .         .
  3.96      0.0263      0.09  Q         .         .         .         .
```

4.16	0.0277	0.09	Q	.	.	.	.
4.35	0.0292	0.09	Q	.	.	.	.
4.54	0.0307	0.09	Q	.	.	.	.
4.74	0.0322	0.09	Q	.	.	.	.
4.93	0.0337	0.10	Q	.	.	.	.
5.13	0.0353	0.10	Q	.	.	.	.
5.32	0.0368	0.10	Q	.	.	.	.
5.52	0.0384	0.10	Q	.	.	.	.
5.71	0.0400	0.10	Q	.	.	.	.
5.90	0.0415	0.10	Q	.	.	.	.
6.10	0.0432	0.10	Q	.	.	.	.
6.29	0.0448	0.10	Q	.	.	.	.
6.49	0.0464	0.10	Q	.	.	.	.
6.68	0.0481	0.10	Q	.	.	.	.
6.87	0.0498	0.11	Q	.	.	.	.
7.07	0.0515	0.11	Q	.	.	.	.
7.26	0.0532	0.11	Q	.	.	.	.
7.46	0.0550	0.11	Q	.	.	.	.
7.65	0.0568	0.11	Q	.	.	.	.
7.85	0.0586	0.11	Q	.	.	.	.
8.04	0.0604	0.11	Q	.	.	.	.
8.23	0.0622	0.12	Q	.	.	.	.
8.43	0.0641	0.12	Q	.	.	.	.
8.62	0.0660	0.12	Q	.	.	.	.
8.82	0.0679	0.12	Q	.	.	.	.
9.01	0.0699	0.12	Q	.	.	.	.
9.20	0.0718	0.12	Q	.	.	.	.
9.40	0.0739	0.13	Q	.	.	.	.
9.59	0.0759	0.13	Q	.	.	.	.
9.79	0.0780	0.13	Q	.	.	.	.
9.98	0.0801	0.13	Q	.	.	.	.
10.18	0.0823	0.14	Q	.	.	.	.
10.37	0.0845	0.14	Q	.	.	.	.
10.56	0.0867	0.14	Q	.	.	.	.
10.76	0.0890	0.14	Q	.	.	.	.
10.95	0.0913	0.15	Q	.	.	.	.
11.15	0.0937	0.15	Q	.	.	.	.
11.34	0.0961	0.15	Q	.	.	.	.
11.53	0.0986	0.16	Q	.	.	.	.
11.73	0.1011	0.16	Q	.	.	.	.
11.92	0.1037	0.17	Q	.	.	.	.
12.12	0.1064	0.17	Q	.	.	.	.
12.31	0.1094	0.21	Q	.	.	.	.
12.51	0.1128	0.21	Q	.	.	.	.
12.70	0.1163	0.22	Q	.	.	.	.
12.89	0.1198	0.22	Q	.	.	.	.
13.09	0.1235	0.23	Q	.	.	.	.
13.28	0.1272	0.24	Q	.	.	.	.
13.48	0.1311	0.25	Q	.	.	.	.
13.67	0.1352	0.25	Q	.	.	.	.
13.86	0.1393	0.27	Q	.	.	.	.
14.06	0.1437	0.27	Q	.	.	.	.
14.25	0.1482	0.29	Q	.	.	.	.
14.45	0.1530	0.30	Q	.	.	.	.
14.64	0.1580	0.32	Q	.	.	.	.
14.84	0.1633	0.34	Q	.	.	.	.
15.03	0.1690	0.37	Q	.	.	.	.
15.22	0.1752	0.40	Q	.	.	.	.
15.42	0.1821	0.46	Q	.	.	.	.
15.61	0.1900	0.52	.Q	.	.	.	.
15.81	0.1997	0.68	.Q	.	.	.	.
16.00	0.2122	0.87	.Q	.	.	.	.
16.19	0.3066	10.90	.	.	.Q	.	.
16.39	0.3988	0.59	.Q	.	.	.	.
16.58	0.4070	0.43	Q	.	.	.	.
16.78	0.4132	0.36	Q	.	.	.	.
16.97	0.4186	0.31	Q	.	.	.	.
17.17	0.4233	0.28	Q	.	.	.	.
17.36	0.4277	0.26	Q	.	.	.	.

17.55	0.4317	0.24	Q	.	.	.	.
17.75	0.4355	0.23	Q	.	.	.	.
17.94	0.4391	0.22	Q	.	.	.	.
18.14	0.4424	0.20	Q	.	.	.	.
18.33	0.4453	0.16	Q	.	.	.	.
18.52	0.4479	0.15	Q	.	.	.	.
18.72	0.4503	0.15	Q	.	.	.	.
18.91	0.4526	0.14	Q	.	.	.	.
19.11	0.4549	0.14	Q	.	.	.	.
19.30	0.4570	0.13	Q	.	.	.	.
19.49	0.4591	0.13	Q	.	.	.	.
19.69	0.4611	0.12	Q	.	.	.	.
19.88	0.4631	0.12	Q	.	.	.	.
20.08	0.4650	0.12	Q	.	.	.	.
20.27	0.4668	0.11	Q	.	.	.	.
20.47	0.4686	0.11	Q	.	.	.	.
20.66	0.4704	0.11	Q	.	.	.	.
20.85	0.4721	0.11	Q	.	.	.	.
21.05	0.4737	0.10	Q	.	.	.	.
21.24	0.4754	0.10	Q	.	.	.	.
21.44	0.4770	0.10	Q	.	.	.	.
21.63	0.4785	0.10	Q	.	.	.	.
21.83	0.4801	0.09	Q	.	.	.	.
22.02	0.4816	0.09	Q	.	.	.	.
22.21	0.4830	0.09	Q	.	.	.	.
22.41	0.4845	0.09	Q	.	.	.	.
22.60	0.4859	0.09	Q	.	.	.	.
22.80	0.4873	0.09	Q	.	.	.	.
22.99	0.4887	0.09	Q	.	.	.	.
23.18	0.4901	0.08	Q	.	.	.	.
23.38	0.4914	0.08	Q	.	.	.	.
23.57	0.4927	0.08	Q	.	.	.	.
23.77	0.4940	0.08	Q	.	.	.	.
23.96	0.4953	0.08	Q	.	.	.	.
24.15	0.4965	0.08	Q	.	.	.	.
24.35	0.4972	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1444.6
10%	11.6
20%	11.6
30%	11.6
40%	11.6
50%	11.6
60%	11.6
70%	11.6
80%	11.6
90%	11.6

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******************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A4
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   48.40
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) = 20.28
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.81
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     9.03

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.11      0.0007      0.14  Q         .         .         .         .
  0.45      0.0046      0.14  Q         .         .         .         .
  0.79      0.0086      0.14  Q         .         .         .         .
  1.13      0.0127      0.15  Q         .         .         .         .
  1.47      0.0168      0.15  Q         .         .         .         .
  1.80      0.0209      0.15  Q         .         .         .         .
  2.14      0.0252      0.15  Q         .         .         .         .
  2.48      0.0294      0.15  Q         .         .         .         .
  2.82      0.0337      0.16  Q         .         .         .         .
  3.16      0.0381      0.16  Q         .         .         .         .
  3.49      0.0426      0.16  Q         .         .         .         .
  3.83      0.0471      0.16  Q         .         .         .         .
  4.17      0.0517      0.17  Q         .         .         .         .
  4.51      0.0563      0.17  Q         .         .         .         .
  4.85      0.0611      0.17  Q         .         .         .         .
  5.18      0.0659      0.17  Q         .         .         .         .
  5.52      0.0708      0.18  Q         .         .         .         .
  5.86      0.0758      0.18  Q         .         .         .         .
  6.20      0.0809      0.18  Q         .         .         .         .
  6.54      0.0860      0.19  Q         .         .         .         .
  6.87      0.0913      0.19  Q         .         .         .         .
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  7.21      0.0967      0.19  Q         .         .         .         .
  7.55      0.1022      0.20  Q         .         .         .         .
  7.89      0.1078      0.20  Q         .         .         .         .
  8.23      0.1136      0.21  Q         .         .         .         .
  8.56      0.1194      0.21  Q         .         .         .         .
  8.90      0.1255      0.22  Q         .         .         .         .
  9.24      0.1317      0.22  Q         .         .         .         .
  9.58      0.1380      0.23  Q         .         .         .         .
  9.92      0.1446      0.24  Q         .         .         .         .
 10.25      0.1513      0.25  Q         .         .         .         .
 10.59      0.1583      0.25  .Q        .         .         .         .
 10.93      0.1655      0.26  .Q        .         .         .         .
 11.27      0.1729      0.27  .Q        .         .         .         .
 11.61      0.1807      0.28  .Q        .         .         .         .
 11.94      0.1887      0.29  .Q        .         .         .         .
 12.28      0.1978      0.36  .Q        .         .         .         .
 12.62      0.2082      0.38  .Q        .         .         .         .
 12.96      0.2192      0.41  .Q        .         .         .         .
 13.30      0.2308      0.42  .Q        .         .         .         .
 13.63      0.2430      0.46  .Q        .         .         .         .
 13.97      0.2560      0.48  .Q        .         .         .         .
 14.31      0.2700      0.52  . Q       .         .         .         .
 14.65      0.2850      0.55  . Q       .         .         .         .
 14.99      0.3017      0.64  . Q       .         .         .         .
 15.32      0.3206      0.71  . Q       .         .         .         .
 15.66      0.3440      0.97  .  Q      .         .         .         .
 16.00      0.3746      1.23  .   Q     .         .         .         .
 16.34      0.5117      8.59  .         .         .         .   Q     .
 16.68      0.6429      0.80  .  Q      .         .         .         .
 17.01      0.6623      0.59  . Q       .         .         .         .
 17.35      0.6776      0.50  .Q        .         .         .         .
 17.69      0.6906      0.44  .Q        .         .         .         .
 18.03      0.7023      0.40  .Q        .         .         .         .
 18.37      0.7120      0.30  .Q        .         .         .         .
 18.70      0.7201      0.28  .Q        .         .         .         .
 19.04      0.7275      0.26  .Q        .         .         .         .
 19.38      0.7345      0.24  Q         .         .         .         .
 19.72      0.7410      0.23  Q         .         .         .         .
 20.06      0.7472      0.22  Q         .         .         .         .
 20.39      0.7531      0.21  Q         .         .         .         .
 20.73      0.7588      0.20  Q         .         .         .         .
 21.07      0.7641      0.19  Q         .         .         .         .
 21.41      0.7693      0.18  Q         .         .         .         .
 21.75      0.7743      0.18  Q         .         .         .         .
 22.08      0.7791      0.17  Q         .         .         .         .
 22.42      0.7838      0.16  Q         .         .         .         .
 22.76      0.7883      0.16  Q         .         .         .         .
 23.10      0.7927      0.15  Q         .         .         .         .
 23.44      0.7970      0.15  Q         .         .         .         .
 23.77      0.8011      0.15  Q         .         .         .         .
 24.11      0.8052      0.14  Q         .         .         .         .
 24.45      0.8072      0.00  Q         .         .         .         .
 --------------------------------------------------------------------------------
--------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated               Duration
        Peak Flow Rate                    (minutes)
    ======================               =========
               0%                         1460.2
              10%                           60.8
              20%                           20.3
              30%                           20.3
              40%                           20.3
              50%                           20.3
              60%                           20.3
              70%                           20.3
```

80%	20.3
90%	20.3

```
******************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A5
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   85.66
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) = 51.46
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.14
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    16.28

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.56      0.0000      0.00  Q         .         .         .         .
  1.42      0.0092      0.26  .Q        .         .         .         .
  2.28      0.0277      0.26  .Q        .         .         .         .
  3.13      0.0468      0.28  .Q        .         .         .         .
  3.99      0.0666      0.28  .Q        .         .         .         .
  4.85      0.0872      0.30  .Q        .         .         .         .
  5.71      0.1087      0.31  .Q        .         .         .         .
  6.57      0.1311      0.33  .Q        .         .         .         .
  7.42      0.1546      0.34  .Q        .         .         .         .
  8.28      0.1794      0.36  .Q        .         .         .         .
  9.14      0.2057      0.38  .Q        .         .         .         .
 10.00      0.2337      0.41  .Q        .         .         .         .
 10.85      0.2637      0.43  .Q        .         .         .         .
 11.71      0.2965      0.49  .Q        .         .         .         .
 12.57      0.3324      0.53  . Q       .         .         .         .
 13.43      0.3771      0.74  . Q       .         .         .         .
 14.28      0.4319      0.81  .  Q      .         .         .         .
 15.14      0.4984      1.07  .   Q     .         .         .         .
 16.00      0.5852      1.38  .    Q    .         .         .         .
 16.86      0.7457      3.15  .         . Q       .         .         .
 17.72      0.8895      0.91  .  Q      .         .         .         .
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```
  18.57      0.9458      0.68  . Q       .         .         .         .
  19.43      0.9861      0.46  .Q        .         .         .         .
  20.29      1.0164      0.39  .Q        .         .         .         .
  21.15      1.0427      0.35  .Q        .         .         .         .
  22.00      1.0663      0.32  .Q        .         .         .         .
  22.86      1.0878      0.29  .Q        .         .         .         .
  23.72      1.1077      0.27  .Q        .         .         .         .
  24.58      1.1262      0.25  .Q        .         .         .         .
  25.43      1.1352      0.00  Q         .         .         .         .
 ----------------------------------------------------------------------------
-------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated               Duration
        Peak Flow Rate                    (minutes)
    ======================                =========
               0%                          1440.9
              10%                           977.7
              20%                           360.2
              30%                           154.4
              40%                           102.9
              50%                            51.5
              60%                            51.5
              70%                            51.5
              80%                            51.5
              90%                            51.5
```

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******************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A6
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   89.75
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) = 27.74
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.27
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    16.98

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.28      0.0000      0.00  Q         .         .         .         .
  0.74      0.0051      0.27  .Q        .         .         .         .
  1.21      0.0153      0.27  .Q        .         .         .         .
  1.67      0.0258      0.28  .Q        .         .         .         .
  2.13      0.0364      0.28  .Q        .         .         .         .
  2.59      0.0472      0.29  .Q        .         .         .         .
  3.05      0.0582      0.29  .Q        .         .         .         .
  3.52      0.0694      0.30  .Q        .         .         .         .
  3.98      0.0808      0.30  .Q        .         .         .         .
  4.44      0.0925      0.31  .Q        .         .         .         .
  4.90      0.1045      0.32  .Q        .         .         .         .
  5.37      0.1167      0.32  .Q        .         .         .         .
  5.83      0.1292      0.33  .Q        .         .         .         .
  6.29      0.1421      0.34  .Q        .         .         .         .
  6.75      0.1552      0.35  .Q        .         .         .         .
  7.22      0.1687      0.36  .Q        .         .         .         .
  7.68      0.1827      0.37  .Q        .         .         .         .
  8.14      0.1970      0.38  .Q        .         .         .         .
  8.60      0.2118      0.39  .Q        .         .         .         .
  9.07      0.2271      0.41  .Q        .         .         .         .
  9.53      0.2429      0.42  .Q        .         .         .         .
```

```
  9.99      0.2594      0.44  .Q       .        .        .        .
 10.45      0.2766      0.46  .Q       .        .        .        .
 10.91      0.2945      0.48  .Q       .        .        .        .
 11.38      0.3133      0.50  .Q       .        .        .        .
 11.84      0.3331      0.54  . Q      .        .        .        .
 12.30      0.3541      0.56  . Q      .        .        .        .
 12.76      0.3787      0.73  . Q      .        .        .        .
 13.23      0.4071      0.76  .  Q     .        .        .        .
 13.69      0.4376      0.84  .  Q     .        .        .        .
 14.15      0.4707      0.89  .  Q     .        .        .        .
 14.61      0.5074      1.03  .   Q    .        .        .        .
 15.08      0.5486      1.13  .   Q    .        .        .        .
 15.54      0.5990      1.51  .     Q  .        .        .        .
 16.00      0.6656      1.98  .      Q .        .        .        .
 16.46      0.8253      6.38  .        .        .    Q   .        .
 16.92      0.9715      1.28  .    Q   .        .        .        .
 17.39      1.0140      0.95  .  Q     .        .        .        .
 17.85      1.0474      0.80  .  Q     .        .        .        .
 18.31      1.0759      0.70  . Q      .        .        .        .
 18.77      1.0991      0.52  . Q      .        .        .        .
 19.24      1.1180      0.47  .Q       .        .        .        .
 19.70      1.1352      0.43  .Q       .        .        .        .
 20.16      1.1510      0.40  .Q       .        .        .        .
 20.62      1.1658      0.38  .Q       .        .        .        .
 21.09      1.1798      0.35  .Q       .        .        .        .
 21.55      1.1929      0.34  .Q       .        .        .        .
 22.01      1.2055      0.32  .Q       .        .        .        .
 22.47      1.2174      0.31  .Q       .        .        .        .
 22.93      1.2289      0.29  .Q       .        .        .        .
 23.40      1.2399      0.28  .Q       .        .        .        .
 23.86      1.2505      0.27  .Q       .        .        .        .
 24.32      1.2607      0.26  .Q       .        .        .        .
 24.78      1.2658      0.00  Q        .        .        .        .
 --------------------------------------------------------------------------------
--------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                Duration
        Peak Flow Rate                     (minutes)
    ======================                 =========
               0%                           1442.5
              10%                            360.6
              20%                            111.0
              30%                             55.5
              40%                             27.7
              50%                             27.7
              60%                             27.7
              70%                             27.7
              80%                             27.7
              90%                             27.7
```

```
******************************************************************************
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                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

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------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  PRE-DEVELOPMENT, 2-YEAR STORM EVENT, DA A7
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   42.02
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) = 14.79
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.76
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     7.78

******************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.22      0.0013      0.12  Q         .         .         .         .
  0.47      0.0038      0.12  Q         .         .         .         .
  0.72      0.0063      0.12  Q         .         .         .         .
  0.96      0.0089      0.13  Q         .         .         .         .
  1.21      0.0115      0.13  Q         .         .         .         .
  1.46      0.0141      0.13  Q         .         .         .         .
  1.70      0.0167      0.13  Q         .         .         .         .
  1.95      0.0194      0.13  Q         .         .         .         .
  2.20      0.0220      0.13  Q         .         .         .         .
  2.44      0.0247      0.13  Q         .         .         .         .
  2.69      0.0275      0.13  Q         .         .         .         .
  2.94      0.0303      0.14  Q         .         .         .         .
  3.18      0.0330      0.14  Q         .         .         .         .
  3.43      0.0359      0.14  Q         .         .         .         .
  3.67      0.0387      0.14  Q         .         .         .         .
  3.92      0.0416      0.14  Q         .         .         .         .
  4.17      0.0445      0.14  Q         .         .         .         .
  4.41      0.0475      0.15  Q         .         .         .         .
  4.66      0.0505      0.15  Q         .         .         .         .
  4.91      0.0535      0.15  Q         .         .         .         .
  5.15      0.0566      0.15  Q         .         .         .         .
```

5.40	0.0597	0.15	Q	.	.	.	.
5.65	0.0628	0.15	Q	.	.	.	.
5.89	0.0660	0.16	Q	.	.	.	.
6.14	0.0692	0.16	Q	.	.	.	.
6.39	0.0725	0.16	Q	.	.	.	.
6.63	0.0758	0.16	Q	.	.	.	.
6.88	0.0792	0.17	Q	.	.	.	.
7.13	0.0826	0.17	Q	.	.	.	.
7.37	0.0861	0.17	Q	.	.	.	.
7.62	0.0896	0.17	Q	.	.	.	.
7.87	0.0932	0.18	Q	.	.	.	.
8.11	0.0968	0.18	Q	.	.	.	.
8.36	0.1005	0.18	Q	.	.	.	.
8.60	0.1043	0.19	Q	.	.	.	.
8.85	0.1081	0.19	Q	.	.	.	.
9.10	0.1120	0.19	Q	.	.	.	.
9.34	0.1160	0.20	Q	.	.	.	.
9.59	0.1201	0.20	Q	.	.	.	.
9.84	0.1242	0.21	Q	.	.	.	.
10.08	0.1285	0.21	Q	.	.	.	.
10.33	0.1328	0.22	Q	.	.	.	.
10.58	0.1373	0.22	Q	.	.	.	.
10.82	0.1419	0.23	Q	.	.	.	.
11.07	0.1465	0.23	Q	.	.	.	.
11.32	0.1513	0.24	Q	.	.	.	.
11.56	0.1563	0.25	Q	.	.	.	.
11.81	0.1614	0.26	Q	.	.	.	.
12.06	0.1666	0.26	Q	.	.	.	.
12.30	0.1726	0.33	Q	.	.	.	.
12.55	0.1794	0.33	Q	.	.	.	.
12.80	0.1863	0.35	Q	.	.	.	.
13.04	0.1935	0.36	Q	.	.	.	.
13.29	0.2010	0.38	Q	.	.	.	.
13.53	0.2088	0.39	Q	.	.	.	.
13.78	0.2169	0.41	Q	.	.	.	.
14.03	0.2254	0.43	Q	.	.	.	.
14.27	0.2344	0.46	Q	.	.	.	.
14.52	0.2439	0.48	Q	.	.	.	.
14.77	0.2541	0.53	.Q	.	.	.	.
15.01	0.2651	0.56	.Q	.	.	.	.
15.26	0.2775	0.65	.Q	.	.	.	.
15.51	0.2914	0.72	.Q	.	.	.	.
15.75	0.3085	0.97	.Q	.	.	.	.
16.00	0.3309	1.23	. Q	.	.	.	.
16.25	0.4726	12.69	.	.	.	Q	.
16.49	0.6103	0.83	.Q	.	.	.	.
16.74	0.6248	0.60	.Q	.	.	.	.
16.99	0.6360	0.50	Q	.	.	.	.
17.23	0.6456	0.44	Q	.	.	.	.
17.48	0.6541	0.40	Q	.	.	.	.
17.73	0.6619	0.37	Q	.	.	.	.
17.97	0.6691	0.34	Q	.	.	.	.
18.22	0.6755	0.29	Q	.	.	.	.
18.47	0.6810	0.25	Q	.	.	.	.
18.71	0.6859	0.24	Q	.	.	.	.
18.96	0.6906	0.22	Q	.	.	.	.
19.20	0.6951	0.21	Q	.	.	.	.
19.45	0.6993	0.20	Q	.	.	.	.
19.70	0.7034	0.20	Q	.	.	.	.
19.94	0.7073	0.19	Q	.	.	.	.
20.19	0.7111	0.18	Q	.	.	.	.
20.44	0.7147	0.18	Q	.	.	.	.
20.68	0.7182	0.17	Q	.	.	.	.
20.93	0.7217	0.17	Q	.	.	.	.
21.18	0.7250	0.16	Q	.	.	.	.
21.42	0.7282	0.16	Q	.	.	.	.
21.67	0.7313	0.15	Q	.	.	.	.
21.92	0.7344	0.15	Q	.	.	.	.
22.16	0.7374	0.15	Q	.	.	.	.

22.41	0.7403	0.14	Q	.	.	.	.
22.66	0.7432	0.14	Q	.	.	.	.
22.90	0.7460	0.14	Q	.	.	.	.
23.15	0.7487	0.13	Q	.	.	.	.
23.39	0.7514	0.13	Q	.	.	.	.
23.64	0.7540	0.13	Q	.	.	.	.
23.89	0.7566	0.13	Q	.	.	.	.
24.13	0.7591	0.12	Q	.	.	.	.
24.38	0.7604	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1449.4
10%	14.8
20%	14.8
30%	14.8
40%	14.8
50%	14.8
60%	14.8
70%	14.8
80%	14.8
90%	14.8

```
******************************************************************************
                     SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

******************************************************************************
------------------------------------------------------------------------------
 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA A1
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   55.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.201
    LOW LOSS FRACTION = 0.287
    TIME OF CONCENTRATION(MIN.) = 11.08
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     7.21
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     3.97

******************************************************************************
  TIME     VOLUME       Q    0.       12.5      25.0      37.5      50.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.12      0.0000      0.00  Q         .         .         .         .
  0.30      0.0121      1.58  .Q        .         .         .         .
  0.49      0.0362      1.59  .Q        .         .         .         .
  0.67      0.0606      1.60  .Q        .         .         .         .
  0.86      0.0851      1.61  .Q        .         .         .         .
  1.04      0.1097      1.62  .Q        .         .         .         .
  1.23      0.1346      1.63  .Q        .         .         .         .
  1.41      0.1596      1.65  .Q        .         .         .         .
  1.60      0.1848      1.65  .Q        .         .         .         .
  1.78      0.2102      1.67  .Q        .         .         .         .
  1.97      0.2357      1.68  .Q        .         .         .         .
  2.15      0.2614      1.69  .Q        .         .         .         .
  2.33      0.2874      1.70  .Q        .         .         .         .
  2.52      0.3135      1.72  .Q        .         .         .         .
  2.70      0.3398      1.73  .Q        .         .         .         .
  2.89      0.3664      1.75  .Q        .         .         .         .
  3.07      0.3931      1.76  .Q        .         .         .         .
  3.26      0.4201      1.78  .Q        .         .         .         .
  3.44      0.4472      1.79  .Q        .         .         .         .
  3.63      0.4746      1.80  .Q        .         .         .         .
  3.81      0.5023      1.81  .Q        .         .         .         .
  4.00      0.5301      1.84  .Q        .         .         .         .
```

4.18	0.5582	1.85	.Q . . . .
4.37	0.5865	1.87	.Q . . . .
4.55	0.6151	1.88	.Q . . . .
4.74	0.6440	1.90	.Q . . . .
4.92	0.6731	1.91	.Q . . . .
5.10	0.7025	1.94	.Q . . . .
5.29	0.7321	1.95	.Q . . . .
5.47	0.7621	1.97	.Q . . . .
5.66	0.7923	1.99	.Q . . . .
5.84	0.8228	2.01	.Q . . . .
6.03	0.8537	2.03	.Q . . . .
6.21	0.8849	2.06	.Q . . . .
6.40	0.9163	2.07	.Q . . . .
6.58	0.9482	2.10	.Q . . . .
6.77	0.9804	2.12	.Q . . . .
6.95	1.0129	2.15	.Q . . . .
7.14	1.0458	2.16	.Q . . . .
7.32	1.0791	2.20	.Q . . . .
7.51	1.1127	2.22	.Q . . . .
7.69	1.1468	2.25	.Q . . . .
7.87	1.1813	2.27	.Q . . . .
8.06	1.2163	2.31	.Q . . . .
8.24	1.2517	2.33	.Q . . . .
8.43	1.2875	2.37	.Q . . . .
8.61	1.3239	2.39	.Q . . . .
8.80	1.3607	2.44	.Q . . . .
8.98	1.3981	2.46	.Q . . . .
9.17	1.4360	2.51	. Q . . . .
9.35	1.4745	2.53	. Q . . . .
9.54	1.5136	2.59	. Q . . . .
9.72	1.5533	2.61	. Q . . . .
9.91	1.5936	2.67	. Q . . . .
10.09	1.6346	2.70	. Q . . . .
10.28	1.6764	2.77	. Q . . . .
10.46	1.7188	2.80	. Q . . . .
10.64	1.7621	2.87	. Q . . . .
10.83	1.8062	2.91	. Q . . . .
11.01	1.8511	2.98	. Q . . . .
11.20	1.8970	3.03	. Q . . . .
11.38	1.9438	3.11	. Q . . . .
11.57	1.9917	3.16	. Q . . . .
11.75	2.0407	3.26	. Q . . . .
11.94	2.0908	3.31	. Q . . . .
12.12	2.1448	3.76	. Q . . . .
12.31	2.2053	4.17	. Q . . . .
12.49	2.2700	4.30	. Q . . . .
12.68	2.3362	4.37	. Q . . . .
12.86	2.4041	4.53	. Q . . . .
13.05	2.4739	4.61	. Q . . . .
13.23	2.5457	4.79	. Q . . . .
13.41	2.6196	4.89	. Q . . . .
13.60	2.6960	5.12	. Q . . . .
13.78	2.7750	5.24	. Q . . . .
13.97	2.8570	5.51	. Q . . . .
14.15	2.9423	5.66	. Q . . . .
14.34	3.0312	5.99	. Q . . . .
14.52	3.1242	6.20	. Q . . . .
14.71	3.2225	6.69	. Q . . . .
14.89	3.3268	6.99	. Q . . . .
15.08	3.4392	7.73	. Q . . . .
15.26	3.5608	8.21	. Q . . . .
15.45	3.6971	9.65	. Q . . . .
15.63	3.8530	10.78	. Q . . . .
15.82	4.0425	14.06	. .Q . . . .
16.00	4.2868	17.96	. . Q . . . .
16.18	4.7812	46.84	. . . . Q .
16.37	5.2310	12.12	. Q. . . . .
16.55	5.3906	8.79	. Q . . . .
16.74	5.5137	7.33	. Q . . . .

```
  16.92      5.6187      6.43  .    Q    .         .         .         .
  17.11      5.7120      5.80  .   Q     .         .         .         .
  17.29      5.7972      5.37  .   Q     .         .         .         .
  17.48      5.8763      5.00  .   Q     .         .         .         .
  17.66      5.9504      4.70  .  Q      .         .         .         .
  17.85      6.0202      4.45  .  Q      .         .         .         .
  18.03      6.0865      4.24  .  Q      .         .         .         .
  18.22      6.1445      3.37  . Q       .         .         .         .
  18.40      6.1946      3.21  . Q       .         .         .         .
  18.59      6.2425      3.07  . Q       .         .         .         .
  18.77      6.2884      2.94  . Q       .         .         .         .
  18.95      6.3325      2.83  . Q       .         .         .         .
  19.14      6.3750      2.73  . Q       .         .         .         .
  19.32      6.4160      2.64  . Q       .         .         .         .
  19.51      6.4557      2.56  . Q       .         .         .         .
  19.69      6.4942      2.48  .Q        .         .         .         .
  19.88      6.5316      2.41  .Q        .         .         .         .
  20.06      6.5680      2.35  .Q        .         .         .         .
  20.25      6.6034      2.29  .Q        .         .         .         .
  20.43      6.6379      2.23  .Q        .         .         .         .
  20.62      6.6716      2.18  .Q        .         .         .         .
  20.80      6.7045      2.13  .Q        .         .         .         .
  20.99      6.7366      2.09  .Q        .         .         .         .
  21.17      6.7681      2.04  .Q        .         .         .         .
  21.36      6.7990      2.00  .Q        .         .         .         .
  21.54      6.8292      1.96  .Q        .         .         .         .
  21.72      6.8589      1.93  .Q        .         .         .         .
  21.91      6.8880      1.89  .Q        .         .         .         .
  22.09      6.9166      1.86  .Q        .         .         .         .
  22.28      6.9447      1.83  .Q        .         .         .         .
  22.46      6.9723      1.79  .Q        .         .         .         .
  22.65      6.9995      1.77  .Q        .         .         .         .
  22.83      7.0262      1.74  .Q        .         .         .         .
  23.02      7.0526      1.71  .Q        .         .         .         .
  23.20      7.0785      1.69  .Q        .         .         .         .
  23.39      7.1041      1.66  .Q        .         .         .         .
  23.57      7.1292      1.64  .Q        .         .         .         .
  23.76      7.1541      1.62  .Q        .         .         .         .
  23.94      7.1786      1.59  .Q        .         .         .         .
  24.13      7.2028      1.57  .Q        .         .         .         .
  24.31      7.2148      0.00  Q         .         .         .         .
 --------------------------------------------------------------------------
--------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated               Duration
        Peak Flow Rate                    (minutes)
    ======================                =========
              0%                           1440.4
             10%                            277.0
             20%                             66.5
             30%                             33.2
             40%                             11.1
             50%                             11.1
             60%                             11.1
             70%                             11.1
             80%                             11.1
             90%                             11.1
```

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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             Ver. 18.0  Release Date: 05/01/2011  License ID 1499

                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA A2
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   18.95
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.319
    LOW LOSS FRACTION = 0.401
    TIME OF CONCENTRATION(MIN.) = 11.77
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

--------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.10
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.75

**************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------
  0.11      0.0021      0.45  Q         .         .         .         .
  0.31      0.0095      0.46  Q         .         .         .         .
  0.50      0.0169      0.46  Q         .         .         .         .
  0.70      0.0244      0.46  Q         .         .         .         .
  0.90      0.0319      0.47  Q         .         .         .         .
  1.09      0.0395      0.47  Q         .         .         .         .
  1.29      0.0472      0.47  Q         .         .         .         .
  1.48      0.0549      0.48  Q         .         .         .         .
  1.68      0.0626      0.48  Q         .         .         .         .
  1.88      0.0705      0.48  Q         .         .         .         .
  2.07      0.0784      0.49  Q         .         .         .         .
  2.27      0.0863      0.49  Q         .         .         .         .
  2.46      0.0943      0.50  Q         .         .         .         .
  2.66      0.1024      0.50  Q         .         .         .         .
  2.86      0.1105      0.50  .Q        .         .         .         .
  3.05      0.1187      0.51  .Q        .         .         .         .
  3.25      0.1270      0.51  .Q        .         .         .         .
  3.45      0.1354      0.52  .Q        .         .         .         .
  3.64      0.1438      0.52  .Q        .         .         .         .
  3.84      0.1523      0.53  .Q        .         .         .         .
  4.03      0.1609      0.53  .Q        .         .         .         .
```

4.23	0.1695	0.54	.Q	.	.	.	.
4.43	0.1783	0.54	.Q	.	.	.	.
4.62	0.1871	0.55	.Q	.	.	.	.
4.82	0.1960	0.55	.Q	.	.	.	.
5.01	0.2050	0.56	.Q	.	.	.	.
5.21	0.2140	0.56	.Q	.	.	.	.
5.41	0.2232	0.57	.Q	.	.	.	.
5.60	0.2325	0.58	.Q	.	.	.	.
5.80	0.2418	0.58	.Q	.	.	.	.
6.00	0.2513	0.59	.Q	.	.	.	.
6.19	0.2608	0.59	.Q	.	.	.	.
6.39	0.2705	0.60	.Q	.	.	.	.
6.58	0.2803	0.61	.Q	.	.	.	.
6.78	0.2902	0.61	.Q	.	.	.	.
6.98	0.3002	0.62	.Q	.	.	.	.
7.17	0.3103	0.63	.Q	.	.	.	.
7.37	0.3206	0.64	.Q	.	.	.	.
7.56	0.3310	0.65	.Q	.	.	.	.
7.76	0.3415	0.65	.Q	.	.	.	.
7.96	0.3521	0.66	.Q	.	.	.	.
8.15	0.3629	0.67	.Q	.	.	.	.
8.35	0.3739	0.68	.Q	.	.	.	.
8.55	0.3850	0.69	.Q	.	.	.	.
8.74	0.3963	0.70	.Q	.	.	.	.
8.94	0.4077	0.71	.Q	.	.	.	.
9.13	0.4193	0.72	.Q	.	.	.	.
9.33	0.4311	0.73	.Q	.	.	.	.
9.53	0.4431	0.75	.Q	.	.	.	.
9.72	0.4553	0.76	.Q	.	.	.	.
9.92	0.4677	0.77	.Q	.	.	.	.
10.11	0.4803	0.78	.Q	.	.	.	.
10.31	0.4932	0.80	.Q	.	.	.	.
10.51	0.5063	0.81	.Q	.	.	.	.
10.70	0.5196	0.83	.Q	.	.	.	.
10.90	0.5333	0.85	.Q	.	.	.	.
11.10	0.5472	0.87	.Q	.	.	.	.
11.29	0.5614	0.88	.Q	.	.	.	.
11.49	0.5760	0.91	.Q	.	.	.	.
11.68	0.5909	0.93	.Q	.	.	.	.
11.88	0.6062	0.96	.Q	.	.	.	.
12.08	0.6218	0.98	.Q	.	.	.	.
12.27	0.6395	1.21	. Q	.	.	.	.
12.47	0.6593	1.23	. Q	.	.	.	.
12.67	0.6796	1.27	. Q	.	.	.	.
12.86	0.7005	1.30	. Q	.	.	.	.
13.06	0.7219	1.35	. Q	.	.	.	.
13.25	0.7440	1.38	. Q	.	.	.	.
13.45	0.7668	1.44	. Q	.	.	.	.
13.65	0.7904	1.47	. Q	.	.	.	.
13.84	0.8150	1.55	. Q	.	.	.	.
14.04	0.8405	1.60	. Q	.	.	.	.
14.23	0.8670	1.68	. Q	.	.	.	.
14.43	0.8948	1.74	. Q	.	.	.	.
14.63	0.9242	1.88	. Q	.	.	.	.
14.82	0.9553	1.97	. Q	.	.	.	.
15.02	0.9889	2.17	. Q	.	.	.	.
15.22	1.0252	2.31	. Q	.	.	.	.
15.41	1.0657	2.69	. Q	.	.	.	.
15.61	1.1121	3.03	. Q	.	.	.	.
15.80	1.1688	3.96	. Q	.	.	.	.
16.00	1.2419	5.05	. Q	.	.	.	.
16.20	1.3929	13.58	. .	.	. Q	.	.
16.39	1.5306	3.41	. Q	.	.	.	.
16.59	1.5783	2.47	. Q	.	.	.	.
16.78	1.6151	2.06	. Q	.	.	.	.
16.98	1.6464	1.81	. Q	.	.	.	.
17.18	1.6744	1.64	. Q	.	.	.	.
17.37	1.6999	1.51	. Q	.	.	.	.
17.57	1.7236	1.41	. Q	.	.	.	.

17.77	1.7457	1.32	. Q	.	.	.	.
17.96	1.7666	1.25	. Q	.	.	.	.
18.16	1.7857	1.11	. Q	.	.	.	.
18.35	1.8023	0.94	.Q	.	.	.	.
18.55	1.8172	0.90	.Q	.	.	.	.
18.75	1.8315	0.86	.Q	.	.	.	.
18.94	1.8451	0.82	.Q	.	.	.	.
19.14	1.8582	0.79	.Q	.	.	.	.
19.33	1.8708	0.76	.Q	.	.	.	.
19.53	1.8830	0.74	.Q	.	.	.	.
19.73	1.8948	0.72	.Q	.	.	.	.
19.92	1.9063	0.70	.Q	.	.	.	.
20.12	1.9174	0.68	.Q	.	.	.	.
20.32	1.9282	0.66	.Q	.	.	.	.
20.51	1.9387	0.64	.Q	.	.	.	.
20.71	1.9490	0.62	.Q	.	.	.	.
20.90	1.9590	0.61	.Q	.	.	.	.
21.10	1.9688	0.60	.Q	.	.	.	.
21.30	1.9783	0.58	.Q	.	.	.	.
21.49	1.9877	0.57	.Q	.	.	.	.
21.69	1.9969	0.56	.Q	.	.	.	.
21.89	2.0058	0.55	.Q	.	.	.	.
22.08	2.0147	0.54	.Q	.	.	.	.
22.28	2.0233	0.53	.Q	.	.	.	.
22.47	2.0318	0.52	.Q	.	.	.	.
22.67	2.0402	0.51	.Q	.	.	.	.
22.87	2.0484	0.50	.Q	.	.	.	.
23.06	2.0564	0.49	Q	.	.	.	.
23.26	2.0644	0.49	Q	.	.	.	.
23.45	2.0722	0.48	Q	.	.	.	.
23.65	2.0799	0.47	Q	.	.	.	.
23.85	2.0875	0.47	Q	.	.	.	.
24.04	2.0950	0.46	Q	.	.	.	.
24.24	2.0987	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1447.7
10%	270.7
20%	58.9
30%	23.5
40%	11.8
50%	11.8
60%	11.8
70%	11.8
80%	11.8
90%	11.8

```
******************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA A3
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   57.97
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.190
    LOW LOSS FRACTION = 0.277
    TIME OF CONCENTRATION(MIN.) = 10.56
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     7.72
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     4.06

******************************************************************************
  TIME     VOLUME       Q    0.       15.0      30.0      45.0      60.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.16      0.0122      1.68  .Q        .         .         .         .
  0.34      0.0367      1.69  .Q        .         .         .         .
  0.51      0.0614      1.70  .Q        .         .         .         .
  0.69      0.0862      1.71  .Q        .         .         .         .
  0.86      0.1112      1.72  .Q        .         .         .         .
  1.04      0.1363      1.74  .Q        .         .         .         .
  1.22      0.1616      1.74  .Q        .         .         .         .
  1.39      0.1871      1.76  .Q        .         .         .         .
  1.57      0.2127      1.77  .Q        .         .         .         .
  1.74      0.2386      1.78  .Q        .         .         .         .
  1.92      0.2646      1.79  .Q        .         .         .         .
  2.10      0.2907      1.81  .Q        .         .         .         .
  2.27      0.3171      1.82  .Q        .         .         .         .
  2.45      0.3436      1.83  .Q        .         .         .         .
  2.62      0.3704      1.84  .Q        .         .         .         .
  2.80      0.3973      1.86  .Q        .         .         .         .
  2.98      0.4245      1.87  .Q        .         .         .         .
  3.15      0.4518      1.89  .Q        .         .         .         .
  3.33      0.4794      1.90  .Q        .         .         .         .
  3.50      0.5071      1.92  .Q        .         .         .         .
  3.68      0.5351      1.93  .Q        .         .         .         .
```

```
 3.86     0.5633     1.95  .Q       .        .        .        .
 4.03     0.5918     1.96  .Q       .        .        .        .
 4.21     0.6204     1.98  .Q       .        .        .        .
 4.38     0.6493     1.99  .Q       .        .        .        .
 4.56     0.6785     2.02  .Q       .        .        .        .
 4.74     0.7079     2.03  .Q       .        .        .        .
 4.91     0.7375     2.05  .Q       .        .        .        .
 5.09     0.7675     2.06  .Q       .        .        .        .
 5.26     0.7977     2.09  .Q       .        .        .        .
 5.44     0.8281     2.10  .Q       .        .        .        .
 5.62     0.8589     2.13  .Q       .        .        .        .
 5.79     0.8899     2.14  .Q       .        .        .        .
 5.97     0.9212     2.17  .Q       .        .        .        .
 6.14     0.9529     2.18  .Q       .        .        .        .
 6.32     0.9848     2.21  .Q       .        .        .        .
 6.50     1.0171     2.23  .Q       .        .        .        .
 6.67     1.0497     2.26  .Q       .        .        .        .
 6.85     1.0827     2.27  .Q       .        .        .        .
 7.02     1.1160     2.31  .Q       .        .        .        .
 7.20     1.1497     2.32  .Q       .        .        .        .
 7.38     1.1837     2.36  .Q       .        .        .        .
 7.55     1.2182     2.38  .Q       .        .        .        .
 7.73     1.2530     2.41  .Q       .        .        .        .
 7.90     1.2882     2.43  .Q       .        .        .        .
 8.08     1.3239     2.47  .Q       .        .        .        .
 8.26     1.3600     2.49  .Q       .        .        .        .
 8.43     1.3966     2.54  .Q       .        .        .        .
 8.61     1.4336     2.56  .Q       .        .        .        .
 8.78     1.4712     2.60  .Q       .        .        .        .
 8.96     1.5092     2.63  .Q       .        .        .        .
 9.14     1.5478     2.68  .Q       .        .        .        .
 9.31     1.5869     2.70  .Q       .        .        .        .
 9.49     1.6265     2.76  .Q       .        .        .        .
 9.66     1.6668     2.78  .Q       .        .        .        .
 9.84     1.7077     2.84  .Q       .        .        .        .
10.02     1.7493     2.87  .Q       .        .        .        .
10.19     1.7915     2.93  .Q       .        .        .        .
10.37     1.8344     2.97  .Q       .        .        .        .
10.54     1.8781     3.04  . Q      .        .        .        .
10.72     1.9225     3.07  . Q      .        .        .        .
10.90     1.9678     3.15  . Q      .        .        .        .
11.07     2.0139     3.19  . Q      .        .        .        .
11.25     2.0610     3.28  . Q      .        .        .        .
11.42     2.1090     3.32  . Q      .        .        .        .
11.60     2.1580     3.42  . Q      .        .        .        .
11.78     2.2081     3.47  . Q      .        .        .        .
11.95     2.2593     3.58  . Q      .        .        .        .
12.13     2.3123     3.70  . Q      .        .        .        .
12.30     2.3719     4.49  . Q      .        .        .        .
12.48     2.4378     4.56  .  Q     .        .        .        .
12.66     2.5052     4.71  .  Q     .        .        .        .
12.83     2.5742     4.78  .  Q     .        .        .        .
13.01     2.6450     4.95  .  Q     .        .        .        .
13.18     2.7177     5.04  .  Q     .        .        .        .
13.36     2.7925     5.24  .  Q     .        .        .        .
13.54     2.8695     5.35  .  Q     .        .        .        .
13.71     2.9491     5.59  .  Q     .        .        .        .
13.89     3.0314     5.73  .  Q     .        .        .        .
14.06     3.1169     6.03  .   Q    .        .        .        .
14.24     3.2055     6.15  .   Q    .        .        .        .
14.42     3.2979     6.55  .   Q    .        .        .        .
14.59     3.3948     6.78  .   Q    .        .        .        .
14.77     3.4973     7.32  .   Q    .        .        .        .
14.94     3.6061     7.64  .    Q   .        .        .        .
15.12     3.7232     8.46  .    Q   .        .        .        .
15.30     3.8500     8.98  .    Q   .        .        .        .
15.47     3.9926    10.63  .      Q .        .        .        .
15.65     4.1556    11.78  .      Q .        .        .        .
15.82     4.3528    15.34  .        Q        .        .        .
```

```
  16.00      4.6071     19.63  .         .  Q      .         .         .
  16.18      5.1230     51.31  .         .         .         .   Q     .
  16.35      5.5924     13.24  .       Q .         .         .         .
  16.53      5.7587      9.62  .     Q   .         .         .         .
  16.70      5.8870      8.02  .    Q    .         .         .         .
  16.88      5.9964      7.03  .   Q     .         .         .         .
  17.06      6.0936      6.34  .   Q     .         .         .         .
  17.23      6.1825      5.87  .  Q      .         .         .         .
  17.41      6.2650      5.47  .  Q      .         .         .         .
  17.58      6.3421      5.14  .  Q      .         .         .         .
  17.76      6.4149      4.87  .  Q      .         .         .         .
  17.94      6.4839      4.63  .  Q      .         .         .         .
  18.11      6.5498      4.43  . Q       .         .         .         .
  18.29      6.6077      3.52  . Q       .         .         .         .
  18.46      6.6578      3.37  . Q       .         .         .         .
  18.64      6.7058      3.23  . Q       .         .         .         .
  18.82      6.7520      3.11  . Q       .         .         .         .
  18.99      6.7964      3.00  . Q       .         .         .         .
  19.17      6.8394      2.90  .Q        .         .         .         .
  19.34      6.8809      2.81  .Q        .         .         .         .
  19.52      6.9212      2.73  .Q        .         .         .         .
  19.70      6.9603      2.65  .Q        .         .         .         .
  19.87      6.9984      2.58  .Q        .         .         .         .
  20.05      7.0354      2.51  .Q        .         .         .         .
  20.22      7.0715      2.45  .Q        .         .         .         .
  20.40      7.1068      2.39  .Q        .         .         .         .
  20.58      7.1412      2.34  .Q        .         .         .         .
  20.75      7.1749      2.29  .Q        .         .         .         .
  20.93      7.2079      2.24  .Q        .         .         .         .
  21.10      7.2401      2.20  .Q        .         .         .         .
  21.28      7.2718      2.15  .Q        .         .         .         .
  21.46      7.3028      2.11  .Q        .         .         .         .
  21.63      7.3333      2.08  .Q        .         .         .         .
  21.81      7.3632      2.04  .Q        .         .         .         .
  21.98      7.3926      2.00  .Q        .         .         .         .
  22.16      7.4215      1.97  .Q        .         .         .         .
  22.34      7.4500      1.94  .Q        .         .         .         .
  22.51      7.4780      1.91  .Q        .         .         .         .
  22.69      7.5055      1.88  .Q        .         .         .         .
  22.86      7.5327      1.85  .Q        .         .         .         .
  23.04      7.5594      1.83  .Q        .         .         .         .
  23.22      7.5858      1.80  .Q        .         .         .         .
  23.39      7.6118      1.77  .Q        .         .         .         .
  23.57      7.6374      1.75  .Q        .         .         .         .
  23.74      7.6627      1.73  .Q        .         .         .         .
  23.92      7.6877      1.71  .Q        .         .         .         .
  24.10      7.7123      1.68  .Q        .         .         .         .
  24.27      7.7246      0.00  Q         .         .         .         .
 --------------------------------------------------------------------------
--------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated               Duration
        Peak Flow Rate                    (minutes)
    ======================               =========
              0%                          1446.7
             10%                           264.0
             20%                            63.4
             30%                            21.1
             40%                            10.6
             50%                            10.6
             60%                            10.6
             70%                            10.6
             80%                            10.6
             90%                            10.6
```

```
******************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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             Ver. 18.0  Release Date: 05/01/2011  License ID 1499

                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA A4
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   95.01
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) = 25.35
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.42
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    17.90

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.37      0.0042      0.28  .Q        .         .         .         .
  0.79      0.0140      0.28  .Q        .         .         .         .
  1.21      0.0239      0.29  .Q        .         .         .         .
  1.63      0.0340      0.29  .Q        .         .         .         .
  2.06      0.0443      0.30  .Q        .         .         .         .
  2.48      0.0547      0.30  .Q        .         .         .         .
  2.90      0.0653      0.31  .Q        .         .         .         .
  3.32      0.0761      0.31  .Q        .         .         .         .
  3.75      0.0871      0.32  .Q        .         .         .         .
  4.17      0.0983      0.32  .Q        .         .         .         .
  4.59      0.1097      0.33  .Q        .         .         .         .
  5.01      0.1214      0.34  .Q        .         .         .         .
  5.44      0.1333      0.35  .Q        .         .         .         .
  5.86      0.1454      0.35  .Q        .         .         .         .
  6.28      0.1579      0.36  .Q        .         .         .         .
  6.70      0.1706      0.37  .Q        .         .         .         .
  7.13      0.1837      0.38  .Q        .         .         .         .
  7.55      0.1971      0.39  .Q        .         .         .         .
  7.97      0.2108      0.40  .Q        .         .         .         .
  8.39      0.2250      0.41  .Q        .         .         .         .
  8.82      0.2396      0.43  .Q        .         .         .         .
```

```
 9.24      0.2546      0.44  .Q        .         .         .         .
 9.66      0.2702      0.46  .Q        .         .         .         .
10.09      0.2863      0.47  .Q        .         .         .         .
10.51      0.3031      0.49  .Q        .         .         .         .
10.93      0.3206      0.51  . Q       .         .         .         .
11.35      0.3388      0.54  . Q       .         .         .         .
11.77      0.3579      0.56  . Q       .         .         .         .
12.20      0.3785      0.62  . Q       .         .         .         .
12.62      0.4024      0.74  . Q       .         .         .         .
13.04      0.4295      0.80  .  Q      .         .         .         .
13.47      0.4581      0.84  .  Q      .         .         .         .
13.89      0.4890      0.93  .  Q      .         .         .         .
14.31      0.5224      0.98  .  Q      .         .         .         .
14.73      0.5594      1.13  .   Q     .         .         .         .
15.15      0.6010      1.25  .   Q     .         .         .         .
15.58      0.6521      1.68  .     Q   .         .         .         .
16.00      0.7195      2.18  .       Q .         .         .         .
16.42      0.9235      9.51  .         .         .         .       Q .
16.84      1.1142      1.41  .    Q    .         .         .         .
17.27      1.1570      1.05  .   Q     .         .         .         .
17.69      1.1907      0.88  .  Q      .         .         .         .
18.11      1.2195      0.77  .  Q      .         .         .         .
18.53      1.2431      0.58  . Q       .         .         .         .
18.96      1.2623      0.52  . Q       .         .         .         .
19.38      1.2798      0.48  .Q        .         .         .         .
19.80      1.2959      0.45  .Q        .         .         .         .
20.23      1.3110      0.42  .Q        .         .         .         .
20.65      1.3252      0.39  .Q        .         .         .         .
21.07      1.3386      0.37  .Q        .         .         .         .
21.49      1.3513      0.36  .Q        .         .         .         .
21.92      1.3635      0.34  .Q        .         .         .         .
22.34      1.3752      0.33  .Q        .         .         .         .
22.76      1.3864      0.31  .Q        .         .         .         .
23.18      1.3972      0.30  .Q        .         .         .         .
23.61      1.4076      0.29  .Q        .         .         .         .
24.03      1.4177      0.28  .Q        .         .         .         .
24.45      1.4226      0.00  Q         .         .         .         .
 ----------------------------------------------------------------------------
-------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                Duration
        Peak Flow Rate                     (minutes)
    ======================                 =========
               0%                           1445.0
              10%                            202.8
              20%                             50.7
              30%                             25.4
              40%                             25.4
              50%                             25.4
              60%                             25.4
              70%                             25.4
              80%                             25.4
              90%                             25.4
```

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******************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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             Ver. 18.0  Release Date: 05/01/2011  License ID 1499

                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

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------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA B
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   68.96
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) = 19.24
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.17
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    12.85

******************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.29      0.0024      0.20  Q         .         .         .         .
  0.61      0.0078      0.20  Q         .         .         .         .
  0.93      0.0132      0.21  Q         .         .         .         .
  1.25      0.0187      0.21  Q         .         .         .         .
  1.57      0.0243      0.21  Q         .         .         .         .
  1.89      0.0299      0.21  Q         .         .         .         .
  2.21      0.0356      0.22  Q         .         .         .         .
  2.53      0.0414      0.22  Q         .         .         .         .
  2.85      0.0473      0.22  Q         .         .         .         .
  3.17      0.0532      0.23  Q         .         .         .         .
  3.49      0.0593      0.23  Q         .         .         .         .
  3.81      0.0654      0.23  Q         .         .         .         .
  4.14      0.0716      0.24  Q         .         .         .         .
  4.46      0.0779      0.24  Q         .         .         .         .
  4.78      0.0842      0.24  Q         .         .         .         .
  5.10      0.0907      0.25  Q         .         .         .         .
  5.42      0.0973      0.25  Q         .         .         .         .
  5.74      0.1040      0.25  Q         .         .         .         .
  6.06      0.1108      0.26  Q         .         .         .         .
  6.38      0.1178      0.26  Q         .         .         .         .
  6.70      0.1249      0.27  Q         .         .         .         .
```

7.02	0.1321	0.27	Q	.	.	.	.
7.34	0.1394	0.28	Q	.	.	.	.
7.66	0.1469	0.28	Q	.	.	.	.
7.98	0.1546	0.29	Q	.	.	.	.
8.30	0.1624	0.30	Q	.	.	.	.
8.62	0.1704	0.31	Q	.	.	.	.
8.95	0.1786	0.31	Q	.	.	.	.
9.27	0.1870	0.32	Q	.	.	.	.
9.59	0.1956	0.33	Q	.	.	.	.
9.91	0.2045	0.34	Q	.	.	.	.
10.23	0.2136	0.35	Q	.	.	.	.
10.55	0.2230	0.36	Q	.	.	.	.
10.87	0.2326	0.37	Q	.	.	.	.
11.19	0.2427	0.39	Q	.	.	.	.
11.51	0.2530	0.40	Q	.	.	.	.
11.83	0.2638	0.42	Q	.	.	.	.
12.15	0.2750	0.43	Q	.	.	.	.
12.47	0.2880	0.54	.Q	.	.	.	.
12.79	0.3026	0.56	.Q	.	.	.	.
13.11	0.3179	0.60	.Q	.	.	.	.
13.43	0.3340	0.62	.Q	.	.	.	.
13.76	0.3510	0.66	.Q	.	.	.	.
14.08	0.3690	0.69	.Q	.	.	.	.
14.40	0.3883	0.76	.Q	.	.	.	.
14.72	0.4091	0.81	.Q	.	.	.	.
15.04	0.4323	0.94	.Q	.	.	.	.
15.36	0.4584	1.03	. Q	.	.	.	.
15.68	0.4908	1.41	. Q	.	.	.	.
16.00	0.5332	1.79	. Q	.	.	.	.
16.32	0.7369	13.58	.	.	.	Q	.
16.64	0.9325	1.17	. Q	.	.	.	.
16.96	0.9595	0.87	.Q	.	.	.	.
17.28	0.9806	0.73	.Q	.	.	.	.
17.60	0.9987	0.64	.Q	.	.	.	.
17.92	1.0148	0.58	.Q	.	.	.	.
18.24	1.0291	0.51	.Q	.	.	.	.
18.57	1.0412	0.41	Q	.	.	.	.
18.89	1.0516	0.38	Q	.	.	.	.
19.21	1.0613	0.35	Q	.	.	.	.
19.53	1.0704	0.33	Q	.	.	.	.
19.85	1.0791	0.32	Q	.	.	.	.
20.17	1.0873	0.30	Q	.	.	.	.
20.49	1.0951	0.29	Q	.	.	.	.
20.81	1.1026	0.28	Q	.	.	.	.
21.13	1.1098	0.27	Q	.	.	.	.
21.45	1.1167	0.26	Q	.	.	.	.
21.77	1.1234	0.25	Q	.	.	.	.
22.09	1.1299	0.24	Q	.	.	.	.
22.41	1.1362	0.23	Q	.	.	.	.
22.73	1.1423	0.23	Q	.	.	.	.
23.05	1.1483	0.22	Q	.	.	.	.
23.38	1.1541	0.22	Q	.	.	.	.
23.70	1.1597	0.21	Q	.	.	.	.
24.02	1.1652	0.21	Q	.	.	.	.
24.34	1.1679	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1443.0
10%	57.7
20%	19.2
30%	19.2
40%	19.2

50%	19.2
60%	19.2
70%	19.2
80%	19.2
90%	19.2

```
******************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
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                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA C
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   10.48
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) = 20.04
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.18
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.96

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.30      0.0004      0.03  Q         .         .         .         .
  0.64      0.0012      0.03  Q         .         .         .         .
  0.97      0.0021      0.03  Q         .         .         .         .
  1.30      0.0030      0.03  Q         .         .         .         .
  1.64      0.0039      0.03  Q         .         .         .         .
  1.97      0.0047      0.03  Q         .         .         .         .
  2.31      0.0057      0.03  Q         .         .         .         .
  2.64      0.0066      0.03  Q         .         .         .         .
  2.97      0.0075      0.03  Q         .         .         .         .
  3.31      0.0085      0.03  Q         .         .         .         .
  3.64      0.0094      0.04  Q         .         .         .         .
  3.98      0.0104      0.04  Q         .         .         .         .
  4.31      0.0114      0.04  Q         .         .         .         .
  4.64      0.0124      0.04  Q         .         .         .         .
  4.98      0.0134      0.04  Q         .         .         .         .
  5.31      0.0144      0.04  Q         .         .         .         .
  5.65      0.0155      0.04  Q         .         .         .         .
  5.98      0.0166      0.04  Q         .         .         .         .
  6.31      0.0177      0.04  Q         .         .         .         .
  6.65      0.0188      0.04  Q         .         .         .         .
  6.98      0.0199      0.04  Q         .         .         .         .
```

```
  7.32      0.0211      0.04  Q          .          .          .          .
  7.65      0.0223      0.04  Q          .          .          .          .
  7.98      0.0235      0.04  Q          .          .          .          .
  8.32      0.0247      0.05  Q          .          .          .          .
  8.65      0.0260      0.05  Q          .          .          .          .
  8.99      0.0273      0.05  Q          .          .          .          .
  9.32      0.0286      0.05  Q          .          .          .          .
  9.65      0.0300      0.05  Q          .          .          .          .
  9.99      0.0314      0.05  Q          .          .          .          .
 10.32      0.0328      0.05  Q          .          .          .          .
 10.66      0.0343      0.05  Q          .          .          .          .
 10.99      0.0359      0.06  Q          .          .          .          .
 11.32      0.0375      0.06  Q          .          .          .          .
 11.66      0.0392      0.06  Q          .          .          .          .
 11.99      0.0409      0.06  Q          .          .          .          .
 12.33      0.0429      0.08  Q          .          .          .          .
 12.66      0.0452      0.08  Q          .          .          .          .
 12.99      0.0475      0.09  Q          .          .          .          .
 13.33      0.0500      0.09  Q          .          .          .          .
 13.66      0.0527      0.10  Q          .          .          .          .
 14.00      0.0555      0.10  Q          .          .          .          .
 14.33      0.0585      0.11  Q          .          .          .          .
 14.66      0.0617      0.12  Q          .          .          .          .
 15.00      0.0653      0.14  Q          .          .          .          .
 15.33      0.0693      0.15  Q          .          .          .          .
 15.67      0.0744      0.21  Q          .          .          .          .
 16.00      0.0810      0.27  .Q         .          .          .          .
 16.33      0.1110      1.91  .      Q   .          .          .          .
 16.67      0.1397      0.17  Q          .          .          .          .
 17.00      0.1438      0.13  Q          .          .          .          .
 17.34      0.1471      0.11  Q          .          .          .          .
 17.67      0.1499      0.10  Q          .          .          .          .
 18.00      0.1524      0.09  Q          .          .          .          .
 18.34      0.1545      0.07  Q          .          .          .          .
 18.67      0.1563      0.06  Q          .          .          .          .
 19.01      0.1579      0.06  Q          .          .          .          .
 19.34      0.1594      0.05  Q          .          .          .          .
 19.67      0.1608      0.05  Q          .          .          .          .
 20.01      0.1621      0.05  Q          .          .          .          .
 20.34      0.1634      0.04  Q          .          .          .          .
 20.68      0.1646      0.04  Q          .          .          .          .
 21.01      0.1658      0.04  Q          .          .          .          .
 21.34      0.1669      0.04  Q          .          .          .          .
 21.68      0.1680      0.04  Q          .          .          .          .
 22.01      0.1690      0.04  Q          .          .          .          .
 22.35      0.1700      0.04  Q          .          .          .          .
 22.68      0.1710      0.03  Q          .          .          .          .
 23.01      0.1719      0.03  Q          .          .          .          .
 23.35      0.1728      0.03  Q          .          .          .          .
 23.68      0.1737      0.03  Q          .          .          .          .
 24.02      0.1746      0.03  Q          .          .          .          .
 24.35      0.1750      0.00  Q          .          .          .          .
 --------------------------------------------------------------------------
--------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated              Duration
       Peak Flow Rate                   (minutes)
   ======================             =========
              0%                       1442.9
             10%                         60.1
             20%                         20.0
             30%                         20.0
             40%                         20.0
             50%                         20.0
             60%                         20.0
             70%                         20.0
```

80%	20.0
90%	20.0

```
******************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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                          Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  UNIT HYDROGRAPH
  POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA D
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   17.61
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.666
    LOW LOSS FRACTION = 0.927
    TIME OF CONCENTRATION(MIN.) = 16.87
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.31
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     3.27

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.25      0.0006      0.05  Q         .         .         .         .
  0.54      0.0018      0.05  Q         .         .         .         .
  0.82      0.0030      0.05  Q         .         .         .         .
  1.10      0.0042      0.05  Q         .         .         .         .
  1.38      0.0055      0.05  Q         .         .         .         .
  1.66      0.0067      0.05  Q         .         .         .         .
  1.94      0.0080      0.05  Q         .         .         .         .
  2.22      0.0093      0.06  Q         .         .         .         .
  2.50      0.0106      0.06  Q         .         .         .         .
  2.79      0.0119      0.06  Q         .         .         .         .
  3.07      0.0132      0.06  Q         .         .         .         .
  3.35      0.0146      0.06  Q         .         .         .         .
  3.63      0.0159      0.06  Q         .         .         .         .
  3.91      0.0173      0.06  Q         .         .         .         .
  4.19      0.0187      0.06  Q         .         .         .         .
  4.47      0.0201      0.06  Q         .         .         .         .
  4.75      0.0215      0.06  Q         .         .         .         .
  5.03      0.0230      0.06  Q         .         .         .         .
  5.32      0.0245      0.06  Q         .         .         .         .
  5.60      0.0260      0.06  Q         .         .         .         .
  5.88      0.0275      0.07  Q         .         .         .         .
```

6.16	0.0290	0.07	Q	.	.	.	.
6.44	0.0306	0.07	Q	.	.	.	.
6.72	0.0322	0.07	Q	.	.	.	.
7.00	0.0338	0.07	Q	.	.	.	.
7.28	0.0354	0.07	Q	.	.	.	.
7.56	0.0371	0.07	Q	.	.	.	.
7.85	0.0388	0.07	Q	.	.	.	.
8.13	0.0406	0.08	Q	.	.	.	.
8.41	0.0423	0.08	Q	.	.	.	.
8.69	0.0441	0.08	Q	.	.	.	.
8.97	0.0460	0.08	Q	.	.	.	.
9.25	0.0479	0.08	Q	.	.	.	.
9.53	0.0498	0.08	Q	.	.	.	.
9.81	0.0518	0.09	Q	.	.	.	.
10.10	0.0538	0.09	Q	.	.	.	.
10.38	0.0559	0.09	Q	.	.	.	.
10.66	0.0580	0.09	Q	.	.	.	.
10.94	0.0602	0.10	Q	.	.	.	.
11.22	0.0625	0.10	Q	.	.	.	.
11.50	0.0648	0.10	Q	.	.	.	.
11.78	0.0672	0.11	Q	.	.	.	.
12.06	0.0697	0.11	Q	.	.	.	.
12.34	0.0726	0.14	Q	.	.	.	.
12.63	0.0758	0.14	Q	.	.	.	.
12.91	0.0792	0.15	Q	.	.	.	.
13.19	0.0827	0.15	Q	.	.	.	.
13.47	0.0863	0.16	Q	.	.	.	.
13.75	0.0901	0.17	Q	.	.	.	.
14.03	0.0942	0.18	Q	.	.	.	.
14.31	0.0985	0.19	Q	.	.	.	.
14.59	0.1030	0.21	Q	.	.	.	.
14.88	0.1080	0.22	Q	.	.	.	.
15.16	0.1135	0.26	.Q	.	.	.	.
15.44	0.1198	0.28	.Q	.	.	.	.
15.72	0.1275	0.38	.Q	.	.	.	.
16.00	0.1376	0.48	.Q	.	.	.	.
16.28	0.1939	4.36	.	.	Q	.	.
16.56	0.2483	0.32	.Q	.	.	.	.
16.84	0.2548	0.24	Q	.	.	.	.
17.12	0.2599	0.20	Q	.	.	.	.
17.41	0.2642	0.17	Q	.	.	.	.
17.69	0.2680	0.16	Q	.	.	.	.
17.97	0.2715	0.14	Q	.	.	.	.
18.25	0.2746	0.12	Q	.	.	.	.
18.53	0.2772	0.10	Q	.	.	.	.
18.81	0.2795	0.10	Q	.	.	.	.
19.09	0.2817	0.09	Q	.	.	.	.
19.37	0.2838	0.09	Q	.	.	.	.
19.66	0.2857	0.08	Q	.	.	.	.
19.94	0.2876	0.08	Q	.	.	.	.
20.22	0.2894	0.08	Q	.	.	.	.
20.50	0.2912	0.07	Q	.	.	.	.
20.78	0.2929	0.07	Q	.	.	.	.
21.06	0.2945	0.07	Q	.	.	.	.
21.34	0.2960	0.07	Q	.	.	.	.
21.62	0.2976	0.06	Q	.	.	.	.
21.90	0.2990	0.06	Q	.	.	.	.
22.19	0.3005	0.06	Q	.	.	.	.
22.47	0.3019	0.06	Q	.	.	.	.
22.75	0.3032	0.06	Q	.	.	.	.
23.03	0.3045	0.06	Q	.	.	.	.
23.31	0.3058	0.06	Q	.	.	.	.
23.59	0.3071	0.05	Q	.	.	.	.
23.87	0.3083	0.05	Q	.	.	.	.
24.15	0.3096	0.05	Q	.	.	.	.
24.43	0.3102	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:

(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1450.8
10%	33.7
20%	16.9
30%	16.9
40%	16.9
50%	16.9
60%	16.9
70%	16.9
80%	16.9
90%	16.9

Section 6.4.4 HCOC Map and Calculations

2-Year Basin Routing Analysis

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**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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                          Analysis prepared by:

                    Kimley-Horn and Associates, Inc.
                           765 The City Drive
                               Suite 200
                            Orange, CA 92868

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  BASIN ANALYSIS
  POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA A1
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   55.00
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.201
    LOW LOSS FRACTION = 0.287
    TIME OF CONCENTRATION(MIN.) = 11.08
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

--------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     7.21
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     3.97

**************************************************************************
  TIME     VOLUME       Q    0.       12.5      25.0      37.5      50.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------
  0.12      0.0000      0.00  Q         .         .         .         .
  0.30      0.0121      1.58  .Q        .         .         .         .
```

0.49	0.0362	1.59	.Q	.	.	.	.
0.67	0.0606	1.60	.Q	.	.	.	.
0.86	0.0851	1.61	.Q	.	.	.	.
1.04	0.1097	1.62	.Q	.	.	.	.
1.23	0.1346	1.63	.Q	.	.	.	.
1.41	0.1596	1.65	.Q	.	.	.	.
1.60	0.1848	1.65	.Q	.	.	.	.
1.78	0.2102	1.67	.Q	.	.	.	.
1.97	0.2357	1.68	.Q	.	.	.	.
2.15	0.2614	1.69	.Q	.	.	.	.
2.33	0.2874	1.70	.Q	.	.	.	.
2.52	0.3135	1.72	.Q	.	.	.	.
2.70	0.3398	1.73	.Q	.	.	.	.
2.89	0.3664	1.75	.Q	.	.	.	.
3.07	0.3931	1.76	.Q	.	.	.	.
3.26	0.4201	1.78	.Q	.	.	.	.
3.44	0.4472	1.79	.Q	.	.	.	.
3.63	0.4746	1.80	.Q	.	.	.	.
3.81	0.5023	1.81	.Q	.	.	.	.
4.00	0.5301	1.84	.Q	.	.	.	.
4.18	0.5582	1.85	.Q	.	.	.	.
4.37	0.5865	1.87	.Q	.	.	.	.
4.55	0.6151	1.88	.Q	.	.	.	.
4.74	0.6440	1.90	.Q	.	.	.	.
4.92	0.6731	1.91	.Q	.	.	.	.
5.10	0.7025	1.94	.Q	.	.	.	.
5.29	0.7321	1.95	.Q	.	.	.	.
5.47	0.7621	1.97	.Q	.	.	.	.
5.66	0.7923	1.99	.Q	.	.	.	.
5.84	0.8228	2.01	.Q	.	.	.	.
6.03	0.8537	2.03	.Q	.	.	.	.
6.21	0.8849	2.06	.Q	.	.	.	.
6.40	0.9163	2.07	.Q	.	.	.	.
6.58	0.9482	2.10	.Q	.	.	.	.
6.77	0.9804	2.12	.Q	.	.	.	.
6.95	1.0129	2.15	.Q	.	.	.	.
7.14	1.0458	2.16	.Q	.	.	.	.
7.32	1.0791	2.20	.Q	.	.	.	.
7.51	1.1127	2.22	.Q	.	.	.	.
7.69	1.1468	2.25	.Q	.	.	.	.
7.87	1.1813	2.27	.Q	.	.	.	.
8.06	1.2163	2.31	.Q	.	.	.	.
8.24	1.2517	2.33	.Q	.	.	.	.
8.43	1.2875	2.37	.Q	.	.	.	.
8.61	1.3239	2.39	.Q	.	.	.	.
8.80	1.3607	2.44	.Q	.	.	.	.
8.98	1.3981	2.46	.Q	.	.	.	.
9.17	1.4360	2.51	. Q	.	.	.	.
9.35	1.4745	2.53	. Q	.	.	.	.
9.54	1.5136	2.59	. Q	.	.	.	.

9.72	1.5533	2.61	. Q . . . .
9.91	1.5936	2.67	. Q . . . .
10.09	1.6346	2.70	. Q . . . .
10.28	1.6764	2.77	. Q . . . .
10.46	1.7188	2.80	. Q . . . .
10.64	1.7621	2.87	. Q . . . .
10.83	1.8062	2.91	. Q . . . .
11.01	1.8511	2.98	. Q . . . .
11.20	1.8970	3.03	. Q . . . .
11.38	1.9438	3.11	. Q . . . .
11.57	1.9917	3.16	. Q . . . .
11.75	2.0407	3.26	. Q . . . .
11.94	2.0908	3.31	. Q . . . .
12.12	2.1448	3.76	. Q . . . .
12.31	2.2053	4.17	. Q . . . .
12.49	2.2700	4.30	. Q . . . .
12.68	2.3362	4.37	. Q . . . .
12.86	2.4041	4.53	. Q . . . .
13.05	2.4739	4.61	. Q . . . .
13.23	2.5457	4.79	. Q . . . .
13.41	2.6196	4.89	. Q . . . .
13.60	2.6960	5.12	. Q . . . .
13.78	2.7750	5.24	. Q . . . .
13.97	2.8570	5.51	. Q . . . .
14.15	2.9423	5.66	. Q . . . .
14.34	3.0312	5.99	. Q . . . .
14.52	3.1242	6.20	. Q . . . .
14.71	3.2225	6.69	. Q . . . .
14.89	3.3268	6.99	. Q . . . .
15.08	3.4392	7.73	. Q . . . .
15.26	3.5608	8.21	. Q . . . .
15.45	3.6971	9.65	. Q . . . .
15.63	3.8530	10.78	. Q . . . .
15.82	4.0425	14.06	. .Q . . .
16.00	4.2868	17.96	. . Q . . .
16.18	4.7812	46.84	. . . . Q .
16.37	5.2310	12.12	. Q. . . .
16.55	5.3906	8.79	. Q . . . .
16.74	5.5137	7.33	. Q . . . .
16.92	5.6187	6.43	. Q . . . .
17.11	5.7120	5.80	. Q . . . .
17.29	5.7972	5.37	. Q . . . .
17.48	5.8763	5.00	. Q . . . .
17.66	5.9504	4.70	. Q . . . .
17.85	6.0202	4.45	. Q . . . .
18.03	6.0865	4.24	. Q . . . .
18.22	6.1445	3.37	. Q . . . .
18.40	6.1946	3.21	. Q . . . .
18.59	6.2425	3.07	. Q . . . .
18.77	6.2884	2.94	. Q . . . .

18.95	6.3325	2.83	. Q	.	.	.	.
19.14	6.3750	2.73	. Q	.	.	.	.
19.32	6.4160	2.64	. Q	.	.	.	.
19.51	6.4557	2.56	. Q	.	.	.	.
19.69	6.4942	2.48	.Q	.	.	.	.
19.88	6.5316	2.41	.Q	.	.	.	.
20.06	6.5680	2.35	.Q	.	.	.	.
20.25	6.6034	2.29	.Q	.	.	.	.
20.43	6.6379	2.23	.Q	.	.	.	.
20.62	6.6716	2.18	.Q	.	.	.	.
20.80	6.7045	2.13	.Q	.	.	.	.
20.99	6.7366	2.09	.Q	.	.	.	.
21.17	6.7681	2.04	.Q	.	.	.	.
21.36	6.7990	2.00	.Q	.	.	.	.
21.54	6.8292	1.96	.Q	.	.	.	.
21.72	6.8589	1.93	.Q	.	.	.	.
21.91	6.8880	1.89	.Q	.	.	.	.
22.09	6.9166	1.86	.Q	.	.	.	.
22.28	6.9447	1.83	.Q	.	.	.	.
22.46	6.9723	1.79	.Q	.	.	.	.
22.65	6.9995	1.77	.Q	.	.	.	.
22.83	7.0262	1.74	.Q	.	.	.	.
23.02	7.0526	1.71	.Q	.	.	.	.
23.20	7.0785	1.69	.Q	.	.	.	.
23.39	7.1041	1.66	.Q	.	.	.	.
23.57	7.1292	1.64	.Q	.	.	.	.
23.76	7.1541	1.62	.Q	.	.	.	.
23.94	7.1786	1.59	.Q	.	.	.	.
24.13	7.2028	1.57	.Q	.	.	.	.
24.31	7.2148	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

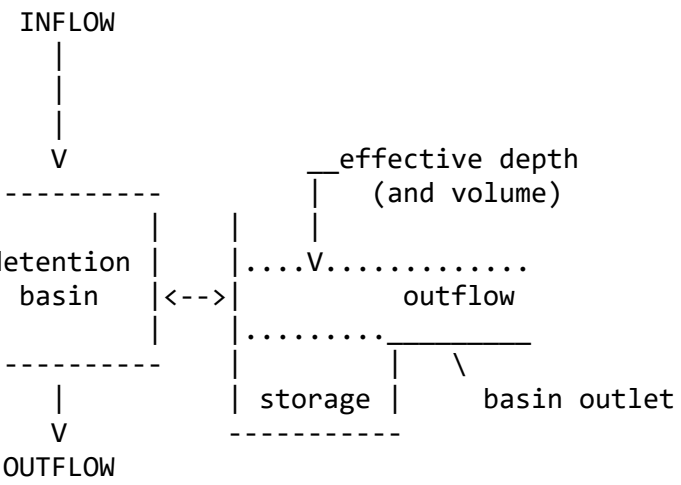
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1440.4
10%	277.0
20%	66.5
30%	33.2
40%	11.1
50%	11.1
60%	11.1
70%	11.1
80%	11.1
90%	11.1

Problem Descriptions:
PACIFIC COMMERCE CENTER
BASIN ANALYSIS
POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA A1

==========

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 11.080
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 17

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**	BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
0.000	0.000	0.000	**	5.500	4.238	0.000	*
6.000	4.702	0.947	**	6.500	5.167	2.674	*
7.000	5.633	3.781	**	7.500	6.097	6.112	*
8.000	6.557	10.710	**	8.500	7.012	16.520	*
9.000	7.460	21.670	**	9.500	7.898	25.600	*
10.000	8.324	28.950	**	10.500	8.736	31.940	*
11.000	9.128	34.650	**	11.500	9.497	37.160	*
12.000	9.834	39.510	**	12.500	10.118	41.720	*
13.000	10.335	43.820	**				

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)

1	0.00	0.00000	0.00000
2	5.50	4.23780	4.23780
3	6.00	4.69447	4.70893
4	6.50	5.14700	5.18780
5	7.00	5.60425	5.66195
6	7.50	6.05036	6.14364
7	8.00	6.47567	6.63913
8	8.50	6.88634	7.13846
9	9.00	7.29474	7.62546
10	9.50	7.70295	8.09365
11	10.00	8.10349	8.54531
12	10.50	8.49187	8.97933
13	11.00	8.86379	9.39261
14	11.50	9.21334	9.78046
15	12.00	9.53231	10.13529
16	12.50	9.79944	10.43616
17	13.00	10.00042	10.66918

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.119	0.000	0.00	0.00	0.00	0.000
0.303	0.000	1.58	0.03	0.00	0.024
0.488	0.000	1.59	0.06	0.00	0.048
0.673	0.000	1.60	0.09	0.00	0.073
0.857	0.000	1.61	0.13	0.00	0.097
1.042	0.000	1.62	0.16	0.00	0.122
1.227	0.000	1.63	0.19	0.00	0.147
1.411	0.000	1.65	0.22	0.00	0.172
1.596	0.000	1.65	0.26	0.00	0.197
1.781	0.000	1.67	0.29	0.00	0.223
1.965	0.000	1.68	0.32	0.00	0.249
2.150	0.000	1.69	0.36	0.00	0.274
2.335	0.000	1.70	0.39	0.00	0.300
2.519	0.000	1.72	0.42	0.00	0.327
2.704	0.000	1.73	0.46	0.00	0.353
2.889	0.000	1.75	0.49	0.00	0.380
3.073	0.000	1.76	0.53	0.00	0.407
3.258	0.000	1.78	0.56	0.00	0.434
3.443	0.000	1.79	0.60	0.00	0.461
3.627	0.000	1.80	0.63	0.00	0.488
3.812	0.000	1.81	0.67	0.00	0.516
3.997	0.000	1.84	0.71	0.00	0.544
4.181	0.000	1.85	0.74	0.00	0.572

4.366	0.000	1.87	0.78	0.00	0.601
4.551	0.000	1.88	0.82	0.00	0.629
4.735	0.000	1.90	0.85	0.00	0.658
4.920	0.000	1.91	0.89	0.00	0.688
5.105	0.000	1.94	0.93	0.00	0.717
5.289	0.000	1.95	0.97	0.00	0.747
5.474	0.000	1.97	1.01	0.00	0.777
5.659	0.000	1.99	1.05	0.00	0.807
5.843	0.000	2.01	1.09	0.00	0.838
6.028	0.000	2.03	1.13	0.00	0.869
6.213	0.000	2.06	1.17	0.00	0.901
6.397	0.000	2.07	1.21	0.00	0.932
6.582	0.000	2.10	1.25	0.00	0.964
6.767	0.000	2.12	1.29	0.00	0.996
6.951	0.000	2.15	1.34	0.00	1.029
7.136	0.000	2.16	1.38	0.00	1.062
7.321	0.000	2.20	1.42	0.00	1.096
7.505	0.000	2.22	1.47	0.00	1.130
7.690	0.000	2.25	1.51	0.00	1.164
7.875	0.000	2.27	1.56	0.00	1.199
8.059	0.000	2.31	1.60	0.00	1.234
8.244	0.000	2.33	1.65	0.00	1.269
8.429	0.000	2.37	1.69	0.00	1.306
8.613	0.000	2.39	1.74	0.00	1.342
8.798	0.000	2.44	1.79	0.00	1.379
8.983	0.000	2.46	1.84	0.00	1.417
9.167	0.000	2.51	1.89	0.00	1.455
9.352	0.000	2.53	1.94	0.00	1.494
9.537	0.000	2.59	1.99	0.00	1.533
9.721	0.000	2.61	2.04	0.00	1.573
9.906	0.000	2.67	2.09	0.00	1.614
10.091	0.000	2.70	2.15	0.00	1.655
10.275	0.000	2.77	2.20	0.00	1.697
10.460	0.000	2.80	2.26	0.00	1.740
10.645	0.000	2.87	2.32	0.00	1.784
10.829	0.000	2.91	2.37	0.00	1.828
11.014	0.000	2.98	2.43	0.00	1.874
11.199	0.000	3.03	2.49	0.00	1.920
11.383	0.000	3.11	2.55	0.00	1.968
11.568	0.000	3.16	2.62	0.00	2.016
11.753	0.000	3.26	2.68	0.00	2.066
11.937	0.000	3.31	2.75	0.00	2.116
12.122	0.000	3.76	2.82	0.00	2.173
12.307	0.000	4.17	2.90	0.00	2.237
12.491	0.000	4.30	2.99	0.00	2.303
12.676	0.000	4.37	3.08	0.00	2.370
12.861	0.000	4.53	3.17	0.00	2.439
13.045	0.000	4.61	3.26	0.00	2.509
13.230	0.000	4.79	3.35	0.00	2.582
13.415	0.000	4.89	3.45	0.00	2.657

13.599	0.000	5.12	3.55	0.00	2.735
13.784	0.000	5.24	3.65	0.00	2.815
13.969	0.000	5.51	3.76	0.00	2.899
14.153	0.000	5.66	3.87	0.00	2.986
14.338	0.000	5.99	3.99	0.00	3.077
14.523	0.000	6.20	4.12	0.00	3.171
14.707	0.000	6.69	4.25	0.00	3.274
14.892	0.000	6.99	4.39	0.00	3.380
15.077	0.000	7.73	4.54	0.00	3.498
15.261	0.000	8.21	4.70	0.00	3.623
15.446	0.000	9.65	4.89	0.00	3.771
15.631	0.000	10.78	5.11	0.00	3.935
15.815	0.000	14.06	5.39	0.00	4.150
16.000	0.000	17.96	5.70	0.19	4.421
16.185	0.000	46.84	6.44	1.42	5.114
16.369	0.000	12.12	6.60	2.68	5.258
16.554	0.000	8.79	6.69	2.99	5.346
16.739	0.000	7.33	6.76	3.18	5.410
16.923	0.000	6.43	6.81	3.31	5.458
17.108	0.000	5.80	6.85	3.41	5.494
17.293	0.000	5.37	6.88	3.48	5.523
17.477	0.000	5.00	6.91	3.55	5.545
17.662	0.000	4.70	6.92	3.59	5.562
17.847	0.000	4.45	6.94	3.63	5.575
18.031	0.000	4.24	6.95	3.65	5.583
18.216	0.000	3.37	6.94	3.66	5.579
18.401	0.000	3.21	6.93	3.64	5.572
18.585	0.000	3.07	6.93	3.63	5.564
18.770	0.000	2.94	6.91	3.60	5.554
18.955	0.000	2.83	6.90	3.58	5.542
19.139	0.000	2.73	6.89	3.55	5.530
19.324	0.000	2.64	6.87	3.52	5.517
19.509	0.000	2.56	6.86	3.49	5.502
19.693	0.000	2.48	6.84	3.45	5.488
19.878	0.000	2.41	6.83	3.42	5.472
20.063	0.000	2.35	6.81	3.38	5.457
20.247	0.000	2.29	6.79	3.34	5.441
20.432	0.000	2.23	6.78	3.30	5.424
20.617	0.000	2.18	6.76	3.26	5.408
20.801	0.000	2.13	6.74	3.23	5.391
20.986	0.000	2.09	6.72	3.19	5.374
21.171	0.000	2.04	6.70	3.15	5.357
21.355	0.000	2.00	6.69	3.11	5.340
21.540	0.000	1.96	6.67	3.07	5.324
21.725	0.000	1.93	6.65	3.03	5.307
21.909	0.000	1.89	6.63	2.99	5.290
22.094	0.000	1.86	6.61	2.95	5.273
22.279	0.000	1.83	6.60	2.91	5.257
22.463	0.000	1.79	6.58	2.87	5.241
22.648	0.000	1.77	6.56	2.83	5.224

22.833	0.000	1.74	6.54	2.79	5.208
23.017	0.000	1.71	6.53	2.75	5.192
23.202	0.000	1.69	6.51	2.71	5.177
23.387	0.000	1.66	6.49	2.67	5.161
23.571	0.000	1.64	6.48	2.62	5.146
23.756	0.000	1.62	6.46	2.57	5.132
23.941	0.000	1.59	6.45	2.52	5.118
24.125	0.000	1.57	6.43	2.46	5.104
24.310	0.000	0.00	6.39	2.37	5.068

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**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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                          Analysis prepared by:

                    Kimley-Horn and Associates, Inc.
                           765 The City Drive
                               Suite 200
                            Orange, CA 92868

**************************************************************************
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 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  BASIN ANALYSIS
  POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA A2
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   18.95
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.319
    LOW LOSS FRACTION = 0.401
    TIME OF CONCENTRATION(MIN.) = 11.77
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

--------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.10
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.75

**************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------
  0.11      0.0021      0.45  Q         .         .         .         .
  0.31      0.0095      0.46  Q         .         .         .         .
```

0.50	0.0169	0.46	Q	.	.	.	.
0.70	0.0244	0.46	Q	.	.	.	.
0.90	0.0319	0.47	Q	.	.	.	.
1.09	0.0395	0.47	Q	.	.	.	.
1.29	0.0472	0.47	Q	.	.	.	.
1.48	0.0549	0.48	Q	.	.	.	.
1.68	0.0626	0.48	Q	.	.	.	.
1.88	0.0705	0.48	Q	.	.	.	.
2.07	0.0784	0.49	Q	.	.	.	.
2.27	0.0863	0.49	Q	.	.	.	.
2.46	0.0943	0.50	Q	.	.	.	.
2.66	0.1024	0.50	Q	.	.	.	.
2.86	0.1105	0.50	.Q	.	.	.	.
3.05	0.1187	0.51	.Q	.	.	.	.
3.25	0.1270	0.51	.Q	.	.	.	.
3.45	0.1354	0.52	.Q	.	.	.	.
3.64	0.1438	0.52	.Q	.	.	.	.
3.84	0.1523	0.53	.Q	.	.	.	.
4.03	0.1609	0.53	.Q	.	.	.	.
4.23	0.1695	0.54	.Q	.	.	.	.
4.43	0.1783	0.54	.Q	.	.	.	.
4.62	0.1871	0.55	.Q	.	.	.	.
4.82	0.1960	0.55	.Q	.	.	.	.
5.01	0.2050	0.56	.Q	.	.	.	.
5.21	0.2140	0.56	.Q	.	.	.	.
5.41	0.2232	0.57	.Q	.	.	.	.
5.60	0.2325	0.58	.Q	.	.	.	.
5.80	0.2418	0.58	.Q	.	.	.	.
6.00	0.2513	0.59	.Q	.	.	.	.
6.19	0.2608	0.59	.Q	.	.	.	.
6.39	0.2705	0.60	.Q	.	.	.	.
6.58	0.2803	0.61	.Q	.	.	.	.
6.78	0.2902	0.61	.Q	.	.	.	.
6.98	0.3002	0.62	.Q	.	.	.	.
7.17	0.3103	0.63	.Q	.	.	.	.
7.37	0.3206	0.64	.Q	.	.	.	.
7.56	0.3310	0.65	.Q	.	.	.	.
7.76	0.3415	0.65	.Q	.	.	.	.
7.96	0.3521	0.66	.Q	.	.	.	.
8.15	0.3629	0.67	.Q	.	.	.	.
8.35	0.3739	0.68	.Q	.	.	.	.
8.55	0.3850	0.69	.Q	.	.	.	.
8.74	0.3963	0.70	.Q	.	.	.	.
8.94	0.4077	0.71	.Q	.	.	.	.
9.13	0.4193	0.72	.Q	.	.	.	.
9.33	0.4311	0.73	.Q	.	.	.	.
9.53	0.4431	0.75	.Q	.	.	.	.
9.72	0.4553	0.76	.Q	.	.	.	.
9.92	0.4677	0.77	.Q	.	.	.	.
10.11	0.4803	0.78	.Q	.	.	.	.

10.31	0.4932	0.80	.Q	.	.	.	.
10.51	0.5063	0.81	.Q	.	.	.	.
10.70	0.5196	0.83	.Q	.	.	.	.
10.90	0.5333	0.85	.Q	.	.	.	.
11.10	0.5472	0.87	.Q	.	.	.	.
11.29	0.5614	0.88	.Q	.	.	.	.
11.49	0.5760	0.91	.Q	.	.	.	.
11.68	0.5909	0.93	.Q	.	.	.	.
11.88	0.6062	0.96	.Q	.	.	.	.
12.08	0.6218	0.98	.Q	.	.	.	.
12.27	0.6395	1.21	. Q	.	.	.	.
12.47	0.6593	1.23	. Q	.	.	.	.
12.67	0.6796	1.27	. Q	.	.	.	.
12.86	0.7005	1.30	. Q	.	.	.	.
13.06	0.7219	1.35	. Q	.	.	.	.
13.25	0.7440	1.38	. Q	.	.	.	.
13.45	0.7668	1.44	. Q	.	.	.	.
13.65	0.7904	1.47	. Q	.	.	.	.
13.84	0.8150	1.55	. Q	.	.	.	.
14.04	0.8405	1.60	. Q	.	.	.	.
14.23	0.8670	1.68	. Q	.	.	.	.
14.43	0.8948	1.74	. Q	.	.	.	.
14.63	0.9242	1.88	. Q	.	.	.	.
14.82	0.9553	1.97	. Q	.	.	.	.
15.02	0.9889	2.17	. Q	.	.	.	.
15.22	1.0252	2.31	. Q	.	.	.	.
15.41	1.0657	2.69	. Q	.	.	.	.
15.61	1.1121	3.03	. Q	.	.	.	.
15.80	1.1688	3.96	. Q	.	.	.	.
16.00	1.2419	5.05	. Q	.	.	.	.
16.20	1.3929	13.58	. .	.	.	Q	.
16.39	1.5306	3.41	. Q	.	.	.	.
16.59	1.5783	2.47	. Q	.	.	.	.
16.78	1.6151	2.06	. Q	.	.	.	.
16.98	1.6464	1.81	. Q	.	.	.	.
17.18	1.6744	1.64	. Q	.	.	.	.
17.37	1.6999	1.51	. Q	.	.	.	.
17.57	1.7236	1.41	. Q	.	.	.	.
17.77	1.7457	1.32	. Q	.	.	.	.
17.96	1.7666	1.25	. Q	.	.	.	.
18.16	1.7857	1.11	. Q	.	.	.	.
18.35	1.8023	0.94	.Q	.	.	.	.
18.55	1.8172	0.90	.Q	.	.	.	.
18.75	1.8315	0.86	.Q	.	.	.	.
18.94	1.8451	0.82	.Q	.	.	.	.
19.14	1.8582	0.79	.Q	.	.	.	.
19.33	1.8708	0.76	.Q	.	.	.	.
19.53	1.8830	0.74	.Q	.	.	.	.
19.73	1.8948	0.72	.Q	.	.	.	.
19.92	1.9063	0.70	.Q	.	.	.	.

20.12	1.9174	0.68	.Q	.	.	.	.
20.32	1.9282	0.66	.Q	.	.	.	.
20.51	1.9387	0.64	.Q	.	.	.	.
20.71	1.9490	0.62	.Q	.	.	.	.
20.90	1.9590	0.61	.Q	.	.	.	.
21.10	1.9688	0.60	.Q	.	.	.	.
21.30	1.9783	0.58	.Q	.	.	.	.
21.49	1.9877	0.57	.Q	.	.	.	.
21.69	1.9969	0.56	.Q	.	.	.	.
21.89	2.0058	0.55	.Q	.	.	.	.
22.08	2.0147	0.54	.Q	.	.	.	.
22.28	2.0233	0.53	.Q	.	.	.	.
22.47	2.0318	0.52	.Q	.	.	.	.
22.67	2.0402	0.51	.Q	.	.	.	.
22.87	2.0484	0.50	.Q	.	.	.	.
23.06	2.0564	0.49	Q	.	.	.	.
23.26	2.0644	0.49	Q	.	.	.	.
23.45	2.0722	0.48	Q	.	.	.	.
23.65	2.0799	0.47	Q	.	.	.	.
23.85	2.0875	0.47	Q	.	.	.	.
24.04	2.0950	0.46	Q	.	.	.	.
24.24	2.0987	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

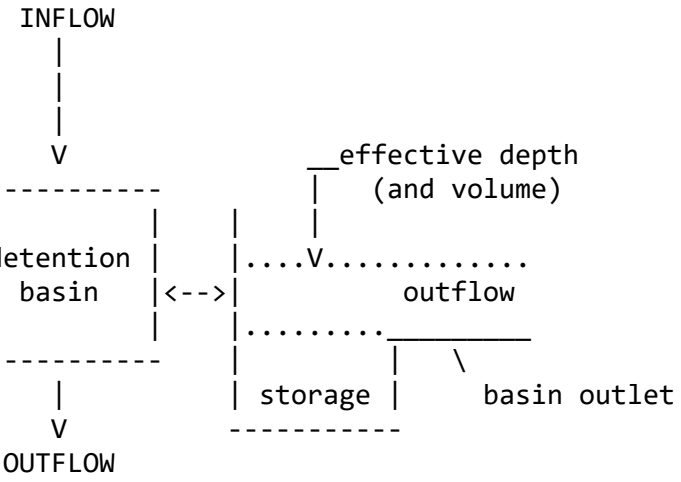
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1447.7
10%	270.7
20%	58.9
30%	23.5
40%	11.8
50%	11.8
60%	11.8
70%	11.8
80%	11.8
90%	11.8

Problem Descriptions:
PACIFIC COMMERCE CENTER
BASIN ANALYSIS
POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA A2

==========

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 11.770
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 18

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**	BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
0.000	0.000	0.000	**	5.000	1.158	0.000	*
5.500	1.298	0.473	**	6.000	1.440	0.819	*
6.500	1.582	1.057	**	7.000	1.725	2.198	*
7.500	1.866	4.092	**	8.000	2.007	5.349	*
8.500	2.146	6.335	**	9.000	2.283	7.178	*
9.500	2.417	7.927	**	10.000	2.547	8.609	*
10.500	2.673	9.240	**	11.000	2.793	9.829	*
11.500	2.906	10.380	**	12.000	3.010	10.910	*
12.500	3.097	11.410	**	13.000	3.165	11.890	*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	5.00	1.15780	1.15780
3	5.50	1.29467	1.30233
4	6.00	1.43356	1.44684
5	6.50	1.57383	1.59097
6	7.00	1.70678	1.74242
7	7.50	1.83313	1.89947
8	8.00	1.96364	2.05036

9	8.50	2.09465	2.19735
10	9.00	2.22461	2.34099
11	9.50	2.35254	2.48106
12	10.00	2.47731	2.61689
13	10.50	2.59810	2.74790
14	11.00	2.71353	2.87287
15	11.50	2.82216	2.99044
16	12.00	2.92136	3.09824
17	12.50	3.00481	3.18979
18	13.00	3.06842	3.26118

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.110	0.000	0.45	0.03	0.00	0.007
0.307	0.000	0.46	0.06	0.00	0.015
0.503	0.000	0.46	0.10	0.00	0.022
0.699	0.000	0.46	0.13	0.00	0.030
0.895	0.000	0.47	0.16	0.00	0.037
1.091	0.000	0.47	0.19	0.00	0.045
1.287	0.000	0.47	0.23	0.00	0.053
1.484	0.000	0.48	0.26	0.00	0.060
1.680	0.000	0.48	0.29	0.00	0.068
1.876	0.000	0.48	0.33	0.00	0.076
2.072	0.000	0.49	0.36	0.00	0.084
2.268	0.000	0.49	0.40	0.00	0.092
2.464	0.000	0.50	0.43	0.00	0.100
2.661	0.000	0.50	0.47	0.00	0.108
2.857	0.000	0.50	0.50	0.00	0.116
3.053	0.000	0.51	0.54	0.00	0.124
3.249	0.000	0.51	0.57	0.00	0.133
3.445	0.000	0.52	0.61	0.00	0.141
3.641	0.000	0.52	0.65	0.00	0.150
3.838	0.000	0.53	0.68	0.00	0.158
4.034	0.000	0.53	0.72	0.00	0.167
4.230	0.000	0.54	0.76	0.00	0.175
4.426	0.000	0.54	0.80	0.00	0.184
4.622	0.000	0.55	0.83	0.00	0.193
4.818	0.000	0.55	0.87	0.00	0.202
5.015	0.000	0.56	0.91	0.00	0.211
5.211	0.000	0.56	0.95	0.00	0.220
5.407	0.000	0.57	0.99	0.00	0.229
5.603	0.000	0.58	1.03	0.00	0.239
5.799	0.000	0.58	1.07	0.00	0.248

5.995	0.000	0.59	1.11	0.00	0.258
6.192	0.000	0.59	1.15	0.00	0.267
6.388	0.000	0.60	1.20	0.00	0.277
6.584	0.000	0.61	1.24	0.00	0.287
6.780	0.000	0.61	1.28	0.00	0.297
6.976	0.000	0.62	1.33	0.00	0.307
7.172	0.000	0.63	1.37	0.00	0.317
7.369	0.000	0.64	1.41	0.00	0.327
7.565	0.000	0.65	1.46	0.00	0.338
7.761	0.000	0.65	1.50	0.00	0.348
7.957	0.000	0.66	1.55	0.00	0.359
8.153	0.000	0.67	1.60	0.00	0.370
8.349	0.000	0.68	1.65	0.00	0.381
8.546	0.000	0.69	1.69	0.00	0.392
8.742	0.000	0.70	1.74	0.00	0.404
8.938	0.000	0.71	1.79	0.00	0.415
9.134	0.000	0.72	1.84	0.00	0.427
9.330	0.000	0.73	1.89	0.00	0.439
9.526	0.000	0.75	1.95	0.00	0.451
9.723	0.000	0.76	2.00	0.00	0.463
9.919	0.000	0.77	2.05	0.00	0.476
10.115	0.000	0.78	2.11	0.00	0.488
10.311	0.000	0.80	2.16	0.00	0.501
10.507	0.000	0.81	2.22	0.00	0.514
10.703	0.000	0.83	2.28	0.00	0.528
10.900	0.000	0.85	2.34	0.00	0.542
11.096	0.000	0.87	2.40	0.00	0.556
11.292	0.000	0.88	2.46	0.00	0.570
11.488	0.000	0.91	2.53	0.00	0.585
11.684	0.000	0.93	2.59	0.00	0.600
11.880	0.000	0.96	2.66	0.00	0.616
12.077	0.000	0.98	2.73	0.00	0.631
12.273	0.000	1.21	2.81	0.00	0.651
12.469	0.000	1.23	2.90	0.00	0.671
12.665	0.000	1.27	2.99	0.00	0.692
12.861	0.000	1.30	3.08	0.00	0.713
13.057	0.000	1.35	3.17	0.00	0.734
13.254	0.000	1.38	3.27	0.00	0.757
13.450	0.000	1.44	3.37	0.00	0.780
13.646	0.000	1.47	3.47	0.00	0.804
13.842	0.000	1.55	3.58	0.00	0.829
14.038	0.000	1.60	3.69	0.00	0.855
14.234	0.000	1.68	3.81	0.00	0.882
14.431	0.000	1.74	3.93	0.00	0.911
14.627	0.000	1.88	4.06	0.00	0.941
14.823	0.000	1.97	4.20	0.00	0.973
15.019	0.000	2.17	4.35	0.00	1.008
15.215	0.000	2.31	4.52	0.00	1.046
15.411	0.000	2.69	4.70	0.00	1.089
15.608	0.000	3.03	4.92	0.00	1.138

15.804	0.000	3.96	5.15	0.07	1.201
16.000	0.000	5.05	5.43	0.28	1.279
16.196	0.000	13.58	6.17	0.65	1.488
16.392	0.000	3.41	6.31	0.93	1.529
16.588	0.000	2.47	6.40	0.99	1.553
16.785	0.000	2.06	6.45	1.02	1.569
16.981	0.000	1.81	6.50	1.05	1.582
17.177	0.000	1.64	6.53	1.09	1.591
17.373	0.000	1.51	6.55	1.15	1.597
17.569	0.000	1.41	6.56	1.19	1.600
17.766	0.000	1.32	6.57	1.21	1.602
17.962	0.000	1.25	6.57	1.22	1.603
18.158	0.000	1.11	6.57	1.21	1.601
18.354	0.000	0.94	6.55	1.19	1.597
18.550	0.000	0.90	6.54	1.16	1.593
18.746	0.000	0.86	6.52	1.12	1.588
18.943	0.000	0.82	6.51	1.09	1.584
19.139	0.000	0.79	6.49	1.06	1.580
19.335	0.000	0.76	6.47	1.05	1.575
19.531	0.000	0.74	6.46	1.04	1.570
19.727	0.000	0.72	6.44	1.03	1.565
19.923	0.000	0.70	6.42	1.02	1.560
20.120	0.000	0.68	6.40	1.01	1.554
20.316	0.000	0.66	6.38	1.01	1.549
20.512	0.000	0.64	6.36	1.00	1.543
20.708	0.000	0.62	6.34	0.99	1.537
20.904	0.000	0.61	6.32	0.98	1.531
21.100	0.000	0.60	6.30	0.97	1.525
21.297	0.000	0.58	6.28	0.96	1.519
21.493	0.000	0.57	6.26	0.95	1.513
21.689	0.000	0.56	6.23	0.94	1.507
21.885	0.000	0.55	6.21	0.93	1.501
22.081	0.000	0.54	6.19	0.92	1.495
22.277	0.000	0.53	6.17	0.91	1.489
22.474	0.000	0.52	6.15	0.89	1.483
22.670	0.000	0.51	6.13	0.88	1.476
22.866	0.000	0.50	6.11	0.87	1.470
23.062	0.000	0.49	6.09	0.86	1.464
23.258	0.000	0.49	6.06	0.85	1.458
23.454	0.000	0.48	6.04	0.84	1.453
23.651	0.000	0.47	6.02	0.83	1.447
23.847	0.000	0.47	6.00	0.82	1.441
24.043	0.000	0.46	5.98	0.81	1.435
24.239	0.000	0.00	5.94	0.79	1.422

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
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                          Analysis prepared by:

                    Kimley-Horn and Associates, Inc.
                           765 The City Drive
                               Suite 200
                            Orange, CA 92868

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  PACIFIC COMMERCE CENTER
  BASIN ANALYSIS
  POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA A3
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =   57.97
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.190
    LOW LOSS FRACTION = 0.277
    TIME OF CONCENTRATION(MIN.) = 10.56
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.14
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.36
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.52
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.92
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.33
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.44

--------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     7.72
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     4.06

**************************************************************************
  TIME     VOLUME       Q    0.       15.0      30.0      45.0      60.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------
  0.16      0.0122      1.68  .Q        .         .         .         .
  0.34      0.0367      1.69  .Q        .         .         .         .
```

0.51	0.0614	1.70	.Q	.	.	.	.
0.69	0.0862	1.71	.Q	.	.	.	.
0.86	0.1112	1.72	.Q	.	.	.	.
1.04	0.1363	1.74	.Q	.	.	.	.
1.22	0.1616	1.74	.Q	.	.	.	.
1.39	0.1871	1.76	.Q	.	.	.	.
1.57	0.2127	1.77	.Q	.	.	.	.
1.74	0.2386	1.78	.Q	.	.	.	.
1.92	0.2646	1.79	.Q	.	.	.	.
2.10	0.2907	1.81	.Q	.	.	.	.
2.27	0.3171	1.82	.Q	.	.	.	.
2.45	0.3436	1.83	.Q	.	.	.	.
2.62	0.3704	1.84	.Q	.	.	.	.
2.80	0.3973	1.86	.Q	.	.	.	.
2.98	0.4245	1.87	.Q	.	.	.	.
3.15	0.4518	1.89	.Q	.	.	.	.
3.33	0.4794	1.90	.Q	.	.	.	.
3.50	0.5071	1.92	.Q	.	.	.	.
3.68	0.5351	1.93	.Q	.	.	.	.
3.86	0.5633	1.95	.Q	.	.	.	.
4.03	0.5918	1.96	.Q	.	.	.	.
4.21	0.6204	1.98	.Q	.	.	.	.
4.38	0.6493	1.99	.Q	.	.	.	.
4.56	0.6785	2.02	.Q	.	.	.	.
4.74	0.7079	2.03	.Q	.	.	.	.
4.91	0.7375	2.05	.Q	.	.	.	.
5.09	0.7675	2.06	.Q	.	.	.	.
5.26	0.7977	2.09	.Q	.	.	.	.
5.44	0.8281	2.10	.Q	.	.	.	.
5.62	0.8589	2.13	.Q	.	.	.	.
5.79	0.8899	2.14	.Q	.	.	.	.
5.97	0.9212	2.17	.Q	.	.	.	.
6.14	0.9529	2.18	.Q	.	.	.	.
6.32	0.9848	2.21	.Q	.	.	.	.
6.50	1.0171	2.23	.Q	.	.	.	.
6.67	1.0497	2.26	.Q	.	.	.	.
6.85	1.0827	2.27	.Q	.	.	.	.
7.02	1.1160	2.31	.Q	.	.	.	.
7.20	1.1497	2.32	.Q	.	.	.	.
7.38	1.1837	2.36	.Q	.	.	.	.
7.55	1.2182	2.38	.Q	.	.	.	.
7.73	1.2530	2.41	.Q	.	.	.	.
7.90	1.2882	2.43	.Q	.	.	.	.
8.08	1.3239	2.47	.Q	.	.	.	.
8.26	1.3600	2.49	.Q	.	.	.	.
8.43	1.3966	2.54	.Q	.	.	.	.
8.61	1.4336	2.56	.Q	.	.	.	.
8.78	1.4712	2.60	.Q	.	.	.	.
8.96	1.5092	2.63	.Q	.	.	.	.
9.14	1.5478	2.68	.Q	.	.	.	.

9.31	1.5869	2.70	.Q . . . .
9.49	1.6265	2.76	.Q . . . .
9.66	1.6668	2.78	.Q . . . .
9.84	1.7077	2.84	.Q . . . .
10.02	1.7493	2.87	.Q . . . .
10.19	1.7915	2.93	.Q . . . .
10.37	1.8344	2.97	.Q . . . .
10.54	1.8781	3.04	. Q . . . .
10.72	1.9225	3.07	. Q . . . .
10.90	1.9678	3.15	. Q . . . .
11.07	2.0139	3.19	. Q . . . .
11.25	2.0610	3.28	. Q . . . .
11.42	2.1090	3.32	. Q . . . .
11.60	2.1580	3.42	. Q . . . .
11.78	2.2081	3.47	. Q . . . .
11.95	2.2593	3.58	. Q . . . .
12.13	2.3123	3.70	. Q . . . .
12.30	2.3719	4.49	. Q . . . .
12.48	2.4378	4.56	. Q . . . .
12.66	2.5052	4.71	. Q . . . .
12.83	2.5742	4.78	. Q . . . .
13.01	2.6450	4.95	. Q . . . .
13.18	2.7177	5.04	. Q . . . .
13.36	2.7925	5.24	. Q . . . .
13.54	2.8695	5.35	. Q . . . .
13.71	2.9491	5.59	. Q . . . .
13.89	3.0314	5.73	. Q . . . .
14.06	3.1169	6.03	. Q . . . .
14.24	3.2055	6.15	. Q . . . .
14.42	3.2979	6.55	. Q . . . .
14.59	3.3948	6.78	. Q . . . .
14.77	3.4973	7.32	. Q . . . .
14.94	3.6061	7.64	. Q . . . .
15.12	3.7232	8.46	. Q . . . .
15.30	3.8500	8.98	. Q . . . .
15.47	3.9926	10.63	. Q . . . .
15.65	4.1556	11.78	. Q . . . .
15.82	4.3528	15.34	. Q . . .
16.00	4.6071	19.63	. . Q . . .
16.18	5.1230	51.31	. . . . Q .
16.35	5.5924	13.24	. Q . . . .
16.53	5.7587	9.62	. Q . . . .
16.70	5.8870	8.02	. Q . . . .
16.88	5.9964	7.03	. Q . . . .
17.06	6.0936	6.34	. Q . . . .
17.23	6.1825	5.87	. Q . . . .
17.41	6.2650	5.47	. Q . . . .
17.58	6.3421	5.14	. Q . . . .
17.76	6.4149	4.87	. Q . . . .
17.94	6.4839	4.63	. Q . . . .

18.11	6.5498	4.43	. Q	.	.	.	.
18.29	6.6077	3.52	. Q	.	.	.	.
18.46	6.6578	3.37	. Q	.	.	.	.
18.64	6.7058	3.23	. Q	.	.	.	.
18.82	6.7520	3.11	. Q	.	.	.	.
18.99	6.7964	3.00	. Q	.	.	.	.
19.17	6.8394	2.90	.Q	.	.	.	.
19.34	6.8809	2.81	.Q	.	.	.	.
19.52	6.9212	2.73	.Q	.	.	.	.
19.70	6.9603	2.65	.Q	.	.	.	.
19.87	6.9984	2.58	.Q	.	.	.	.
20.05	7.0354	2.51	.Q	.	.	.	.
20.22	7.0715	2.45	.Q	.	.	.	.
20.40	7.1068	2.39	.Q	.	.	.	.
20.58	7.1412	2.34	.Q	.	.	.	.
20.75	7.1749	2.29	.Q	.	.	.	.
20.93	7.2079	2.24	.Q	.	.	.	.
21.10	7.2401	2.20	.Q	.	.	.	.
21.28	7.2718	2.15	.Q	.	.	.	.
21.46	7.3028	2.11	.Q	.	.	.	.
21.63	7.3333	2.08	.Q	.	.	.	.
21.81	7.3632	2.04	.Q	.	.	.	.
21.98	7.3926	2.00	.Q	.	.	.	.
22.16	7.4215	1.97	.Q	.	.	.	.
22.34	7.4500	1.94	.Q	.	.	.	.
22.51	7.4780	1.91	.Q	.	.	.	.
22.69	7.5055	1.88	.Q	.	.	.	.
22.86	7.5327	1.85	.Q	.	.	.	.
23.04	7.5594	1.83	.Q	.	.	.	.
23.22	7.5858	1.80	.Q	.	.	.	.
23.39	7.6118	1.77	.Q	.	.	.	.
23.57	7.6374	1.75	.Q	.	.	.	.
23.74	7.6627	1.73	.Q	.	.	.	.
23.92	7.6877	1.71	.Q	.	.	.	.
24.10	7.7123	1.68	.Q	.	.	.	.
24.27	7.7246	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1446.7
10%	264.0
20%	63.4
30%	21.1
40%	10.6

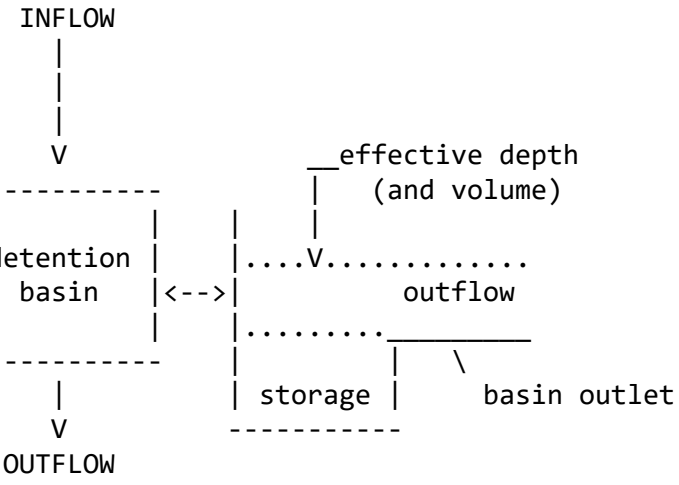
50%	10.6
60%	10.6
70%	10.6
80%	10.6
90%	10.6

Problem Descriptions:
PACIFIC COMMERCE CENTER
BASIN ANALYSIS
POST-DEVELOPMENT, 2-YEAR STORM EVENT, DA A3

==========

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 10.560
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 18

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS) **	**BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS) *
0.000	0.000	0.000**	5.000	4.516	0.000*
5.500	5.067	0.947**	6.000	5.622	2.670*
6.500	6.180	3.781**	7.000	6.737	4.631*
7.500	7.292	6.828**	8.000	7.843	11.340*
8.500	8.387	17.090**	9.000	8.923	22.200*
9.500	9.447	26.090**	10.000	9.957	29.410*
10.500	10.448	32.370**	11.000	10.918	35.060*

```
     *     11.500     11.359     37.560**     12.000     11.762     39.890*
     *     12.500     12.101     42.090**     13.000     12.359     44.180*
-------------------------------------------------------------------------------
     BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
      INTERVAL   DEPTH   {S-O*DT/2}   {S+O*DT/2}
       NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
           1     0.00       0.00000      0.00000
           2     5.00       4.51650      4.51650
           3     5.50       5.06051      5.07429
           4     6.00       5.60308      5.64192
           5     6.50       6.15210      6.20710
           6     7.00       6.70312      6.77048
           7     7.50       7.24224      7.34156
           8     8.00       7.76033      7.92527
           9     8.50       8.26291      8.51149
          10     9.00       8.76135      9.08425
          11     9.50       9.25725      9.63675
          12    10.00       9.74281     10.17059
          13    10.50      10.21308     10.68392
          14    11.00      10.66292     11.17288
          15    11.50      11.08564     11.63196
          16    12.00      11.47139     12.05161
          17    12.50      11.79439     12.40661
          18    13.00      12.03799     12.68061
     WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
-------------------------------------------------------------------------------
     DETENTION BASIN ROUTING RESULTS:
     NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
           OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
           AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

        TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
       (HRS)   FILLED(AF)    (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
-------------------------------------------------------------------------------
       0.160        0.000     1.68      0.03     0.00      0.024
       0.336        0.000     1.69      0.05     0.00      0.049
       0.512        0.000     1.70      0.08     0.00      0.074
       0.688        0.000     1.71      0.11     0.00      0.099
       0.864        0.000     1.72      0.14     0.00      0.124
       1.040        0.000     1.74      0.16     0.00      0.149
       1.216        0.000     1.74      0.19     0.00      0.174
       1.392        0.000     1.76      0.22     0.00      0.200
       1.568        0.000     1.77      0.25     0.00      0.226
       1.744        0.000     1.78      0.28     0.00      0.252
       1.920        0.000     1.79      0.31     0.00      0.278
       2.096        0.000     1.81      0.34     0.00      0.304
       2.272        0.000     1.82      0.37     0.00      0.330
       2.448        0.000     1.83      0.40     0.00      0.357
       2.624        0.000     1.84      0.42     0.00      0.384
       2.800        0.000     1.86      0.45     0.00      0.411
```

2.976	0.000	1.87	0.48	0.00	0.438
3.152	0.000	1.89	0.52	0.00	0.466
3.328	0.000	1.90	0.55	0.00	0.493
3.504	0.000	1.92	0.58	0.00	0.521
3.680	0.000	1.93	0.61	0.00	0.549
3.856	0.000	1.95	0.64	0.00	0.577
4.032	0.000	1.96	0.67	0.00	0.606
4.208	0.000	1.98	0.70	0.00	0.635
4.384	0.000	1.99	0.73	0.00	0.664
4.560	0.000	2.02	0.77	0.00	0.693
4.736	0.000	2.03	0.80	0.00	0.723
4.912	0.000	2.05	0.83	0.00	0.752
5.088	0.000	2.06	0.87	0.00	0.782
5.264	0.000	2.09	0.90	0.00	0.813
5.440	0.000	2.10	0.93	0.00	0.843
5.616	0.000	2.13	0.97	0.00	0.874
5.792	0.000	2.14	1.00	0.00	0.905
5.968	0.000	2.17	1.04	0.00	0.937
6.144	0.000	2.18	1.07	0.00	0.969
6.320	0.000	2.21	1.11	0.00	1.001
6.496	0.000	2.23	1.14	0.00	1.033
6.672	0.000	2.26	1.18	0.00	1.066
6.848	0.000	2.27	1.22	0.00	1.099
7.024	0.000	2.31	1.25	0.00	1.133
7.200	0.000	2.32	1.29	0.00	1.167
7.376	0.000	2.36	1.33	0.00	1.201
7.552	0.000	2.38	1.37	0.00	1.235
7.728	0.000	2.41	1.41	0.00	1.271
7.904	0.000	2.43	1.45	0.00	1.306
8.080	0.000	2.47	1.49	0.00	1.342
8.256	0.000	2.49	1.53	0.00	1.378
8.432	0.000	2.54	1.57	0.00	1.415
8.608	0.000	2.56	1.61	0.00	1.452
8.784	0.000	2.60	1.65	0.00	1.490
8.960	0.000	2.63	1.69	0.00	1.528
9.136	0.000	2.68	1.73	0.00	1.567
9.312	0.000	2.70	1.78	0.00	1.607
9.488	0.000	2.76	1.82	0.00	1.647
9.664	0.000	2.78	1.87	0.00	1.687
9.840	0.000	2.84	1.91	0.00	1.728
10.016	0.000	2.87	1.96	0.00	1.770
10.192	0.000	2.93	2.01	0.00	1.813
10.368	0.000	2.97	2.05	0.00	1.856
10.544	0.000	3.04	2.10	0.00	1.900
10.720	0.000	3.07	2.15	0.00	1.945
10.896	0.000	3.15	2.20	0.00	1.991
11.072	0.000	3.19	2.26	0.00	2.037
11.248	0.000	3.28	2.31	0.00	2.085
11.424	0.000	3.32	2.36	0.00	2.133
11.600	0.000	3.42	2.42	0.00	2.183

11.776	0.000	3.47	2.47	0.00	2.233
11.952	0.000	3.58	2.53	0.00	2.285
12.128	0.000	3.70	2.59	0.00	2.339
12.304	0.000	4.49	2.66	0.00	2.405
12.480	0.000	4.56	2.74	0.00	2.471
12.656	0.000	4.71	2.81	0.00	2.539
12.832	0.000	4.78	2.89	0.00	2.609
13.008	0.000	4.95	2.97	0.00	2.681
13.184	0.000	5.04	3.05	0.00	2.754
13.360	0.000	5.24	3.13	0.00	2.831
13.536	0.000	5.35	3.22	0.00	2.908
13.712	0.000	5.59	3.31	0.00	2.990
13.888	0.000	5.73	3.40	0.00	3.073
14.064	0.000	6.03	3.50	0.00	3.161
14.240	0.000	6.15	3.60	0.00	3.250
14.416	0.000	6.55	3.70	0.00	3.346
14.592	0.000	6.78	3.81	0.00	3.444
14.768	0.000	7.32	3.93	0.00	3.551
14.944	0.000	7.64	4.05	0.00	3.662
15.120	0.000	8.46	4.19	0.00	3.785
15.296	0.000	8.98	4.33	0.00	3.915
15.472	0.000	10.63	4.51	0.00	4.070
15.648	0.000	11.78	4.70	0.00	4.241
15.824	0.000	15.34	4.94	0.00	4.464
16.000	0.000	19.63	5.21	0.20	4.747
16.176	0.000	51.31	5.87	1.30	5.474
16.352	0.000	13.24	6.01	2.45	5.631
16.528	0.000	9.62	6.10	2.79	5.731
16.704	0.000	8.02	6.16	2.96	5.804
16.880	0.000	7.03	6.21	3.09	5.862
17.056	0.000	6.34	6.26	3.19	5.907
17.232	0.000	5.87	6.29	3.28	5.945
17.408	0.000	5.47	6.32	3.34	5.976
17.584	0.000	5.14	6.34	3.40	6.001
17.760	0.000	4.87	6.36	3.45	6.022
17.936	0.000	4.63	6.37	3.48	6.039
18.112	0.000	4.43	6.39	3.51	6.052
18.288	0.000	3.52	6.39	3.53	6.052
18.464	0.000	3.37	6.38	3.52	6.050
18.640	0.000	3.23	6.38	3.52	6.046
18.816	0.000	3.11	6.37	3.51	6.040
18.992	0.000	3.00	6.37	3.50	6.033
19.168	0.000	2.90	6.36	3.48	6.024
19.344	0.000	2.81	6.35	3.46	6.015
19.520	0.000	2.73	6.34	3.44	6.004
19.696	0.000	2.65	6.33	3.42	5.993
19.872	0.000	2.58	6.32	3.40	5.981
20.048	0.000	2.51	6.31	3.37	5.969
20.224	0.000	2.45	6.30	3.35	5.956
20.400	0.000	2.39	6.29	3.32	5.942

20.576	0.000	2.34	6.27	3.29	5.928
20.752	0.000	2.29	6.26	3.27	5.914
20.928	0.000	2.24	6.25	3.24	5.900
21.104	0.000	2.20	6.24	3.21	5.885
21.280	0.000	2.15	6.22	3.18	5.870
21.456	0.000	2.11	6.21	3.15	5.855
21.632	0.000	2.08	6.20	3.12	5.840
21.808	0.000	2.04	6.18	3.09	5.825
21.984	0.000	2.00	6.17	3.06	5.809
22.160	0.000	1.97	6.15	3.03	5.794
22.336	0.000	1.94	6.14	3.00	5.779
22.512	0.000	1.91	6.13	2.97	5.763
22.688	0.000	1.88	6.11	2.94	5.748
22.864	0.000	1.85	6.10	2.90	5.733
23.040	0.000	1.83	6.09	2.87	5.717
23.216	0.000	1.80	6.07	2.84	5.702
23.392	0.000	1.77	6.06	2.81	5.687
23.568	0.000	1.75	6.04	2.78	5.672
23.744	0.000	1.73	6.03	2.75	5.657
23.920	0.000	1.71	6.02	2.72	5.642
24.096	0.000	1.68	6.00	2.69	5.628
24.272	0.000	0.00	5.97	2.62	5.589

Section 6.4.5 BMP Sizing Calculations

CONTECH ENGINEERED SOLUTIONS

Date: 12/23/2022
Project Name: Underground Detention CMP #1

City / County:
State:

Designed By:
Company:
Telephone:

CMP: Underground Detention System
Storage Volume Estimation

=Adjustable Input Cells

Contech Engineered Solutions, LLC is pleased to offer the following estimate of storage volume for the above named project. The results are submitted as an estimate only, without liability on the part of Contech Engineered Solutions, LLC for accuracy or suitability to any particular applicaton and are subject to verification of the Engineer of Record. **This tool is only applicable for rectangular shaped systems.**

Summary of Inputs

System Information		Backfill Information		Pipe & Analysis Information	
Out-to-out length (ft):	600.0	Backfill Porosity (%):	40%	System Diameter (in):	144
Out-to-out width (ft):	72.0	Depth Above Pipe (in):	6.0	Pipe Spacing (in):	36
Number of Manifolds (ea):	1.0	Depth Below Pipe (in):	6.0	Incremental Analysis (in):	2
Number of Barrels (ea):	5.0	Width At Ends (ft):	3.0	System Invert (Elevation):	0
		Width At Sides (ft):	3.0		

Storage Volume Estimation

System		Pipe		Stone		Total System		Miscellaneous	
Depth (ft)	Elevation (ft)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Percent Open Storage (%)	Ave. Surface Area (sf)
0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	18,907.2
0.17	0.16	0.0	0.0	3,151.2	3,151.2	3,151.2	3,151.2	0.0%	18,907.2
0.33	0.33	0.0	0.0	3,151.2	6,302.4	3,151.2	6,302.4	0.0%	18,907.2
0.50	0.50	0.0	0.0	3,151.2	9,453.6	3,151.2	9,453.6	0.0%	18,907.2
0.67	0.66	942.6	942.6	2,774.1	12,227.7	3,716.8	13,170.4	7.2%	23,983.1
0.83	0.83	1,712.3	2,654.9	2,466.3	14,694.0	4,178.6	17,348.9	15.3%	26,034.9
1.00	1.00	2,201.7	4,856.6	2,270.5	16,964.5	4,472.2	21,821.2	22.3%	27,574.2
1.17	1.16	2,588.5	7,445.2	2,115.8	19,080.3	4,704.3	26,525.5	28.1%	28,842.2
1.33	1.33	2,914.6	10,359.8	1,985.3	21,065.7	4,900.0	31,425.5	33.0%	29,932.9
1.50	1.50	3,198.9	13,558.7	1,871.6	22,937.3	5,070.5	36,496.0	37.2%	30,894.8
1.67	1.66	3,451.7	17,010.4	1,770.5	24,707.9	5,222.2	41,718.2	40.8%	31,756.8
1.83	1.83	3,679.5	20,689.9	1,679.4	26,387.2	5,358.9	47,077.1	43.9%	32,538.0
2.00	2.00	3,886.9	24,576.8	1,596.5	27,983.7	5,483.3	52,560.5	46.8%	33,251.4
2.17	2.16	4,076.8	28,653.5	1,520.5	29,504.2	5,597.3	58,157.7	49.3%	33,906.8
2.33	2.33	4,251.7	32,905.2	1,450.5	30,954.7	5,702.2	63,859.9	51.5%	34,511.6
2.50	2.50	4,413.3	37,318.5	1,385.9	32,340.6	5,799.2	69,659.1	53.6%	35,071.3
2.67	2.66	4,563.0	41,881.5	1,326.0	33,666.6	5,889.0	75,548.1	55.4%	35,590.5
2.83	2.83	4,702.1	46,583.6	1,270.4	34,937.0	5,972.4	81,520.5	57.1%	36,073.0
3.00	3.00	4,831.3	51,414.9	1,218.7	36,155.6	6,050.0	87,570.5	58.7%	36,521.6
3.17	3.16	4,951.6	56,366.5	1,170.6	37,326.2	6,122.1	93,692.7	60.2%	36,939.0
3.33	3.33	5,063.4	61,429.9	1,125.8	38,452.1	6,189.2	99,881.9	61.5%	37,327.2
3.50	3.50	5,167.4	66,597.3	1,084.2	39,536.3	6,251.7	106,133.6	62.7%	37,688.2
3.67	3.66	5,264.1	71,861.4	1,045.6	40,581.9	6,309.6	112,443.2	63.9%	38,023.3
3.83	3.83	5,353.7	77,215.1	1,009.7	41,591.6	6,363.4	118,806.7	65.0%	38,334.0
4.00	4.00	5,436.8	82,651.9	976.5	42,568.0	6,413.3	125,219.9	66.0%	38,621.4
4.17	4.16	5,513.5	88,165.4	945.8	43,513.8	6,459.3	131,679.2	67.0%	38,886.5
4.33	4.33	5,584.2	93,749.5	917.5	44,431.4	6,501.7	138,180.9	67.8%	39,130.3
4.50	4.50	5,649.0	99,398.5	891.6	45,323.0	6,540.6	144,721.5	68.7%	39,353.3
4.67	4.66	5,708.1	105,106.6	867.9	46,190.9	6,576.1	151,297.6	69.5%	39,556.4
4.83	4.83	5,761.9	110,868.5	846.5	47,037.4	6,608.3	157,905.9	70.2%	39,740.1
5.00	5.00	5,810.3	116,678.8	827.1	47,864.5	6,637.4	164,543.3	70.9%	39,905.0
5.17	5.16	5,853.5	122,532.2	809.8	48,674.3	6,663.3	171,206.5	71.6%	40,051.4
5.33	5.33	5,891.6	128,423.8	794.6	49,468.9	6,686.2	177,892.7	72.2%	40,179.7

5.50	5.50	5,924.8	134,348.6	781.3	50,250.2	6,706.1	184,598.8	72.8%	40,290.3
5.67	5.66	5,953.1	140,301.7	770.0	51,020.1	6,723.0	191,321.8	73.3%	40,383.4
5.83	5.83	5,976.6	146,278.3	760.6	51,780.7	6,737.1	198,059.0	73.9%	40,459.3
6.00	6.00	5,995.3	152,273.5	753.1	52,533.8	6,748.4	204,807.3	74.3%	40,518.2
6.17	6.16	6,009.3	158,282.8	747.5	53,281.3	6,756.8	211,564.1	74.8%	40,560.1
6.33	6.33	6,018.6	164,301.4	743.8	54,025.1	6,762.3	218,326.4	75.3%	40,585.2
6.50	6.50	6,023.2	170,324.6	741.9	54,767.0	6,765.1	225,091.6	75.7%	40,593.6
6.67	6.66	6,023.2	176,347.8	741.9	55,508.9	6,765.1	231,856.7	76.1%	40,585.2
6.83	6.83	6,018.6	182,366.4	743.8	56,252.6	6,762.3	238,619.0	76.4%	40,560.1
7.00	7.00	6,009.3	188,375.6	747.5	57,000.1	6,756.8	245,375.8	76.8%	40,518.2
7.17	7.16	5,995.3	194,370.9	753.1	57,753.2	6,748.4	252,124.1	77.1%	40,459.3
7.33	7.33	5,976.6	200,347.5	760.6	58,513.8	6,737.1	258,861.3	77.4%	40,383.4
7.50	7.50	5,953.1	206,300.5	770.0	59,283.8	6,723.0	265,584.3	77.7%	40,290.3
7.67	7.66	5,924.8	212,225.3	781.3	60,065.1	6,706.1	272,290.4	77.9%	40,179.7
7.83	7.83	5,891.6	218,117.0	794.6	60,859.6	6,686.2	278,976.6	78.2%	40,051.4
8.00	8.00	5,853.5	223,970.4	809.8	61,669.4	6,663.3	285,639.9	78.4%	39,905.0
8.17	8.16	5,810.3	229,780.7	827.1	62,496.5	6,637.4	292,277.2	78.6%	39,740.1
8.33	8.33	5,761.9	235,542.5	846.5	63,343.0	6,608.3	298,885.5	78.8%	39,556.4
8.50	8.50	5,708.1	241,250.7	867.9	64,210.9	6,576.1	305,461.6	79.0%	39,353.3
8.67	8.66	5,649.0	246,899.6	891.6	65,102.5	6,540.6	312,002.2	79.1%	39,130.3
8.83	8.83	5,584.2	252,483.8	917.5	66,020.1	6,501.7	318,503.9	79.3%	38,886.5
9.00	9.00	5,513.5	257,997.3	945.8	66,965.9	6,459.3	324,963.2	79.4%	38,621.4
9.17	9.16	5,436.8	263,434.1	976.5	67,942.4	6,413.3	331,376.4	79.5%	38,334.0
9.33	9.33	5,353.7	268,787.8	1,009.7	68,952.1	6,363.4	337,739.9	79.6%	38,023.3
9.50	9.50	5,264.1	274,051.9	1,045.6	69,997.6	6,309.6	344,049.5	79.7%	37,688.2
9.67	9.66	5,167.4	279,219.3	1,084.2	71,081.9	6,251.7	350,301.2	79.7%	37,327.2
9.83	9.83	5,063.4	284,282.7	1,125.8	72,207.7	6,189.2	356,490.4	79.7%	36,939.0
10.00	10.00	4,951.6	289,234.3	1,170.6	73,378.3	6,122.1	362,612.6	79.8%	36,521.6
10.17	10.16	4,831.3	294,065.6	1,218.7	74,597.0	6,050.0	368,662.6	79.8%	36,073.0
10.33	10.33	4,702.1	298,767.7	1,270.4	75,867.3	5,972.4	374,635.0	79.7%	35,590.5
10.50	10.50	4,563.0	303,330.7	1,326.0	77,193.3	5,889.0	380,524.0	79.7%	35,071.3
10.67	10.66	4,413.3	307,744.0	1,385.9	78,579.2	5,799.2	386,323.2	79.7%	34,511.6
10.83	10.83	4,251.7	311,995.6	1,450.5	80,029.7	5,702.2	392,025.4	79.6%	33,906.8
11.00	11.00	4,076.8	316,072.4	1,520.5	81,550.2	5,597.3	397,622.7	79.5%	33,251.4
11.17	11.16	3,886.9	319,959.3	1,596.5	83,146.7	5,483.3	403,106.0	79.4%	32,538.0
11.33	11.33	3,679.5	323,638.8	1,679.4	84,826.1	5,358.9	408,464.9	79.2%	31,756.8
11.50	11.50	3,451.7	327,090.5	1,770.5	86,596.6	5,222.2	413,687.1	79.1%	30,894.8
11.67	11.66	3,198.9	330,289.4	1,871.6	88,468.2	5,070.5	418,757.6	78.9%	29,932.9
11.83	11.83	2,914.6	333,204.0	1,985.3	90,453.6	4,900.0	423,657.6	78.6%	28,842.2
12.00	12.00	2,588.5	335,792.5	2,115.8	92,569.4	4,704.3	428,361.9	78.4%	27,574.2
12.17	12.16	2,201.7	337,994.3	2,270.5	94,839.9	4,472.2	432,834.2	78.1%	26,034.9
12.33	12.33	1,712.3	339,706.5	2,466.3	97,306.2	4,178.6	437,012.7	77.7%	23,983.1
12.50	12.50	942.6	340,649.2	2,774.1	100,080.3	3,716.8	440,729.5	77.3%	18,907.2
12.67	12.66	0.0	340,649.2	3,151.2	103,231.5	3,151.2	443,880.7	76.7%	18,907.2
12.83	12.83	0.0	340,649.2	3,151.2	106,382.7	3,151.2	447,031.9	76.2%	18,907.2
13.00	13.00	0.0	340,649.2	3,151.2	109,533.9	3,151.2	450,183.1	75.7%	18,907.2

CONTECH ENGINEERED SOLUTIONS

Date: 12/23/2022
Project Name: Underground Detention CMP #2

City / County:
State:

Designed By:
Company:
Telephone:

CMP: Underground Detention System
Storage Volume Estimation

=Adjustable Input Cells

Contech Engineered Solutions, LLC is pleased to offer the following estimate of storage volume for the above named project. The results are submitted as an estimate only, without liability on the part of Contech Engineered Solutions, LLC for accuracy or suitability to any particular applicaton and are subject to verification of the Engineer of Record. **This tool is only applicable for rectangular shaped systems.**

Summary of Inputs

System Information		Backfill Information		Pipe & Analysis Information	
Out-to-out length (ft):	300.0	Backfill Porosity (%):	40%	System Diameter (in):	144
Out-to-out width (ft):	42.0	Depth Above Pipe (in):	6.0	Pipe Spacing (in):	36
Number of Manifolds (ea):	1.0	Depth Below Pipe (in):	6.0	Incremental Analysis (in):	2
Number of Barrels (ea):	3.0	Width At Ends (ft):	3.0	System Invert (Elevation):	0
		Width At Sides (ft):	3.0		

Storage Volume Estimation

System		Pipe		Stone		Total System		Miscellaneous	
Depth (ft)	Elevation (ft)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Percent Open Storage (%)	Ave. Surface Area (sf)
0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	5,875.2
0.17	0.16	0.0	0.0	979.2	979.2	979.2	979.2	0.0%	5,875.2
0.33	0.33	0.0	0.0	979.2	1,958.4	979.2	1,958.4	0.0%	5,875.2
0.50	0.50	0.0	0.0	979.2	2,937.6	979.2	2,937.6	0.0%	5,875.2
0.67	0.66	283.5	283.5	865.8	3,803.4	1,149.3	4,086.9	6.9%	7,402.0
0.83	0.83	515.0	798.6	773.2	4,576.6	1,288.2	5,375.2	14.9%	8,019.2
1.00	1.00	662.3	1,460.9	714.3	5,290.9	1,376.6	6,751.7	21.6%	8,482.2
1.17	1.16	778.6	2,239.5	667.8	5,958.6	1,446.4	8,198.1	27.3%	8,863.6
1.33	1.33	876.7	3,116.2	628.5	6,587.1	1,505.2	9,703.3	32.1%	9,191.7
1.50	1.50	962.2	4,078.4	594.3	7,181.4	1,556.5	11,259.8	36.2%	9,481.0
1.67	1.66	1,038.3	5,116.7	563.9	7,745.3	1,602.2	12,862.0	39.8%	9,740.3
1.83	1.83	1,106.8	6,223.5	536.5	8,281.8	1,643.3	14,505.3	42.9%	9,975.3
2.00	2.00	1,169.2	7,392.6	511.5	8,793.4	1,680.7	16,186.0	45.7%	10,189.9
2.17	2.16	1,226.3	8,618.9	488.7	9,282.0	1,715.0	17,900.9	48.1%	10,387.0
2.33	2.33	1,278.9	9,897.8	467.6	9,749.7	1,746.5	19,647.5	50.4%	10,568.9
2.50	2.50	1,327.5	11,225.3	448.2	10,197.9	1,775.7	21,423.2	52.4%	10,737.3
2.67	2.66	1,372.5	12,597.8	430.2	10,628.1	1,802.7	23,225.9	54.2%	10,893.5
2.83	2.83	1,414.4	14,012.2	413.5	11,041.5	1,827.8	25,053.7	55.9%	11,038.6
3.00	3.00	1,453.2	15,465.4	397.9	11,439.4	1,851.1	26,904.9	57.5%	11,173.6
3.17	3.16	1,489.4	16,954.9	383.4	11,822.9	1,872.8	28,777.7	58.9%	11,299.1
3.33	3.33	1,523.1	18,477.9	370.0	12,192.8	1,893.0	30,670.7	60.2%	11,415.9
3.50	3.50	1,554.3	20,032.3	357.5	12,550.3	1,911.8	32,582.6	61.5%	11,524.5
3.67	3.66	1,583.4	21,615.7	345.8	12,896.1	1,929.2	34,511.8	62.6%	11,625.3
3.83	3.83	1,610.4	23,226.1	335.0	13,231.2	1,945.4	36,457.2	63.7%	11,718.7
4.00	4.00	1,635.4	24,861.4	325.1	13,556.2	1,960.4	38,417.7	64.7%	11,805.2
4.17	4.16	1,658.4	26,519.9	315.8	13,872.1	1,974.3	40,391.9	65.7%	11,884.9
4.33	4.33	1,679.7	28,199.6	307.3	14,179.4	1,987.0	42,378.9	66.5%	11,958.2
4.50	4.50	1,699.2	29,898.8	299.5	14,478.9	1,998.7	44,377.7	67.4%	12,025.3
4.67	4.66	1,717.0	31,615.7	292.4	14,771.3	2,009.4	46,387.0	68.2%	12,086.4
4.83	4.83	1,733.1	33,348.9	285.9	15,057.2	2,019.1	48,406.1	68.9%	12,141.7
5.00	5.00	1,747.7	35,096.6	280.1	15,337.4	2,027.8	50,434.0	69.6%	12,191.3
5.17	5.16	1,760.7	36,857.3	274.9	15,612.3	2,035.6	52,469.6	70.2%	12,235.3
5.33	5.33	1,772.2	38,629.5	270.3	15,882.6	2,042.5	54,512.1	70.9%	12,273.9

5.50	5.50	1,782.2	40,411.6	266.3	16,148.9	2,048.5	56,560.6	71.4%	12,307.2
5.67	5.66	1,790.7	42,202.3	262.9	16,411.9	2,053.6	58,614.2	72.0%	12,335.2
5.83	5.83	1,797.7	44,000.0	260.1	16,672.0	2,057.8	60,672.0	72.5%	12,358.0
6.00	6.00	1,803.4	45,803.4	257.9	16,929.8	2,061.2	62,733.2	73.0%	12,375.7
6.17	6.16	1,807.6	47,611.0	256.2	17,186.0	2,063.7	64,797.0	73.5%	12,388.3
6.33	6.33	1,810.4	49,421.3	255.1	17,441.1	2,065.4	66,862.4	73.9%	12,395.9
6.50	6.50	1,811.8	51,233.1	254.5	17,695.6	2,066.3	68,928.7	74.3%	12,398.4
6.67	6.66	1,811.8	53,044.9	254.5	17,950.1	2,066.3	70,994.9	74.7%	12,395.9
6.83	6.83	1,810.4	54,855.2	255.1	18,205.1	2,065.4	73,060.3	75.1%	12,388.3
7.00	7.00	1,807.6	56,662.8	256.2	18,461.3	2,063.7	75,124.1	75.4%	12,375.7
7.17	7.16	1,803.4	58,466.2	257.9	18,719.1	2,061.2	77,185.3	75.7%	12,358.0
7.33	7.33	1,797.7	60,263.9	260.1	18,979.2	2,057.8	79,243.1	76.0%	12,335.2
7.50	7.50	1,790.7	62,054.5	262.9	19,242.2	2,053.6	81,296.7	76.3%	12,307.2
7.67	7.66	1,782.2	63,836.7	266.3	19,508.5	2,048.5	83,345.2	76.6%	12,273.9
7.83	7.83	1,772.2	65,608.9	270.3	19,778.8	2,042.5	85,387.7	76.8%	12,235.3
8.00	8.00	1,760.7	67,369.6	274.9	20,053.8	2,035.6	87,423.4	77.1%	12,191.3
8.17	8.16	1,747.7	69,117.3	280.1	20,333.9	2,027.8	89,451.2	77.3%	12,141.7
8.33	8.33	1,733.1	70,850.4	285.9	20,619.8	2,019.1	91,470.3	77.5%	12,086.4
8.50	8.50	1,717.0	72,567.4	292.4	20,912.2	2,009.4	93,479.7	77.6%	12,025.3
8.67	8.66	1,699.2	74,266.6	299.5	21,211.7	1,998.7	95,478.4	77.8%	11,958.2
8.83	8.83	1,679.7	75,946.3	307.3	21,519.1	1,987.0	97,465.4	77.9%	11,884.9
9.00	9.00	1,658.4	77,604.8	315.8	21,834.9	1,974.3	99,439.7	78.0%	11,805.2
9.17	9.16	1,635.4	79,240.1	325.1	22,159.9	1,960.4	101,400.1	78.1%	11,718.7
9.33	9.33	1,610.4	80,850.5	335.0	22,495.0	1,945.4	103,345.5	78.2%	11,625.3
9.50	9.50	1,583.4	82,433.9	345.8	22,840.8	1,929.2	105,274.8	78.3%	11,524.5
9.67	9.66	1,554.3	83,988.3	357.5	23,198.3	1,911.8	107,186.6	78.4%	11,415.9
9.83	9.83	1,523.1	85,511.3	370.0	23,568.3	1,893.0	109,079.6	78.4%	11,299.1
10.00	10.00	1,489.4	87,000.7	383.4	23,951.7	1,872.8	110,952.4	78.4%	11,173.6
10.17	10.16	1,453.2	88,454.0	397.9	24,349.6	1,851.1	112,803.6	78.4%	11,038.6
10.33	10.33	1,414.4	89,868.4	413.5	24,763.1	1,827.8	114,631.4	78.4%	10,893.5
10.50	10.50	1,372.5	91,240.9	430.2	25,193.2	1,802.7	116,434.1	78.4%	10,737.3
10.67	10.66	1,327.5	92,568.4	448.2	25,641.4	1,775.7	118,209.8	78.3%	10,568.9
10.83	10.83	1,278.9	93,847.3	467.6	26,109.1	1,746.5	119,956.4	78.2%	10,387.0
11.00	11.00	1,226.3	95,073.6	488.7	26,597.8	1,715.0	121,671.3	78.1%	10,189.9
11.17	11.16	1,169.2	96,242.7	511.5	27,109.3	1,680.7	123,352.0	78.0%	9,975.3
11.33	11.33	1,106.8	97,349.5	536.5	27,645.8	1,643.3	124,995.3	77.9%	9,740.3
11.50	11.50	1,038.3	98,387.8	563.9	28,209.7	1,602.2	126,597.5	77.7%	9,481.0
11.67	11.66	962.2	99,350.0	594.3	28,804.0	1,556.5	128,154.0	77.5%	9,191.7
11.83	11.83	876.7	100,226.7	628.5	29,432.5	1,505.2	129,659.2	77.3%	8,863.6
12.00	12.00	778.6	101,005.3	667.8	30,100.3	1,446.4	131,105.6	77.0%	8,482.2
12.17	12.16	662.3	101,667.6	714.3	30,814.6	1,376.6	132,482.2	76.7%	8,019.2
12.33	12.33	515.0	102,182.6	773.2	31,587.7	1,288.2	133,770.4	76.4%	7,402.0
12.50	12.50	283.5	102,466.2	865.8	32,453.5	1,149.3	134,919.7	75.9%	5,875.2
12.67	12.66	0.0	102,466.2	979.2	33,432.7	979.2	135,898.9	75.4%	5,875.2
12.83	12.83	0.0	102,466.2	979.2	34,411.9	979.2	136,878.1	74.9%	5,875.2
13.00	13.00	0.0	102,466.2	979.2	35,391.1	979.2	137,857.3	74.3%	5,875.2

CONTECH ENGINEERED SOLUTIONS

Date: 12/23/2022
Project Name: Underground Detention CMP #3

City / County:
State:

Designed By:
Company:
Telephone:

CMP: Underground Detention System
Storage Volume Estimation

=Adjustable Input Cells

Contech Engineered Solutions, LLC is pleased to offer the following estimate of storage volume for the above named project. The results are submitted as an estimate only, without liability on the part of Contech Engineered Solutions, LLC for accuracy or suitability to any particular applicaton and are subject to verification of the Engineer of Record. **This tool is only applicable for rectangular shaped systems.**

Summary of Inputs

System Information		Backfill Information		Pipe & Analysis Information	
Out-to-out length (ft):	600.0	Backfill Porosity (%):	40%	System Diameter (in):	144
Out-to-out width (ft):	87.0	Depth Above Pipe (in):	6.0	Pipe Spacing (in):	36
Number of Manifolds (ea):	1.0	Depth Below Pipe (in):	6.0	Incremental Analysis (in):	2
Number of Barrels (ea):	6.0	Width At Ends (ft):	3.0	System Invert (Elevation):	0
		Width At Sides (ft):	3.0		

Storage Volume Estimation

System		Pipe		Stone		Total System		Miscellaneous	
Depth (ft)	Elevation (ft)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Percent Open Storage (%)	Ave. Surface Area (sf)
0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	22,543.2
0.17	0.16	0.0	0.0	3,757.2	3,757.2	3,757.2	3,757.2	0.0%	22,543.2
0.33	0.33	0.0	0.0	3,757.2	7,514.4	3,757.2	7,514.4	0.0%	22,543.2
0.50	0.50	0.0	0.0	3,757.2	11,271.6	3,757.2	11,271.6	0.0%	22,543.2
0.67	0.66	1,131.3	1,131.3	3,304.7	14,576.3	4,436.0	15,707.6	7.2%	28,635.3
0.83	0.83	2,055.1	3,186.4	2,935.2	17,511.4	4,990.2	20,697.9	15.4%	31,097.9
1.00	1.00	2,642.5	5,828.9	2,700.2	20,211.6	5,342.7	26,040.6	22.4%	32,945.4
1.17	1.16	3,106.7	8,935.7	2,514.5	22,726.1	5,621.2	31,661.8	28.2%	34,467.2
1.33	1.33	3,498.2	12,433.8	2,357.9	25,084.1	5,856.1	37,517.9	33.1%	35,776.3
1.50	1.50	3,839.3	16,273.1	2,221.5	27,305.6	6,060.8	43,578.7	37.3%	36,930.7
1.67	1.66	4,142.7	20,415.8	2,100.1	29,405.7	6,242.8	49,821.5	41.0%	37,965.3
1.83	1.83	4,416.2	24,832.0	1,990.7	31,396.4	6,406.9	56,228.4	44.2%	38,902.8
2.00	2.00	4,665.0	29,497.0	1,891.2	33,287.6	6,556.2	62,784.6	47.0%	39,759.1
2.17	2.16	4,893.0	34,389.9	1,800.0	35,087.6	6,693.0	69,477.6	49.5%	40,545.8
2.33	2.33	5,102.8	39,492.8	1,716.1	36,803.7	6,818.9	76,296.5	51.8%	41,271.6
2.50	2.50	5,296.8	44,789.6	1,638.5	38,442.2	6,935.3	83,231.8	53.8%	41,943.3
2.67	2.66	5,476.5	50,266.1	1,566.6	40,008.7	7,043.1	90,274.9	55.7%	42,566.5
2.83	2.83	5,643.4	55,909.6	1,499.8	41,508.6	7,143.3	97,418.1	57.4%	43,145.5
3.00	3.00	5,798.6	61,708.1	1,437.8	42,946.4	7,236.3	104,654.5	59.0%	43,684.0
3.17	3.16	5,942.9	67,651.0	1,380.1	44,326.4	7,322.9	111,977.4	60.4%	44,184.9
3.33	3.33	6,077.1	73,728.1	1,326.4	45,652.8	7,403.5	119,380.8	61.8%	44,650.9
3.50	3.50	6,201.9	79,930.0	1,276.4	46,929.2	7,478.4	126,859.2	63.0%	45,084.1
3.67	3.66	6,317.9	86,247.9	1,230.0	48,159.2	7,548.0	134,407.2	64.2%	45,486.3
3.83	3.83	6,425.6	92,673.5	1,187.0	49,346.2	7,612.5	142,019.7	65.3%	45,859.2
4.00	4.00	6,525.2	99,198.7	1,147.1	50,493.3	7,672.3	149,692.0	66.3%	46,204.2
4.17	4.16	6,617.3	105,816.0	1,110.3	51,603.6	7,727.6	157,419.6	67.2%	46,522.4
4.33	4.33	6,702.1	112,518.1	1,076.4	52,680.0	7,778.5	165,198.1	68.1%	46,814.9
4.50	4.50	6,779.9	119,298.0	1,045.2	53,725.2	7,825.1	173,023.2	68.9%	47,082.6
4.67	4.66	6,850.9	126,148.9	1,016.8	54,742.0	7,867.7	180,890.9	69.7%	47,326.4
4.83	4.83	6,915.4	133,064.3	991.1	55,733.1	7,906.4	188,797.4	70.5%	47,546.9
5.00	5.00	6,973.5	140,037.7	967.8	56,700.9	7,941.3	196,738.6	71.2%	47,744.7
5.17	5.16	7,025.3	147,063.1	947.1	57,648.0	7,972.4	204,711.0	71.8%	47,920.4
5.33	5.33	7,071.1	154,134.2	928.8	58,576.7	7,999.9	212,710.9	72.5%	48,074.4

5.50	5.50	7,110.9	161,245.1	912.8	59,489.6	8,023.8	220,734.7	73.0%	48,207.2
5.67	5.66	7,144.9	168,390.0	899.2	60,388.8	8,044.1	228,778.8	73.6%	48,318.9
5.83	5.83	7,173.1	175,563.1	888.0	61,276.8	8,061.0	236,839.8	74.1%	48,410.0
6.00	6.00	7,195.5	182,758.6	879.0	62,155.8	8,074.5	244,914.3	74.6%	48,480.7
6.17	6.16	7,212.3	189,970.9	872.3	63,028.0	8,084.6	252,998.9	75.1%	48,531.0
6.33	6.33	7,223.5	197,194.4	867.8	63,895.9	8,091.3	261,090.2	75.5%	48,561.2
6.50	6.50	7,229.1	204,423.4	865.6	64,761.4	8,094.6	269,184.9	75.9%	48,571.2
6.67	6.66	7,229.1	211,652.5	865.6	65,627.0	8,094.6	277,279.5	76.3%	48,561.2
6.83	6.83	7,223.5	218,876.0	867.8	66,494.8	8,091.3	285,370.8	76.7%	48,531.0
7.00	7.00	7,212.3	226,088.3	872.3	67,367.1	8,084.6	293,455.4	77.0%	48,480.7
7.17	7.16	7,195.5	233,283.8	879.0	68,246.1	8,074.5	301,529.9	77.4%	48,410.0
7.33	7.33	7,173.1	240,456.9	888.0	69,134.1	8,061.0	309,590.9	77.7%	48,318.9
7.50	7.50	7,144.9	247,601.8	899.2	70,033.3	8,044.1	317,635.1	78.0%	48,207.2
7.67	7.66	7,110.9	254,712.7	912.8	70,946.1	8,023.8	325,658.8	78.2%	48,074.4
7.83	7.83	7,071.1	261,783.8	928.8	71,874.9	7,999.9	333,658.7	78.5%	47,920.4
8.00	8.00	7,025.3	268,809.1	947.1	72,822.0	7,972.4	341,631.1	78.7%	47,744.7
8.17	8.16	6,973.5	275,782.6	967.8	73,789.8	7,941.3	349,572.3	78.9%	47,546.9
8.33	8.33	6,915.4	282,698.0	991.1	74,780.8	7,906.4	357,478.8	79.1%	47,326.4
8.50	8.50	6,850.9	289,548.9	1,016.8	75,797.7	7,867.7	365,346.5	79.3%	47,082.6
8.67	8.66	6,779.9	296,328.8	1,045.2	76,842.9	7,825.1	373,171.7	79.4%	46,814.9
8.83	8.83	6,702.1	303,030.9	1,076.4	77,919.3	7,778.5	380,950.1	79.5%	46,522.4
9.00	9.00	6,617.3	309,648.2	1,110.3	79,029.5	7,727.6	388,677.7	79.7%	46,204.2
9.17	9.16	6,525.2	316,173.4	1,147.1	80,176.7	7,672.3	396,350.0	79.8%	45,859.2
9.33	9.33	6,425.6	322,598.9	1,187.0	81,363.6	7,612.5	403,962.6	79.9%	45,486.3
9.50	9.50	6,317.9	328,916.9	1,230.0	82,593.7	7,548.0	411,510.5	79.9%	45,084.1
9.67	9.66	6,201.9	335,118.8	1,276.4	83,870.1	7,478.4	418,988.9	80.0%	44,650.9
9.83	9.83	6,077.1	341,195.9	1,326.4	85,196.4	7,403.5	426,392.3	80.0%	44,184.9
10.00	10.00	5,942.9	347,138.7	1,380.1	86,576.5	7,322.9	433,715.2	80.0%	43,684.0
10.17	10.16	5,798.6	352,937.3	1,437.8	88,014.3	7,236.3	440,951.6	80.0%	43,145.5
10.33	10.33	5,643.4	358,580.7	1,499.8	89,514.1	7,143.3	448,094.8	80.0%	42,566.5
10.50	10.50	5,476.5	364,057.3	1,566.6	91,080.7	7,043.1	455,138.0	80.0%	41,943.3
10.67	10.66	5,296.8	369,354.1	1,638.5	92,719.2	6,935.3	462,073.2	79.9%	41,271.6
10.83	10.83	5,102.8	374,456.9	1,716.1	94,435.2	6,818.9	468,892.2	79.9%	40,545.8
11.00	11.00	4,893.0	379,349.9	1,800.0	96,235.3	6,693.0	475,585.1	79.8%	39,759.1
11.17	11.16	4,665.0	384,014.9	1,891.2	98,126.5	6,556.2	482,141.3	79.6%	38,902.8
11.33	11.33	4,416.2	388,431.0	1,990.7	100,117.2	6,406.9	488,548.2	79.5%	37,965.3
11.50	11.50	4,142.7	392,573.7	2,100.1	102,217.3	6,242.8	494,791.0	79.3%	36,930.7
11.67	11.66	3,839.3	396,413.0	2,221.5	104,438.8	6,060.8	500,851.8	79.1%	35,776.3
11.83	11.83	3,498.2	399,911.2	2,357.9	106,796.7	5,856.1	506,707.9	78.9%	34,467.2
12.00	12.00	3,106.7	403,017.9	2,514.5	109,311.2	5,621.2	512,329.2	78.7%	32,945.4
12.17	12.16	2,642.5	405,660.4	2,700.2	112,011.4	5,342.7	517,671.9	78.4%	31,097.9
12.33	12.33	2,055.1	407,715.5	2,935.2	114,946.6	4,990.2	522,662.1	78.0%	28,635.3
12.50	12.50	1,131.3	408,846.9	3,304.7	118,251.3	4,436.0	527,098.1	77.6%	22,543.2
12.67	12.66	0.0	408,846.9	3,757.2	122,008.5	3,757.2	530,855.3	77.0%	22,543.2
12.83	12.83	0.0	408,846.9	3,757.2	125,765.7	3,757.2	534,612.5	76.5%	22,543.2
13.00	13.00	0.0	408,846.9	3,757.2	129,522.9	3,757.2	538,369.7	75.9%	22,543.2

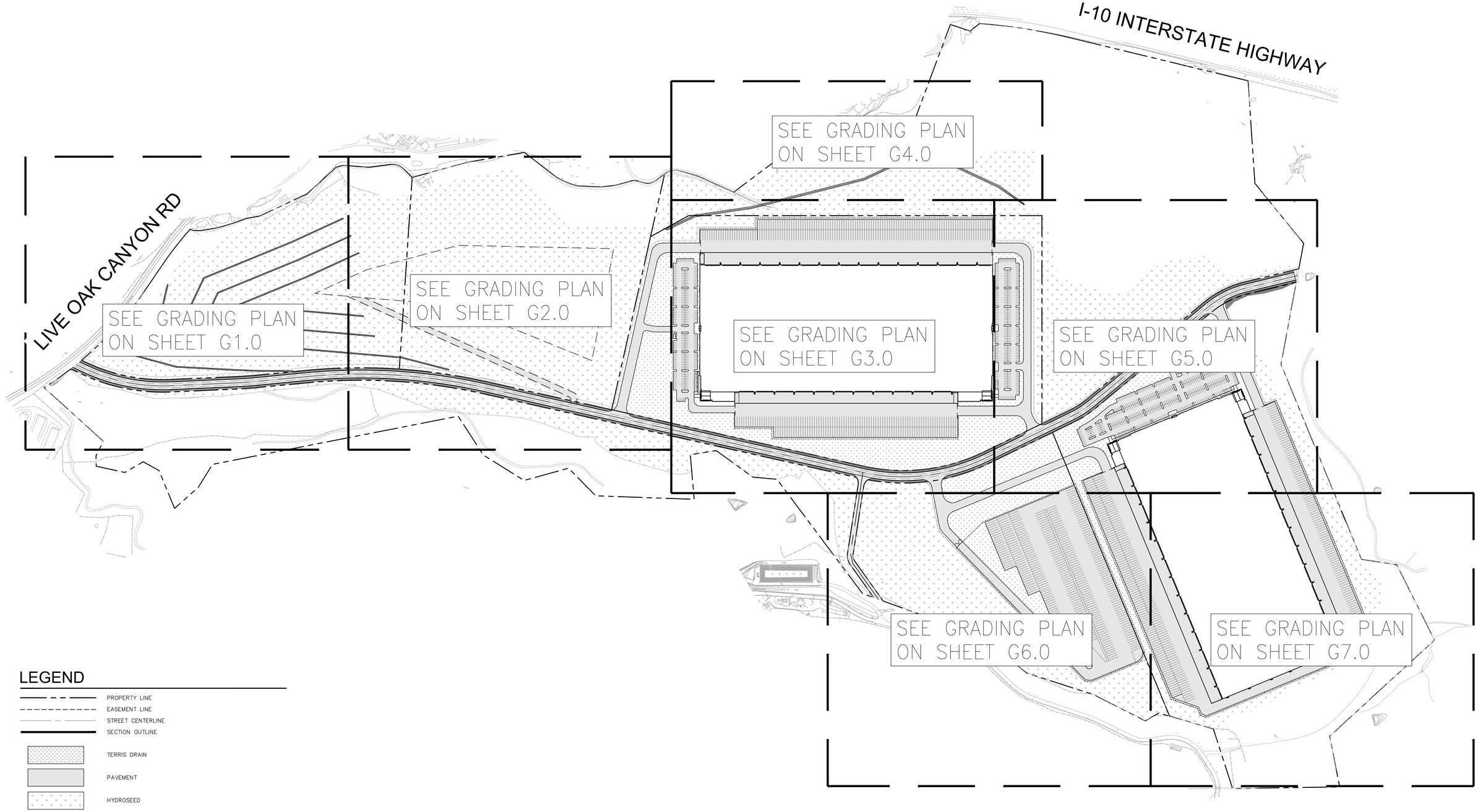
Section 6.4.6 Geotechnical Report

To be prepared in Final Engineering

Section 6.4.7 Educational Materials

To be prepared in Final Engineering

Section 6.4.8 Construction Plans



LEGEND

- PROPERTY LINE
- EASEMENT LINE
- STREET CENTERLINE
- SECTION OUTLINE
- TERRIS DRAIN
- PAVEMENT
- HYDROSEED
- LANDSCAPING

NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

SCALE: 1" = 200'
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PACIFIC OAKS COMMERCE CENTER

YUCAIPA, CA

CONCEPTUAL GRADING OVERALL PLAN

M-177

REGISTERED PROFESSIONAL ENGINEER JACOB S. GLATFELTER C 87934 CIVIL STATE OF CALIFORNIA

MARK	DATE	DESCRIPTION

RGA PROJECT NO:	20128.00
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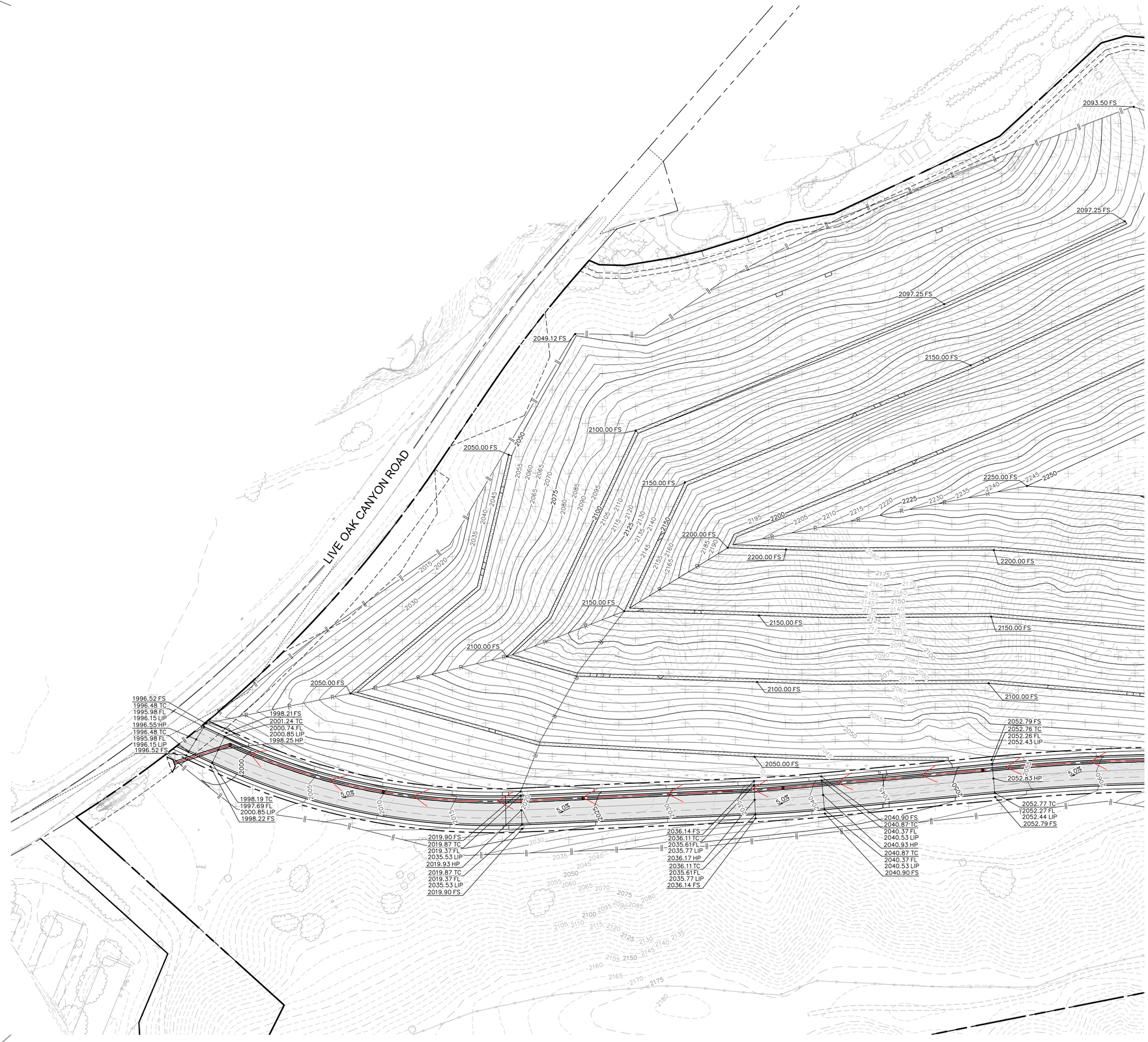

LEGEND

- PROPERTY LINE
- EASEMENT LINE
- STREET CENTERLINE
- 2166 — PROPOSED CONTOURS
- 2166 — EXISTING CONTOURS
- GB — PROPOSED GRADE BREAK
- R — PROPOSED RIDGE
- DAYLIGHT LINE
- TR — TOP OF RAMP
- TW — TOP OF WALL
- TC — TOP OF CURB
- FS — FINISHED SURFACE
- TS — TOP OF STAIRS
- BS — BOTTOM OF STAIRS
- HP — HIGH POINT
- (2166.50 TC) (2166.00 FS) — EXISTING GRADE
- 2166.50 TC 2166.00 FS — PROPOSED GRADE
- TERRIS DRAIN
- PAVEMENT
- HYDROSEED
- LANDSCAPING
- x.x% — PROPOSED SLOPE

NORTH

GRAPHIC SCALE IN FEET
0 30 60 120

SCALE: 1" = 60'
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PACIFIC OAKS COMMERCE CENTER

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CONCEPTUAL GRADING AND DRAINAGE PLAN 1

REGISTERED PROFESSIONAL ENGINEER
JACOB S. CLARK
C 87934
CIVIL
STATE OF CALIFORNIA

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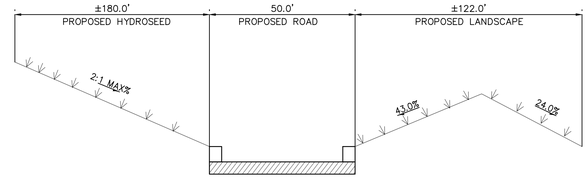
LEGEND

	PROPERTY LINE
	EASEMENT LINE
	STREET CENTERLINE
2166	PROPOSED CONTOURS
2166	EXISTING CONTOURS
GB	PROPOSED GRADE BREAK
R	PROPOSED RIDGE
	DAYLIGHT LINE
TR	TOP OF RAMP
TW	TOP OF WALL
TC	TOP OF CURB
FS	FINISHED SURFACE
TS	TOP OF STAIRS
BS	BOTTOM OF STAIRS
HP	HIGH POINT
(2166.50 TC) (2166.00 FS)	EXISTING GRADE
2166.50 TC 2166.00 FS	PROPOSED GRADE
	TERRIS DRAIN
	PAVEMENT
	HYDROSEED
	LANDSCAPING
x.x%	PROPOSED SLOPE



A-A SECTION

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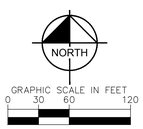

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PACIFIC OAKS COMMERCE CENTER

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CONCEPTUAL GRADING AND DRAINAGE PLAN 2

M-179

REGISTERED PROFESSIONAL ENGINEER
DAVID S. GLEESE
C 87934
CIVIL
STATE OF CALIFORNIA

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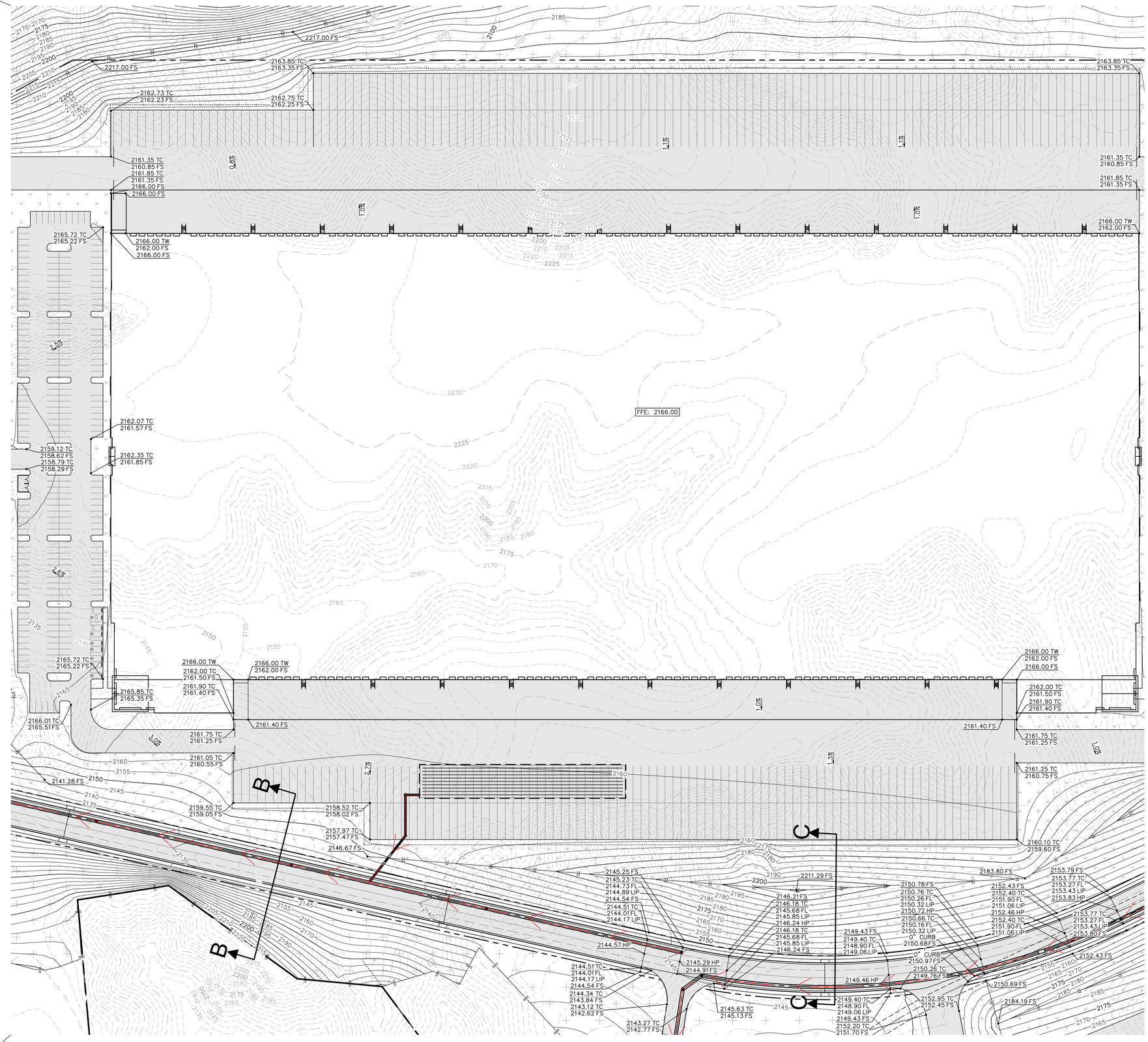
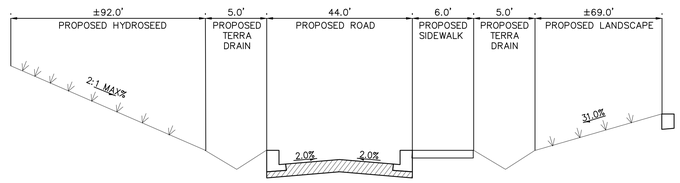


LEGEND

- PROPERTY LINE
- EASEMENT LINE
- STREET CENTERLINE
- 2166 — PROPOSED CONTOURS
- 2166 — EXISTING CONTOURS
- GB — PROPOSED GRADE BREAK
- R — PROPOSED RIDGE
- DAYLIGHT LINE
- TR — TOP OF RAMP
- TW — TOP OF WALL
- TC — TOP OF CURB
- FS — FINISHED SURFACE
- TS — TOP OF STAIRS
- BS — BOTTOM OF STAIRS
- HP — HIGH POINT
- (2166.50 TC) / (2166.00 FS) — EXISTING GRADE
- 2166.50 TC / 2166.00 FS — PROPOSED GRADE
- TERRIS DRAIN
- PAVEMENT
- HYDROSEED
- LANDSCAPING
- x.x% — PROPOSED SLOPE



B-B SECTION

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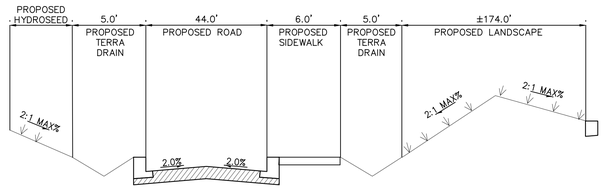

C-C SECTION

NOT TO SCALE

NORTH

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PACIFIC OAKS COMMERCE CENTER

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CONCEPTUAL GRADING AND DRAINAGE PLAN 3

M-180

REGISTERED PROFESSIONAL ENGINEER — JASON S. RUITE — C 87934 — CIVIL — STATE OF CALIFORNIA

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LEGEND

	PROPERTY LINE
	EASEMENT LINE
	STREET CENTERLINE
2166	PROPOSED CONTOURS
2166	EXISTING CONTOURS
GB	PROPOSED GRADE BREAK
R	PROPOSED RIDGE
	DAYLIGHT LINE
TR	TOP OF RAMP
TW	TOP OF WALL
TC	TOP OF CURB
FS	FINISHED SURFACE
TS	TOP OF STAIRS
BS	BOTTOM OF STAIRS
HP	HIGH POINT
(2166.50 TC) (2166.00 FS)	EXISTING GRADE
2166.50 TC 2166.00 FS	PROPOSED GRADE
	TERRIS DRAIN
	PAVEMENT
	HYDROSEED
	LANDSCAPING
x.x%	PROPOSED SLOPE

NORTH

GRAPHIC SCALE IN FEET
0 30 60 120

SCALE: 1" = 60'
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PACIFIC OAKS COMMERCE CENTER

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CONCEPTUAL GRADING AND DRAINAGE PLAN 4

M-181

REGISTERED PROFESSIONAL ENGINEER JASON S. TITUS C 87934 CIVIL STATE OF CALIFORNIA

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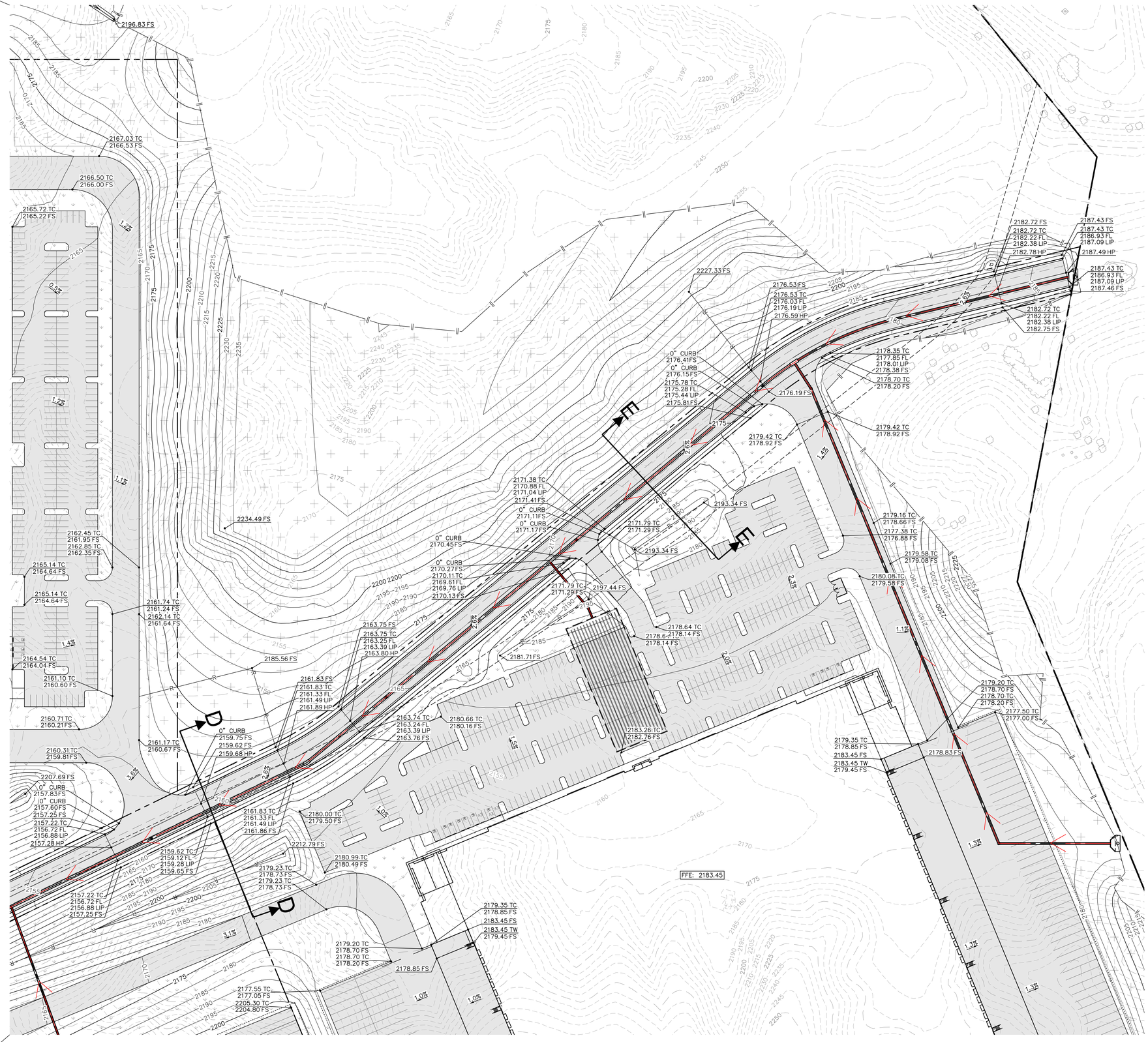
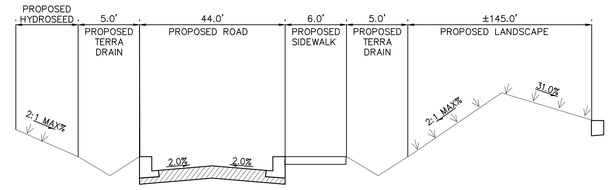


LEGEND

	PROPERTY LINE
	EASEMENT LINE
	STREET CENTERLINE
2166	PROPOSED CONTOURS
2166	EXISTING CONTOURS
GB	PROPOSED GRADE BREAK
R	PROPOSED RIDGE
‖	DAYLIGHT LINE
TR	TOP OF RAMP
TW	TOP OF WALL
TC	TOP OF CURB
FS	FINISHED SURFACE
TS	TOP OF STAIRS
BS	BOTTOM OF STAIRS
HP	HIGH POINT
(2166.50 TC) (2166.00 FS)	EXISTING GRADE
2166.50 TC 2166.00 FS	PROPOSED GRADE
	TERRIS DRAIN
	PAVEMENT
	HYDROSEED
	LANDSCAPING
x.x%	PROPOSED SLOPE



D-D SECTION

NOT TO SCALE

E-E SECTION

NOT TO SCALE

NORTH

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PACIFIC OAKS COMMERCE CENTER

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CONCEPTUAL GRADING AND DRAINAGE PLAN 5

M-182

REGISTERED PROFESSIONAL ENGINEER JASON S. GLEESE C 87934 CIVIL STATE OF CALIFORNIA

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LEGEND

	PROPERTY LINE
	EASEMENT LINE
	STREET CENTERLINE
2166	PROPOSED CONTOURS
2166	EXISTING CONTOURS
GB	PROPOSED GRADE BREAK
R	PROPOSED RIDGE
	DAYLIGHT LINE
TR	TOP OF RAMP
TW	TOP OF WALL
TC	TOP OF CURB
FS	FINISHED SURFACE
TS	TOP OF STAIRS
BS	BOTTOM OF STAIRS
HP	HIGH POINT
(2166.50 TC) (2166.00 FS)	EXISTING GRADE
2166.50 TC 2166.00 FS	PROPOSED GRADE
	TERRIS DRAIN
	PAVEMENT
	HYDROSEED
	LANDSCAPING
x.x%	PROPOSED SLOPE

NORTH

GRAPHIC SCALE IN FEET
0 30 60 120

SCALE: 1" = 60'
WHEN PRINTED AT FULL SIZE 30"X42"

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PACIFIC OAKS COMMERCE CENTER

YUCAIPA, CA

CONCEPTUAL GRADING AND DRAINAGE PLAN 6

REGISTERED PROFESSIONAL ENGINEER
JACOB S. GLATFELTER
C 87934
CIVIL
STATE OF CALIFORNIA

MARK	DATE	DESCRIPTION

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SHEET TITLE	
G6.0	

LEGEND

	PROPERTY LINE
	EASEMENT LINE
	STREET CENTERLINE
2166	PROPOSED CONTOURS
2166	EXISTING CONTOURS
GB	PROPOSED GRADE BREAK
R	PROPOSED RIDGE
	DAYLIGHT LINE
TR	TOP OF RAMP
TW	TOP OF WALL
TC	TOP OF CURB
FS	FINISHED SURFACE
TS	TOP OF STAIRS
BS	BOTTOM OF STAIRS
HP	HIGH POINT
(2166.50 TC) (2166.00 FS)	EXISTING GRADE
2166.50 TC 2166.00 FS	PROPOSED GRADE
	TERRIS DRAIN
	PAVEMENT
	HYDROSEED
	LANDSCAPING
x.x%	PROPOSED SLOPE

NORTH

GRAPHIC SCALE IN FEET
0 ## ## ##

SCALE: 1" = 20'
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CONCEPTUAL GRADING AND DRAINAGE PLAN 7

REGISTERED PROFESSIONAL ENGINEER JACOB S. DYE C 87934 CIVIL STATE OF CALIFORNIA

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Section 6.4.9 Preliminary WQMP

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