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HYDROLOGY AND WATER QUALITY TECHNICAL REPORT

Bowerman Power Renewable Natural Gas Plant

Prepared for

Bowerman Power LFG, LLC
5313 Campbells Run Road, Suite 200
Pittsburgh, Pennsylvania 15205

Prepared by

Geosyntec Consultants, Inc.
3530 Hyland Avenue, Suite 100
Costa Mesa, California 92626

Project Number: HSW1898

June 5, 2024

Hydrology and Water Quality Technical Report

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Project Number: HSW1898

June 5, 2024

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ACRONYMS AND ABBREVIATIONS

ac	Acre
AES	Advanced Engineering Software
BMP	Best management practice
cfs	Cubic feet per second
CGP	Construction General Permit
CH1	Computational Hydraulics 1
CN	Curve number
CWA	Clean Water Act
DCV	Design capture volume
DDT	Dichloro-diphenyl-trichloroethane
ft^3	Cubic feet
HCOC	Hydrologic Condition of Concern
IGP	Industrial General Permit
in	Inch
LID	Low Impact Development
min	Minute
MS4	Municipal Separate Storm Sewer System
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OCFCD	Orange County Flood Control District
OCWR	Orange County Waste & Recycling
PCB	Polychlorinated biphenyl
PDP	Priority development project
RWQCB	Regional Water Quality Control Board
RNG	Renewable Natural Gas
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TGD	Technical Guidance Document
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
WQMP	Water Quality Management Plan

1. INTRODUCTION

1.1 Purpose of Report

This Hydrology and Water Quality Technical Report assesses the drainage and water quality conditions related to the Bowerman Power LFG, LLC (Bowerman Power) Renewable Natural Gas (RNG) Plant Project (Project) in support of the Mitigated Negative Declaration.

1.2 Project Overview for Hydrology and Water Quality Analyses

The analyses described herein assume the Project will disturb approximately 4.09 acres of undeveloped land within the Bowerman Power lease boundary. This includes the development of a 2.30-acre pad and the disturbance and revegetation of 1.79 acres that will remain undeveloped. Additionally, the Project will temporarily disturb approximately 0.10 acres of existing impervious area (paved access road) outside of the Bowerman Power lease area but inside of the Project Site area, and a 2.4-mile pipeline will be constructed from the future RNG Plant down Bee Canyon Access Road to the corner of Portola Parkway and Jeffery Road.

As the proposed Project is anticipated to convert approximately 1.38 acres of undeveloped land to impervious surfaces, water quality, hydromodification, and hydrology assessments have been performed at a conceptual level to inform the stormwater management design.

1.3 Report Structure

This report is organized into the following sections:

- Section 2, "Environmental Setting," describes the existing environmental conditions of the Project, as relevant to the site hydrology and water quality.
- Section 3, "Regulatory Drivers," presents an overview of the regulatory settings as they relate to potential water quality, hydromodification, and hydrology considerations for the overall Project design.
- Section 4, "Hydrology & Water Quality Analysis," summarizes the hydrology and water quality-specific assessments performed as part of this report at a conceptual level.

Conclusions, references, tables, figures, and appendices are presented at the end of the report.

2. ENVIRONMENTAL SETTING

This section describes the existing environmental conditions of the Project, as relevant to the site hydrology and water quality.

2.1 Regional Watershed

As shown in Figure 1, the Project is located within the San Diego Creek watershed, a heavily urbanized, 112-square mile (71,680-acre) watershed that drains to Upper Newport Bay. The watershed is bounded by Loma Ridge to the north, the Santa Ana River to the west, Aliso Creek and Laguna Canyon Creek to the southeast, and the San Joaquin Hills to the south. Elevations at Loma Ridge range from approximately 1,000 to 2,000 feet and elevations of the low San Joaquin Hills range from approximately 400 to 600 feet. The watershed falls under the jurisdiction of the Santa Ana Regional Water Quality Control Board (RWQCB), a division of the State Water Resources Control Board (SWRCB).

2.2 Project Drainage Conditions

The Project proximity drainage condition is shown in Figure 2. Stormwater runoff from the proposed RNG Plant and adjacent slope areas, as well as a portion of the runoff that will be associated with pipeline construction, discharges directly to a concrete open channel where it comingles with landfill runoff. Comingled runoff is contained in a concrete sedimentation basin that is owned, operated, and maintained by Orange County Waste & Recycling (OCWR) then discharges to the Bee Canyon Retarding Basin, which is owned and operated by the Orange County Flood Control District (OCFCD), via Bee Canyon Wash. Bee Canyon Wash is a tributary of San Diego Creek Reach 1, which ultimately drains to the Upper Newport Bay. Stormwater runoff associated with pipeline construction that is not directed to the landfill sedimentation basin and Bee Canyon Retarding Basin is anticipated to comingle with runoff from Bee Canyon Access Road and drain to open space, East Hicks Retarding Basin, and/or different components of the County of Orange or City of Irvine Municipal Separate Storm Sewer System (MS4).

2.3 Pollutants of Concern

Pollutants of concern that may be generated during Project construction and potentially cause or contribute to water quality impairments include the following:

- *Oil and Gas* – Spills from oil and gas contain hydrocarbons, heavy metals, salts, and other toxic chemicals, which have the potential to impair soils, vegetation, and groundwater. Oil and gas pollution can result from various activities, such as vehicle maintenance operations and equipment or vehicle fueling.
- *Total Suspended Solids (TSS)/Sediment* – Excessive erosion, transport, and deposition of sediment in surface waters can impair aquatic life by covering spawning gravels, impairing fish food sources, filling rearing pools, and reducing other beneficial habitat in stream channels.
- *Trash and Debris* – Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic debris (such as cleared vegetation and food waste) are general waste products on the landscape that can be entrained in runoff. The presence of trash and debris may have a significant impact on the recreational value of a water body

and aquatic habitat. Excess organic matter in runoff can create a high oxygen demand in a stream and thereby lower its water quality.

- *Trace Metals (Copper, Lead, Zinc, and Iron)* – Copper, lead, and zinc are the most prevalent heavy metals typically found in urban runoff and are of concern because of their potentially toxic effects on aquatic life. The primary anthropogenic sources copper, lead, and zinc in stormwater are commercially available metals used in transportation, buildings, and infrastructure but they are also found in fuels, adhesives, paints, and other coatings. Iron is naturally abundant in local geologic formations (i.e., in soil) and can be associated with heavy machinery used for earth moving (i.e., grading) activities; however, iron is not typically considered a heavy metal with the potential to bioaccumulate in fish and shellfish and affect beneficial uses of a waterbody.

3. REGULATORY DRIVERS

This section presents an overview of the regulatory settings as they relate to potential water quality, hydromodification, and hydrology considerations for the Project.

3.1 Federal Legislation

3.1.1 Clean Water Act

In 1987, the federal Clean Water Act (CWA) was amended to require that the United States Environmental Protection Agency (USEPA) establish regulations for permitting of municipal, construction, and industrial stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) permit program (USEPA, 1987). The USEPA published final regulations regarding stormwater discharges on November 16, 1990. The regulations require that MS4 discharges and discharges of stormwater associated with land disturbance and industrial activities to surface waters be regulated by an NPDES permit.

It is anticipated that the Project will be subject to NPDES permitting during and after construction. It is also located in a large (Phase I) MS4 area with requirements relating to post-construction hydrology and water quality, as discussed later in this section.

3.1.2 Clean Water Act Section 303(d) and Total Maximum Daily Loads

Water bodies not meeting water quality standards are deemed "impaired" and, under CWA Section 303(d), are placed on a list of impaired waters for which a Total Maximum Daily Load (TMDL) must be developed for the impairing pollutant(s). A TMDL is an estimate of the total load of pollutants from point, nonpoint, and natural sources that a water body may receive without exceeding applicable water quality standards (with a "factor of safety" included). For point sources, including stormwater, the load allocation is referred to as a "Waste Load Allocation," whereas for nonpoint sources, the allocation is referred to simply as a "Load Allocation." Once established, the TMDL allocates the loads (or concentrations) among current and future pollutant sources to the waterbody.

Sections 303(d) and 305(b) of the CWA require that the SWRCB and RWQCBs conduct Water Quality Assessments that address the condition of surface waters and submit a list of impaired waters to the USEPA for review and approval. A report integrating the requirements of these two CWA sections is referred to as an Integrated Report. The 2020-2022 Integrated Report and updated 303(d) list were approved by the SWRCB on January 19, 2022, and by the USEPA on May 11, 2022 (SWRCB, 2022a).

According to the CWA Section 303(d) list issued by the SWRCB, San Diego Creek Reaches 1 and 2 and Upper Newport Bay are impaired water bodies for sedimentation/siltation, nutrients, indicator bacteria, benthic community effects, selenium, toxaphene, dichloro-diphenyl-trichloroethane (DDT), malathion, polychlorinated biphenyls (PCBs), toxicity and chlordane. Of those listed pollutants, USEPA-approved TMDLs exist for sedimentation/siltation, nutrients, toxaphene, DDT, PCBs, and chlordane.

3.2 Statewide General Permits

3.2.1 Construction General Permit

The SWRCB reissued the statewide NPDES General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit) (Order No. 2022-0057-DWQ, NPDES No. CAR000002) on September 8, 2022 (SWRCB, 2022b). Under this Construction General Permit (CGP), effective September 1, 2023, discharges of stormwater from construction sites with a disturbed area of one or more acres must be covered under an individual NPDES permit or the CGP. Coverage under the CGP is accomplished by completing a Notice of Intent (NOI) that includes a construction site risk calculation to determine appropriate coverage level; preparing a Stormwater Pollution Prevention Plan (SWPPP), complete with site maps, a Construction Site Monitoring Program, and sediment basin design calculations (if applicable); and supporting documentation for compliance with existing permitted Phase I or Phase II MS4 post-construction requirements or the post-construction standards of the CGP.

Because the anticipated areas of disturbance are separate under each phase of the Project (i.e., disturbance related to the RNG Pad and pipeline construction), each phase sponsor will be seeking coverage under the CGP separately and will comply with the requirements relating to hydrology and water quality therein.

3.2.2 Industrial General Permit

The SWRCB adopted an amendment to the statewide NPDES General Permit for Stormwater Discharges Associated with Industrial Activity (Industrial General Permit) (Order 2014-0057-DWQ as Amended in 2015 and 2018, NPDES No. CAS000001) on November 6, 2018 (SWRCB, 2018). Under this Industrial General Permit (IGP), effective July 1, 2020, discharges of stormwater from industrial sites with exposed industrial activities must be covered under an individual NPDES permit or the IGP. Coverage under the IGP is accomplished by completing an NOI that includes a SWPPP and monitoring implementation plan, site maps, and water quality best management practice (BMP) design calculations (if applicable).

The Bowerman Power Landfill Gas to Energy Plant currently has coverage under the IGP. Coverage will be amended to incorporate the RNG Plant upon completion of construction and commissioning.

3.3 County-Specific Regulations and Guidelines

3.3.1 North Orange County Municipal Separate Storm Sewer System Permit

Waste discharge requirements for urban stormwater runoff apply throughout Orange County. The MS4 Permit regulates discharges of stormwater from public storm drains. Separate MS4 Permits exist for the northern and southern areas of the county. For North Orange County, where the Project is located, the MS4 Permittees include the County of Orange, OCFCD, and incorporated cities (see Order No. R8-2009-0030 as amended by Order No. R8-2010-0062, NPDES No. CAS618030) (SARWQCB, 2009).

The Permittees have developed a Model Water Quality Management Plan (WQMP) (OCPW, 2011) and Technical Guidance Document (TGD) (OCPW, 2013) in accordance with the new development/significant redevelopment requirements of the MS4 Permit These documents include guidance for the preparation of conceptual or preliminary WQMPs to more effectively ensure that

water quality protection is considered in the earliest phases of a project. They address Low Impact Development (LID) principles and provide information on BMPs. The latter discussion clarifies BMP effectiveness and applicability to new development or significant redevelopment as defined in the MS4 Permit.

In general, a WQMP is required for projects that qualify as a priority development project (PDP). In North Orange County, new development qualifies as a PDP if it creates 10,000 or more square feet of impervious surface. As the Project exceeds the impervious surface threshold, a WQMP will be required as part of the final engineering design.

3.3.1.1 Low Impact Development Provisions

The MS4 Permit and associated guidance documents, including the Model WQMP and TGD, require that the design for a PDP incorporates new LID provisions and addresses the impact of development on downstream hydrology. PDP design for stormwater management must infiltrate, harvest and reuse, or biotreat the "design capture volume" (DCV) associated with the 85th percentile, 24-hour storm event. This is equivalent to the retention or treatment of 80 percent of the average annual runoff volume. Biotreatment may be considered only if infiltration and/or harvest and reuse cannot be feasibly implemented at a project site. Any portion of the DCV that is not infiltrated, harvested and reused, or biotreated by LID BMPs on the project site must be treated and discharged per specific conditions of the permit.

According to the requirements of the MS4 Permit, the Project triggers LID requirements and therefore a site-specific BMP will be required to manage the runoff volume from the 85th percentile, 24-hour storm event[1]. As infiltration is infeasible due to landfill operations and there is insufficient on-site demand for harvest and reuse, a biotreatment basin is proposed as the site-specific BMP for the Project and is described in Section 4.

3.3.1.2 Hydromodification Control

The MS4 Permit also requires Project sponsors or designers to identify Hydrologic Conditions of Concern (HCOCs) associated with the project. Such conditions occur when there is a potential for increased runoff that can cause significant impacts on downstream channels and aquatic habitats, alone or in conjunction with impacts of other projects. Such impacts are termed hydromodification, and they are defined as the alteration of natural flow characteristics and sediment supply in streams and channels due to urbanization. If HCOCs are identified, the project must implement BMPs to mitigate hydromodification. Specifically, for North Orange County, the project must implement on-site or regional hydromodification controls such that:

1. The post-development runoff volume for the 2-year, 24-hour storm event does not exceed that of the pre-development condition by more than five percent, and
2. Time of concentration (i.e., the time required for runoff to travel from the hydraulically most distant point in a drainage area to the outlet) of post-development runoff for the

[1] The 85th percentile, 24-hour storm event is a statistical design storm defined through a hydrologic analysis of long-term rainfall records for a particular geographic area. At the most basic level, the design storm represents the 85th percentile, 24-hour rainfall depth (measured in inches of rain) among all 24-hour rainfall depths evaluated in the historical record (LARWQCB, 2021). The 85th percentile 24-hour storm depth within Orange County is published in the Technical Guidance Document (OCPW, 2013).

2-year, 24-hour storm event is not less than that for the pre-development condition by more than five percent.

HCOCs are assessed in Section 4 to determine if Items 1 and 2 above are identified as applicable.

3.3.2 Orange County Hydrology Manual

The 1986 Orange County Hydrology Manual and its 1996 Addendum provide guidance for estimating peak discharge rates and runoff volumes for flood control purposes (OCEMA, 1996). Precipitation data used in designing local drainage facilities for runoff mitigation are provided for the 2-, 10-, 25-, and 100-year, 24-hour duration storm events.

As the Project may be subject to flood control criteria, the aforementioned storm events for local drainage facility design are included in the hydrologic analysis detailed in Section 4.

4. HYDROLOGY & WATER QUALITY ANALYSES

This section summarizes the hydrology and water quality assessments performed at a conceptual level as part of this report. As discussed below, additional studies may be conducted to confirm conceptual assumptions and calculations during final engineering design.

4.1 Hydrology Analysis

4.1.1 Overview

The hydrology analysis detailed in this section describes the anticipated long-term changes to time of concentration, total volume, and peak flow of stormwater runoff resulting from completion of the Project and assumes the following:

1. Runoff from the RNG Plant pad (approximately 2.30 acres) will be treated by the LID BMP constructed at the RNG Plant.
2. Approximately 1.34 acres of land upslope of the RNG Plant pad, both inside and outside of the Project Site area, will be disturbed and replanted to meet local fire fuel vegetation management guidelines but will not otherwise be developed. Therefore, no increase in imperviousness will be made in this area. Run-on to the RNG Plant pad from this area will be routed to a proposed perimeter v-ditch and bypass the LID BMP. Additional measures necessary to address alterations in hydrology and water quality due to runoff originating in this area during the period of disturbance will be addressed in the construction phase SWPPP (See Section 4.2.1).
3. Run-on from approximately 0.33 acres of undisturbed land upslope of the RNG Plant pad, outside of the Project Site area, will be routed to a proposed perimeter v-ditch and bypass the LID BMP.
4. Approximately 0.45 acres of land downslope of the RNG Plant pad, inside of the Project Site area, will be disturbed, regraded, and revegetated but will not otherwise be developed. Therefore, no increase in imperviousness will be made in this area. Runoff from this area will continue to flow similar to existing conditions. Additional measures necessary to address alterations in hydrology and water quality due to runoff originating in this area during the period of disturbance will be addressed in the construction phase SWPPP (See Section 4.2.1).
5. No changes will be made to existing impervious areas outside of the RNG Plant pad. Runoff will continue to follow existing drainage patterns.

The hydrology analysis was conducted with regards to the 2.30-acre RNG Plant pad. Time of concentration calculations and other hydrology analyses are not provided for up- or down-slope areas, as the net change in runoff volume is anticipated to be zero from existing to proposed conditions.

4.1.2 Existing vs. Proposed Conditions

Under existing (pre-development) conditions, the 2.30-acre drainage area to be served by the LID BMP consists primarily of pervious, vegetated area that is considered open brush in good condition (CN 81; more than 70% of the ground surface protected by vegetation). As illustrated on Figure 3, a small portion of the area consists of an impervious concrete drainage control channel (CN 98)

that was constructed and is currently maintained by OCWR. Under proposed (post-development) conditions, a section of the existing open brush area will be paved to facilitate access to the RNG Plant. As illustrated on Figure 4, various concrete pads will also be installed to house equipment. Approximately 60% (1.38 acres) of the LID BMP drainage area will be impervious (CN 98), while the remaining areas will be considered pervious barren graded land (CN 93). The resulting change in time of concentration from pre- to post-development condition for the LID BMP drainage area is summarized in Table 1.

Table 1: LID BMP Drainage Area Under Existing and Proposed Conditions

Condition	Total Area (ac)	Impervious / Paved Area (ac) (CN 98)	Barren Graded Land (ac) (CN 93)	Open Brush (ac) (CN 81)	Time of Concentration (min)
Existing	2.30	0.03	0	2.27	16.5
Proposed	2.30	1.38	0.92	0	11

ac: acres
min: minutes

4.1.3 Model Results

The precipitation data used for the storm events included in the analysis were determined from the Orange County Hydrology Manual. All storms followed a Type I rainfall distribution. The 24-hour rainfall depths used for the 2-year, 10-year, 25-year, and 100-year storms were 2.05, 3.68, 4.49, and 5.63 inches, respectively. Hydromodification considerations are determined based on the 2-year, 24-hour storm, while potential flood control design is determined based on the 10-year, 25-year, and 100-year, 24-hour storms. While design storms for flood control are analyzed in this report, any flood control requirements will be addressed as part of the final engineering design.

As requested by Orange County Public Works, the hydrology analysis was performed using the Computational Hydraulics 1 (CH1) module of Advanced Engineering Software (AES). The CH1 module of AES uses the small area unit hydrograph method to determine the peak flow rate and volume generated by the specified design storms. The results from the model, as well as the nomographs from the Orange County Hydrology Manual used to determine the existing and proposed times of concentration, are included in Appendix A. The model output is summarized below in Table 2.

Table 2: Summary of Hydrology Analysis

Storm Event	Existing Conditions		Proposed Conditions		Increase	
	Runoff Volume (ft^3)	Peak Flow (cfs)	Runoff Volume (ft^3)	Peak Flow (cfs)	Runoff Volume (ft^3)	Peak Flow (cfs)
2-year, 24-hour	5,663	1.93	12,197	2.81	+6,534	+0.88
10-year, 24-hour	15,246	3.81	24,394	5.18	+9,148	+1.37
25-year, 24-hour	20,909	4.64	30,492	6.19	+9,583	+1.55

Storm Event	Existing Conditions		Proposed Conditions		Increase	
	Runoff Volume (ft^3)	Peak Flow (cfs)	Runoff Volume (ft^3)	Peak Flow (cfs)	Runoff Volume (ft^3)	Peak Flow (cfs)
100-year, 24-hour	28,750	6.00	38,768	7.97	+10,019	+1.97

ft^3: cubic feet
cfs: cubic feet per second

Project conditions are expected to increase both the volume and peak flow of stormwater runoff (see Table 2) and decrease the time of concentration (see Table 1). Therefore, on-site hydromodification and flood control may be required. Alternatively, as per discussion with Orange County Public Works staff on June 22, 2023, calculations demonstrating adequate capacity within the downstream OCFCD-owned Bee Canyon Retarding Basin to support the increased discharge may be a viable option in lieu of on-site detention. Calculations for this alternative to manage post-development runoff may be provided as part of the final engineering design. If using Bee Canyon Retarding Basin is determined to be infeasible, on-site detention would be provided as part of the final engineering design.

4.2 Water Quality Analysis

To satisfy water quality requirements, BMPs must be proposed and implemented during both the construction phase and for the long-term operation of the Project. These are summarized below at the conceptual level. Site-specific BMPs for the construction phase will be specified within the future RNG Pad and SoCal Gas Pipeline construction SWPPPs to be prepared by Bowerman Power and SoCal Gas, respectively. Site-specific operational phase BMPs will be specified in the WQMP and RNG Facility industrial SWPPP documents prepared by Bowerman Power.

4.2.1 Construction Phase

Project construction activities will be carried out in accordance with the requirements of the CGP. At a minimum, BMP implementation may include perimeter controls (e.g., silt fence), sediment controls to minimize tracking (e.g., rumble strips at the entrance of the work zone), and wind erosion controls (e.g., watering for dust) as applicable by Project phase. Access roads leading into and out of Project areas will be swept. Future, phase specific SWPPPs will designate site-specific BMPs to be implemented during the RNG Plant and pipeline construction phases of the Project. The Project will remain covered under the CGP until the requirements for Notice of Termination have been met.

4.2.2 Operational Phase

4.2.2.1 Water Quality Management Plan

Drainage conditions under the operational phase are described in detail in Section 4.1. As discussed previously, the Project is located within the Frank R. Bowerman Landfill and discharges to a concrete-lined sedimentation basin managed by OCWR. It also triggers LID BMP requirements. The landfill sedimentation basin does not serve as an LID facility for the Project; therefore, additional BMPs are required to meet the Orange County MS4 Permit LID provisions.

Proposed BMPs must follow the design guidance contained in the TGD to meet water quality requirements. Per the LID BMP selection flow chart, proposed BMPs must assess, in order of

priority, the feasibility of infiltration, harvest and reuse, and biotreatment. It is anticipated that infiltration will not be feasible due to landfill operations and that there is inadequate demand for a harvest and reuse system. Therefore, a biotreatment BMP with an underdrain will be proposed.

To determine the sizing of the biotreatment BMP, the DCV for the water quality storm event (85th percentile, 24-hour storm) was calculated using the Simple Method defined in the TGD. The equation for the Simple Method is shown below (V provides an approximation of DCV):

$$V = C \times d \times A \times 43560 \frac{ft^2}{ac} \times \frac{1ft}{12in}$$

Where:

V = runoff volume during the design storm event (cubic feet)
C = runoff coefficient = (0.75 × *imp* + 0.15) = 0.601
imp = impervious fraction of drainage area (0.601)
d = storm depth (0.87 inches, from TGD Rainfall Zones figure)
A = tributary area (2.30 acres)

Project DCV = 4,355 cubic feet

Using the Simple Method, the runoff volume during the 85th percentile, 24-hour storm event is calculated at 4,355 cubic feet. Based on this value for the DCV and the runoff volumes for the existing and proposed conditions in Section 4.1.3, the sizing of the biotreatment BMP will be governed by the 2-year, 24-hour storm event. This is specified by hydromodification criteria, since the difference in the existing and proposed 2-year, 24-hour volumes (6,534 cubic feet) is greater than the DCV (4,355 cubic feet).

Following the TGD, approximate dimensions for the BMP were determined from 2-year, 24-hour volumes. The recommended BMP is a bioretention basin with underdrain and a minimum media layer area of 1,815 square feet with an effective depth of 3.6 feet which assumes a ponding depth of three feet (with a fence) and a media depth of three feet (assuming 20% porosity). It is currently assumed that the bioretention basin with underdrain would be designed with straight concrete walls and no side slopes. The proposed location of the basin is shown on Figure 4. The design of the BMP at the time of this report is subject to change per the Final WQMP to be submitted as part of the final engineering design for the project.

4.2.2.2 Industrial Stormwater Pollution Prevention Plan

Operational phase activities at the RNG Plant will be carried out in accordance with the requirements of the IGP. At a minimum, BMP implementation will include the seven minimum BMPs:

1. Good housekeeping
2. Preventative maintenance
3. Spill and leak response
4. Material handling and waste management
5. Erosion and sediment control

6. Employee training
7. Quality assurance/quality control

Advanced BMPs are not required to be implemented under the IGP; however, the BMP recommended to satisfy the MS4 Permit requirements (bioretention basin with underdrain) will be incorporated as an advanced BMP in the RNG Facility SWPPP.

Natural gas transmission pipelines are categorized under Standard Industrial Classification (SIC) Code 4922 (OMB, 1997) which is not subject to the IGP according to Attachment A of the Permit (SWRCB, 2018); therefore, a separate SWPPP will not be prepared to cover routine pipeline operations and the pipeline will not be incorporated in to the RNG Facility SWPPP.

5. CONCLUSIONS

The proposed project will increase stormwater runoff flow rates and volumes as compared to the existing condition where flood control, hydromodification, and LID design criteria will be required. As part of final engineering, the Project will follow specified design criteria within the requirements of the MS4 Permit and Orange County Hydrology Manual. As a result, no impacts to downstream drainage or water quality are anticipated.

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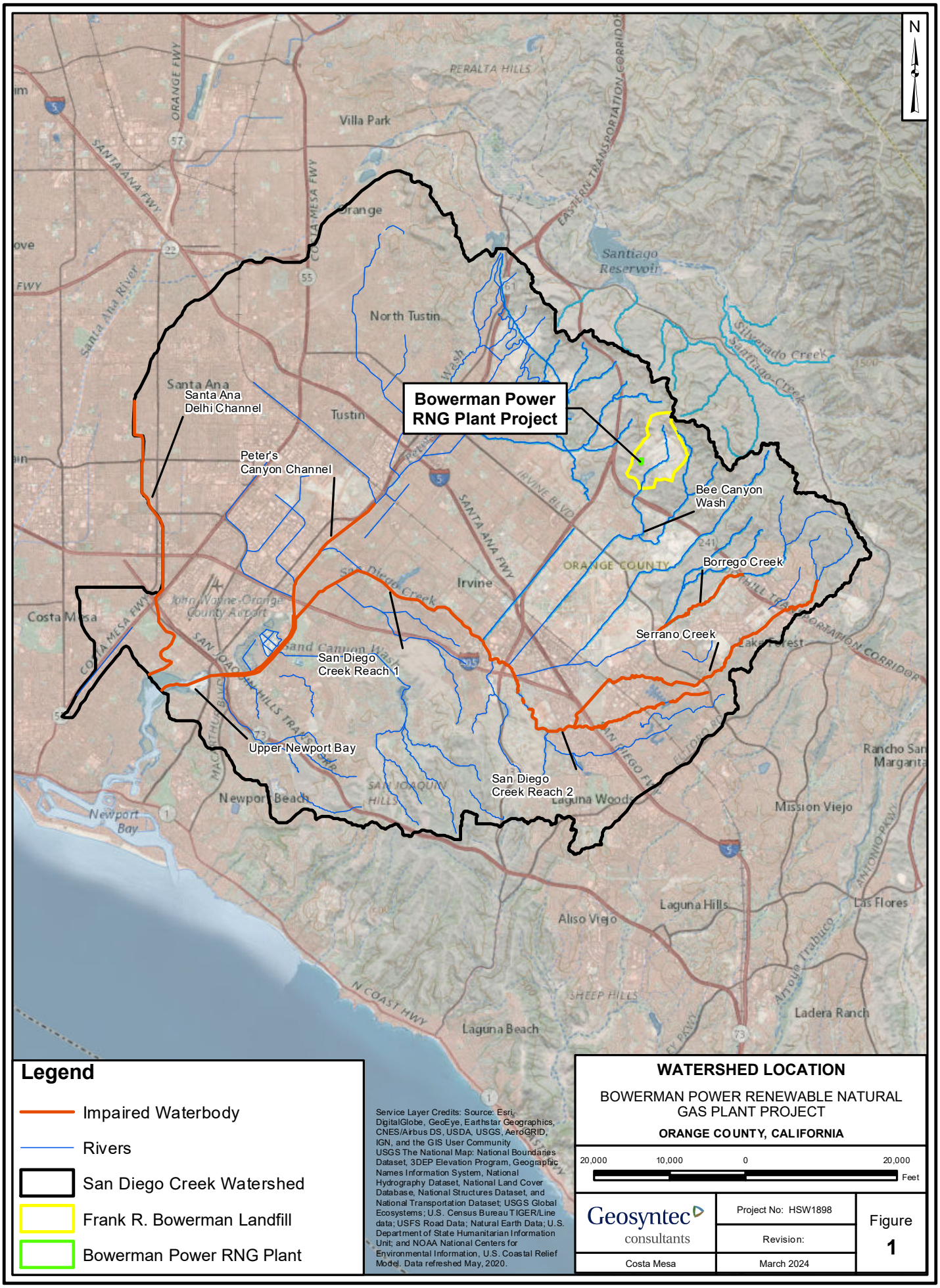
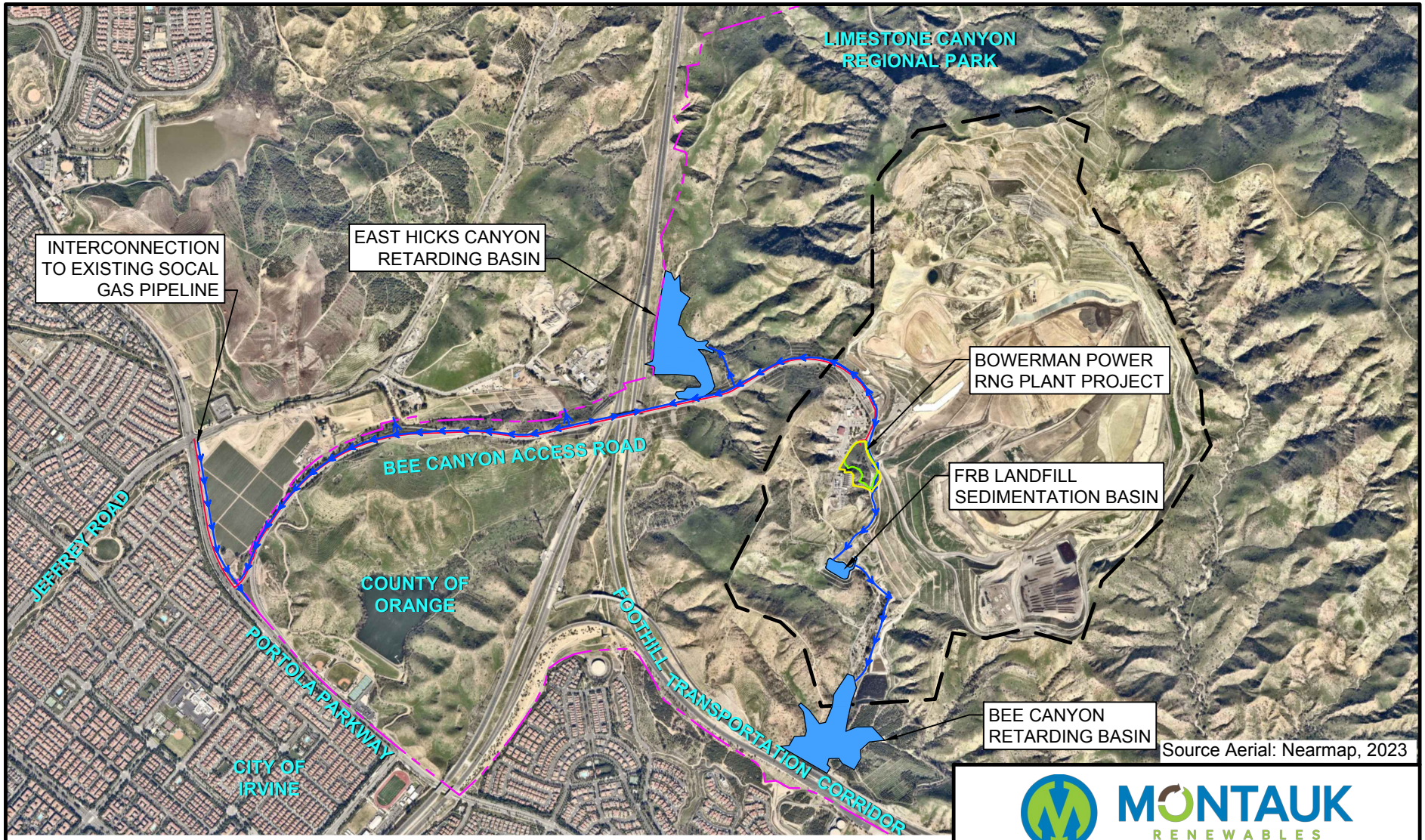
FIGURES


N
Bowerman Power RNG Plant Project
Santa Ana Delhi Channel
Peter's Canyon Channel
Bee Canyon Wash
Borrego Creek
Serrano Creek
San Diego Creek Reach 1
San Diego Creek Reach 2
Upper Newport Bay
Villa Park
Orange
North Tustin
Santa Ana
Tustin
Irvine
Costa Mesa
Newport Beach
Laguna Woods
Laguna Hills
Aliso Viejo
Laguna Beach
Mission Viejo
Ladera Ranch
Las Flores
Rancho San Margarita
Santiago Reservoir
Peralta Hills
Sheep Hills
Legend
Impaired Waterbody
Rivers
San Diego Creek Watershed
Frank R. Bowerman Landfill
Bowerman Power RNG Plant
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed May, 2020.
WATERSHED LOCATION
BOWERMAN POWER RENEWABLE NATURAL GAS PLANT PROJECT
ORANGE COUNTY, CALIFORNIA
20,000 10,000 0 20,000
Feet
Geosyntec consultants
Project No: HSW1898
Revision:
Costa Mesa
March 2024
Figure 1



LEGEND

- LEASE BOUNDARY
- PROJECT SITE
- PIPELINE ROUTE
- JURISDICTIONAL BOUNDARY
- SURFACE FLOW DIRECTION
- FRANK R. BOWERMAN LANDFILL
- WATER QUALITY BASIN

N

0 2000'

MONTAUK RENEWABLES

PROJECT DRAINAGE

BOWERMAN POWER RENEWABLE NATURAL GAS PLANT PROJECT

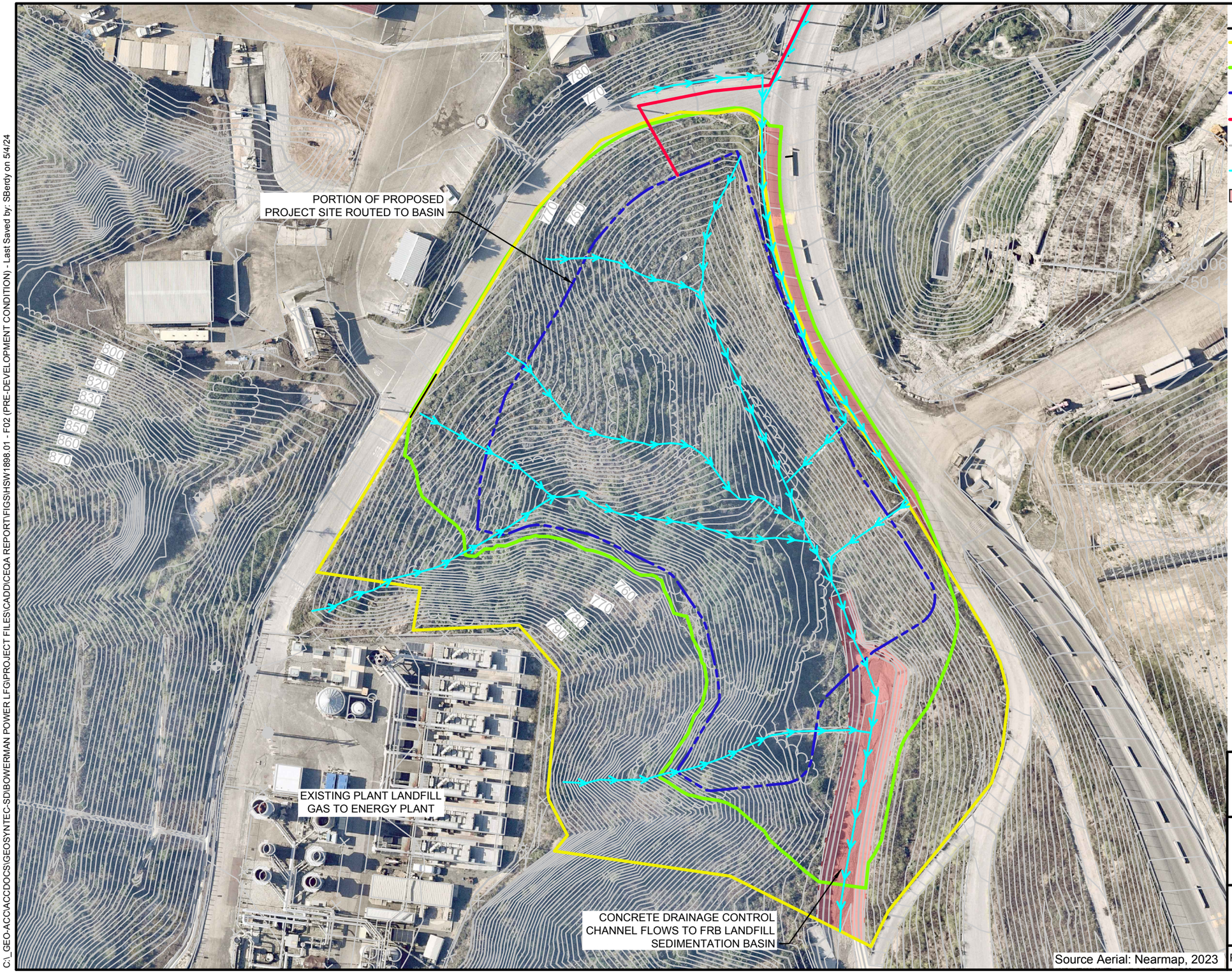
Geosyntec consultants

FIGURE 2

PROJECT NO: HSW1898 | MARCH 2024

C:_GEOPW\DS01\DMS22845\HSW1898.01 - F01 (PROJECT DRAINAGE) - Last Saved by: SBerdy on 10/12/23

pw:\\geosyntec-pw.bentley.com:geosyntec-pw-01\Documents\Clients\B\BOWERMAN POWER LFG LLC\HSW1898 - BOWERMAN POWER RNG PLANT EXPANSION\CADD\01 - CEQA REPORT\FIGURES\



LEGEND

- LEASE BOUNDARY
- PROJECT SITE
- BASIN DRAINAGE AREA (2.30 ACRES)
- PIPELINE ROUTE
- 800 EXISTING GROUND MAJOR CONTOUR (10')
- SURFACE FLOW DIRECTION
- EXISTING IMPERVIOUS AREA

N

0 80'

MONTAUK RENEWABLES

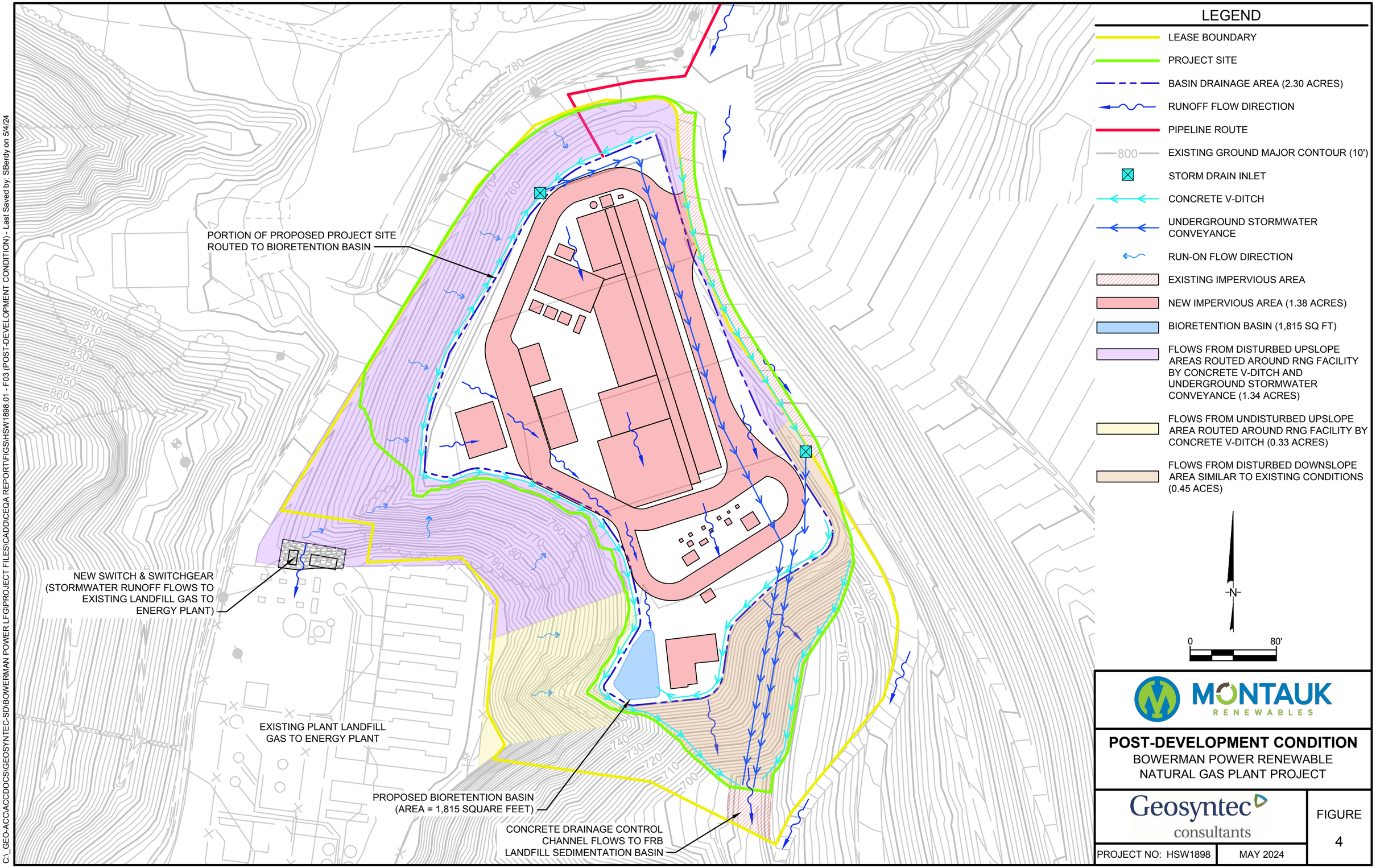
PRE-DEVELOPMENT CONDITION
BOWERMAN POWER RENEWABLE
NATURAL GAS PLANT PROJECT

Geosyntec consultants

FIGURE 3

PROJECT NO: HSW1898 | MAY 2024

C:_GEO-ACCACCDOCS\GEOSYNTEC-SD\BOWERMAN POWER LFG\PROJECT FILES\CADD\CEQA REPORT\FIGS\HSW1898.01 - F02 (PRE-DEVELOPMENT CONDITION) - Last Saved by: SBerdy on 5/4/24



C:_GEO-ACCACCDOCS\GEOSYNTEC-SDIBOWERMAN POWER LFG\PROJECT FILES\CADD\CEQA REPORT\FIGS\HSW1898.01 - F03 (POST-DEVELOPMENT CONDITION) - Last Saved by: SBerdy on 5/4/24

MONTAUK RENEWABLES

POST-DEVELOPMENT CONDITION
BOWERMAN POWER RENEWABLE
NATURAL GAS PLANT PROJECT

Geosyntec consultants

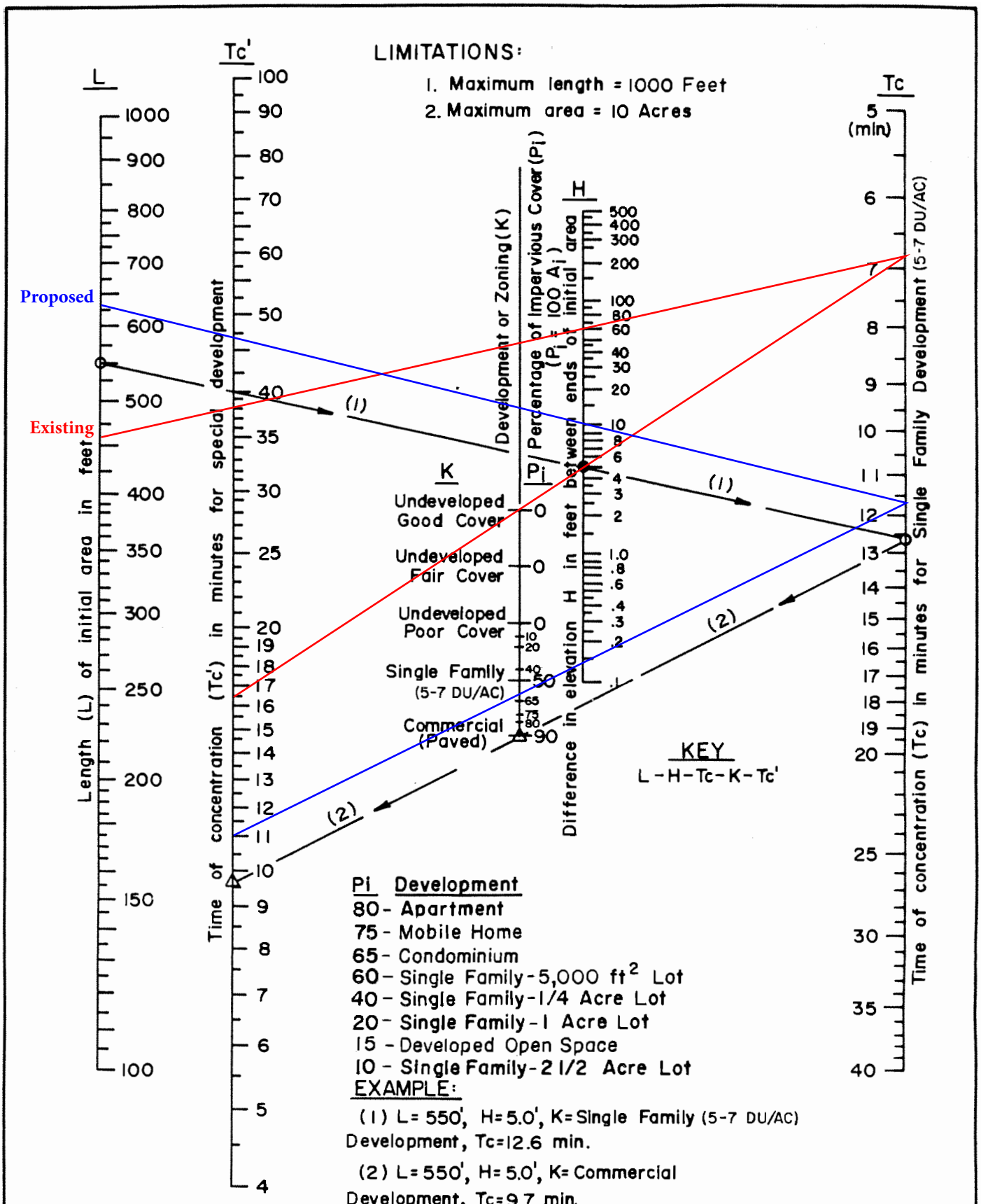
PROJECT NO: HSW1898 | MAY 2024

FIGURE
4

Geosyntec consultants

APPENDIX A

Orange County Hydrology Manual Time of Concentration Nomograph & AES Hydrology Analysis Output



ORANGE COUNTY

HYDROLOGY MANUAL

TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

Figure D-1

2-YEAR, 24-HOUR: EXISTING CONDITIONS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 2.30
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.200
LOW LOSS FRACTION = 0.710
TIME OF CONCENTRATION(MIN.) = 16.50
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 2
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.19
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.40
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.53
3-HOUR POINT RAINFALL VALUE(INCHES) = 0.89
6-HOUR POINT RAINFALL VALUE(INCHES) = 1.22
24-HOUR POINT RAINFALL VALUE(INCHES) = 2.05

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.13
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.26

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0000	0.00	Q	.	.	.	.
0.32	0.0002	0.02	Q	.	.	.	.
0.60	0.0007	0.02	Q	.	.	.	.
0.88	0.0011	0.02	Q	.	.	.	.
1.15	0.0016	0.02	Q	.	.	.	.
1.42	0.0020	0.02	Q	.	.	.	.
1.70	0.0025	0.02	Q	.	.	.	.
1.98	0.0029	0.02	Q	.	.	.	.
2.25	0.0034	0.02	Q	.	.	.	.
2.53	0.0039	0.02	Q	.	.	.	.
2.80	0.0044	0.02	Q	.	.	.	.
3.08	0.0049	0.02	Q	.	.	.	.
3.35	0.0054	0.02	Q	.	.	.	.
3.62	0.0059	0.02	Q	.	.	.	.
3.90	0.0064	0.02	Q	.	.	.	.
4.18	0.0069	0.02	Q	.	.	.	.
4.45	0.0074	0.02	Q	.	.	.	.
4.72	0.0079	0.02	Q	.	.	.	.
5.00	0.0085	0.02	Q	.	.	.	.
5.28	0.0090	0.02	Q	.	.	.	.
5.55	0.0096	0.02	Q	.	.	.	.
5.82	0.0102	0.03	Q	.	.	.	.
6.10	0.0107	0.03	Q	.	.	.	.

6.38	0.0113	0.03	Q	.	.	.	.
6.65	0.0119	0.03	Q	.	.	.	.
6.93	0.0125	0.03	Q	.	.	.	.
7.20	0.0131	0.03	Q	.	.	.	.
7.47	0.0138	0.03	Q	.	.	.	.
7.75	0.0144	0.03	Q	.	.	.	.
8.02	0.0151	0.03	Q	.	.	.	.
8.30	0.0157	0.03	Q	.	.	.	.
8.57	0.0164	0.03	Q	.	.	.	.
8.85	0.0171	0.03	Q	.	.	.	.
9.12	0.0178	0.03	Q	.	.	.	.
9.40	0.0186	0.03	Q	.	.	.	.
9.68	0.0193	0.03	Q	.	.	.	.
9.95	0.0201	0.03	Q	.	.	.	.
10.23	0.0209	0.04	Q	.	.	.	.
10.50	0.0217	0.04	Q	.	.	.	.
10.77	0.0226	0.04	Q	.	.	.	.
11.05	0.0234	0.04	Q	.	.	.	.
11.32	0.0243	0.04	Q	.	.	.	.
11.60	0.0253	0.04	Q	.	.	.	.
11.88	0.0262	0.04	Q	.	.	.	.
12.15	0.0272	0.04	Q	.	.	.	.
12.43	0.0284	0.06	Q	.	.	.	.
12.70	0.0297	0.06	Q	.	.	.	.
12.98	0.0311	0.06	Q	.	.	.	.
13.25	0.0325	0.06	Q	.	.	.	.
13.52	0.0341	0.07	Q	.	.	.	.
13.80	0.0357	0.07	Q	.	.	.	.
14.07	0.0374	0.08	Q	.	.	.	.
14.35	0.0393	0.09	Q	.	.	.	.
14.62	0.0413	0.10	Q	.	.	.	.
14.90	0.0436	0.10	Q	.	.	.	.
15.18	0.0461	0.12	Q	.	.	.	.
15.45	0.0490	0.13	Q	.	.	.	.
15.73	0.0524	0.16	Q	.	.	.	.
16.00	0.0584	0.37	.Q	.	.	.	.
16.27	0.0846	1.93	.	Q	.	.	.
16.55	0.1081	0.14	Q	.	.	.	.
16.83	0.1110	0.11	Q	.	.	.	.
17.10	0.1133	0.09	Q	.	.	.	.
17.38	0.1151	0.08	Q	.	.	.	.
17.65	0.1168	0.07	Q	.	.	.	.
17.92	0.1182	0.06	Q	.	.	.	.
18.20	0.1195	0.05	Q	.	.	.	.
18.48	0.1206	0.04	Q	.	.	.	.
18.75	0.1215	0.04	Q	.	.	.	.
19.02	0.1224	0.04	Q	.	.	.	.
19.30	0.1232	0.03	Q	.	.	.	.
19.58	0.1240	0.03	Q	.	.	.	.
19.85	0.1247	0.03	Q	.	.	.	.

20.12	0.1254	0.03	Q	.	.	.	.
20.40	0.1261	0.03	Q	.	.	.	.
20.67	0.1268	0.03	Q	.	.	.	.
20.95	0.1274	0.03	Q	.	.	.	.
21.23	0.1280	0.03	Q	.	.	.	.
21.50	0.1285	0.02	Q	.	.	.	.
21.77	0.1291	0.02	Q	.	.	.	.
22.05	0.1296	0.02	Q	.	.	.	.
22.33	0.1302	0.02	Q	.	.	.	.
22.60	0.1307	0.02	Q	.	.	.	.
22.88	0.1312	0.02	Q	.	.	.	.
23.15	0.1317	0.02	Q	.	.	.	.
23.42	0.1321	0.02	Q	.	.	.	.
23.70	0.1326	0.02	Q	.	.	.	.
23.98	0.1330	0.02	Q	.	.	.	.
24.25	0.1335	0.02	Q	.	.	.	.
24.52	0.1337	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%	1452.0
10%	33.0
20%	16.5
30%	16.5
40%	16.5
50%	16.5
60%	16.5
70%	16.5
80%	16.5
90%	16.5

10-YEAR, 24-HOUR: EXISTING CONDITIONS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 2.30
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.200
LOW LOSS FRACTION = 0.520
TIME OF CONCENTRATION(MIN.) = 16.50
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 10
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.34
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.72
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.95
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.59
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.20
24-HOUR POINT RAINFALL VALUE(INCHES) = 3.68

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.35
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.35

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0000	0.00	Q	.	.	.	.
0.32	0.0006	0.06	Q	.	.	.	.
0.60	0.0019	0.06	Q	.	.	.	.
0.88	0.0033	0.06	Q	.	.	.	.
1.15	0.0046	0.06	Q	.	.	.	.
1.42	0.0059	0.06	Q	.	.	.	.
1.70	0.0073	0.06	Q	.	.	.	.
1.98	0.0087	0.06	Q	.	.	.	.
2.25	0.0100	0.06	Q	.	.	.	.
2.53	0.0115	0.06	Q	.	.	.	.
2.80	0.0129	0.06	Q	.	.	.	.
3.08	0.0143	0.06	Q	.	.	.	.
3.35	0.0158	0.06	Q	.	.	.	.
3.62	0.0173	0.07	Q	.	.	.	.
3.90	0.0188	0.07	Q	.	.	.	.
4.18	0.0203	0.07	Q	.	.	.	.
4.45	0.0218	0.07	Q	.	.	.	.
4.72	0.0234	0.07	Q	.	.	.	.
5.00	0.0250	0.07	Q	.	.	.	.
5.28	0.0266	0.07	Q	.	.	.	.
5.55	0.0283	0.07	Q	.	.	.	.
5.82	0.0299	0.07	Q	.	.	.	.
6.10	0.0316	0.08	Q	.	.	.	.

10-YEAR, 24-HOUR: EXISTING CONDITIONS

6.38	0.0334	0.08	Q	.	.	.	.
6.65	0.0351	0.08	Q	.	.	.	.
6.93	0.0369	0.08	Q	.	.	.	.
7.20	0.0387	0.08	Q	.	.	.	.
7.47	0.0406	0.08	Q	.	.	.	.
7.75	0.0425	0.08	Q	.	.	.	.
8.02	0.0444	0.09	Q	.	.	.	.
8.30	0.0464	0.09	Q	.	.	.	.
8.57	0.0484	0.09	Q	.	.	.	.
8.85	0.0505	0.09	Q	.	.	.	.
9.12	0.0526	0.09	Q	.	.	.	.
9.40	0.0548	0.10	Q	.	.	.	.
9.68	0.0570	0.10	Q	.	.	.	.
9.95	0.0593	0.10	Q	.	.	.	.
10.23	0.0616	0.11	Q	.	.	.	.
10.50	0.0640	0.11	Q	.	.	.	.
10.77	0.0665	0.11	Q	.	.	.	.
11.05	0.0691	0.11	Q	.	.	.	.
11.32	0.0718	0.12	Q	.	.	.	.
11.60	0.0745	0.12	Q	.	.	.	.
11.88	0.0774	0.13	Q	.	.	.	.
12.15	0.0804	0.13	Q	.	.	.	.
12.43	0.0839	0.18	Q	.	.	.	.
12.70	0.0879	0.18	Q	.	.	.	.
12.98	0.0922	0.19	Q	.	.	.	.
13.25	0.0966	0.20	Q	.	.	.	.
13.52	0.1013	0.21	Q	.	.	.	.
13.80	0.1062	0.22	Q	.	.	.	.
14.07	0.1114	0.24	Q	.	.	.	.
14.35	0.1170	0.25	.Q	.	.	.	.
14.62	0.1231	0.28	.Q	.	.	.	.
14.90	0.1297	0.30	.Q	.	.	.	.
15.18	0.1372	0.36	.Q	.	.	.	.
15.45	0.1459	0.41	.Q	.	.	.	.
15.73	0.1571	0.58	. Q	.	.	.	.
16.00	0.1750	1.00	. Q	.	.	.	.
16.27	0.2295	3.81	.	.	Q	.	.
16.55	0.2778	0.44	.Q	.	.	.	.
16.83	0.2865	0.33	.Q	.	.	.	.
17.10	0.2933	0.27	.Q	.	.	.	.
17.38	0.2989	0.23	Q	.	.	.	.
17.65	0.3038	0.20	Q	.	.	.	.
17.92	0.3083	0.19	Q	.	.	.	.
18.20	0.3123	0.17	Q	.	.	.	.
18.48	0.3156	0.13	Q	.	.	.	.
18.75	0.3183	0.12	Q	.	.	.	.
19.02	0.3209	0.11	Q	.	.	.	.
19.30	0.3233	0.10	Q	.	.	.	.
19.58	0.3256	0.10	Q	.	.	.	.
19.85	0.3278	0.09	Q	.	.	.	.

10-YEAR, 24-HOUR: EXISTING CONDITIONS

20.12	0.3298	0.09	Q	.	.	.	.
20.40	0.3318	0.09	Q	.	.	.	.
20.67	0.3337	0.08	Q	.	.	.	.
20.95	0.3355	0.08	Q	.	.	.	.
21.23	0.3373	0.08	Q	.	.	.	.
21.50	0.3390	0.07	Q	.	.	.	.
21.77	0.3406	0.07	Q	.	.	.	.
22.05	0.3422	0.07	Q	.	.	.	.
22.33	0.3438	0.07	Q	.	.	.	.
22.60	0.3453	0.07	Q	.	.	.	.
22.88	0.3468	0.06	Q	.	.	.	.
23.15	0.3482	0.06	Q	.	.	.	.
23.42	0.3496	0.06	Q	.	.	.	.
23.70	0.3509	0.06	Q	.	.	.	.
23.98	0.3523	0.06	Q	.	.	.	.
24.25	0.3536	0.06	Q	.	.	.	.
24.52	0.3542	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%	1452.0
10%	82.5
20%	33.0
30%	16.5
40%	16.5
50%	16.5
60%	16.5
70%	16.5
80%	16.5
90%	16.5

25-YEAR, 24-HOUR: EXISTING CONDITIONS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 2.30
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.200
LOW LOSS FRACTION = 0.450
TIME OF CONCENTRATION(MIN.) = 16.50
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 25
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.40
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.87
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.15
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.94
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.71
24-HOUR POINT RAINFALL VALUE(INCHES) = 4.49

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.48
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.38

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0000	0.00	Q	.	.	.	.
0.32	0.0009	0.08	Q	.	.	.	.
0.60	0.0027	0.08	Q	.	.	.	.
0.88	0.0045	0.08	Q	.	.	.	.
1.15	0.0063	0.08	Q	.	.	.	.
1.42	0.0081	0.08	Q	.	.	.	.
1.70	0.0100	0.08	Q	.	.	.	.
1.98	0.0119	0.08	Q	.	.	.	.
2.25	0.0138	0.08	Q	.	.	.	.
2.53	0.0157	0.09	Q	.	.	.	.
2.80	0.0177	0.09	Q	.	.	.	.
3.08	0.0197	0.09	Q	.	.	.	.
3.35	0.0217	0.09	Q	.	.	.	.
3.62	0.0237	0.09	Q	.	.	.	.
3.90	0.0258	0.09	Q	.	.	.	.
4.18	0.0279	0.09	Q	.	.	.	.
4.45	0.0300	0.09	Q	.	.	.	.
4.72	0.0322	0.10	Q	.	.	.	.
5.00	0.0343	0.10	Q	.	.	.	.
5.28	0.0366	0.10	Q	.	.	.	.
5.55	0.0388	0.10	Q	.	.	.	.
5.82	0.0411	0.10	Q	.	.	.	.
6.10	0.0435	0.10	Q	.	.	.	.

6.38	0.0459	0.11	Q	.	.	.	.
6.65	0.0483	0.11	Q	.	.	.	.
6.93	0.0507	0.11	Q	.	.	.	.
7.20	0.0533	0.11	Q	.	.	.	.
7.47	0.0558	0.11	Q	.	.	.	.
7.75	0.0584	0.12	Q	.	.	.	.
8.02	0.0611	0.12	Q	.	.	.	.
8.30	0.0638	0.12	Q	.	.	.	.
8.57	0.0666	0.12	Q	.	.	.	.
8.85	0.0695	0.13	Q	.	.	.	.
9.12	0.0724	0.13	Q	.	.	.	.
9.40	0.0754	0.13	Q	.	.	.	.
9.68	0.0784	0.14	Q	.	.	.	.
9.95	0.0816	0.14	Q	.	.	.	.
10.23	0.0848	0.15	Q	.	.	.	.
10.50	0.0882	0.15	Q	.	.	.	.
10.77	0.0916	0.15	Q	.	.	.	.
11.05	0.0952	0.16	Q	.	.	.	.
11.32	0.0988	0.17	Q	.	.	.	.
11.60	0.1027	0.17	Q	.	.	.	.
11.88	0.1066	0.18	Q	.	.	.	.
12.15	0.1107	0.18	Q	.	.	.	.
12.43	0.1157	0.26	.Q	.	.	.	.
12.70	0.1216	0.26	.Q	.	.	.	.
12.98	0.1278	0.28	.Q	.	.	.	.
13.25	0.1342	0.29	.Q	.	.	.	.
13.52	0.1409	0.31	.Q	.	.	.	.
13.80	0.1480	0.32	.Q	.	.	.	.
14.07	0.1556	0.35	.Q	.	.	.	.
14.35	0.1636	0.36	.Q	.	.	.	.
14.62	0.1722	0.40	.Q	.	.	.	.
14.90	0.1816	0.43	.Q	.	.	.	.
15.18	0.1921	0.50	. Q	.	.	.	.
15.45	0.2046	0.60	. Q	.	.	.	.
15.73	0.2205	0.79	. Q	.	.	.	.
16.00	0.2447	1.34	. Q	.	.	.	.
16.27	0.3126	4.64	.	.	Q	.	.
16.55	0.3725	0.63	. Q	.	.	.	.
16.83	0.3849	0.46	.Q	.	.	.	.
17.10	0.3944	0.38	.Q	.	.	.	.
17.38	0.4025	0.33	.Q	.	.	.	.
17.65	0.4096	0.30	.Q	.	.	.	.
17.92	0.4160	0.27	.Q	.	.	.	.
18.20	0.4218	0.24	Q	.	.	.	.
18.48	0.4265	0.17	Q	.	.	.	.
18.75	0.4303	0.16	Q	.	.	.	.
19.02	0.4339	0.15	Q	.	.	.	.
19.30	0.4372	0.14	Q	.	.	.	.
19.58	0.4404	0.14	Q	.	.	.	.
19.85	0.4434	0.13	Q	.	.	.	.

20.12	0.4462	0.12	Q	.	.	.	.
20.40	0.4490	0.12	Q	.	.	.	.
20.67	0.4516	0.11	Q	.	.	.	.
20.95	0.4541	0.11	Q	.	.	.	.
21.23	0.4565	0.10	Q	.	.	.	.
21.50	0.4589	0.10	Q	.	.	.	.
21.77	0.4611	0.10	Q	.	.	.	.
22.05	0.4633	0.09	Q	.	.	.	.
22.33	0.4654	0.09	Q	.	.	.	.
22.60	0.4675	0.09	Q	.	.	.	.
22.88	0.4695	0.09	Q	.	.	.	.
23.15	0.4715	0.09	Q	.	.	.	.
23.42	0.4734	0.08	Q	.	.	.	.
23.70	0.4752	0.08	Q	.	.	.	.
23.98	0.4771	0.08	Q	.	.	.	.
24.25	0.4788	0.08	Q	.	.	.	.
24.52	0.4797	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%	1452.0
10%	99.0
20%	33.0
30%	16.5
40%	16.5
50%	16.5
60%	16.5
70%	16.5
80%	16.5
90%	16.5

100-YEAR, 24-HOUR: EXISTING CONDITIONS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 2.30
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.200
LOW LOSS FRACTION = 0.390
TIME OF CONCENTRATION(MIN.) = 16.50
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 100
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.52
30-MINUTE POINT RAINFALL VALUE(INCHES) = 1.09
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.45
3-HOUR POINT RAINFALL VALUE(INCHES) = 2.43
6-HOUR POINT RAINFALL VALUE(INCHES) = 3.36
24-HOUR POINT RAINFALL VALUE(INCHES) = 5.63

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.66
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.42

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0000	0.00	Q	.	.	.	.
0.32	0.0013	0.11	Q	.	.	.	.
0.60	0.0038	0.11	Q	.	.	.	.
0.88	0.0063	0.11	Q	.	.	.	.
1.15	0.0089	0.11	Q	.	.	.	.
1.42	0.0116	0.12	Q	.	.	.	.
1.70	0.0142	0.12	Q	.	.	.	.
1.98	0.0169	0.12	Q	.	.	.	.
2.25	0.0196	0.12	Q	.	.	.	.
2.53	0.0223	0.12	Q	.	.	.	.
2.80	0.0251	0.12	Q	.	.	.	.
3.08	0.0279	0.12	Q	.	.	.	.
3.35	0.0308	0.13	Q	.	.	.	.
3.62	0.0337	0.13	Q	.	.	.	.
3.90	0.0366	0.13	Q	.	.	.	.
4.18	0.0396	0.13	Q	.	.	.	.
4.45	0.0426	0.13	Q	.	.	.	.
4.72	0.0457	0.14	Q	.	.	.	.
5.00	0.0488	0.14	Q	.	.	.	.
5.28	0.0519	0.14	Q	.	.	.	.
5.55	0.0551	0.14	Q	.	.	.	.
5.82	0.0584	0.14	Q	.	.	.	.
6.10	0.0617	0.15	Q	.	.	.	.

6.38	0.0651	0.15	Q	.	.	.	.
6.65	0.0685	0.15	Q	.	.	.	.
6.93	0.0720	0.16	Q	.	.	.	.
7.20	0.0755	0.16	Q	.	.	.	.
7.47	0.0792	0.16	Q	.	.	.	.
7.75	0.0829	0.16	Q	.	.	.	.
8.02	0.0866	0.17	Q	.	.	.	.
8.30	0.0905	0.17	Q	.	.	.	.
8.57	0.0944	0.18	Q	.	.	.	.
8.85	0.0985	0.18	Q	.	.	.	.
9.12	0.1026	0.18	Q	.	.	.	.
9.40	0.1068	0.19	Q	.	.	.	.
9.68	0.1111	0.19	Q	.	.	.	.
9.95	0.1156	0.20	Q	.	.	.	.
10.23	0.1202	0.21	Q	.	.	.	.
10.50	0.1249	0.21	Q	.	.	.	.
10.77	0.1297	0.22	Q	.	.	.	.
11.05	0.1347	0.22	Q	.	.	.	.
11.32	0.1399	0.23	Q	.	.	.	.
11.60	0.1453	0.24	Q	.	.	.	.
11.88	0.1508	0.25	.Q	.	.	.	.
12.15	0.1566	0.26	.Q	.	.	.	.
12.43	0.1634	0.34	.Q	.	.	.	.
12.70	0.1713	0.35	.Q	.	.	.	.
12.98	0.1795	0.37	.Q	.	.	.	.
13.25	0.1881	0.38	.Q	.	.	.	.
13.52	0.1971	0.41	.Q	.	.	.	.
13.80	0.2067	0.43	.Q	.	.	.	.
14.07	0.2168	0.47	.Q	.	.	.	.
14.35	0.2277	0.49	.Q	.	.	.	.
14.62	0.2395	0.55	. Q	.	.	.	.
14.90	0.2524	0.59	. Q	.	.	.	.
15.18	0.2672	0.72	. Q	.	.	.	.
15.45	0.2850	0.85	. Q	.	.	.	.
15.73	0.3076	1.14	. Q	.	.	.	.
16.00	0.3399	1.71	. Q	.	.	.	.
16.27	0.4275	6.00	.	.	.	Q	.	.
16.55	0.5060	0.92	. Q	.	.	.	.
16.83	0.5237	0.63	. Q	.	.	.	.
17.10	0.5367	0.52	. Q	.	.	.	.
17.38	0.5477	0.44	.Q	.	.	.	.
17.65	0.5572	0.40	.Q	.	.	.	.
17.92	0.5658	0.36	.Q	.	.	.	.
18.20	0.5736	0.32	.Q	.	.	.	.
18.48	0.5800	0.24	Q	.	.	.	.
18.75	0.5854	0.23	Q	.	.	.	.
19.02	0.5904	0.21	Q	.	.	.	.
19.30	0.5951	0.20	Q	.	.	.	.
19.58	0.5996	0.19	Q	.	.	.	.
19.85	0.6038	0.18	Q	.	.	.	.

20.12	0.6078	0.17	Q	.	.	.	.
20.40	0.6117	0.17	Q	.	.	.	.
20.67	0.6154	0.16	Q	.	.	.	.
20.95	0.6189	0.15	Q	.	.	.	.
21.23	0.6224	0.15	Q	.	.	.	.
21.50	0.6257	0.14	Q	.	.	.	.
21.77	0.6289	0.14	Q	.	.	.	.
22.05	0.6320	0.13	Q	.	.	.	.
22.33	0.6350	0.13	Q	.	.	.	.
22.60	0.6379	0.13	Q	.	.	.	.
22.88	0.6408	0.12	Q	.	.	.	.
23.15	0.6436	0.12	Q	.	.	.	.
23.42	0.6463	0.12	Q	.	.	.	.
23.70	0.6489	0.12	Q	.	.	.	.
23.98	0.6515	0.11	Q	.	.	.	.
24.25	0.6541	0.11	Q	.	.	.	.
24.52	0.6553	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%	1452.0
10%	115.5
20%	33.0
30%	16.5
40%	16.5
50%	16.5
60%	16.5
70%	16.5
80%	16.5
90%	16.5

2-YEAR, 24-HOUR: PROPOSED CONDITIONS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 2.30
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.080
LOW LOSS FRACTION = 0.210
TIME OF CONCENTRATION(MIN.) = 11.00
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 2
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.19
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.40
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.53
3-HOUR POINT RAINFALL VALUE(INCHES) = 0.89
6-HOUR POINT RAINFALL VALUE(INCHES) = 1.22
24-HOUR POINT RAINFALL VALUE(INCHES) = 2.05

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.28
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.11

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0000	0.00	Q	.	.	.	.
0.23	0.0004	0.05	Q	.	.	.	.
0.42	0.0012	0.05	Q	.	.	.	.
0.60	0.0020	0.05	Q	.	.	.	.
0.78	0.0028	0.05	Q	.	.	.	.
0.97	0.0036	0.05	Q	.	.	.	.
1.15	0.0044	0.05	Q	.	.	.	.
1.33	0.0053	0.05	Q	.	.	.	.
1.52	0.0061	0.06	Q	.	.	.	.
1.70	0.0069	0.06	Q	.	.	.	.
1.88	0.0078	0.06	Q	.	.	.	.
2.07	0.0087	0.06	Q	.	.	.	.
2.25	0.0095	0.06	Q	.	.	.	.
2.43	0.0104	0.06	Q	.	.	.	.
2.62	0.0113	0.06	Q	.	.	.	.
2.80	0.0121	0.06	Q	.	.	.	.
2.98	0.0130	0.06	Q	.	.	.	.
3.17	0.0139	0.06	Q	.	.	.	.
3.35	0.0148	0.06	Q	.	.	.	.
3.53	0.0158	0.06	Q	.	.	.	.
3.72	0.0167	0.06	Q	.	.	.	.
3.90	0.0176	0.06	Q	.	.	.	.
4.08	0.0185	0.06	Q	.	.	.	.

2-YEAR, 24-HOUR: PROPOSED CONDITIONS

4.27	0.0195	0.06	Q	.	.	.	.
4.45	0.0205	0.06	Q	.	.	.	.
4.63	0.0214	0.06	Q	.	.	.	.
4.82	0.0224	0.06	Q	.	.	.	.
5.00	0.0234	0.07	Q	.	.	.	.
5.18	0.0244	0.07	Q	.	.	.	.
5.37	0.0254	0.07	Q	.	.	.	.
5.55	0.0264	0.07	Q	.	.	.	.
5.73	0.0274	0.07	Q	.	.	.	.
5.92	0.0285	0.07	Q	.	.	.	.
6.10	0.0295	0.07	Q	.	.	.	.
6.28	0.0306	0.07	Q	.	.	.	.
6.47	0.0317	0.07	Q	.	.	.	.
6.65	0.0328	0.07	Q	.	.	.	.
6.83	0.0339	0.07	Q	.	.	.	.
7.02	0.0350	0.07	Q	.	.	.	.
7.20	0.0361	0.08	Q	.	.	.	.
7.38	0.0373	0.08	Q	.	.	.	.
7.57	0.0384	0.08	Q	.	.	.	.
7.75	0.0396	0.08	Q	.	.	.	.
7.93	0.0408	0.08	Q	.	.	.	.
8.12	0.0420	0.08	Q	.	.	.	.
8.30	0.0433	0.08	Q	.	.	.	.
8.48	0.0445	0.08	Q	.	.	.	.
8.67	0.0458	0.08	Q	.	.	.	.
8.85	0.0470	0.09	Q	.	.	.	.
9.03	0.0484	0.09	Q	.	.	.	.
9.22	0.0497	0.09	Q	.	.	.	.
9.40	0.0510	0.09	Q	.	.	.	.
9.58	0.0524	0.09	Q	.	.	.	.
9.77	0.0538	0.09	Q	.	.	.	.
9.95	0.0552	0.09	Q	.	.	.	.
10.13	0.0567	0.10	Q	.	.	.	.
10.32	0.0581	0.10	Q	.	.	.	.
10.50	0.0596	0.10	Q	.	.	.	.
10.68	0.0612	0.10	Q	.	.	.	.
10.87	0.0627	0.10	Q	.	.	.	.
11.05	0.0643	0.11	Q	.	.	.	.
11.23	0.0660	0.11	Q	.	.	.	.
11.42	0.0677	0.11	Q	.	.	.	.
11.60	0.0694	0.11	Q	.	.	.	.
11.78	0.0711	0.12	Q	.	.	.	.
11.97	0.0729	0.12	Q	.	.	.	.
12.15	0.0750	0.14	Q	.	.	.	.
12.33	0.0772	0.15	Q	.	.	.	.
12.52	0.0796	0.16	Q	.	.	.	.
12.70	0.0821	0.16	Q	.	.	.	.
12.88	0.0846	0.17	Q	.	.	.	.
13.07	0.0872	0.17	Q	.	.	.	.
13.25	0.0899	0.18	Q	.	.	.	.

13.43	0.0926	0.19	Q	.	.	.	.
13.62	0.0955	0.20	Q	.	.	.	.
13.80	0.0985	0.20	Q	.	.	.	.
13.98	0.1017	0.21	Q	.	.	.	.
14.17	0.1050	0.22	Q	.	.	.	.
14.35	0.1085	0.24	Q	.	.	.	.
14.53	0.1123	0.25	.Q	.	.	.	.
14.72	0.1163	0.28	.Q	.	.	.	.
14.90	0.1206	0.29	.Q	.	.	.	.
15.08	0.1252	0.32	.Q	.	.	.	.
15.27	0.1303	0.35	.Q	.	.	.	.
15.45	0.1358	0.38	.Q	.	.	.	.
15.63	0.1417	0.40	.Q	.	.	.	.
15.82	0.1490	0.57	. Q	.	.	.	.
16.00	0.1596	0.83	. Q	.	.	.	.
16.18	0.1872	2.81	.	.Q	.	.	.
16.37	0.2119	0.46	.Q	.	.	.	.
16.55	0.2183	0.37	.Q	.	.	.	.
16.73	0.2234	0.31	.Q	.	.	.	.
16.92	0.2277	0.26	.Q	.	.	.	.
17.10	0.2315	0.24	Q	.	.	.	.
17.28	0.2348	0.21	Q	.	.	.	.
17.47	0.2378	0.19	Q	.	.	.	.
17.65	0.2406	0.18	Q	.	.	.	.
17.83	0.2432	0.17	Q	.	.	.	.
18.02	0.2457	0.16	Q	.	.	.	.
18.20	0.2478	0.12	Q	.	.	.	.
18.38	0.2496	0.12	Q	.	.	.	.
18.57	0.2513	0.11	Q	.	.	.	.
18.75	0.2530	0.11	Q	.	.	.	.
18.93	0.2545	0.10	Q	.	.	.	.
19.12	0.2560	0.10	Q	.	.	.	.
19.30	0.2575	0.09	Q	.	.	.	.
19.48	0.2589	0.09	Q	.	.	.	.
19.67	0.2602	0.09	Q	.	.	.	.
19.85	0.2615	0.08	Q	.	.	.	.
20.03	0.2628	0.08	Q	.	.	.	.
20.22	0.2640	0.08	Q	.	.	.	.
20.40	0.2652	0.08	Q	.	.	.	.
20.58	0.2664	0.08	Q	.	.	.	.
20.77	0.2675	0.07	Q	.	.	.	.
20.95	0.2686	0.07	Q	.	.	.	.
21.13	0.2697	0.07	Q	.	.	.	.
21.32	0.2708	0.07	Q	.	.	.	.
21.50	0.2718	0.07	Q	.	.	.	.
21.68	0.2728	0.07	Q	.	.	.	.
21.87	0.2738	0.06	Q	.	.	.	.
22.05	0.2748	0.06	Q	.	.	.	.
22.23	0.2757	0.06	Q	.	.	.	.
22.42	0.2766	0.06	Q	.	.	.	.

22.60	0.2775	0.06	Q	.	.	.	.
22.78	0.2784	0.06	Q	.	.	.	.
22.97	0.2793	0.06	Q	.	.	.	.
23.15	0.2802	0.06	Q	.	.	.	.
23.33	0.2811	0.06	Q	.	.	.	.
23.52	0.2819	0.06	Q	.	.	.	.
23.70	0.2827	0.05	Q	.	.	.	.
23.88	0.2835	0.05	Q	.	.	.	.
24.07	0.2843	0.05	Q	.	.	.	.
24.25	0.2847	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%	1441.0
10%	121.0
20%	33.0
30%	11.0
40%	11.0
50%	11.0
60%	11.0
70%	11.0
80%	11.0
90%	11.0

10-YEAR, 24-HOUR: PROPOSED CONDITIONS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 2.30
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.080
LOW LOSS FRACTION = 0.120
TIME OF CONCENTRATION(MIN.) = 11.00
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 10
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.34
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.72
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.95
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.59
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.20
24-HOUR POINT RAINFALL VALUE(INCHES) = 3.68

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.56
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.14

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0000	0.00	Q	.	.	.	.
0.23	0.0008	0.10	Q	.	.	.	.
0.42	0.0024	0.10	Q	.	.	.	.
0.60	0.0040	0.11	Q	.	.	.	.
0.78	0.0056	0.11	Q	.	.	.	.
0.97	0.0072	0.11	Q	.	.	.	.
1.15	0.0088	0.11	Q	.	.	.	.
1.33	0.0105	0.11	Q	.	.	.	.
1.52	0.0121	0.11	Q	.	.	.	.
1.70	0.0138	0.11	Q	.	.	.	.
1.88	0.0155	0.11	Q	.	.	.	.
2.07	0.0172	0.11	Q	.	.	.	.
2.25	0.0189	0.11	Q	.	.	.	.
2.43	0.0206	0.11	Q	.	.	.	.
2.62	0.0223	0.12	Q	.	.	.	.
2.80	0.0241	0.12	Q	.	.	.	.
2.98	0.0258	0.12	Q	.	.	.	.
3.17	0.0276	0.12	Q	.	.	.	.
3.35	0.0294	0.12	Q	.	.	.	.
3.53	0.0312	0.12	Q	.	.	.	.
3.72	0.0331	0.12	Q	.	.	.	.
3.90	0.0349	0.12	Q	.	.	.	.
4.08	0.0368	0.12	Q	.	.	.	.

10-YEAR, 24-HOUR: PROPOSED CONDITIONS

4.27	0.0387	0.12	Q	.	.	.	.
4.45	0.0406	0.13	Q	.	.	.	.
4.63	0.0425	0.13	Q	.	.	.	.
4.82	0.0444	0.13	Q	.	.	.	.
5.00	0.0464	0.13	Q	.	.	.	.
5.18	0.0484	0.13	Q	.	.	.	.
5.37	0.0504	0.13	Q	.	.	.	.
5.55	0.0524	0.13	Q	.	.	.	.
5.73	0.0544	0.14	Q	.	.	.	.
5.92	0.0565	0.14	Q	.	.	.	.
6.10	0.0586	0.14	Q	.	.	.	.
6.28	0.0607	0.14	Q	.	.	.	.
6.47	0.0629	0.14	Q	.	.	.	.
6.65	0.0650	0.14	Q	.	.	.	.
6.83	0.0672	0.15	Q	.	.	.	.
7.02	0.0694	0.15	Q	.	.	.	.
7.20	0.0717	0.15	Q	.	.	.	.
7.38	0.0740	0.15	Q	.	.	.	.
7.57	0.0763	0.15	Q	.	.	.	.
7.75	0.0786	0.16	Q	.	.	.	.
7.93	0.0810	0.16	Q	.	.	.	.
8.12	0.0834	0.16	Q	.	.	.	.
8.30	0.0858	0.16	Q	.	.	.	.
8.48	0.0883	0.17	Q	.	.	.	.
8.67	0.0908	0.17	Q	.	.	.	.
8.85	0.0934	0.17	Q	.	.	.	.
9.03	0.0960	0.17	Q	.	.	.	.
9.22	0.0986	0.18	Q	.	.	.	.
9.40	0.1013	0.18	Q	.	.	.	.
9.58	0.1040	0.18	Q	.	.	.	.
9.77	0.1068	0.18	Q	.	.	.	.
9.95	0.1096	0.19	Q	.	.	.	.
10.13	0.1125	0.19	Q	.	.	.	.
10.32	0.1154	0.20	Q	.	.	.	.
10.50	0.1184	0.20	Q	.	.	.	.
10.68	0.1215	0.20	Q	.	.	.	.
10.87	0.1246	0.21	Q	.	.	.	.
11.05	0.1278	0.21	Q	.	.	.	.
11.23	0.1310	0.22	Q	.	.	.	.
11.42	0.1344	0.22	Q	.	.	.	.
11.60	0.1378	0.23	Q	.	.	.	.
11.78	0.1413	0.24	Q	.	.	.	.
11.97	0.1449	0.24	Q	.	.	.	.
12.15	0.1489	0.30	.Q	.	.	.	.
12.33	0.1536	0.32	.Q	.	.	.	.
12.52	0.1585	0.33	.Q	.	.	.	.
12.70	0.1636	0.34	.Q	.	.	.	.
12.88	0.1688	0.35	.Q	.	.	.	.
13.07	0.1742	0.36	.Q	.	.	.	.
13.25	0.1797	0.37	.Q	.	.	.	.

10-YEAR, 24-HOUR: PROPOSED CONDITIONS

13.43	0.1854	0.38	.Q	.	.	.	.
13.62	0.1913	0.40	.Q	.	.	.	.
13.80	0.1975	0.41	.Q	.	.	.	.
13.98	0.2039	0.44	.Q	.	.	.	.
14.17	0.2107	0.45	.Q	.	.	.	.
14.35	0.2177	0.48	.Q	.	.	.	.
14.53	0.2252	0.50	. Q	.	.	.	.
14.72	0.2331	0.55	. Q	.	.	.	.
14.90	0.2416	0.57	. Q	.	.	.	.
15.08	0.2508	0.64	. Q	.	.	.	.
15.27	0.2608	0.69	. Q	.	.	.	.
15.45	0.2717	0.75	. Q	.	.	.	.
15.63	0.2834	0.78	. Q	.	.	.	.
15.82	0.2980	1.15	. Q	.	.	.	.
16.00	0.3190	1.63	. Q	.	.	.	.
16.18	0.3706	5.18	.	.	Q	.	.
16.37	0.4167	0.91	. Q	.	.	.	.
16.55	0.4292	0.74	. Q	.	.	.	.
16.73	0.4393	0.60	. Q	.	.	.	.
16.92	0.4479	0.52	. Q	.	.	.	.
17.10	0.4554	0.47	.Q	.	.	.	.
17.28	0.4621	0.42	.Q	.	.	.	.
17.47	0.4683	0.39	.Q	.	.	.	.
17.65	0.4740	0.36	.Q	.	.	.	.
17.83	0.4794	0.34	.Q	.	.	.	.
18.02	0.4844	0.32	.Q	.	.	.	.
18.20	0.4887	0.24	Q	.	.	.	.
18.38	0.4923	0.23	Q	.	.	.	.
18.57	0.4958	0.22	Q	.	.	.	.
18.75	0.4990	0.21	Q	.	.	.	.
18.93	0.5021	0.20	Q	.	.	.	.
19.12	0.5051	0.19	Q	.	.	.	.
19.30	0.5080	0.19	Q	.	.	.	.
19.48	0.5108	0.18	Q	.	.	.	.
19.67	0.5135	0.17	Q	.	.	.	.
19.85	0.5161	0.17	Q	.	.	.	.
20.03	0.5186	0.16	Q	.	.	.	.
20.22	0.5210	0.16	Q	.	.	.	.
20.40	0.5234	0.15	Q	.	.	.	.
20.58	0.5257	0.15	Q	.	.	.	.
20.77	0.5279	0.15	Q	.	.	.	.
20.95	0.5301	0.14	Q	.	.	.	.
21.13	0.5323	0.14	Q	.	.	.	.
21.32	0.5344	0.14	Q	.	.	.	.
21.50	0.5364	0.13	Q	.	.	.	.
21.68	0.5384	0.13	Q	.	.	.	.
21.87	0.5404	0.13	Q	.	.	.	.
22.05	0.5423	0.13	Q	.	.	.	.
22.23	0.5442	0.12	Q	.	.	.	.
22.42	0.5460	0.12	Q	.	.	.	.

22.60	0.5478	0.12	Q	.	.	.	.
22.78	0.5496	0.12	Q	.	.	.	.
22.97	0.5514	0.11	Q	.	.	.	.
23.15	0.5531	0.11	Q	.	.	.	.
23.33	0.5548	0.11	Q	.	.	.	.
23.52	0.5565	0.11	Q	.	.	.	.
23.70	0.5581	0.11	Q	.	.	.	.
23.88	0.5597	0.11	Q	.	.	.	.
24.07	0.5613	0.10	Q	.	.	.	.
24.25	0.5621	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%	1441.0
10%	143.0
20%	33.0
30%	22.0
40%	11.0
50%	11.0
60%	11.0
70%	11.0
80%	11.0
90%	11.0

25-YEAR, 24-HOUR: PROPOSED CONDITIONS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 2.30
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.080
LOW LOSS FRACTION = 0.100
TIME OF CONCENTRATION(MIN.) = 11.00
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 25
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.40
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.87
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.15
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.94
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.71
24-HOUR POINT RAINFALL VALUE(INCHES) = 4.49

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.70
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.16

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0000	0.00	Q	.	.	.	.
0.23	0.0010	0.13	Q	.	.	.	.
0.42	0.0029	0.13	Q	.	.	.	.
0.60	0.0049	0.13	Q	.	.	.	.
0.78	0.0068	0.13	Q	.	.	.	.
0.97	0.0088	0.13	Q	.	.	.	.
1.15	0.0108	0.13	Q	.	.	.	.
1.33	0.0128	0.13	Q	.	.	.	.
1.52	0.0148	0.13	Q	.	.	.	.
1.70	0.0169	0.14	Q	.	.	.	.
1.88	0.0189	0.14	Q	.	.	.	.
2.07	0.0210	0.14	Q	.	.	.	.
2.25	0.0231	0.14	Q	.	.	.	.
2.43	0.0252	0.14	Q	.	.	.	.
2.62	0.0274	0.14	Q	.	.	.	.
2.80	0.0295	0.14	Q	.	.	.	.
2.98	0.0317	0.14	Q	.	.	.	.
3.17	0.0339	0.14	Q	.	.	.	.
3.35	0.0361	0.15	Q	.	.	.	.
3.53	0.0383	0.15	Q	.	.	.	.
3.72	0.0405	0.15	Q	.	.	.	.
3.90	0.0428	0.15	Q	.	.	.	.
4.08	0.0451	0.15	Q	.	.	.	.

4.27	0.0474	0.15	Q	.	.	.	.
4.45	0.0497	0.16	Q	.	.	.	.
4.63	0.0521	0.16	Q	.	.	.	.
4.82	0.0545	0.16	Q	.	.	.	.
5.00	0.0569	0.16	Q	.	.	.	.
5.18	0.0593	0.16	Q	.	.	.	.
5.37	0.0618	0.16	Q	.	.	.	.
5.55	0.0643	0.17	Q	.	.	.	.
5.73	0.0668	0.17	Q	.	.	.	.
5.92	0.0693	0.17	Q	.	.	.	.
6.10	0.0719	0.17	Q	.	.	.	.
6.28	0.0745	0.17	Q	.	.	.	.
6.47	0.0771	0.17	Q	.	.	.	.
6.65	0.0798	0.18	Q	.	.	.	.
6.83	0.0825	0.18	Q	.	.	.	.
7.02	0.0852	0.18	Q	.	.	.	.
7.20	0.0880	0.18	Q	.	.	.	.
7.38	0.0908	0.19	Q	.	.	.	.
7.57	0.0936	0.19	Q	.	.	.	.
7.75	0.0965	0.19	Q	.	.	.	.
7.93	0.0994	0.19	Q	.	.	.	.
8.12	0.1024	0.20	Q	.	.	.	.
8.30	0.1054	0.20	Q	.	.	.	.
8.48	0.1084	0.20	Q	.	.	.	.
8.67	0.1115	0.21	Q	.	.	.	.
8.85	0.1146	0.21	Q	.	.	.	.
9.03	0.1178	0.21	Q	.	.	.	.
9.22	0.1211	0.22	Q	.	.	.	.
9.40	0.1244	0.22	Q	.	.	.	.
9.58	0.1277	0.22	Q	.	.	.	.
9.77	0.1312	0.23	Q	.	.	.	.
9.95	0.1346	0.23	Q	.	.	.	.
10.13	0.1382	0.24	Q	.	.	.	.
10.32	0.1418	0.24	Q	.	.	.	.
10.50	0.1455	0.25	Q	.	.	.	.
10.68	0.1493	0.25	.Q	.	.	.	.
10.87	0.1531	0.26	.Q	.	.	.	.
11.05	0.1570	0.26	.Q	.	.	.	.
11.23	0.1611	0.27	.Q	.	.	.	.
11.42	0.1652	0.28	.Q	.	.	.	.
11.60	0.1694	0.28	.Q	.	.	.	.
11.78	0.1737	0.29	.Q	.	.	.	.
11.97	0.1782	0.30	.Q	.	.	.	.
12.15	0.1833	0.38	.Q	.	.	.	.
12.33	0.1893	0.41	.Q	.	.	.	.
12.52	0.1957	0.43	.Q	.	.	.	.
12.70	0.2023	0.44	.Q	.	.	.	.
12.88	0.2090	0.45	.Q	.	.	.	.
13.07	0.2159	0.46	.Q	.	.	.	.
13.25	0.2231	0.48	.Q	.	.	.	.

13.43	0.2304	0.49	.Q	.	.	.	.
13.62	0.2381	0.52	. Q	.	.	.	.
13.80	0.2460	0.53	. Q	.	.	.	.
13.98	0.2543	0.56	. Q	.	.	.	.
14.17	0.2629	0.58	. Q	.	.	.	.
14.35	0.2719	0.61	. Q	.	.	.	.
14.53	0.2813	0.63	. Q	.	.	.	.
14.72	0.2914	0.69	. Q	.	.	.	.
14.90	0.3021	0.72	. Q	.	.	.	.
15.08	0.3137	0.81	. Q	.	.	.	.
15.27	0.3264	0.86	. Q	.	.	.	.
15.45	0.3401	0.94	. Q	.	.	.	.
15.63	0.3546	0.97	. Q	.	.	.	.
15.82	0.3730	1.46	. Q	.	.	.	.
16.00	0.3996	2.06	. Q	.	.	.	.
16.18	0.4622	6.19	.	.	. Q	.	.
16.37	0.5176	1.13	. Q	.	.	.	.
16.55	0.5332	0.93	. Q	.	.	.	.
16.73	0.5461	0.76	. Q	.	.	.	.
16.92	0.5568	0.66	. Q	.	.	.	.
17.10	0.5663	0.59	. Q	.	.	.	.
17.28	0.5749	0.55	. Q	.	.	.	.
17.47	0.5829	0.50	. Q	.	.	.	.
17.65	0.5903	0.47	.Q	.	.	.	.
17.83	0.5972	0.44	.Q	.	.	.	.
18.02	0.6038	0.42	.Q	.	.	.	.
18.20	0.6092	0.30	.Q	.	.	.	.
18.38	0.6137	0.29	.Q	.	.	.	.
18.57	0.6179	0.27	.Q	.	.	.	.
18.75	0.6219	0.26	.Q	.	.	.	.
18.93	0.6258	0.25	Q	.	.	.	.
19.12	0.6295	0.24	Q	.	.	.	.
19.30	0.6330	0.23	Q	.	.	.	.
19.48	0.6364	0.22	Q	.	.	.	.
19.67	0.6397	0.21	Q	.	.	.	.
19.85	0.6429	0.21	Q	.	.	.	.
20.03	0.6460	0.20	Q	.	.	.	.
20.22	0.6490	0.20	Q	.	.	.	.
20.40	0.6520	0.19	Q	.	.	.	.
20.58	0.6548	0.18	Q	.	.	.	.
20.77	0.6576	0.18	Q	.	.	.	.
20.95	0.6603	0.18	Q	.	.	.	.
21.13	0.6629	0.17	Q	.	.	.	.
21.32	0.6655	0.17	Q	.	.	.	.
21.50	0.6680	0.16	Q	.	.	.	.
21.68	0.6704	0.16	Q	.	.	.	.
21.87	0.6728	0.16	Q	.	.	.	.
22.05	0.6752	0.15	Q	.	.	.	.
22.23	0.6775	0.15	Q	.	.	.	.
22.42	0.6798	0.15	Q	.	.	.	.

22.60	0.6820	0.15	Q	.	.	.	.
22.78	0.6842	0.14	Q	.	.	.	.
22.97	0.6863	0.14	Q	.	.	.	.
23.15	0.6884	0.14	Q	.	.	.	.
23.33	0.6905	0.14	Q	.	.	.	.
23.52	0.6926	0.13	Q	.	.	.	.
23.70	0.6946	0.13	Q	.	.	.	.
23.88	0.6966	0.13	Q	.	.	.	.
24.07	0.6985	0.13	Q	.	.	.	.
24.25	0.6995	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%	1441.0
10%	154.0
20%	33.0
30%	22.0
40%	11.0
50%	11.0
60%	11.0
70%	11.0
80%	11.0
90%	11.0

100-YEAR, 24-HOUR: PROPOSED CONDITIONS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 2.30
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.080
LOW LOSS FRACTION = 0.080
TIME OF CONCENTRATION(MIN.) = 11.00
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = 100
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.52
30-MINUTE POINT RAINFALL VALUE(INCHES) = 1.09
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.45
3-HOUR POINT RAINFALL VALUE(INCHES) = 2.43
6-HOUR POINT RAINFALL VALUE(INCHES) = 3.36
24-HOUR POINT RAINFALL VALUE(INCHES) = 5.63

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.89
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.18

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0000	0.00	Q	.	.	.	.
0.23	0.0013	0.17	Q	.	.	.	.
0.42	0.0038	0.17	Q	.	.	.	.
0.60	0.0064	0.17	Q	.	.	.	.
0.78	0.0089	0.17	Q	.	.	.	.
0.97	0.0115	0.17	Q	.	.	.	.
1.15	0.0141	0.17	Q	.	.	.	.
1.33	0.0168	0.17	Q	.	.	.	.
1.52	0.0194	0.18	Q	.	.	.	.
1.70	0.0221	0.18	Q	.	.	.	.
1.88	0.0248	0.18	Q	.	.	.	.
2.07	0.0275	0.18	Q	.	.	.	.
2.25	0.0303	0.18	Q	.	.	.	.
2.43	0.0330	0.18	Q	.	.	.	.
2.62	0.0358	0.19	Q	.	.	.	.
2.80	0.0386	0.19	Q	.	.	.	.
2.98	0.0415	0.19	Q	.	.	.	.
3.17	0.0443	0.19	Q	.	.	.	.
3.35	0.0472	0.19	Q	.	.	.	.
3.53	0.0501	0.19	Q	.	.	.	.
3.72	0.0531	0.20	Q	.	.	.	.
3.90	0.0560	0.20	Q	.	.	.	.
4.08	0.0590	0.20	Q	.	.	.	.

100-YEAR, 24-HOUR: PROPOSED CONDITIONS

4.27	0.0620	0.20	Q	.	.	.	.
4.45	0.0651	0.20	Q	.	.	.	.
4.63	0.0682	0.20	Q	.	.	.	.
4.82	0.0713	0.21	Q	.	.	.	.
5.00	0.0744	0.21	Q	.	.	.	.
5.18	0.0776	0.21	Q	.	.	.	.
5.37	0.0808	0.21	Q	.	.	.	.
5.55	0.0841	0.22	Q	.	.	.	.
5.73	0.0873	0.22	Q	.	.	.	.
5.92	0.0907	0.22	Q	.	.	.	.
6.10	0.0940	0.22	Q	.	.	.	.
6.28	0.0974	0.23	Q	.	.	.	.
6.47	0.1008	0.23	Q	.	.	.	.
6.65	0.1043	0.23	Q	.	.	.	.
6.83	0.1078	0.23	Q	.	.	.	.
7.02	0.1114	0.24	Q	.	.	.	.
7.20	0.1150	0.24	Q	.	.	.	.
7.38	0.1187	0.24	Q	.	.	.	.
7.57	0.1224	0.25	Q	.	.	.	.
7.75	0.1261	0.25	Q	.	.	.	.
7.93	0.1299	0.25	.Q	.	.	.	.
8.12	0.1338	0.26	.Q	.	.	.	.
8.30	0.1377	0.26	.Q	.	.	.	.
8.48	0.1416	0.26	.Q	.	.	.	.
8.67	0.1457	0.27	.Q	.	.	.	.
8.85	0.1498	0.27	.Q	.	.	.	.
9.03	0.1539	0.28	.Q	.	.	.	.
9.22	0.1581	0.28	.Q	.	.	.	.
9.40	0.1624	0.29	.Q	.	.	.	.
9.58	0.1668	0.29	.Q	.	.	.	.
9.77	0.1713	0.30	.Q	.	.	.	.
9.95	0.1758	0.30	.Q	.	.	.	.
10.13	0.1804	0.31	.Q	.	.	.	.
10.32	0.1851	0.31	.Q	.	.	.	.
10.50	0.1899	0.32	.Q	.	.	.	.
10.68	0.1948	0.33	.Q	.	.	.	.
10.87	0.1998	0.33	.Q	.	.	.	.
11.05	0.2049	0.34	.Q	.	.	.	.
11.23	0.2101	0.35	.Q	.	.	.	.
11.42	0.2155	0.36	.Q	.	.	.	.
11.60	0.2209	0.36	.Q	.	.	.	.
11.78	0.2266	0.38	.Q	.	.	.	.
11.97	0.2323	0.38	.Q	.	.	.	.
12.15	0.2388	0.47	.Q	.	.	.	.
12.33	0.2463	0.51	. Q	.	.	.	.
12.52	0.2541	0.53	. Q	.	.	.	.
12.70	0.2622	0.54	. Q	.	.	.	.
12.88	0.2705	0.56	. Q	.	.	.	.
13.07	0.2790	0.57	. Q	.	.	.	.
13.25	0.2878	0.59	. Q	.	.	.	.

100-YEAR, 24-HOUR: PROPOSED CONDITIONS

13.43	0.2969	0.61	. Q	.	.	.	.
13.62	0.3064	0.64	. Q	.	.	.	.
13.80	0.3162	0.66	. Q	.	.	.	.
13.98	0.3265	0.70	. Q	.	.	.	.
14.17	0.3372	0.72	. Q	.	.	.	.
14.35	0.3485	0.77	. Q	.	.	.	.
14.53	0.3604	0.80	. Q	.	.	.	.
14.72	0.3731	0.87	. Q	.	.	.	.
14.90	0.3867	0.92	. Q	.	.	.	.
15.08	0.4014	1.03	. Q	.	.	.	.
15.27	0.4175	1.10	. Q	.	.	.	.
15.45	0.4351	1.22	. Q	.	.	.	.
15.63	0.4540	1.28	. Q	.	.	.	.
15.82	0.4774	1.81	. Q	.	.	.	.
16.00	0.5103	2.53	. Q	.	.	.	.
16.18	0.5898	7.97	.	.	.	.Q	.
16.37	0.6614	1.48	. Q	.	.	.	.
16.55	0.6816	1.18	. Q	.	.	.	.
16.73	0.6979	0.97	. Q	.	.	.	.
16.92	0.7115	0.84	. Q	.	.	.	.
17.10	0.7235	0.75	. Q	.	.	.	.
17.28	0.7343	0.68	. Q	.	.	.	.
17.47	0.7441	0.62	. Q	.	.	.	.
17.65	0.7533	0.58	. Q	.	.	.	.
17.83	0.7618	0.55	. Q	.	.	.	.
18.02	0.7699	0.52	. Q	.	.	.	.
18.20	0.7768	0.39	.Q	.	.	.	.
18.38	0.7825	0.37	.Q	.	.	.	.
18.57	0.7880	0.35	.Q	.	.	.	.
18.75	0.7933	0.34	.Q	.	.	.	.
18.93	0.7983	0.32	.Q	.	.	.	.
19.12	0.8031	0.31	.Q	.	.	.	.
19.30	0.8077	0.30	.Q	.	.	.	.
19.48	0.8121	0.29	.Q	.	.	.	.
19.67	0.8164	0.28	.Q	.	.	.	.
19.85	0.8206	0.27	.Q	.	.	.	.
20.03	0.8246	0.26	.Q	.	.	.	.
20.22	0.8285	0.25	.Q	.	.	.	.
20.40	0.8323	0.25	Q	.	.	.	.
20.58	0.8360	0.24	Q	.	.	.	.
20.77	0.8396	0.23	Q	.	.	.	.
20.95	0.8431	0.23	Q	.	.	.	.
21.13	0.8466	0.22	Q	.	.	.	.
21.32	0.8499	0.22	Q	.	.	.	.
21.50	0.8532	0.21	Q	.	.	.	.
21.68	0.8564	0.21	Q	.	.	.	.
21.87	0.8596	0.21	Q	.	.	.	.
22.05	0.8626	0.20	Q	.	.	.	.
22.23	0.8657	0.20	Q	.	.	.	.
22.42	0.8686	0.19	Q	.	.	.	.

22.60	0.8715	0.19	Q	.	.	.	.
22.78	0.8744	0.19	Q	.	.	.	.
22.97	0.8772	0.18	Q	.	.	.	.
23.15	0.8800	0.18	Q	.	.	.	.
23.33	0.8827	0.18	Q	.	.	.	.
23.52	0.8854	0.18	Q	.	.	.	.
23.70	0.8880	0.17	Q	.	.	.	.
23.88	0.8906	0.17	Q	.	.	.	.
24.07	0.8932	0.17	Q	.	.	.	.
24.25	0.8944	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%	1441.0
10%	154.0
20%	33.0
30%	22.0
40%	11.0
50%	11.0
60%	11.0
70%	11.0
80%	11.0
90%	11.0