Appendix H.

Hydrology Technical Memorandum

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MEMORANDUM

To:	Peter Vanek, Integral Communities
From:	Eric Schniewind, Dudek
Subject:	Hydrology Technical Memorandum for Riverview Development Project
Date:	November 16, 2022
Attachments:	A — Hydrology Report, Alliance Land Planning and Engineering B — USMP/LID Report, Alliance Land Planning and Engineering

This section describes the existing hydrology and water quality setting and regulatory setting that would apply to the proposed Riverview Development Project (project or proposed project) in the City of Santa Clarita, California. The project site is located on the south bank of the Santa Clara River, between a Metrolink commuter railroad line to the south and Soledad Canyon Road to the north, and east of Commuter Way. The site encompasses approximately 35.4 acres. The following provides information and resources that can be used for the purposes of completing an environmental analysis of the proposed project pursuant to the requirements of the California Environmental Quality Act.

1 Setting

1.1 Regional Hydrology

1.1.1 Santa Clara River Watershed

The project site is located within the Santa Clara River watershed, which is the largest river system in southern California that remains in a relatively natural state and drains approximately 1,200 square miles (RWQCB 2022a). The Santa Clara River originates in the northern slope of the San Gabriel Mountains in Los Angeles County and traverses through Ventura County where it eventually empties into the Pacific Ocean between San Buenaventura and Oxnard. Land use on and around the project site is characterized by predominantly open space with the mainstem of the river flowing through residential, agricultural, and some industrial land uses. The river runs approximately 100 miles and is considered a high quality resource for much of its entire length (RWQCB 2022a). However, increasing loads of nitrogen and salts in supplies of groundwater threaten beneficial uses of the river including irrigation and drinking water. Other threats to water quality include increasing development in floodplain areas which has resulted in the construction of flood control measures such as channelized drainage structures that increases stormwater runoff volumes and velocities causing erosion and loss of habitat (RWQCB 2022a).

According to the Regional Water Quality Control Board (RWQCB) as part of federal Clean Water Act requirements, the RWQCB has identified the following beneficial uses in the watershed for the areas above the estuary:

- Contact and non-contact water recreation
- Wildlife habitat
- Preservation of rare & endangered species
- Migratory habitat
- Wetlands habitat
- Municipal supply
- Industrial service supply
- Industrial process supply
- Agricultural supply
- Groundwater recharge
- Freshwater replenishment
- Warmwater habitat
- Coldwater habitat

The project site is located within the Reach 6 segment of the Santa Clara River of what is defined as the Upper Santa Clara River (USCRWMG 2015). Reach 6 runs between Bouquet Canyon Road Bridge and West Pier Highway 99. According to the RWQCB, Reach 6 of the Santa Clara River is impaired by chlorpyrifos (insecticide), coliform bacteria, diazinon (insecticide), toxicity, and chloride (salts) (RWQCB 2022b). The project site is located immediately southwest Soledad Canyon Road, which traverses the southern bank of the Santa Clara River. Therefore, the Santa Clara River would be considered the nearest receiving body of water for any stormwater runoff discharging from the site.

1.1.2 Santa Clara River Valley East Groundwater Basin

The Santa Clara River Valley groundwater basin has a total of six subbasins. The project site is located within the Santa Clara River Valley East subbasin (DWR Basin 4-004.07) (DWR 2022), the easternmost of the six subbasins. It is bounded on the north by the Piru Mountains, on the east and southeast by the San Gabriel Mountains, and on the south by the Santa Susannah Mountains (SCVGSA 2022). The City of Santa Clarita is near the eastern boundary of this 66,200-acre subbasin. Groundwater is found in the alluvial deposits, terrace deposits, and the Saugus Formation. While the groundwater is generally unconfined it can also be found as confined or semi-confined within the Saugus Formation (SCVGSA 2022). The two principal aquifer systems of the subbasin include the Alluvial Aquifer System which overlies the Saugus Formation (SCVGSA 2022).

Average annual precipitation in the Santa Clara River Valley ranges from 14 to 16 inches. Rain falling in the upper elevations of the watershed infiltrates into the soil, where some of the water evaporates or is transpired by vegetation and the remainder becomes stormwater that can also infiltrate to underlying groundwater resources. A portion of the runoff occurs as overland flows into side canyons and tributaries to the Santa Clara River. In the urban areas, precipitation falling on impervious surfaces is directed to storm drains that flow to the river or the stormwater is directed to swales and allowed to infiltrate locally (SCVGSA 2022).

The subbasin is not adjudicated and in accordance with the California Groundwater Sustainability Management Act (SGMA) is being managed by the Santa Clara River Valley Water Agency as the Groundwater Sustainability Agency (GSA). As required by SGMA, the California Department of Water Resource (DWR) has evaluated the subbasin for sustainability and determined that it is a High Priority basin, with long term hydrographs showing groundwater levels declining (DWR 2022). However, according to the 2020 Urban Water Management Plan, the projected demands can be met by supplies in normal, single dry year, and multiple dry year scenarios although demands may require some passive and active conservation measures to end up below projected supplies (SCVWA 2021). According to the Groundwater Sustainability Plan for the subbasin, "the Basin is not likely to be in an overdraft condition under a sustained level of pumping at the full-build-out level of human demand for groundwater, even under the average climate change scenarios for 2030 and 2070; and the operating plan for the Basin's groundwater resources is expected to continue maintaining a condition that does not create an overdraft condition (chronic long-term declines in groundwater levels) in the future" (SCVGSA 2022).

The project would be served by the Santa Clarita Valley Water Agency (SCV Water). SCV Water has prepared a 2020 Urban Water Management Plan (UWMP) for its service area, including the project site. According to Table 4-1 of the SCV Water 2020 UWMP, in 2020, SCV Water received approximately 26% of its water supply from groundwater, 0.7% from recycled water, 38.8% from imported water, and 34.5% from banked water (SCVWA 2021). SCV Water has long planned to increase its supplies of recycled water for the purposes of irrigation and in implementing the recent GSP has identified projects and programs to achieve a sustainable yield for the subbasin.

1.2 Project Site Stormwater Drainage

The project site is currently predominantly covered by impervious surfaces (approximately 80%). Stormwater runoff at the site currently occurs as sheet flows that move from southwest to northeast and into two existing storm drain pipe culverts that are owned/maintained by the County of Los Angeles (RDD 234, Cash Contract No. 2674) (Attachment A). A third pipe also collects flows but for just a section of Soledad Canyon Road. These existing pipe culverts convey stormwater under Soledad Canyon Road and outlet to the Santa Clara River on the north side of Soledad Canyon Road. The hillsides southwest of the project site currently drain towards the Metrolink railroad and into three inlets leading to debris basins and 24-inch pipes that convey the flow under the railroad. The stormwater then sheet-flows across the project site.

1.3 Flood Zones

The project site is located in the Santa Clara River watershed adjacent to the riverbank which is just the other side of Soledad Canyon Road. According to mapping compiled by the Federal Emergency Management Agency (FEMA), the entire project site is located outside of any 100-year flood zone and is located within an area of minimal flood hazard (Zone X) (FEMA 2021). The floodplain associated with the Santa Clara River is confined and bounded on the south bank, nearest to the project site, by Soledad Canyon Road.

2 Regulatory Setting

2.1 Federal

2.1.1 Clean Water Act

Increasing public awareness and concern for controlling water pollution led to the enactment of the Federal Water Pollution Control Act Amendments of 1972. As amended in 1977, this law became commonly known as the Clean Water Act (CWA) (33 USC 1251 et seq.). The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The CWA established basic guidelines for regulating discharges of pollutants into the waters of the United States. The CWA requires that states adopt water quality standards to protect public health, enhance the quality of water resources, and ensure implementation of the CWA.

Section 303 of the Clean Water Act (Beneficial Use and Water Quality Objectives)

The Los Angeles RWQCB is responsible for the protection of the beneficial uses of waters within the proposed project area. The RWQCB uses its planning, permitting, and enforcement authority to meet its responsibilities adopted in the Basin Plan to implement plans, policies, and provisions for water quality management.

In accordance with state policy for water quality control, the RWQCB employs a range of beneficial use definitions for surface waters, groundwater basins, marshes, and mudflats that serve as the basis for establishing water quality objectives and discharge conditions and prohibitions. The Basin Plan for the Los Angeles Region has identified existing and potential beneficial uses supported by the key surface water drainages throughout its jurisdiction. Under CWA Section 303(d), the State of California is required to develop a list of impaired water bodies that do not meet water quality standards and objectives. A total maximum daily load defines how much of a specific pollutant/stressor a given water body can tolerate and still meet relevant water quality standards. The RWQCB has developed total maximum daily loads for select reaches of water bodies.

Section 401 of the Clean Water Act (Water Quality Certification)

Section 401 of the CWA requires that an applicant for any federal permit (e.g., a U.S. Army Corps of Engineers Section 404 permit) obtain certification from the state, requiring that discharge to waters of the United States would comply with provisions of the CWA and with state water quality standards. For example, an applicant for a permit under Section 404 of the CWA must also obtain water quality certification per Section 401 of the CWA. Section 404 of the CWA requires a permit from the U.S. Army Corps of Engineers prior to discharging dredged or fill material into waters of the United States unless such a discharge is exempt from CWA Section 404. For the project area, the Los Angeles RWQCB provides the water quality certification required under Section 401 of the CWA.

Section 402 of the Clean Water Act

The CWA was amended in 1972 to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES permit program, as authorized by Section 402 of the CWA, was established to control water pollution by regulating point sources that discharge pollutants into waters of the United States (33 USC 1342). In California, the EPA has authorized the State Water Resources Control Board (SWRCB) permitting authority to implement the NPDES program.

Regulations (Phase II Rule) that became final on December 8, 1999, expanded the existing NPDES Program to address stormwater discharges from construction sites that disturb land equal to or greater than 1 acre and less than 5 acres (small construction activity). The regulations also require that stormwater discharges from small MS4s be regulated by an NPDES General Permit for Storm Water Discharges Associated with Construction Activity, Order No. 99-08-DWQ (i.e., the General Construction Permit). Post-Construction stormwater controls to satisfy requirements of the NPDES Program are permitted under the Phase II Small Municipal Storm Sewer System (MS4) Permit (Order No. 2013-001 DWQ effective July 1, 2013).

To obtain coverage under the Construction General Permit, a project applicant must provide a Notice of Intent, a Stormwater Pollution Prevention Plan (SWPPP), and other documents required by Attachment B of the Construction General Permit. The SWPPP must contain a visual monitoring program, a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of best management practices (BMPs), and a sediment-monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. On September 2, 2009, the SWRCB issued a new NPDES General Permit for Storm Water Associated with Construction Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002 - as amended by 2010-0014-DWQ and 2012-0006-DWQ), that became effective July 1, 2010.

Section 404 of the Clean Water Act

Section 404 of the CWA established a permitting program to regulate the discharge of dredged or fill material into waters of the United States, which include wetlands adjacent to national waters (33 USC 1344). This permitting program is administered by the U.S. Army Corps of Engineers and enforced by the EPA.

2.1.2 National Flood Insurance Program

The National Flood Insurance Act of 1968 established the National Flood Insurance Program in order to provide flood insurance within communities that were willing to adopt floodplain management programs to mitigate future flood losses. The Act also required the identification of all floodplain areas within the United States and the establishment of flood-risk zones within those areas. FEMA is the primary agency responsible for administering programs and coordinating with communities to establish effective floodplain management standards. FEMA is responsible for preparing Flood Insurance Rate Maps that delineate the areas of known special flood hazards and their risk applicable to the community. The program encourages the adoption and enforcement by local communities of floodplain management ordinances that reduce flood risks. In support of the program, FEMA identifies flood hazard areas throughout the United States on FEMA flood hazard boundary maps.

2.1.3 Federal Antidegradation Policy

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

2.2 State

2.2.1 Senate Bill 610 and Senate Bill 221: Water Supply Assessments and Water Supply Verifications

Senate Bill (SB) 610 and SB 221, effective January 1, 2002, improve the linkage between certain land use decisions made by cities and counties and water supply availability. The statutes require detailed information regarding water availability and reliability with respect to certain developments to be included in the administrative record. Under Water Code Section 10912(a), projects subject to the California Environmental Quality Act requiring a water supply assessment include residential development of more than 500 dwelling units; shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space; commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space; hotel, motel or both, having more than 500 rooms; industrial, manufacturing, or processing plants, or industrial parks planned to house more than 1,000 persons, occupying more than 40 acres of land or having more than 650,000 square feet of floor area; mixed-use projects that include one or more of the projects specified; or a project that would demand an amount of water equivalent to or greater than the amount required by a 500 dwelling unit project. A fundamental source document for compliance with SB 610 is the UWMP, which can be used by the water supplier to meet the standard for SB 610.

2.2.2 California Water Code Section 10610 et seq., Urban Water Management Planning Act

California urban water providers are required by state law to develop an UWMP to ensure sufficient water supplies are available to meet the long-term needs of its customers during normal, dry, or multiple-dry years. The Urban Water Management Planning Act requires urban water suppliers, which provide water for municipal purposes to more than 3,000 customers or supply more than 3,000 acre-feet of water annually, to develop an UWMP every 5 years, in the years ending in 0 and 5.

In the Act, the California Legislature declared that the waters of the state are a limited and renewable resource subject to ever increasing demands; that the conservation and efficient use of urban water supplies are of a statewide concern; that successful implementation of plans is best accomplished at the local level; that conservation and efficient use of water shall be actively pursued to protect both the people of the state and their water resources; that conservation and efficient use of urban water supplies shall be a guiding criterion in public decisions; and that urban water suppliers shall be required to develop water management plans to achieve conservation and efficient use.

The City of Santa Clarita 2020 UWMP has been prepared in compliance with these requirements of the Act, as well as the additional reporting requirements of the Water Conservation Act of 2009. The UWMP is intended to serve as a general, flexible, and open-ended document that periodically can be updated to reflect changes in regional water supply trends, conservation policies, and water use efficiency policies.

2.2.3 Sustainable Groundwater Management Act

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package—Assembly Bill 1739 (Dickinson), SB 1168 (Pavley), and SB 1319 (Pavley)—collectively known as SGMA, which requires governments and water agencies of high- and medium-priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, sustainability should be achieved by 2040. For the remaining high- and medium-priority basins, 2042 is the deadline. Through SGMA, the California Department of Water Resources provides ongoing support to local agencies through guidance, financial assistance, and technical assistance. SGMA empowers local agencies to form Groundwater Sustainability Agencies (GSAs) to manage basins sustainably and requires Groundwater Sustainability Plans (GSPs) for crucial (i.e., medium to high priority) groundwater basins in California. The Santa Clarita Valley Water Agency is the GSA for the subbasin beneath the project site which has developed a GSP.

2.2.4 California Porter-Cologne Water Quality Control Act

Since 1973, the California SWRCB and its nine RWQCBs have been delegated the responsibility for administering permitted discharge into the waters of California. The project site falls within the jurisdiction of the Santa Ana RWCQB. The Porter-Cologne Water Quality Act (California Water Code Section 13000 et seq.; California Code of Regulations, Title 23, Division 3, Chapter 15) provides a comprehensive water-quality management system for the protection of California waters. Under the Act, “any person discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the state” must file a report of the discharge with the appropriate RWQCB. Pursuant to the Act, the RWQCB may then prescribe “waste discharge requirements” that add conditions related to control of the discharge. Porter-Cologne defines “waste” broadly, and the term has been applied to a diverse array of materials, including non-point source pollution. When regulating discharges that are included in the federal Clean Water Act, the state essentially treats Waste Discharge Requirements and NPDES as a single permitting vehicle. In April 1991, the SWRCB and other state environmental agencies were incorporated into the California Environmental Protection Agency.

The RWQCB regulates urban runoff discharges under the NPDES permit regulations. NPDES permitting requirements cover runoff discharged from point (e.g., industrial outfall discharges) and nonpoint (e.g., stormwater runoff) sources. The RWQCB implements the NPDES program by issuing construction and industrial discharge permits.

Under the NPDES permit regulations, BMPs are required as part of a SWPPP. The EPA defines BMPs as “schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of Waters of the United States.” BMPs include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage” (40 CFR 122.2).

2.2.5 CALGreen

Formerly known as the California Green Building Standards Code, Title 24, Part 11, of the California Code of Regulations, CALGreen is designed to improve public health, safety, and general welfare by using design and construction methods that reduce the negative environmental impact of development and to encourage sustainable construction practices. CALGreen provides mandatory direction to developers of all new construction and renovations of residential and non-residential structures with regard to all aspects of design and construction, including, but not limited to, site drainage design, stormwater management, and water use efficiency. Required measures are accompanied by a set of voluntary standards designed to encourage developers and local agencies to aim for a higher standard of development.

2.2.6 California Water Code

The California Water Code includes 22 kinds of districts or local agencies with specific statutory provisions to manage surface water. Many of these agencies have statutory authority to exercise some forms of groundwater management. For example, a Water Replenishment District (Water Code Section 60000 et seq.) is authorized to establish groundwater replenishment programs and collect fees for that service, while a Water Conservation District (Water Code Section 75500 et seq.) can levy groundwater extraction fees. Through special acts of the Legislature, 13 local agencies have been granted greater authority to manage groundwater. Most of these agencies, formed since 1980, have the authority to limit export and control some in-basin extraction upon evidence of overdraft or the threat of an overdraft condition. These agencies can also generally levy fees for groundwater management activities and for water supply replenishment.

2.2.7 Assembly Bill 3030 – Groundwater Management Act

In 1992, Assembly Bill 3030 was passed, which increased the number of local agencies authorized to develop a groundwater management plan and set forth a common framework for management by local agencies throughout California. These agencies could possess the same authority as a water replenishment district to "fix and collect fees and assessments for groundwater management" (Water Code Section 10754), provided they receive a majority of votes in favor of the proposal in a local election (Water Code Section 10754.3).

2.3 Regional

2.3.1 Los Angeles Regional Water Quality Control Board

As previously detailed, the project site is located within the jurisdiction of the Los Angeles RWQCB. The Los Angeles RWQCB authorizes NPDES permits that ensure compliance with wastewater treatment and discharge requirements. The Los Angeles RWQCB enforces wastewater treatment and discharge requirements for properties near and surrounding the project site.

2.3.2 Municipal Separate Storm Sewer System Permit

Los Angeles County and 85 incorporated cities, including the City of Santa Clarita, have a joint Municipal Separate Storm Sewer System NPDES permit (MS4 Permit) (Permit Order No. R4-2021-0105, NPDES Permit No. CAS004004) that was granted on November 8, 2012, and recently modified in July 2018. The MS4 Permit is intended to implement BMPs to reduce pollutants in stormwater discharges to the maximum extent practicable. The permittees listed under the joint permit have the authority to develop, administer, implement, and enforce storm water management programs within their own jurisdiction. On April 7, 2016, the Los Angeles County, Los Angeles County Flood Control District, and the City of Santa Clarita formed the Upper Santa Clara River Watershed Group to develop a collaborative approach to meet the requirements of the MS4 Permit.

Urban storm water runoff is defined in the MS4 Permit as including stormwater and dry weather flows from a drainage area that reaches a receiving water body or subsurface. The permit regulates the discharge of all wet and dry weather urban storm water runoff within the County of Los Angeles (with the exception of the City of Long Beach). Part VI.C of the Los Angeles County MS4 permit allows permittees the flexibility to develop Watershed Management Programs or Enhanced Watershed Management Programs (EWMPs) to implement the requirements of the permit on a watershed scale through customized strategies, control measures, and BMPs. The Upper Santa Clara River Watershed Management Area Group developed a EWMP that was approved by the Los Angeles RWQCB on April 7, 2016. The EWMP includes water quality priorities for the Santa Clara River Watershed Management Area, watershed control measures consisting of both structural and non-structural BMPs, financial strategies, and legal authority (permittees have the necessary legal authority to implement the BMPs identified in the EWMP or the legal authority exists to compel implementation of the BMPs).

2.3.3 County of Los Angeles Low Impact Development Standards Manual

In 2014, the County of Los Angeles prepared the Low Impact Development Standards Manual (LID Standards Manual) to comply with the requirements of the NPDES MS4 Permit for stormwater and non-stormwater discharges from the MS4 within the coastal watersheds of Los Angeles County. The LID Standards Manual provides guidance for the implementation of stormwater quality control measures in new development and redevelopment projects in unincorporated areas of the County with the intention of improving water quality and mitigating potential water quality impacts from stormwater and non-stormwater discharges. The City of Santa Clarita implements these standards for projects within the city.

2.4 Local

2.4.1 Santa Clarita Municipal Code—Stormwater

Chapter 10.04 of the City of Santa Clarita Municipal Code provides the stormwater and urban runoff pollution control requirements for new development and redevelopment projects. Projects are required to implement best management practices for both operation and construction activities. Illicit discharges and illicit connections are prohibited as well as spills, dumping, or disposal of any solid or liquid waste including any pollutant as defined in Section 502(6) of the Clean Water Act, 33 U.S.C. Section 1362(6) or incorporated into California Water Code Section 13373.

2.4.2 Santa Clarita Floodplain Management Ordinance

City of Santa Clarita Floodplain Management Ordinance (SCMC Chapter 10.06) The City of Santa Clarita participates in the National Flood Insurance Program. The intention of the National Flood Insurance Program is to lessen the financial devastation caused by flooding in communities across the United States. It is a voluntary program based on a mutual agreement between FEMA and the local community. Participation in the program makes federally backed flood insurance available to City residents and allows them to obtain direct federal relief following declared flood disasters (City of Santa Clarita 2020). In cooperation with FEMA, the City has adopted a Floodplain Management Ordinance (Chapter 10.06 of the SCMC), which governs development in the City's floodplains. In order to remain a National Flood Insurance Program community, the City must regulate development in its flood hazard areas per the requirements of the Floodplain Management Ordinance along with other various technical documents published by FEMA. In order to accomplish reducing flood losses, the Floodplain Management Ordinance requires the following:

- Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- Require that uses vulnerable to floods, including facilities, which serve such uses, be protected against flood damage at the time of initial construction;

- Control the alteration of natural floodplains, stream channels and natural protective barriers, which help accommodate or channel floodwaters;
- Control filling, grading, dredging and other development, which may increase flood damage; and
- Prevent or regulate the construction of flood barriers, which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

2.4.3 City of Santa Clarita Stormwater Mitigation Plan

Chapter 17.95 of the Santa Clarita Municipal Code identifies certain requirements for post-construction stormwater activities for development projects to comply with the NPDES and MS4 permits. This chapter requires that each project develop and implement a mitigation plan to lessen the water quality impacts of development by using smart growth practices and BMPs and integrate low impact development (LID) design principles to mimic pre-development hydrology conditions through infiltration, evapotranspiration, rainfall harvest, and use.

2.4.4 Santa Clarita General Plan

The 2022 General Plan Safety Element for the City of Santa Clarita has the following goals, objectives and policies that would apply to the proposed project:

Goal S 2. Protection of public safety and property from unreasonable risks due to flooding.

Objective S 2.1. Plan for flood protection as part of a multi-objective watershed management approach for the Santa Clara River and its tributaries.

Policy S 2.1.2. Promote Low Impact Development standards on development sites, including but not limited to minimizing impervious surface area and promoting infiltration, in order to reduce the flow and velocity of stormwater runoff throughout the watershed.

Policy S 2.1.5. Promote the joint use of flood control facilities with other beneficial uses where feasible, such as by incorporating detention basins into parks and extending trails through floodplains.

In addition, following goals, objectives and policies from the Conservation and Open Space Element of the General Plan would apply:

Goal CO 4. An adequate supply of clean water to meet the needs of present and future residents and businesses, balanced with the needs of natural ecosystems.

Objective CO 4.3. Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing stormwater runoff at the source.

Policy CO 4.3.1. On undeveloped sites proposed for development, promote onsite stormwater infiltration through design techniques such as pervious paving, draining runoff into bioswales or properly designed landscaped areas, preservation of natural soils and vegetation, and limiting impervious surfaces.

Policy CO 4.3.2. On previously developed sites proposed for major alteration, provide stormwater management improvements to restore natural infiltration, as required by the reviewing authority.

Policy CO 4.3.3. Provide flexibility for design standards for street width, sidewalk width, parking, and other impervious surfaces when it can be shown that such reductions will not have negative impacts and will provide the benefits of stormwater retention, groundwater infiltration, reduction of heat islands, enhancement of habitat and biodiversity, saving of significant trees or planting of new trees, or other environmental benefit.

Policy CO 4.3.4. Encourage and promote the use of new materials and technology for improved stormwater management, such as pervious paving, green roofs, rain gardens, and vegetated swales.

Policy CO 4.3.5. Where detention and retention basins or ponds are required, seek methods to integrate these areas into the landscaping design of the site as amenity areas, such as a network of small ephemeral swales treated with attractive planting.

Policy CO 4.3.6. Discourage the use of mounded turf and lawn areas which drain onto adjacent sidewalks and parking lots, replacing these areas with landscape designs that retain runoff and allow infiltration.

Policy CO 4.3.7. Reduce the amount of pollutants entering the Santa Clara River and its tributaries by capturing and treating stormwater runoff at the source, to the extent possible.

3 Impact Analysis

Would the project violate water quality standards or waste discharge requirements or degrade surface or ground water quality?

Construction

The proposed project would involve earthwork activities and soil disturbance over the course of construction that could expose soils to the effects of wind and water erosion and sedimentation. Earthwork activities would include grading, excavations for foundations, and trenching for placement of utilities onsite as well as some perimeter areas just outside of the project site boundary. The primary potential pollutant associated with construction activity is sediment (i.e., high turbidity) generated from site preparation and grading activities. Although Reach 6 of the Santa Clara River is listed under CWA Section 303(d) as impaired for sedimentation/siltation, a measurable increase in sedimentation/siltation from construction activities on the site could temporarily violate Basin Plan objectives, if not properly controlled. In addition to sediment, other pollutants associated with construction activity could include heavy metals, oil/grease, fuels, demolition debris and trash, and other pollutants from accidental spills or releases of refuse, paints, solvents, sanitary wastes, and concrete curing compounds. Without adequate precautions, wind and/or rain events that occur during construction activities could generate pollutants and/or mobilize sediment such that it contributes to water quality degradation of receiving waters and/or violates Basin Plan objectives.

Standard construction management practices, as required through the Santa Clarita Municipal Code and the statewide NPDES Construction General Permit, would minimize construction-related impacts on water quality. The Construction General Permit would require implementation of a SWPPP to address potential construction-related impacts on water quality. The SWPPP must specify the location, type, and maintenance requirements for BMPs necessary to prevent stormwater runoff from carrying construction-related pollutants into the City's municipal storm drain system, Santa Clara River, and/or the underlying groundwater basin. BMPs must be implemented to address potential release of fuels, oil, and/or lubricants from construction vehicles and equipment (e.g., drip pans, secondary containment, washing stations); release of sediment from material stockpiles and other construction-related excavations (e.g., sediment barriers, soil binders); and other construction-related activities with the potential to adversely affect water quality. The number, type, location, and maintenance requirements of BMPs to be implemented as part of the SWPPP depend on site-specific risk factors such as soil erosivity, construction season/duration, and receiving water sensitivity.

The following list includes examples of treatment control BMPs commonly employed during construction, although these could vary based on the nature of construction activities, the characteristics of the site, and the existing receiving waters impairments (these features would appear as notes on any final design plans):

- Silt fences installed along limits of work and/or the construction site
- Stockpile containment (e.g., visqueen, fiber rolls, gravel bags)
- Exposed soil stabilization structures (e.g., fiber matrix on slopes and construction access stabilization mechanisms)
- Street sweeping
- Tire washes for equipment
- Runoff control devices (e.g., drainage swales, gravel bag barriers/chevrons, velocity check dams) and slope protection
- Drainage system inlet protection
- Wind erosion (dust) controls
- Tracking controls
- Prevention of fluid leaks (inspections and drip pans) from vehicles
- Materials pollution management
- Proper waste management (e.g., concrete waste management)
- Regular inspections and maintenance of BMPs

The standard requirements contained in a SWPPP, and enforced through the Santa Clara Municipal Code Chapters 10.04, are sufficient to minimize the project's potential to violate water quality standards or waste discharge requirements during construction. Therefore, construction-related impacts of the project on water quality would be less than significant.

Operation

Redevelopment of the project site would involve changes to existing drainage patterns. While the project site is already largely covered in impervious surfaces, estimated at 80% (Attachment B), the proposed changes would increase the impervious surfaces percentage to approximately 85%. These changes could become a source of pollution from incidental spills of vehicle oils and other chemicals that can be conveyed by storm and landscape irrigation flows. The impervious surfaces would prevent polluted surface waters from absorbing into the ground surface.

During storm events, pollutants from paved areas lacking in proper stormwater controls and BMPs could enter the municipal storm drain system, before eventually being discharged to the Santa Clara River. The majority of pollutants entering the storm drain system in this manner could be sediment, nutrients, organic compounds, oxygen demanding substances, trash, debris, bacteria, residual petroleum products (e.g., motor oil, gasoline, diesel fuel), and metals. Certain metals, along with nutrients and pesticides from landscape areas, can also be present in stormwater runoff. Between periods of rainfall, surface pollutants tend to accumulate, and runoff from the first significant storm of the year ("first flush") would likely have the largest concentration of pollutants.

However, all proposed improvements would be required to adhere to existing drainage control requirements including the MS4 NPDES permit and the City's drainage control requirements (Municipal Code Chapter 17.95 - Stormwater Mitigation Plan). Prior to issuance of a building permit, the proponent would have to submit their Urban Stormwater Mitigation Plan (USMP) to the City for review and approval. A USMP has been prepared for the proposed project and demonstrates how the proposed drainage control improvements, a biofiltration basin and biofiltration treatment units, would be incorporated into project design plans to address the specific water quality issues at the site (Attachment B). As part of these requirements, the USMP identifies that the applicable BMPs are consistent with LID requirements that meet all applicable MS4 and City requirements. The proposed project would include this biofiltration basin and biofiltration treatment units to remove a majority of pollutants with a capacity that is adequate to treat all site runoff (Attachment B). With adherence to these drainage control requirements, the proposed improvements post-construction BMPs, would minimize water quality concerns during operations. Therefore, compliance with these existing regulatory requirements for drainage control design measures would reduce potential impacts related to water quality standards and waste discharge requirements to a less than significant level.

Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

There are no groundwater extraction wells currently at the project site and no extraction wells are proposed as part of the project. The proposed project would not include any require deep excavation that would potentially encounter groundwater and thus no dewatering activities would be anticipated during construction.

The proposed project would be served by the Santa Clara Valley Water Agency (SCV Water) for all water supply demands. The developed project would receive all of its water from a piped water system, connected to a Santa Clarita Valley Water Agency water transmission main. According to the 2020 UWMP, SCV Water obtains approximately 26% of its water supplies from groundwater. Analysis of projected growth that would include the proposed project and projected supplies, the SCV Water's demands can be met by supplies in normal, single dry year, and multiple dry year scenarios although demands may require some passive and active conservation measures to end up below projected supplies (SCVWA 2021). In addition, according to the GSP for the underlying groundwater subbasin, "the Basin is not likely to be in an overdraft condition under a sustained level of pumping at the full-build-out level of human demand for groundwater, even under the average climate change scenarios for 2030 and 2070; and the operating plan for the Basin's groundwater resources is expected to continue maintaining a condition that does not create an overdraft condition (chronic long-term declines in groundwater levels) in the future" (SCVGSA 2022).

In addition, the City's Stormwater Mitigation Plan (SCMC Chapter 17.95) requires that projects develop and implement a mitigation plan to lessen the water quality impacts of the project by using smart growth practices and BMPs and integrate LID design principles to mimic pre-development hydrology conditions through infiltration, evapotranspiration, rainfall harvest, and use. The proposed project would include construction of an onsite biofiltration basin would allow much of the stormwater runoff from the site to provide local groundwater recharge. Therefore, while the project would increase the amount of new impervious surfaces at the site, the site also includes landscaped areas and the biofiltration basin where infiltration would occur during rainstorms. Therefore, the proposed project would not contribute to depletion of groundwater or interfere with recharge of a managed groundwater supply source. Impacts would be less than significant.

Would the project substantially alter the existing drainage pattern of the site or area through the addition of impervious surfaces resulting in erosion or siltation on- or off-site; increasing the rate or amount of surface runoff resulting in flooding on- or off-site; contributing runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide polluted runoff; or impede or redirect flood flows?

As noted above, the proposed project would alter the existing drainage patterns of the site, although the increase in impervious surfaces would only be from approximately 80 to 85% of the site. However, the proposed improvements would be required to adhere to MS4 permit requirements and local City drainage control requirements. All runoff from the project would be captured in a private drainage control system that routs through an underground system before eventually tying into the existing storm drain pipe culverts owned/maintained by Los Angeles County (Attachment A). Prior to discharging to the existing storm drain system, the storm water would be routed to a low flow splitter. The splitter would send the first flush flows to the biofiltration basin to be treated. The splitter would convey high flows to the existing downstream storm drain system. For the portion of the site that cannot be treated in the basin the low flow will be treated in one of two proprietary biofiltration units. Therefore, with adherence to the MS4 permit and local City drainage control requirements (Municipal Code Chapter 17.95 - Stormwater Mitigation Plan), the proposed changes to drainage patterns would not result in erosion or siltation on or off site.

As detailed in the Hydrology Report prepared for the project site, stormwater flows from the site currently occur as sheet flows in a northeast direction and into the two aforementioned storm drain culverts as well as a 3rd culvert that picks up flow for a section of Soledad Canyon Road (Attachment A). According to the analysis of the proposed drainage condition, all developed flows would be below the culvert capacities, and it was determined that these existing culverts can adequately convey the developed flow condition from the proposed project (Attachment A). As a result, the proposed project would not increase the rate or amount of surface runoff that would result in flooding on- or off-site nor would exceed the capacity of existing stormwater drainage systems. There would also be no other sources of polluted runoff that is not already discussed above.

The project site is not located in a Special Flood Hazard Area as mapped by FEMA (FEMA 2021), and is therefore not at threat for impeding or redirecting flood flows.

Overall, the project would adhere to the existing drainage control regulatory requirements of the NPDES MS4 permit and City drainage control requirements such that the proposed changes in drainage patterns would have a less than significant impact related to erosion/siltation, flooding, capacities of existing infrastructure, or impeding or redirecting flood flows.

Would the project release pollutants during flooding?

The project site is located well inland and outside of any tsunami hazard zone areas. The site is also not adjacent to an enclosed or semi-enclosed body of water and as a result would not be susceptible to seiche wave hazards. Finally, the project site is not located within a designated flood hazard zone. Therefore, the potential for release of pollutants during flooding would be considered less than significant.

Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The project site falls within the jurisdiction of the Los Angeles RWQCB (Region 4) Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties; and the RWQCB is given authority to issue waste discharge requirements, enforce actions against stormwater discharge violators, and monitor water quality. In California, the NPDES stormwater permitting program is administered by the SWRCB. The County of Los Angeles and the City are two of the Co-Permittees under the Los Angeles County NPDES MS4 Permit, and, as such, are required to implement development planning guidance and control measures regarding water quality impacts from new development. The Los Angeles County MS4 Permit contains provisions for implementation and enforcement of the City's Urban Stormwater Mitigation Plan. The City supports the requirements of the Los Angeles County MS4 Permit through SCMC Chapters 10.04 and 17.95, which identify requirements for pre- and postconstruction stormwater activities, respectively, for development projects to comply with the NPDES and MS4 permits. As discussed above, the project would be subject to the requirements of the NPDES Construction General Permit, which includes the preparation and implementation of a SWPPP. In addition, the project would comply with the requirements of the City's Municipal Code Section 10.04.070 (Construction Activity Stormwater Measures) and Chapter 17.95 (Stormwater Mitigation Plan) to ensure impacts to water quality would be less than significant. In regard to sustainable groundwater management, the SCV-GSA has prepared and is implementing the GSP for the subbasin. As the water supplier for the project, SCV Water is also complying with the GSP and the proposed project is consistent with the projected growth that is accounted for in the plan. Accordingly, the project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, and impacts would be less than significant.

4 References

DWR (California Department of Water Resources). 2022. "SGMA Basin Prioritization Map, Santa Clara River Valley East" [map]. Accessed October 5, 2022. https://gis.water.ca.gov/app/bp-dashboard/final/.

FEMA (Federal Emergency Management Agency). 2021. National Flood Hazard Layer FIRMette. City of Santa Clarita 060729. Effective June 2, 2021.

RWQCB (Regional Water Quality Control Board, Los Angeles Region). 2022a. "Santa Clara River Watershed" [PDF]. Accessed October 5, 2022. https://www.waterboards.ca.gov/losangeles/water_issues/programs/regional_program/Water_Quality_and_Watersheds/santa_clara_river_watershed/SC_River.pdf.

RWQCB. 2022b. Santa Clara River Watershed Impaired Waters [web page]. Accessed October 7, 2022. https://www.waterboards.ca.gov/losangeles/water_issues/programs/regional_program/Water_Quality_and_Watersheds/santa_clara_river_watershed/303.shtml.

SCVGSA (Santa Clara Valley Groundwater Sustainability Agency). 2022. *Groundwater Sustainability Plan*. January 2022.

SCVWA (Santa Clarita Valley Water Agency). 2021. *2020 Urban Water Management Plan*. June 2021.

USCRWMG (Upper Santa Clara River Watershed Management Group). 2015. Enhanced Watershed Management Program.

Attachment A

Hydrology Report, Alliance Land Planning and Engineering

Public Works
LOS ANGELES COUNTY

LAND DEVELOPMENT DIVISION
STORM DRAIN & HYDROLOGY UNIT

TO: Santa Clarita
ATTN: Amalia Marreh
CC: Alliance Land Planning & Engineering

DATE 8/8/22

REVIEW OF HYDROLOGY STUDY

CITY OF	**Santa Clarita**	**DATE OF REPORT**	**08/03/2022**
MTD. NO.	**1888**	**PLAN CHECK NO.**	**3**
TR NO.	**83605**	**PLAN CASE NO.**	**ESTU2021000659**

We have reviewed your Hydrology Study.

[X] This hydrology study was reviewed only to determine conformity to LACFCD transfer standards and for no other purpose. The hydrology study indicates that the capacity of the associated storm drain improvement or drainage system conforms to those standards. In addition, any review of the hydrology study for other purposes as may be required by the City must be done to the satisfaction of the City.

[X] Refer to comments below:

COMMENTS:

1. The foregoing notwithstanding, nothing herein is intended to express or imply any representation or commitment by the LACFCD that it will accept the transfer of the storm drain improvement or drainage system if constructed.

2. Water quality requirements have not been reviewed as part of this recommended approval. The City shall be responsible for review and approval of all water quality requirements. Any discrepancies between the water quality analysis and the Hydrology Study may require a revised Hydrology Study.

3. Please have the City approve and sign the plan and report and return a scanned copy to the Land Development Division of Los Angeles County Department of Public Works as soon as possible.

REVIEWED BY: ____________
Alex Mikhailpoor (626) 458-4921

REVIEWED UNDER THE SUPERVISION OF: ____________
Vilong Truong

RIVERVIEW

DEVELOPED CONDITION HYDROLOGY EXHIBIT

8/3/22

MTD 1888

ESTU2021000659

TRACT NO. 83605

EXISTING VS DEVELOPED CONDITION FLOWRATES						
CULVERT	Q_ALLOWABLE	DEV DESIGN Q	DEV 50-YR BURNED	EXISTING 50-YR CLEAR	EXISTING 50-YR BURNED	EXISTING 50-YR BURNED AND BULKED
	CFS	CFS	CFS	CFS	CFS	CFS
CULVERT 1	50	47.73	53.16	110.55	114.36	140.69
CULVERT 2	38	29.22	45.12	28.8	NA	NA
CULVERT 3	84	70.79	101.69	6.76	NA	NA

BASIN A -DEVELOPED CONDITION HYDROLOGIC PARAMETERS											
SUBAREA	AREA	OVERLAND (Tc)		FLOWPATH		50-Yr RAIN	IMP	SOIL	DPA #	Tc	
		LENGTH	SLOPE	LENGTH	SLOPE					25-YR	50-YR
	ac	ft	ft/ft	ft	ft/ft	in	%			min	min
1A	3.4	440.0	0.005	400	0.008	6.8	50	97	9	8	7
2B	3.3	680.0	0.006	255	0.006	6.8	88	20	9	9	9
3B	1.1	515.0	0.007	60	0.018	6.8	88	20	9	8	7
4AB				505	0.011	6.8		20	9		
6C	2.5	755.0	0.006	630	0.006	6.8	85	20	9	10	9
7AC				30	0.005	6.8		20	9		
9A	2.1	550.0	0.008	25	0.083	6.8	85	20	9	8	7
10A	3.8	580.0	0.010	100	0.012	6.8	85	20	9	8	7
1D	5.3	1140.0	0.006	30	0.006	6.8	88	20	9	13	12
2D	3.5	840.0	0.006	465	0.007	6.8	88	20	9	11	10
1E	7.8	640	0.338	125	0.132	6.8	5	97	8	-	5
2E	1.7	380	0.061	1220	0.006	6.8	10	97	9	5	5
4E	BASIN D			120	0.009	6.8		20			
1F	6.8	725	0.306	200	0.031	6.8	5	97	8	-	5
2F	0.9	290	0.086	820	0.010	6.8	50	97	8	5	5
3F	2.0	1240	0.009	25	0.005	6.8	90	20	9	13	12
4F	8.6	850.0	0.034	230	0.004	6.8	75	97	8	8	7
6F	1.8	1175	0.008	35	0.005	6.8	90	20	9	13	12
1H	18.9	1095	0.246	245	0.020	6.8	5	97	8	-	7
3H	1.6	360	0.067	670	0.008	6.8	55	97	9	6	5
4H	BASIN A			1	0.010	6.8		20			
6H	1.3	900	0.009	90.0	0.005	6.8	90	20	9	10	10
7H	1.3	895	0.009	50.0	0.005	6.8	90	20	9	10	9
1J	1.0	515.0	0.029	1.000	0.010	6.80	85	20	9	6	5

DEBRIS PRODUCING SUBAREAS	SURFACE AREA		DEBRIS PRODUCTION RATE (DPA 8)	DEBRIS PRODUCED (VOL_REQ)	DETENTION VOL REQUIRED	TOTAL REQ VOL (VOL_REQ)
	ac	sq mi	cy / sq mi	cy	cy	cy
SUBAREA 1F	6.8	0.011	35000	372	0	372
SUBAREA 1E	7.8	0.012	35000	427	13	440
SUBAREA 1H	18.9	0.030	35000	1034	71	1105
TOTAL		0.052		1832	84	1917

DEBRIS BASIN	depth	TOP(CONE LIMIT) area	mid area	bot area	VOL_PROV		VOL_REQ	DELTA
	ft	sf	sf	sf	cf	cy		cy
BASIN F	4	4355	2760	1164	11038	409	372	37
BASIN E	5	3938	2761	1583	13803	511	440	71
BASIN H	5.5	7278	5498.5	3719	30242	1120	1105	15

NOTE: NOT WITHIN COUNTY ADOPTED FLOODWAY AND NOT WITHIN FEMA FLOOD ZONE "A".

HYDROLOGY STUDY APPROVED BY CITY OF ________________

APPROVED BY:________________________DATE__________

THIS HYDROLOGY STUDY WAS REVIEWED ONLY TO DETERMINE CONFORMITY TO LACFCD TRANSFER STANDARDS AND FOR NO OTHER PURPOSE. THE HYDROLOGY STUDY INDICATES THAT THE CAPACITY OF THE ASSOCIATED STORM DRAIN IMPROVEMENT OR DRAINAGE SYSTEM CONFORMS TO THOSE STANDARDS. THE FOREGOING NOTWITHSTANDING, NOTHING HEREIN IS INTENDED TO EXPRESS OR IMPLY ANY REPRESENTATION OR COMMITMENT BY THE LACFCD THAT IT WILL ACCEPT THE TRANSFER OF THE STORM DRAIN IMPROVEMENT OR DRAINAGE SYSTEM IF CONSTRUCTED. IN ADDITION, ANY REVIEW OF THE HYDROLOGY STUDY FOR OTHER PURPOSES AS MAY BE REQUIRED BY THE LOCAL JURISDICTION MUST BE DONE TO THE SATISFACTION OF THAT JURISDICTION.

CHECKED BY: ____________ DATE 08/04/2022

REVIEWED UNDER THE SUPERVISION OF: ____________ DATE 8/4/22

LOS ANGELES COUNTY PUBLIC WORKS
LAND DEVELOPMENT DIVISION

LEGEND:

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- STORM DRAIN LINE (PVT)
- STORM DRAIN LINE (LACFCD)
- MTA DRAIN LINE (PRIVATE)
- LACFCD SD/ACCESS EASEMENT
- LOW FLOW SD LINE (PVT)
- OVERLAND PATH
- FLOWPATH
- SOIL CLASSIFICATION DIVIDING LINE*
- DPA DIVIDING LINE*
- BASIN F (DRAINS TO CULVERT 1)
- BASIN'S D & E (DRAINS TO CULVERT 2)
- BASIN'S A & H (DRAINS TO CULVERT 3)
- XX — SUBAREA NAME
- X.X — SUBAREA ACREAGE (AC)
- EXISTING CONTOURS(MINOR)
- EXISTING CONTOURS (MAJOR)
- PROPOSED CONTOURS
- PROPOSED TOP/TOE OF SLOPE
- PROPOSED DAYLIGHT
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING CURB
- PROPOSED CURB
- DEBRIS CONE LIMIT
- Q_{25} — DEVELOPED SUBAREA FLOWRATE 25YR (CFS)
- Q_{50B} — UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED (CFS)
- ΣQ — SUM OF SUBAREAS FLOWRATE (CFS)
- ΣQ_{OUT} — ACTUAL FLOWRATE THAT LEAVES THE DEBRIS/DETENTION BASIN PER MODPULS CALCULATION
- $\Sigma Q_{ALLOWABLE}$ — FLOWRATE ALLOWED TO LEAVE DEBRIS/DETENTION BASIN
- A — SUBAREA ACREAGE (AC)
- ΣA — SUM SUBAREAS ACREAGE (AC)
- Tc — TIME OF CONCENTRATION
- DPV — DEBRIS VOLUME PRODUCED IN A GIVEN SUBAREA
- WATER QUALITY TREATMENT BIOFILTRATION BASIN

ALLIANCE
LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE. CARLSBAD, CA 92008 TEL: (760) 431-9896 FAX: (760) 431-8802
27413 TOURNEY ROAD SUITE 120 VALENCIA, CA 91355 TEL: (661) 799-2760
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

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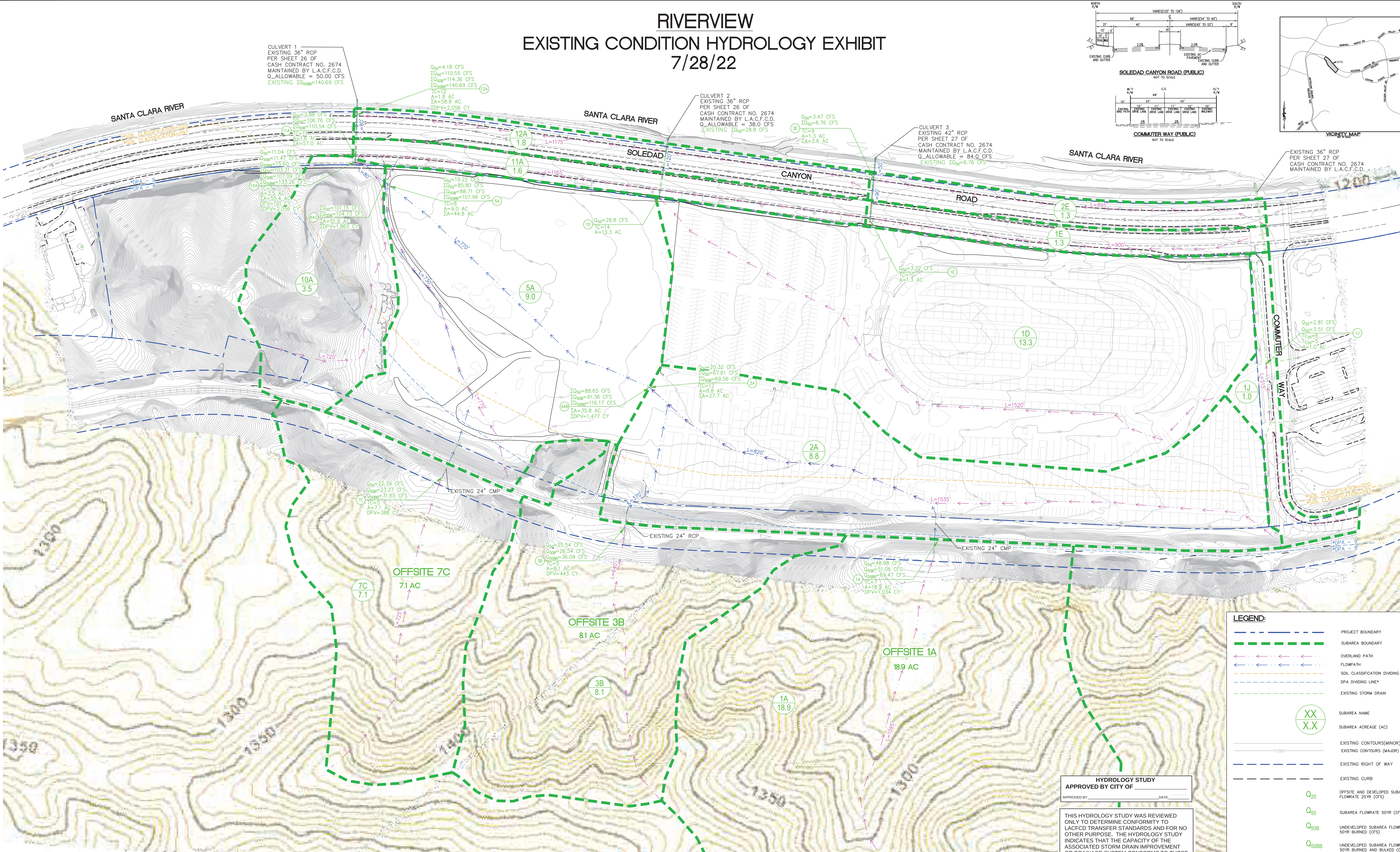
RIVERVIEW

EXISTING CONDITION HYDROLOGY EXHIBIT

7/28/22



BASIN A -EXISTING CONDITION HYDROLOGIC PARAMETERS

SUBAREA	AREA	OVERLAND (Tc) LENGTH	OVERLAND (Tc) SLOPE	FLOWPATH LENGTH	FLOWPATH SLOPE	50-Yr RAIN	IMP	SOIL	DPA #	Tc 25-YR	Tc 50-YR
	ac	ft	ft/ft	ft	ft/ft	in	%			min	min
1A	18.9	1095	0.246	820	0.010	6.8	5	97	8	-	7
2A	8.8	1535	0.018	1.0	0.010	6.8	80	97	9	-	12
3B	8.1	640	0.338	370	0.057	6.8	5	97	8	-	5
4AB				770.0	0.006	6.8		20			
5A	9.0	770	0.042	1.0	0.010		15	20	9	-	8
7C	7.1	725	0.303	730	0.016	6.8	5	97	8	-	5
8AC				80.0	0.063			20			
10A	3.5	720	0.142	15.0	0.004	6.8	5	97	8	-	5
11A	1.6	1165	0.008	80	0.004	6.8	90	20	9	-	11
12A	1.8	1175	0.008	35	0.005	6.8	90	20	9	-	12
1D	13.3	1520	0.008	120	0.009	6.80	90	20	9	-	14
1E	1.3	900	0.009	90.0	0.005	6.8	90	20	9	-	10
2E	1.3	895	0.009	50.0	0.005	6.8	90	20	9	-	9
1J	1.0	515.0	0.029	1.000	0.0100	6.80	85	20	9	6	5

SCALE: 1"=80'

NOTE: NOT WITHIN COUNTY ADOPTED FLOODWAY AND NOT WITHIN FEMA FLOOD ZONE "A".

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTEKER
NO. 51929
EXP 6-30-24
CIVIL
STATE OF CALIFORNIA

ALLIANCE
LAND PLANNING & ENGINEERING INC.

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TEL: (661) 799-2760

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HYDROLOGY STUDY
APPROVED BY CITY OF ________________

APPROVED BY:________________________________DATE__________

THIS HYDROLOGY STUDY WAS REVIEWED ONLY TO DETERMINE CONFORMITY TO LACFCD TRANSFER STANDARDS AND FOR NO OTHER PURPOSE. THE HYDROLOGY STUDY INDICATES THAT THE CAPACITY OF THE ASSOCIATED STORM DRAIN IMPROVEMENT OR DRAINAGE SYSTEM CONFORMS TO THOSE STANDARDS. THE FOREGOING NOTWITHSTANDING, NOTHING HEREIN IS INTENDED TO EXPRESS OR IMPLY ANY REPRESENTATION OR COMMITMENT BY THE LACFCD THAT IT WILL ACCEPT THE TRANSFER OF THE STORM DRAIN IMPROVEMENT OR DRAINAGE SYSTEM IF CONSTRUCTED. IN ADDITION, ANY REVIEW OF THE HYDROLOGY STUDY FOR OTHER PURPOSES AS MAY BE REQUIRED BY THE LOCAL JURISDICTION MUST BE DONE TO THE SATISFACTION OF THAT JURISDICTION.

CHECKED BY: ____________________ DATE 08/04/2022

REVIEWED UNDER THE SUPERVISION OF: ____________________ DATE 8/4/22

LOS ANGELES COUNTY PUBLIC WORKS
LAND DEVELOPMENT DIVISION

LEGEND:

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- OVERLAND PATH
- FLOWPATH
- SOIL CLASSIFICATION DIVIDING LINE*
- DPA DIVIDING LINE*
- EXISTING STORM DRAIN
- XX — SUBAREA NAME
- X.X — SUBAREA ACREAGE (AC)
- EXISTING CONTOURS(MINOR)
- 1100 — EXISTING CONTOURS (MAJOR)
- EXISTING RIGHT OF WAY
- EXISTING CURB
- Q_{25} — OFFSITE AND DEVELOPED SUBAREA FLOWRATE 25YR (CFS)
- Q_{50} — SUBAREA FLOWRATE 50YR (CFS)
- Q_{50B} — UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED (CFS)
- Q_{50BB} — UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED AND BULKED (CFS)
- ΣQ_{50} — SUM OF 50YR SUBAREA FLOWRATES(CFS)
- ΣQ_{50B} — SUM OF 50YR DEVELOPED SUBAREAS AND 50YR BURNED UNDEVELOPED SUBAREAS FLOWRATES, DESIGN STORM EVENT (CFS)
- ΣQ_{50BB} — SUM OF SUBAREAS DESIGN STORM EVENT FLOWRATES WITH BULKING (CFS)**
- A — SUBAREA ACREAGE (AC)
- ΣA — SUM SUBAREAS ACREAGE (AC)
- Tc & Tc_{50} — TIME OF CONCENTRATION 50YR STORM EVENTS
- Tc_{25} — TIME OF CONCENTRATION 25YR STORM EVENT
- DPV — DEBRIS PRODUCTION VOLUME (CY)
- ΣDPV — SUM OF DEBRIS (CY)**

**DEBRIS VOLUMES AND BULKED FLOWRATES PROVIDED AT KEY LOCATIONS ONLY

THIS HYDROLOGY STUDY WAS REVIEWED ONLY TO DETERMINE CONFORMITY TO LACFCD TRANSFER STANDARDS AND FOR NO OTHER PURPOSE. THE HYDROLOGY STUDY INDICATES THAT THE CAPACITY OF THE ASSOCIATED STORM DRAIN IMPROVEMENT OR DRAINAGE SYSTEM CONFORMS TO THOSE STANDARDS. THE FOREGOING NOTWITHSTANDING, NOTHING HEREIN IS INTENDED TO EXPRESS OR IMPLY ANY REPRESENTATION OR COMMITMENT BY THE LACFCD THAT IT WILL ACCEPT THE TRANSFER OF THE STORM DRAIN IMPROVEMENT OR DRAINAGE SYSTEM IF CONSTRUCTED. IN ADDITION, ANY REVIEW OF THE HYDROLOGY STUDY FOR OTHER PURPOSES AS MAY BE REQUIRED BY THE LOCAL JURISDICTION MUST BE DONE TO THE SATISFACTION OF THAT JURISDICTION.

CHECKED BY: ____________ DATE 08/04/2022

REVIEWED UNDER THE SUPERVISION OF: ____________ DATE 8/4/22

LOS ANGELES COUNTY PUBLIC WORKS
LAND DEVELOPMENT DIVISION

HYDROLOGY STUDY
APPROVED BY CITY OF ____________

APPROVED BY: ____________ DATE ____________

HYDROLOGY REPORT

City of Santa Clarita

RIVERVIEW

Tract No. 83605

ESTU2021000659

MTD 1888

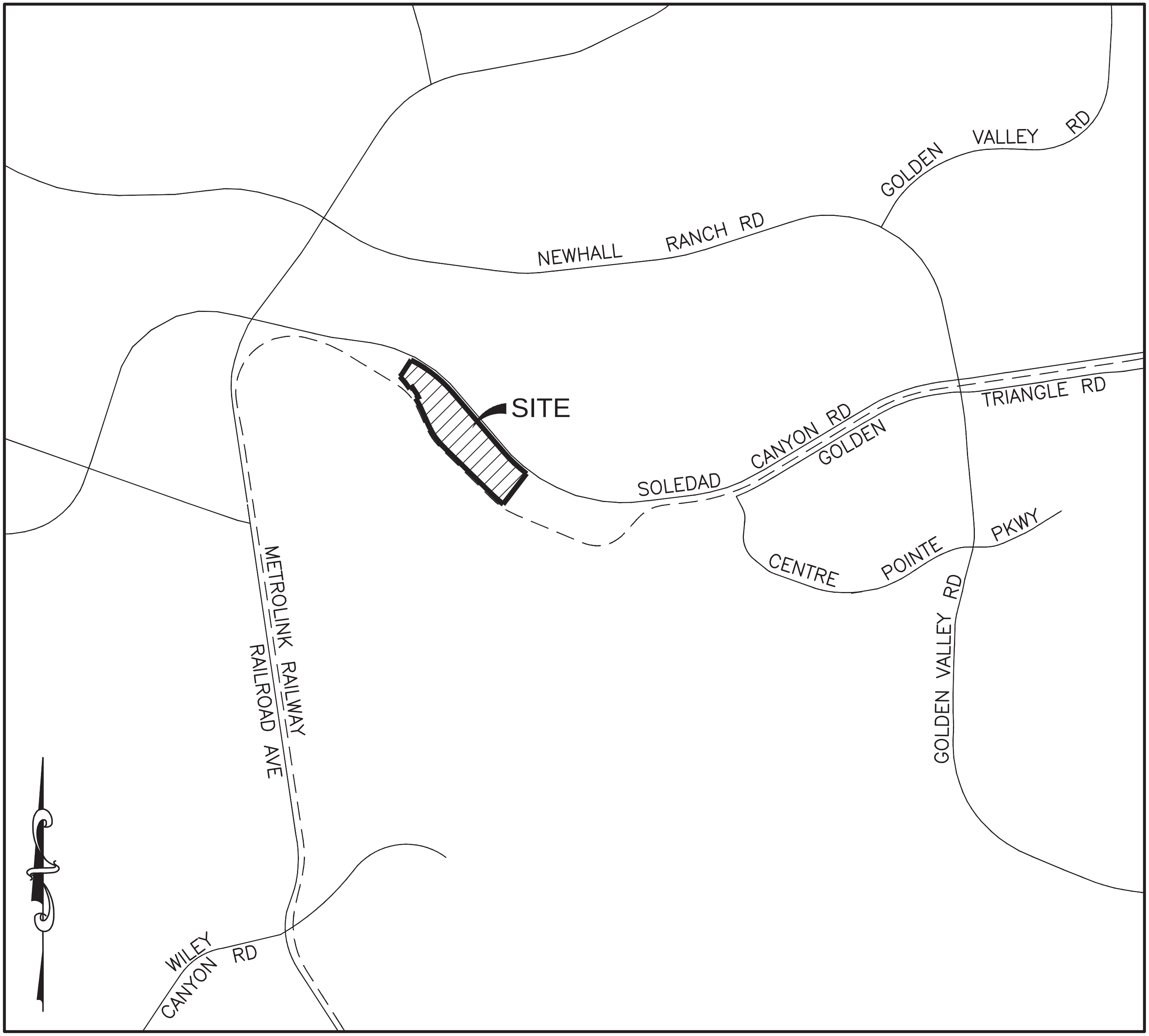
Prepared For:
Integral Communities
888 San Clemente Drive
Newport Beach, CA 92660

Prepared By:
Alliance Land Planning & Engineering, Inc.
2248 Faraday Ave.
Carlsbad, CA 92008

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTEKER
NO. 51929
EXP 6-30-24
CIVIL
STATE OF CALIFORNIA

AUGUST 3, 2022

JN 2130



VICINITY MAP

NOT TO SCALE

Table of Contents

List of Appendices

Project Description

The Riverview project is an approximately 37.7 ac mixed use project located in the City of Santa Clarita. The proposed project includes a commercial site section with parking structure in addition to multi-family residential, park and rec area, access roads, parking, landscaping, and hardscape. The project site is currently undeveloped land, a parking lot, and The Santa Clarita Swap Meet site. The site is bordered by MTA Railroad Tracks to the South, Soledad Canyon Road to the North, and a Metrolink Station to the East.

Methodology

Methods currently outlined in the Los Angeles County Hydrology Manual have been used throughout this study. Time of concentration (TC) values were calculated using County of Los Angeles, HydroCalc software. Flowrates were calculated using the Modified Rational Method and County of Los Angeles approved, LAR04 software. A summary of general hydrologic parameters was taken from the relevant 50-yr, 24-hr isohyetal map is provided in Table 1 below. The map and TC calcs are provided in Appendix B.

Table 1 - General Hydrologic Parameters

Parameter	***Value***
50-yr. 24-Hr Isohyetal Map	Oat Mountain
50-yr Inches of Rainfall (24 Hours)	6.8 in
Soil Classification Area	20 & 97
Debris Potential Area (DPA Zone)	8 & 9

Design Storm Event

The design storm event modeled for this project follows Los Angeles County criteria utilizing a 25-yr storm event for all developed subareas. The offsite hillside subareas to the South use the 50-yr burned storm event.

Existing Condition Drainage

The project site currently sheet flows in a northeast direction and into two existing storm drain pipe culverts that are owned/maintained by the County of Los Angeles (RDD 234, Cash Contract No. 2674). A third pipe also picks up flow for only a section of Soledad Canyon Road. These existing pipe culverts convey stormwater under Soledad Canyon Road and outlet to the Santa Clara River on the North side of Soledad Canyon Road. The southerly offsite hillsides northerly drain towards the railroad and at three locations have inlets on the south side of the railroad tract with basins to collect debris and 24-inch pipes that convey the flow under the railroad. The stormwater then sheet flows across the project site. See Appendix F for the existing RDD 234 pipe plans. Culvert 1 (aka “8 to 9” per RDD 234) and Culvert 2 (aka “10 to 11”) are currently undersized per the Existing condition map in Appendix A while

Culvert 3 (aka “12 to 13”) is oversized but the project site end of the pipe is capped with brick and mortar so that it only inlets catch basin runoff from Soledad Canyon Road.

Proposed Condition Drainage

In the proposed condition, all runoff from the project will be captured in private storm drains and routed through an underground storm drain system which will tie into the existing RDD 234 storm drains. All existing offsite stormwater will be kept in separate, underground lines that will also connect to the three RDD 234 pipes. Prior to connecting to RDD 234, onsite first-flush runoff from the project site will be treated in a water quality treatment (WQT) biofiltration basin proposed for the project.

Results

Table 2 shows a summary of developed condition Flows vs RDD 234 Allowable Flowrates. Developed condition flowrates include offsite flows.

Table 2 – DEVELOPED PROJECT FLOWRATES VS RDD 234 Pipe Culvert Capacities

CULVERT # PER DEV HYDRO EXHIBIT	DEV PROJECT FLOWRATE	CULVERT ALLOWABLE FLOWRATE
	CFS	CFS
CULVERT 1 (6F)	47.73	50
CULVERT 2 (4G)	29.22	38
CULVERT 3 (7H)	70.79	84

Debris/Detention Basins

Runoff from the natural hillside south of the railway will be conveyed into 3 debris basins. Two of the debris basins will also serve as detention facilities due to the downstream Q_Allowable restrictions. These two basins are designed with a flow restricting plates in the connection of the desilting perforated riser pipe to the debris wall/outlet structure. Two ModPuls calculations were done per basin, to accurately size and simulate the basins, to ensure the correct outflow. The first run was done under the assumption that the debris basins are empty.

The second ModPuls run is done under the assumption that the debris basin was not properly maintained and is filled with half the required debris prior to the design storm event. Per ModPuls both basins work within their design parameters and flowrates leaving the basin are below the max allowable.

Hydromodification

This project discharges to Los Angeles County Flood Control District maintained RDD 234 which discharges directly to the Santa Clarita River. Since the project outlets directly to the Santa Clarita River, the project is exempt from any additional hydromod.

Water Quality Treatment

Water quality aspects of this project are covered separately in detail within the SUSMP/LID Report which will be reviewed by the City of Santa Clarita. Water quality treatment will be achieved via a biofiltration basin. See the SUSMP report for additional info and details. The WQT basin is not to be maintained by LACFCD. Water quality aspects are not to be reviewed by LACFCD.

Conclusion

The proposed project conveys storm water runoff into LACFCD's RDD 234 under Soledad Commercial Road to the Santa Clarita River. Additionally, runoff from existing offsite areas south of the MTA Railroad is conveyed through the site and into the existing RDD 234 pipe culverts. Based on the Q_Allowable of the three existing pipe culverts per RDD 234 they can adequately convey the developed condition stormwater flow from this project.

APPENDIX A

HYDROLOGY MAPS

RIVERVIEW
DEVELOPED CONDITION HYDROLOGY EXHIBIT
8/3/22
MTD 1888
ESTU2021000659
TRACT NO. 83605

EXISTING VS DEVELOPED CONDITION FLOWRATES						
CULVERT	Q_ALLOWABLE	DEV DESIGN Q	DEV 50-YR BURNED	EXISTING 50-YR CLEAR	EXISTING 50-YR BURNED	EXISTING 50-YR BURNED AND BULKED
	CFS	CFS	CFS	CFS	CFS	CFS
CULVERT 1	50	47.73	53.16	110.55	114.36	140.69
CULVERT 2	38	29.22	45.12	28.8	NA	NA
CULVERT 3	84	70.79	101.69	6.76	NA	NA

BASIN A -DEVELOPED CONDITION HYDROLOGIC PARAMETERS											
SUBAREA	AREA	OVERLAND (Tc)		FLOWPATH		50-Yr RAIN	IMP	SOIL	DPA #	Tc	
		LENGTH	SLOPE	LENGTH	SLOPE					25-YR	50-YR
	ac	ft	ft/ft	ft	ft/ft	in	%			min	min
1A	3.4	440.0	0.005	400	0.008	6.8	50	97	9	8	7
2B	3.3	680.0	0.006	255	0.006	6.8	88	20	9	9	9
3B	1.1	515.0	0.007	60	0.018	6.8	88	20	9	8	7
4AB				505	0.011	6.8		20	9		
6C	2.5	755.0	0.006	630	0.006	6.8	85	20	9	10	9
7AC				30	0.005	6.8		20	9		
9A	2.1	550.0	0.008	25	0.083	6.8	85	20	9	8	7
10A	3.8	580.0	0.010	100	0.012	6.8	85	20	9	8	7
1D	5.3	1140.0	0.006	30	0.006	6.8	88	20	9	13	12
2D	3.5	840.0	0.006	465	0.007	6.8	88	20	9	11	10
1E	7.8	640	0.338	125	0.132	6.8	5	97	8	-	5
2E	1.7	380	0.061	1220	0.006	6.8	10	97	9	5	5
4E	BASIN D			120	0.009	6.8		20			
1F	6.8	725	0.306	200	0.031	6.8	5	97	8	-	5
2F	0.9	290	0.086	820	0.010	6.8	50	97	8	5	5
3F	2.0	1240	0.009	25	0.005	6.8	90	20	9	13	12
4F	8.6	850.0	0.034	230	0.004	6.8	75	97	8	8	7
6F	1.8	1175	0.008	35	0.005	6.8	90	20	9	13	12
1H	18.9	1095	0.246	245	0.020	6.8	5	97	8	-	7
3H	1.6	360	0.067	670	0.008	6.8	55	97	9	6	5
4H	BASIN A			1	0.010	6.8		20			
6H	1.3	900	0.009	90.0	0.005	6.8	90	20	9	10	10
7H	1.3	895	0.009	50.0	0.005	6.8	90	20	9	10	9
1J	1.0	515.0	0.029	1.000	0.010	6.80	85	20	9	6	5

DEBRIS PRODUCING SUBAREAS	SURFACE AREA		DEBRIS PRODUCTION RATE (DPA 8)	DEBRIS PRODUCED (VOL_REQ)	DETENTION VOL REQUIRED	TOTAL REQ VOL (VOL_REQ)
	ac	sq mi	cy / sq mi	cy	cy	cy
SUBAREA 1F	6.8	0.011	35000	372	0	372
SUBAREA 1E	7.8	0.012	35000	427	13	440
SUBAREA 1H	18.9	0.030	35000	1034	71	1105
TOTAL		0.052		1832	84	1917

DEBRIS BASIN	depth	TOP(CONE LIMIT) area	mid area	bot area	VOL_PROV		VOL_REQ	DELTA
	ft	sf	sf	sf	cf	cy		cy
BASIN F	4	4355	2760	1164	11038	409	372	37
BASIN E	5	3938	2761	1583	13803	511	440	71
BASIN H	5.5	7278	5498.5	3719	30242	1120	1105	15

LEGEND:

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- STORM DRAIN LINE (PVT)
- STORM DRAIN LINE (LACFCD)
- MTA DRAIN LINE (PRIVATE)
- LACFCD SD/ACCESS EASEMENT
- LOW FLOW SD LINE (PVT)
- OVERLAND PATH
- FLOWPATH
- SOIL CLASSIFICATION DIVIDING LINE*
- DPA DIVIDING LINE*
- BASIN F (DRAINS TO CULVERT 1)
- BASIN'S D & E (DRAINS TO CULVERT 2)
- BASIN'S A & H (DRAINS TO CULVERT 3)
- XX — SUBAREA NAME
- X.X — SUBAREA ACREAGE (AC)
- EXISTING CONTOURS(MINOR)
- 1100 — EXISTING CONTOURS (MAJOR)
- 1100 — PROPOSED CONTOURS
- PROPOSED TOP/TOE OF SLOPE
- PROPOSED DAYLIGHT
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING CURB
- PROPOSED CURB
- DEBRIS CONE LIMIT
- Q_{25} — DEVELOPED SUBAREA FLOWRATE 25YR (CFS)
- Q_{50B} — UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED (CFS)
- ΣQ — SUM OF SUBAREAS FLOWRATE (CFS)
- ΣQ_{OUT} — ACTUAL FLOWRATE THAT LEAVES THE DEBRIS/DETENTION BASIN PER MODPULS CALCULATION
- $\Sigma Q_{ALLOWABLE}$ — FLOWRATE ALLOWED TO LEAVE DEBRIS/DETENTION BASIN
- A — SUBAREA ACREAGE (AC)
- ΣA — SUM SUBAREAS ACREAGE (AC)
- Tc — TIME OF CONCENTRATION
- DPV — DEBRIS VOLUME PRODUCED IN A GIVEN SUBAREA
- WATER QUALITY TREATMENT BIOFILTRATION BASIN

NOTE: NOT WITHIN COUNTY ADOPTED FLOODWAY AND NOT WITHIN FEMA FLOOD ZONE "A".

ALLIANCE
LAND PLANNING & ENGINEERING INC.
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FAX: (760) 431-8802
27413 TOURNEY ROAD
SUITE 120
VALENCIA, CA 91355
TEL: (661) 799-2760
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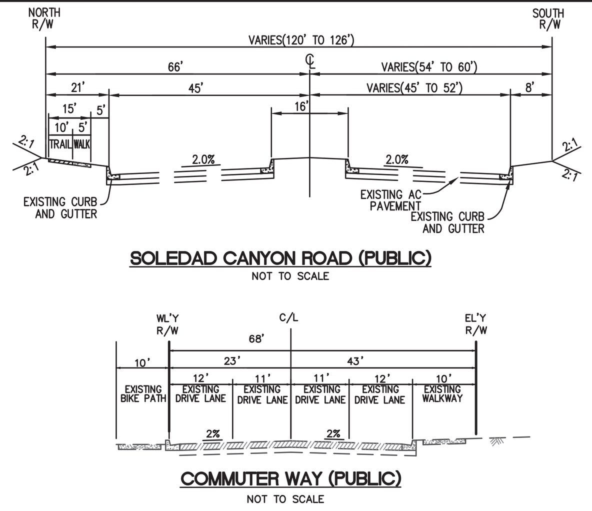
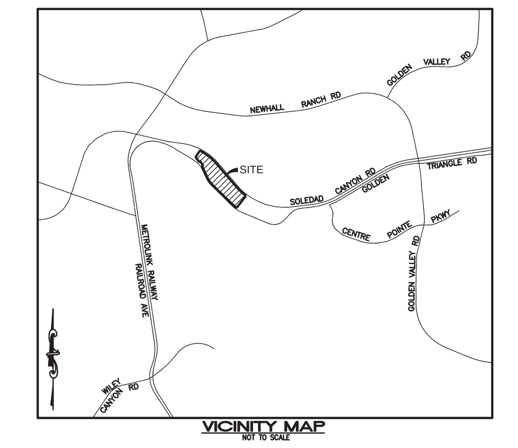
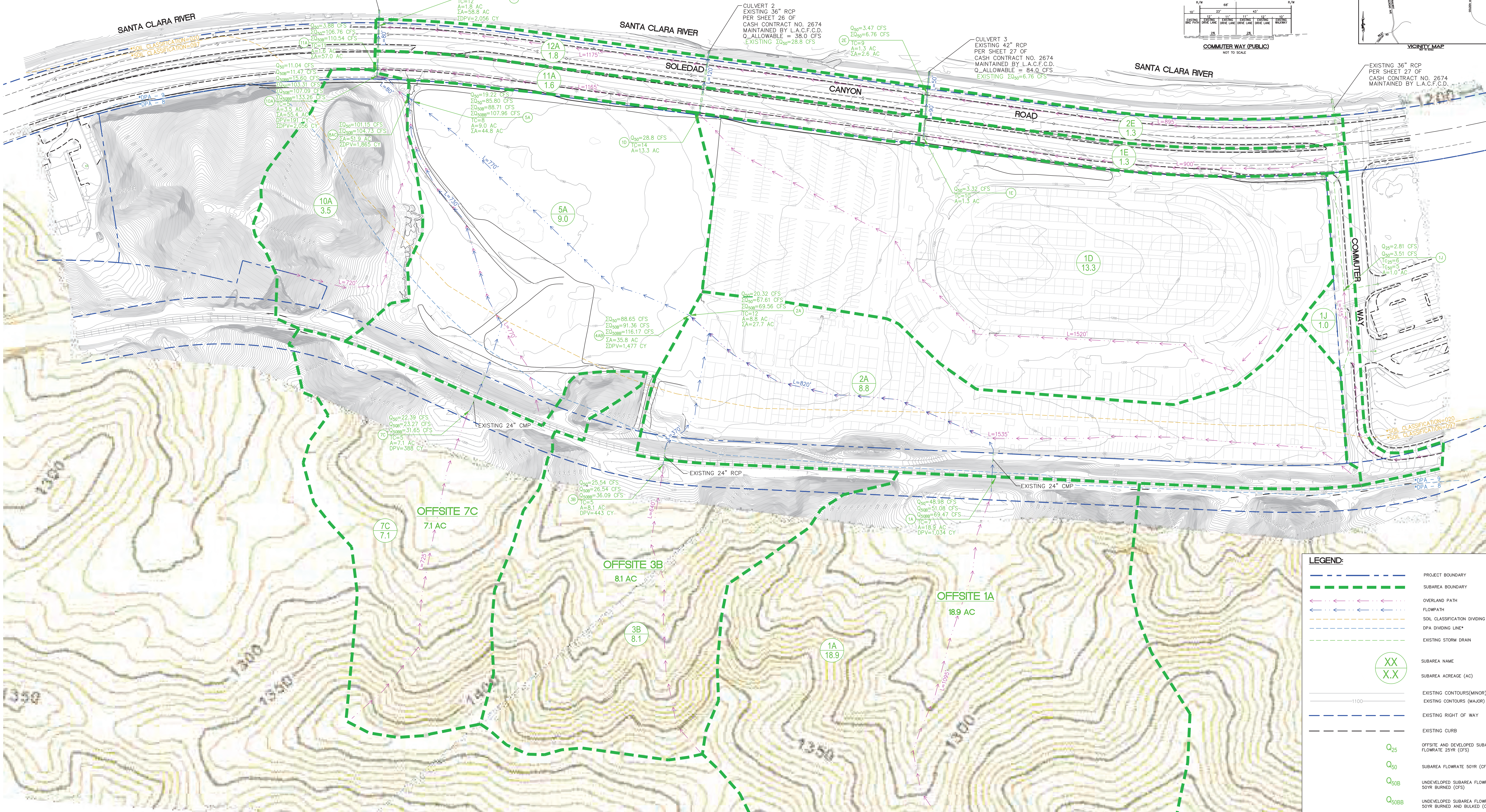
RIVERVIEW

EXISTING CONDITION HYDROLOGY EXHIBIT

7/28/22







SCALE: 1"=80'

NOTE: NOT WITHIN COUNTY ADOPTED FLOODWAY AND NOT WITHIN FEMA FLOOD ZONE "A".

BASIN A -EXISTING CONDITION HYDROLOGIC PARAMETERS

SUBAREA	AREA	OVERLAND (Tc)		FLOWPATH		50-Yr RAIN	IMP	SOIL	DPA #	Tc	
		LENGTH	SLOPE	LENGTH	SLOPE					25-YR	50-YR
	ac	ft	ft/ft	ft	ft/ft	in	%			min	min
1A	18.9	1095	0.246	820	0.010	6.8	5	97	8	-	7
2A	8.8	1535	0.018	1.0	0.010	6.8	80	97	9	-	12
3B	8.1	640	0.338	370	0.057	6.8	5	97	8	-	5
4AB				770.0	0.006	6.8		20			
5A	9.0	770	0.042	1.0	0.010		15	20	9	-	8
7C	7.1	725	0.303	730	0.016	6.8	5	97	8	-	5
8AC				80.0	0.063			20			
10A	3.5	720	0.142	15.0	0.004	6.8	5	97	8	-	5
11A	1.6	1165	0.008	80	0.004	6.8	90	20	9	-	11
12A	1.8	1175	0.008	35	0.005	6.8	90	20	9	-	12
1D	13.3	1520	0.008	120	0.009	6.80	90	20	9	-	14
1E	1.3	900	0.009	90.0	0.005	6.8	90	20	9	-	10
2E	1.3	895	0.009	50.0	0.005	6.8	90	20	9	-	9
1J	1.0	515.0	0.029	1.000	0.0100	6.80	85	20	9	6	5

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTEKER
NO. 51929
EXP 6-30-24
CIVIL
STATE OF CALIFORNIA

LEGEND:

PROJECT BOUNDARY

SUBAREA BOUNDARY

OVERLAND PATH

FLOWPATH

SOIL CLASSIFICATION DIVIDING LINE*

DPA DIVIDING LINE*

EXISTING STORM DRAIN

XX SUBAREA NAME

X.X SUBAREA ACREAGE (AC)

EXISTING CONTOURS(MINOR)

1100 EXISTING CONTOURS (MAJOR)

EXISTING RIGHT OF WAY

EXISTING CURB

Q_{25} OFFSITE AND DEVELOPED SUBAREA FLOWRATE 25YR (CFS)

Q_{50} SUBAREA FLOWRATE 50YR (CFS)

Q_{50B} UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED (CFS)

Q_{50BB} UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED AND BULKED (CFS)

ΣQ_{50} SUM OF 50YR SUBAREA FLOWRATES(CFS)

ΣQ_{50B} SUM OF 50YR DEVELOPED SUBAREAS AND 50YR BURNED UNDEVELOPED SUBAREAS FLOWRATES, DESIGN STORM EVENT (CFS)

ΣQ_{50BB} SUM OF SUBAREAS DESIGN STORM EVENT FLOWRATES WITH BULKING (CFS)**

A SUBAREA ACREAGE (AC)

ΣA SUM SUBAREAS ACREAGE (AC)

Tc & Tc_{50} TIME OF CONCENTRATION 50YR STORM EVENTS

Tc_{25} TIME OF CONCENTRATION 25YR STORM EVENT

DPV DEBRIS PRODUCTION VOLUME (CY)

ΣDPV SUM OF DEBRIS (CY)**

**DEBRIS VOLUMES AND BULKED FLOWRATES PROVIDED AT KEY LOCATIONS ONLY

ALLIANCE
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SUITE 120
VALENCIA, CA 91355
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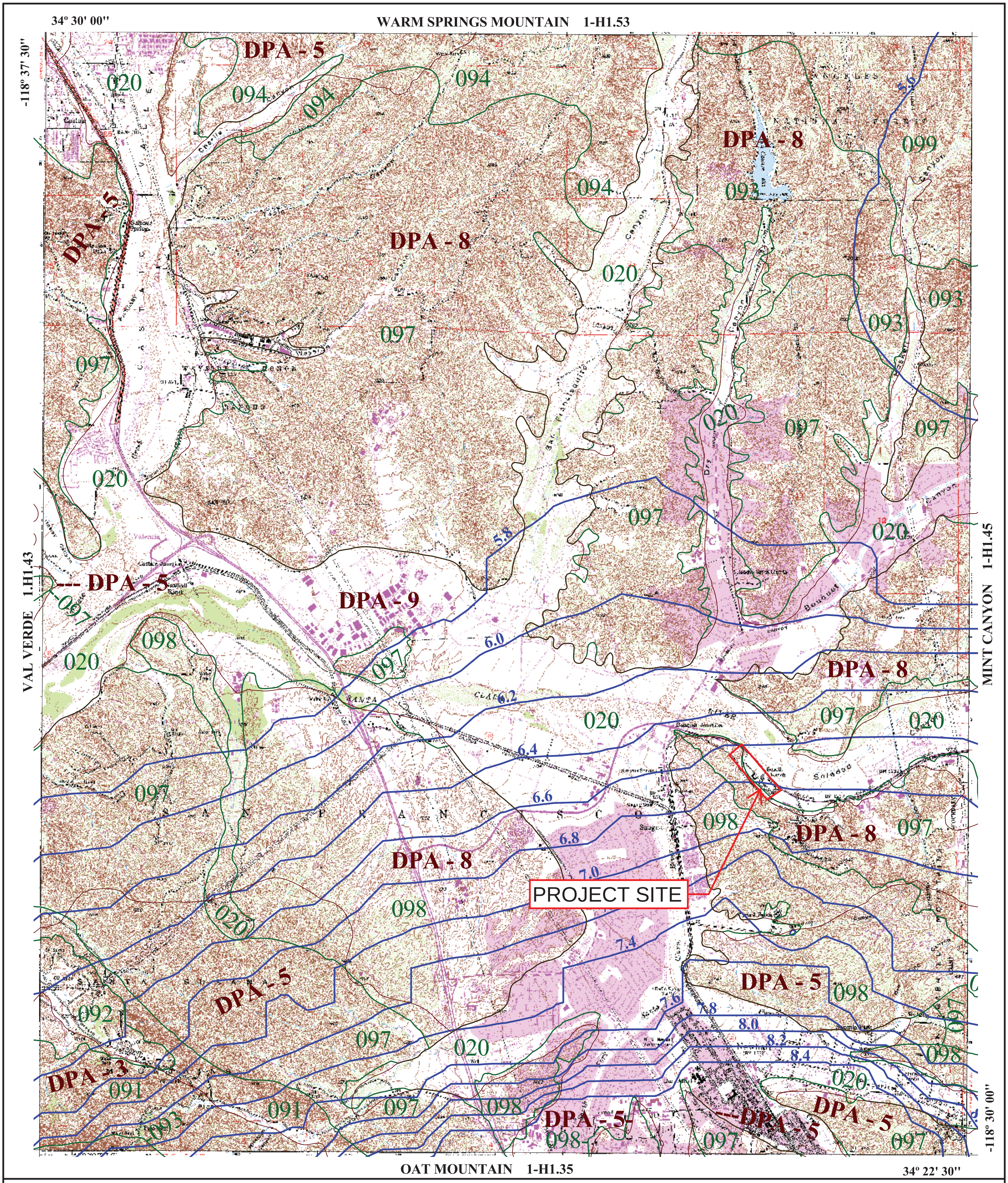
I:\CAD\2130\HYDRO & WQT\2130_HYDRO.dwg

APPENDIX B

HYDROLOGIC DESIGN PARAMETERS



016	SOIL CLASSIFICATION AREA
7.2	INCHES OF RAINFALL
DPA - 6	DEBRIS POTENTIAL AREA

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

N E W H A L L
50-YEAR 24-HOUR ISOHYET

1-H1.44

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

RIVERVIEW

DEVELOPED CONDITION TC's

DESIGN STORM EVENT

Peak Flow Hydrologic Analysis

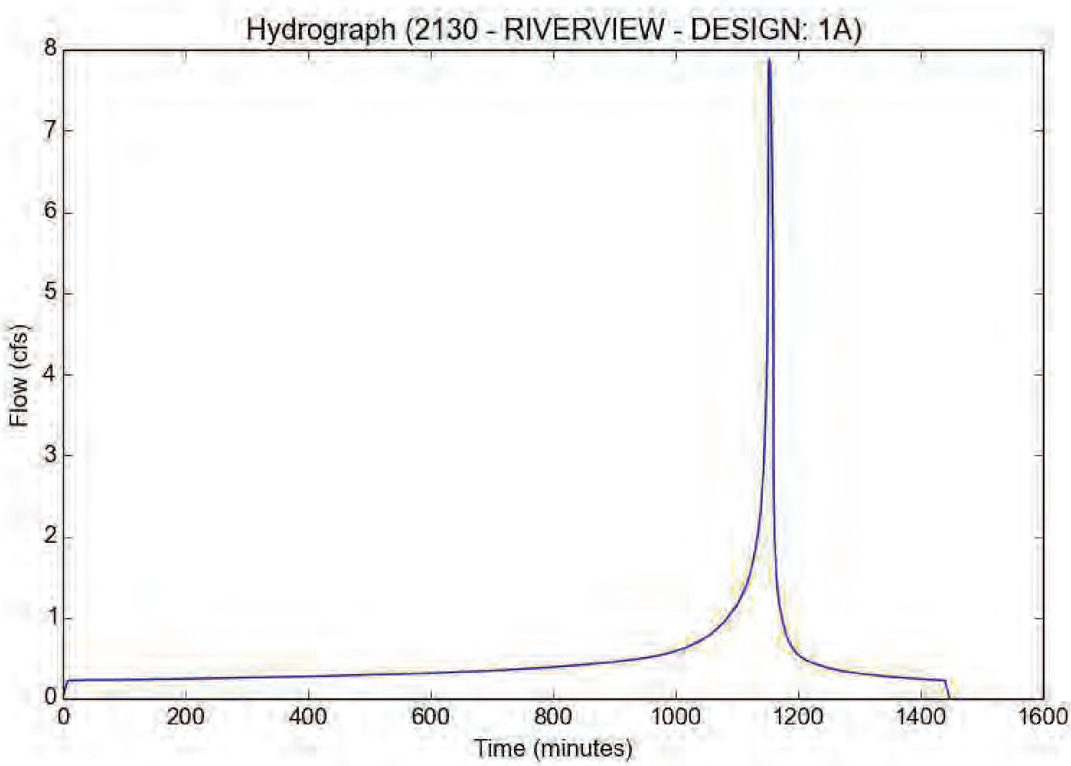
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1A
Area (ac)	3.4
Flow Path Length (ft)	440.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.5
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.8561
Undeveloped Runoff Coefficient (Cu)	0.7229
Developed Runoff Coefficient (Cd)	0.8115
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	7.8798
Burned Peak Flow Rate (cfs)	7.8798
24-Hr Clear Runoff Volume (ac-ft)	0.9282
24-Hr Clear Runoff Volume (cu-ft)	40430.2412



Peak Flow Hydrologic Analysis

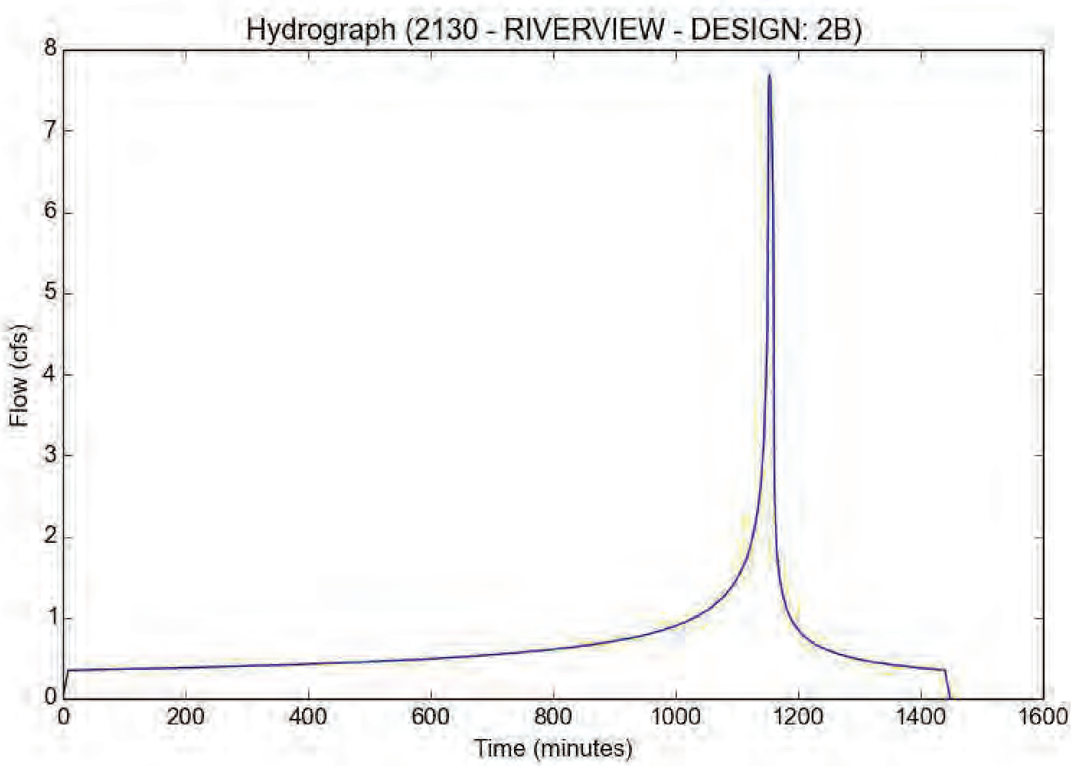
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	2B
Area (ac)	3.3
Flow Path Length (ft)	680.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.7023
Undeveloped Runoff Coefficient (Cu)	0.5796
Developed Runoff Coefficient (Cd)	0.8616
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	7.6829
Burned Peak Flow Rate (cfs)	7.6829
24-Hr Clear Runoff Volume (ac-ft)	1.3221
24-Hr Clear Runoff Volume (cu-ft)	57590.1081



Peak Flow Hydrologic Analysis

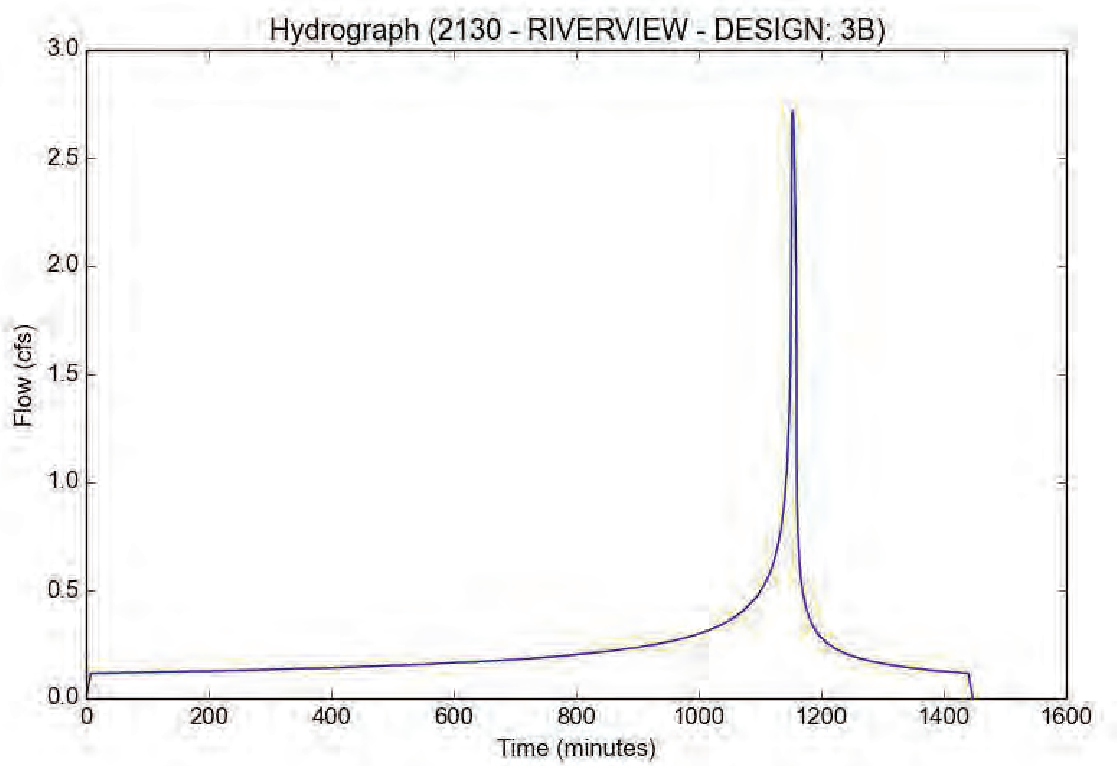
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	3B
Area (ac)	1.1
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.8561
Undeveloped Runoff Coefficient (Cu)	0.5935
Developed Runoff Coefficient (Cd)	0.8632
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	2.712
Burned Peak Flow Rate (cfs)	2.712
24-Hr Clear Runoff Volume (ac-ft)	0.4407
24-Hr Clear Runoff Volume (cu-ft)	19197.5857



Peak Flow Hydrologic Analysis

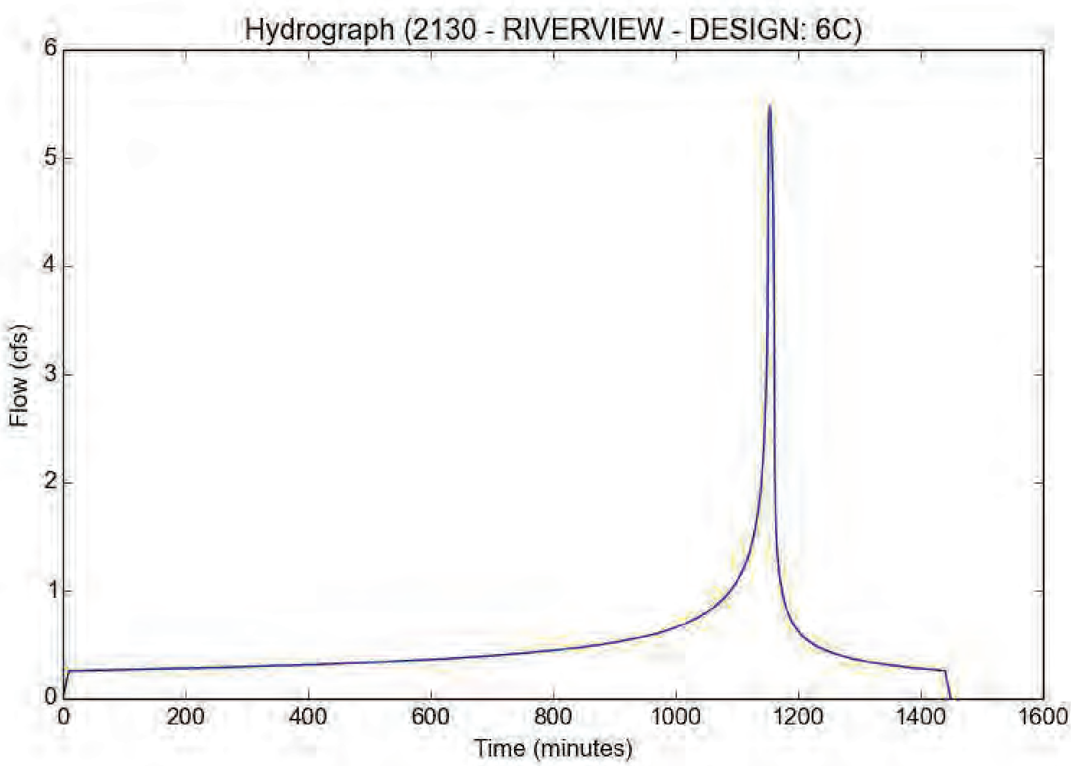
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	6C
Area (ac)	2.5
Flow Path Length (ft)	755.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.5717
Undeveloped Runoff Coefficient (Cu)	0.5678
Developed Runoff Coefficient (Cd)	0.8502
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	5.466
Burned Peak Flow Rate (cfs)	5.466
24-Hr Clear Runoff Volume (ac-ft)	0.9744
24-Hr Clear Runoff Volume (cu-ft)	42443.8433



Peak Flow Hydrologic Analysis

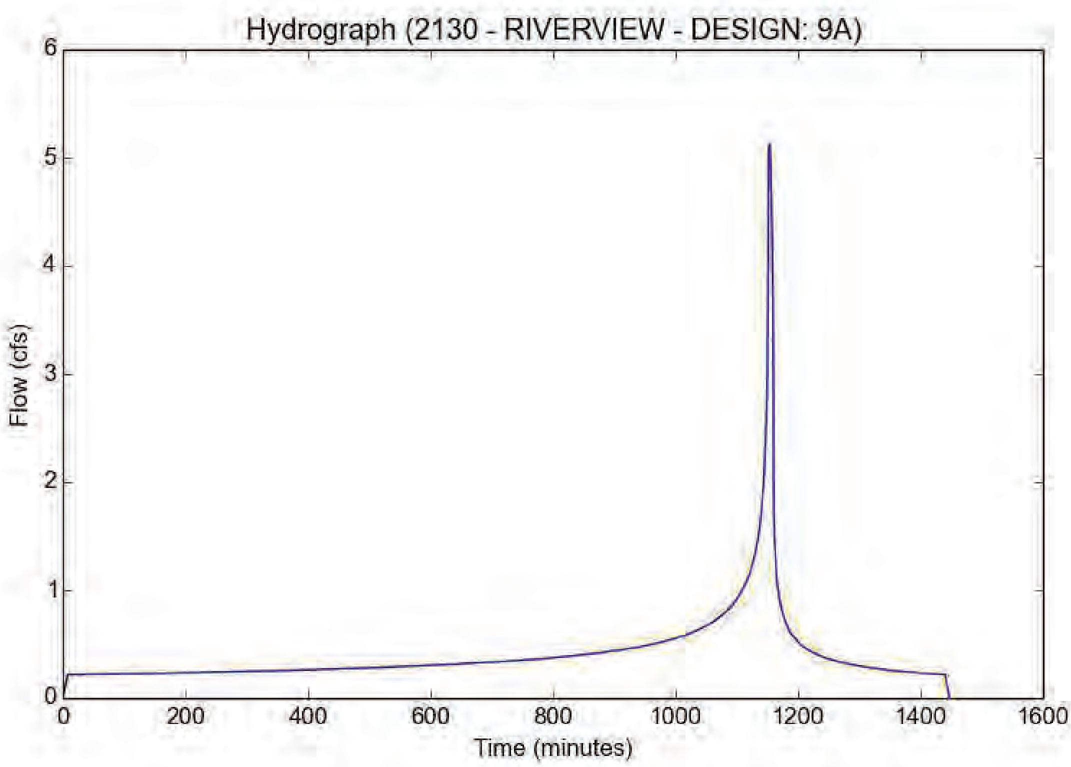
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	9A
Area (ac)	2.1
Flow Path Length (ft)	550.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.8561
Undeveloped Runoff Coefficient (Cu)	0.5935
Developed Runoff Coefficient (Cd)	0.854
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	5.1223
Burned Peak Flow Rate (cfs)	5.1223
24-Hr Clear Runoff Volume (ac-ft)	0.8186
24-Hr Clear Runoff Volume (cu-ft)	35656.7617



Peak Flow Hydrologic Analysis

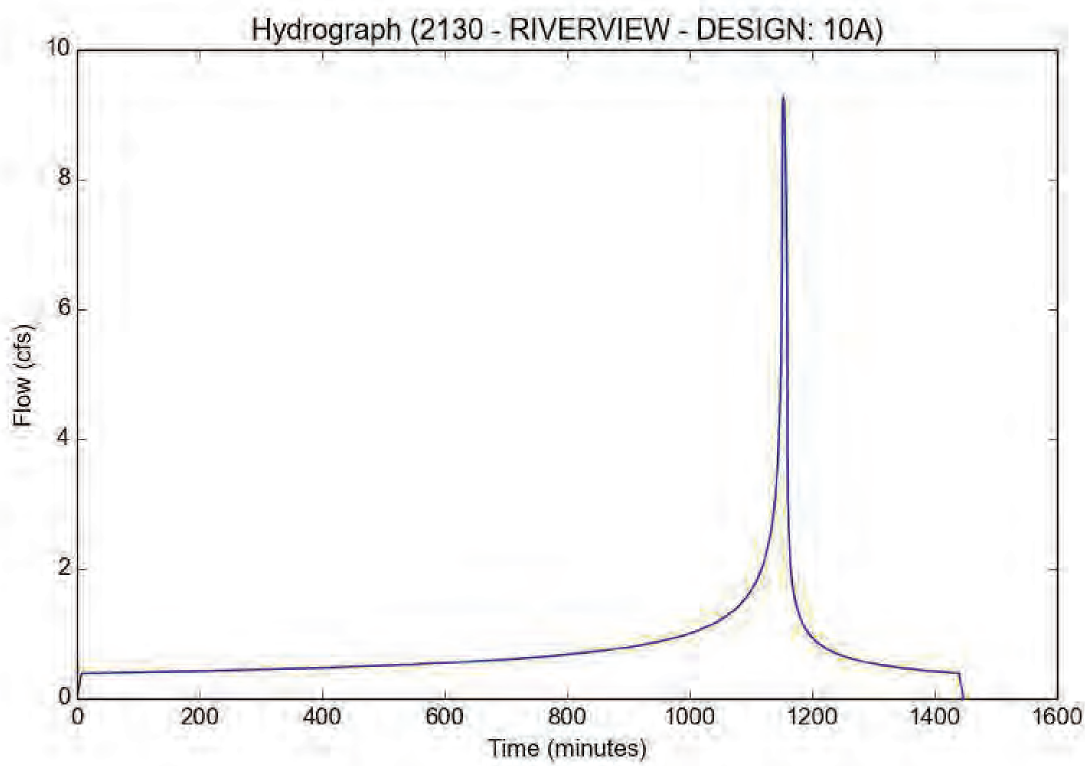
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	10A
Area (ac)	3.8
Flow Path Length (ft)	580.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.8561
Undeveloped Runoff Coefficient (Cu)	0.5935
Developed Runoff Coefficient (Cd)	0.854
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	9.2689
Burned Peak Flow Rate (cfs)	9.2689
24-Hr Clear Runoff Volume (ac-ft)	1.4812
24-Hr Clear Runoff Volume (cu-ft)	64521.7594



Peak Flow Hydrologic Analysis

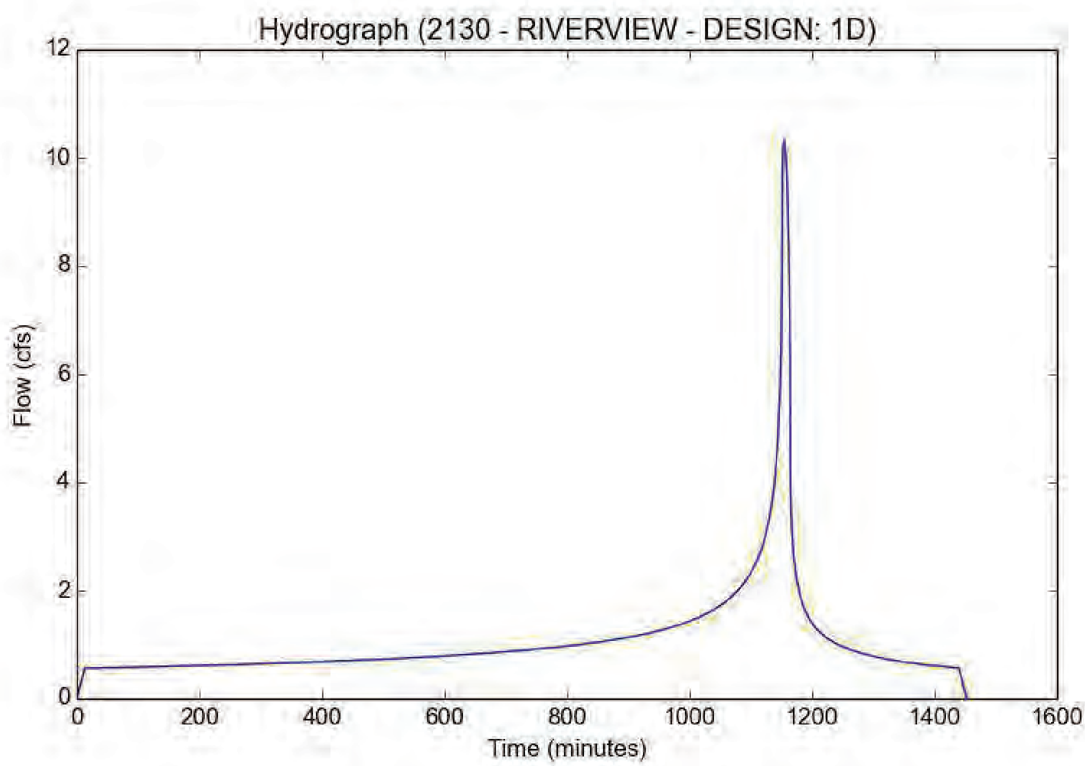
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1D
Area (ac)	5.3
Flow Path Length (ft)	1140.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.2734
Undeveloped Runoff Coefficient (Cu)	0.5408
Developed Runoff Coefficient (Cd)	0.8569
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	10.3246
Burned Peak Flow Rate (cfs)	10.3246
24-Hr Clear Runoff Volume (ac-ft)	2.1231
24-Hr Clear Runoff Volume (cu-ft)	92480.6519



Peak Flow Hydrologic Analysis

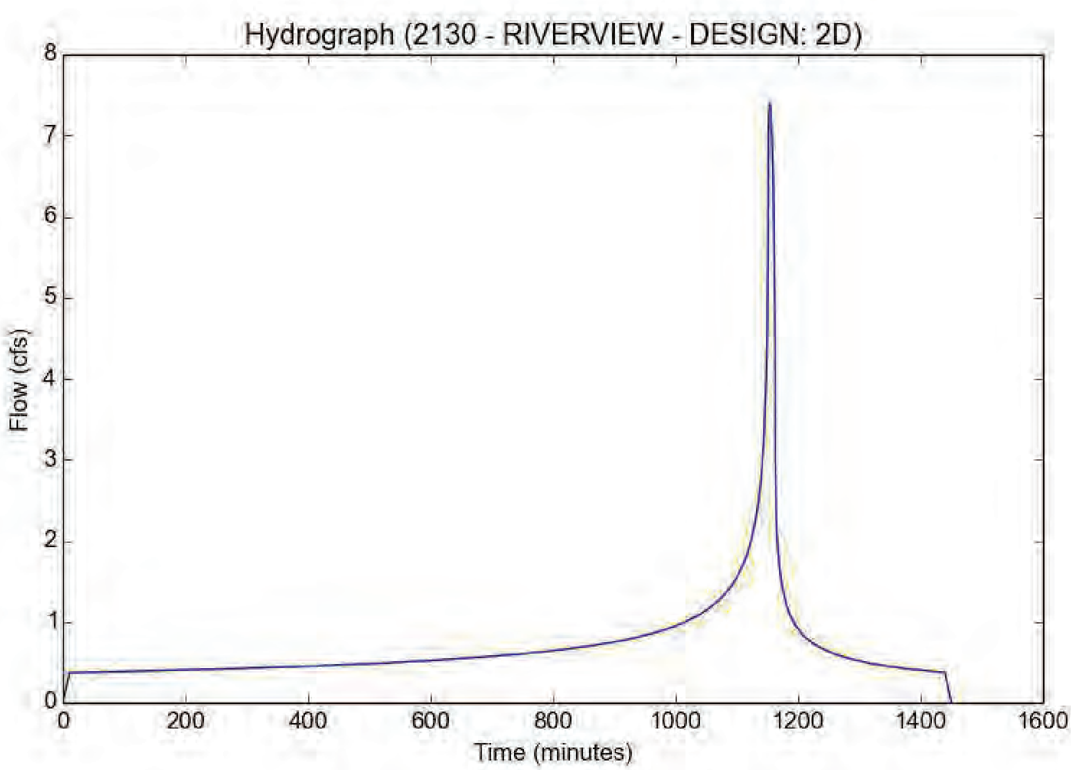
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	2D
Area (ac)	3.5
Flow Path Length (ft)	840.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.4591
Undeveloped Runoff Coefficient (Cu)	0.5576
Developed Runoff Coefficient (Cd)	0.8589
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	7.3924
Burned Peak Flow Rate (cfs)	7.3924
24-Hr Clear Runoff Volume (ac-ft)	1.4021
24-Hr Clear Runoff Volume (cu-ft)	61075.8417



Peak Flow Hydrologic Analysis

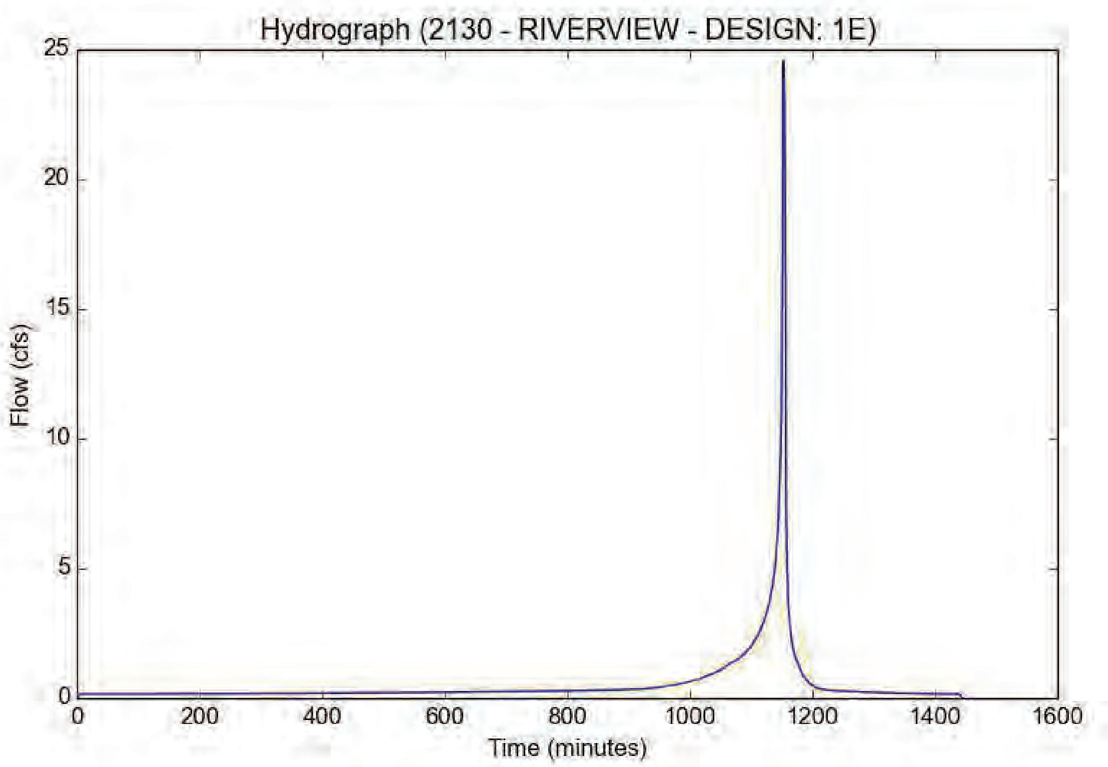
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1E
Area (ac)	7.8
Flow Path Length (ft)	640.0
Flow Path Slope (vft/hft)	0.338
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	24.5614
Burned Peak Flow Rate (cfs)	24.5614
24-Hr Clear Runoff Volume (ac-ft)	1.1298
24-Hr Clear Runoff Volume (cu-ft)	49212.4637



Peak Flow Hydrologic Analysis

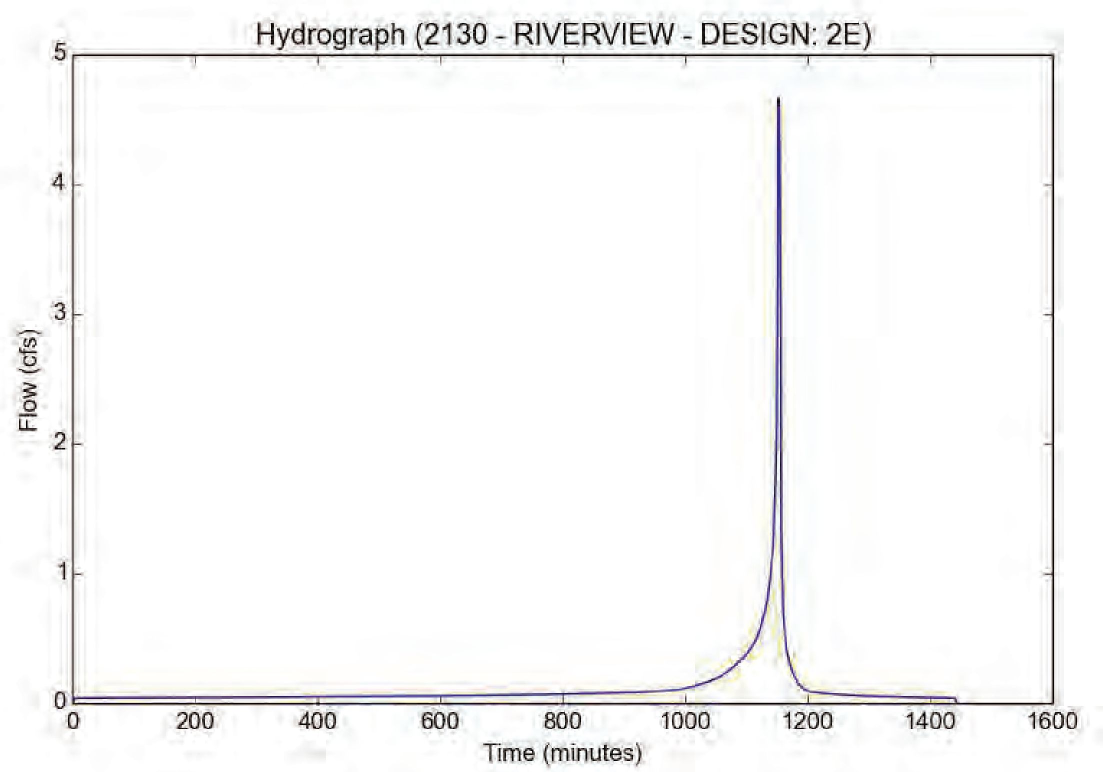
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	2E
Area (ac)	1.7
Flow Path Length (ft)	380.0
Flow Path Slope (vft/hft)	0.061
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.1
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	3.5621
Undeveloped Runoff Coefficient (Cu)	0.7553
Developed Runoff Coefficient (Cd)	0.7698
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.6614
Burned Peak Flow Rate (cfs)	4.6614
24-Hr Clear Runoff Volume (ac-ft)	0.2317
24-Hr Clear Runoff Volume (cu-ft)	10092.0681



Peak Flow Hydrologic Analysis

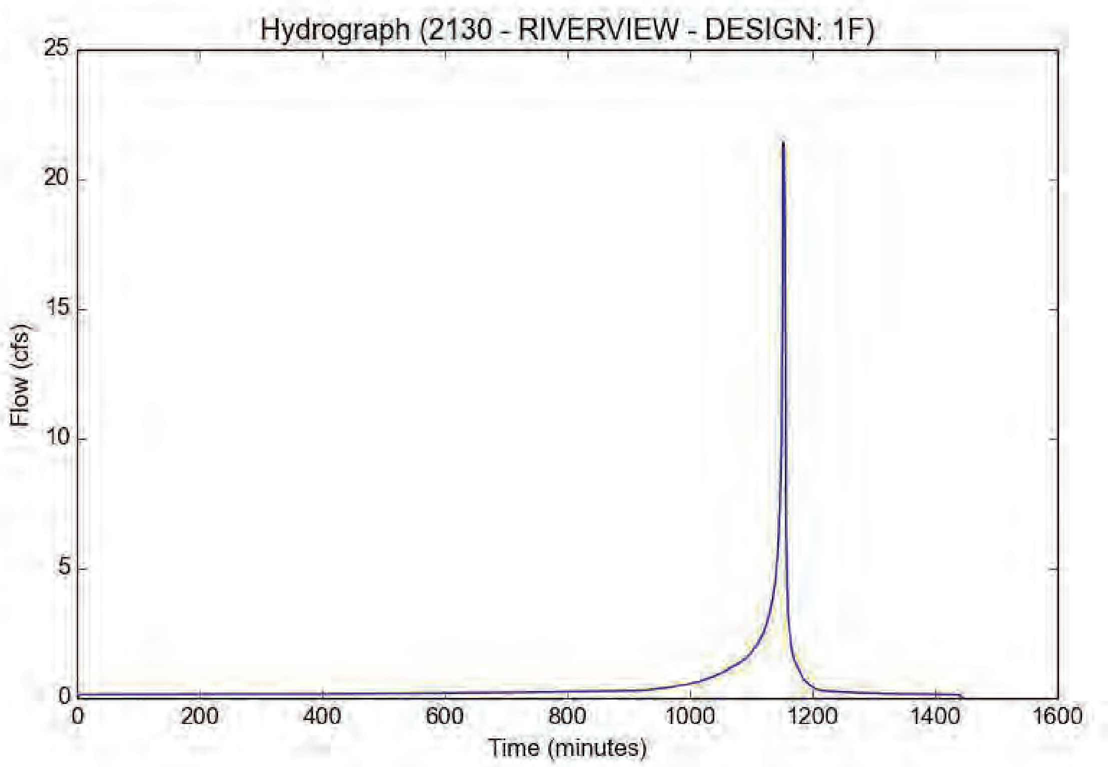
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1F
Area (ac)	6.8
Flow Path Length (ft)	725.0
Flow Path Slope (vft/hft)	0.306
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	21.4125
Burned Peak Flow Rate (cfs)	21.4125
24-Hr Clear Runoff Volume (ac-ft)	0.9849
24-Hr Clear Runoff Volume (cu-ft)	42903.1734



Peak Flow Hydrologic Analysis

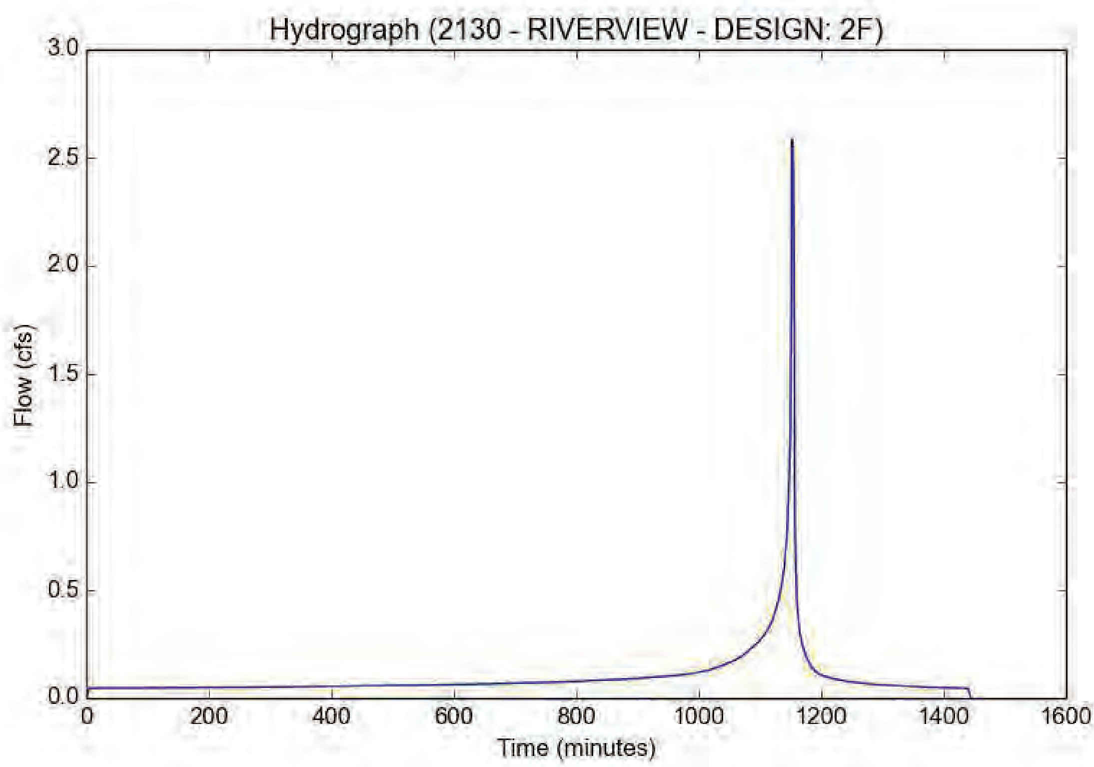
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	2F
Area (ac)	0.9
Flow Path Length (ft)	290.0
Flow Path Slope (vft/hft)	0.086
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.35
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	3.5621
Undeveloped Runoff Coefficient (Cu)	0.7553
Developed Runoff Coefficient (Cd)	0.8059
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.5838
Burned Peak Flow Rate (cfs)	2.5838
24-Hr Clear Runoff Volume (ac-ft)	0.1996
24-Hr Clear Runoff Volume (cu-ft)	8694.7574



Peak Flow Hydrologic Analysis

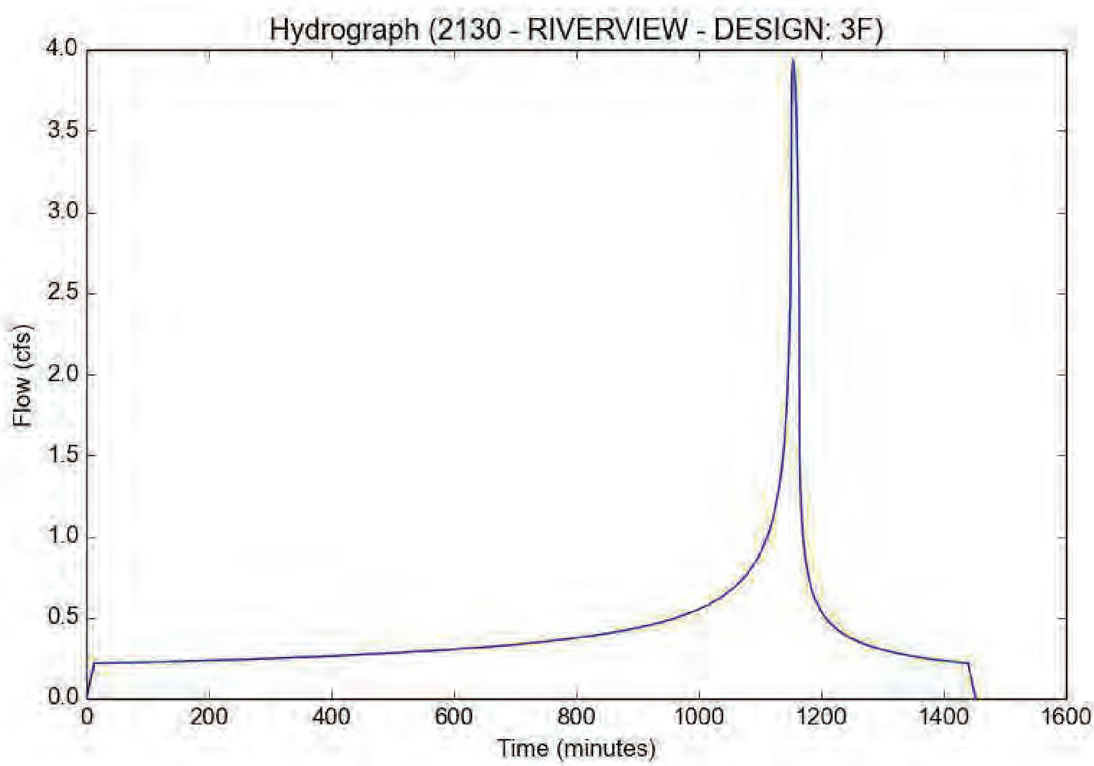
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	3F
Area (ac)	2.0
Flow Path Length (ft)	1240.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.2734
Undeveloped Runoff Coefficient (Cu)	0.5408
Developed Runoff Coefficient (Cd)	0.8641
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	3.9287
Burned Peak Flow Rate (cfs)	3.9287
24-Hr Clear Runoff Volume (ac-ft)	0.8157
24-Hr Clear Runoff Volume (cu-ft)	35530.0117



Peak Flow Hydrologic Analysis

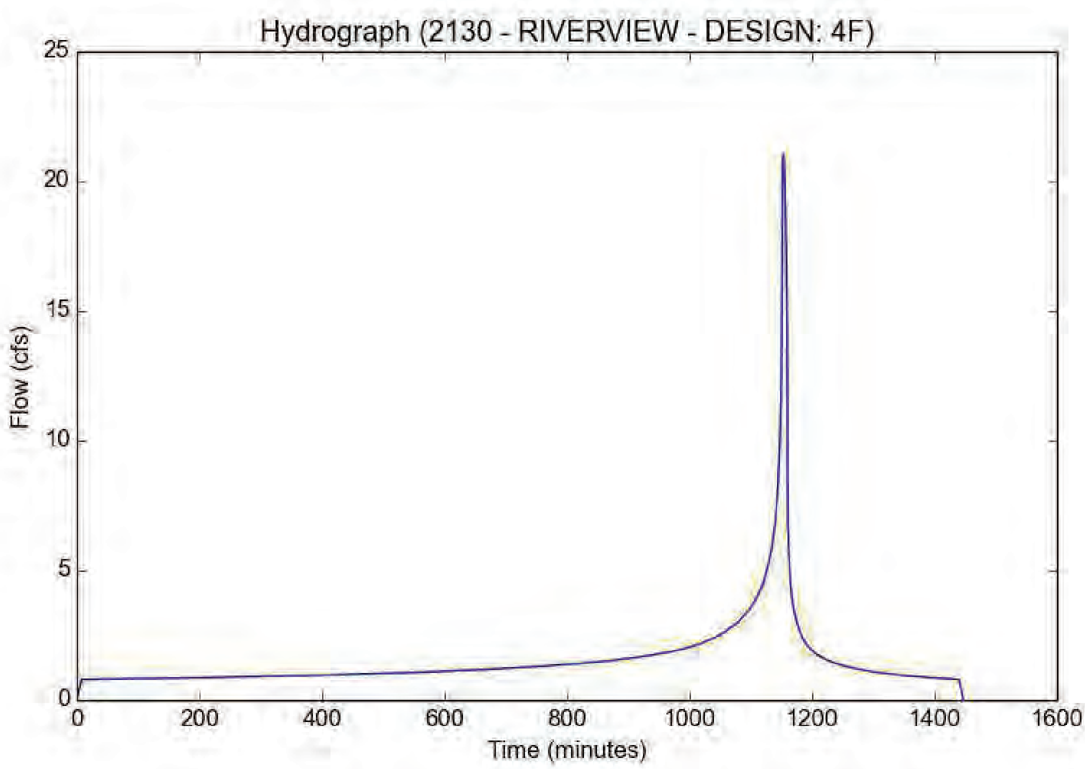
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	4F
Area (ac)	8.6
Flow Path Length (ft)	850.0
Flow Path Slope (vft/hft)	0.034
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.75
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.8561
Undeveloped Runoff Coefficient (Cu)	0.7229
Developed Runoff Coefficient (Cd)	0.8557
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	21.0187
Burned Peak Flow Rate (cfs)	21.0187
24-Hr Clear Runoff Volume (ac-ft)	3.0834
24-Hr Clear Runoff Volume (cu-ft)	134312.0436



Peak Flow Hydrologic Analysis

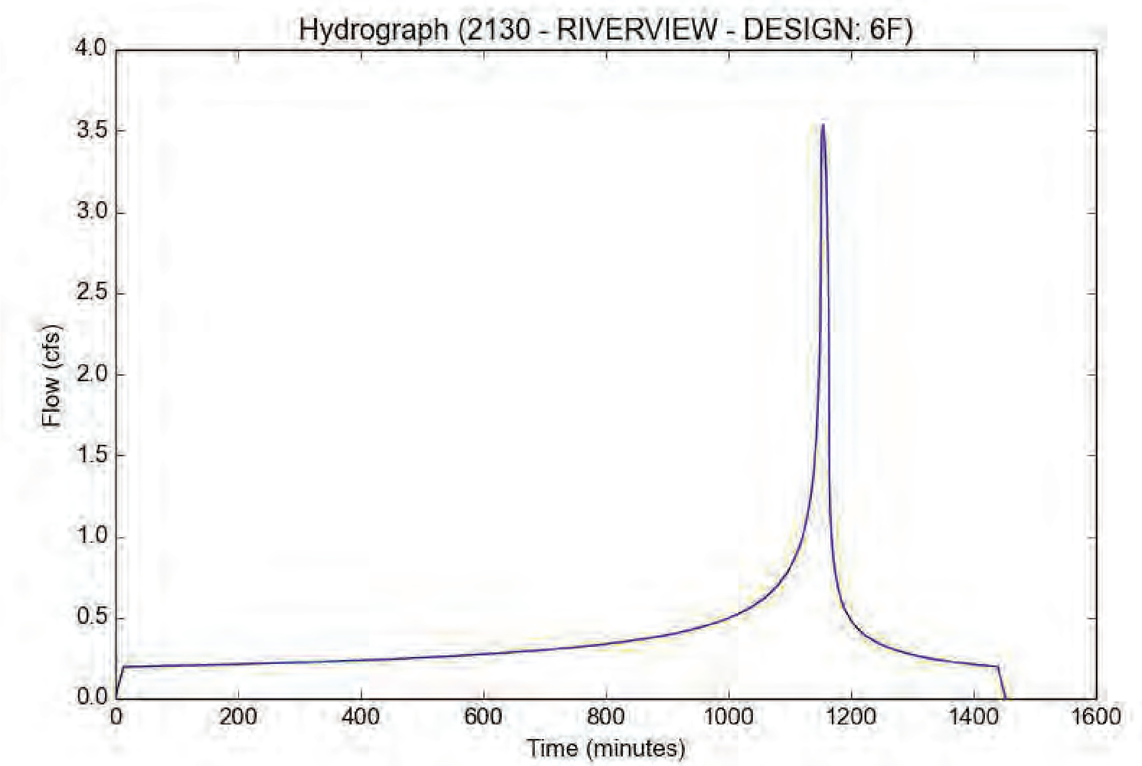
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	6F
Area (ac)	1.8
Flow Path Length (ft)	1175.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.2734
Undeveloped Runoff Coefficient (Cu)	0.5408
Developed Runoff Coefficient (Cd)	0.8641
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	3.5359
Burned Peak Flow Rate (cfs)	3.5359
24-Hr Clear Runoff Volume (ac-ft)	0.7341
24-Hr Clear Runoff Volume (cu-ft)	31977.0106



Peak Flow Hydrologic Analysis

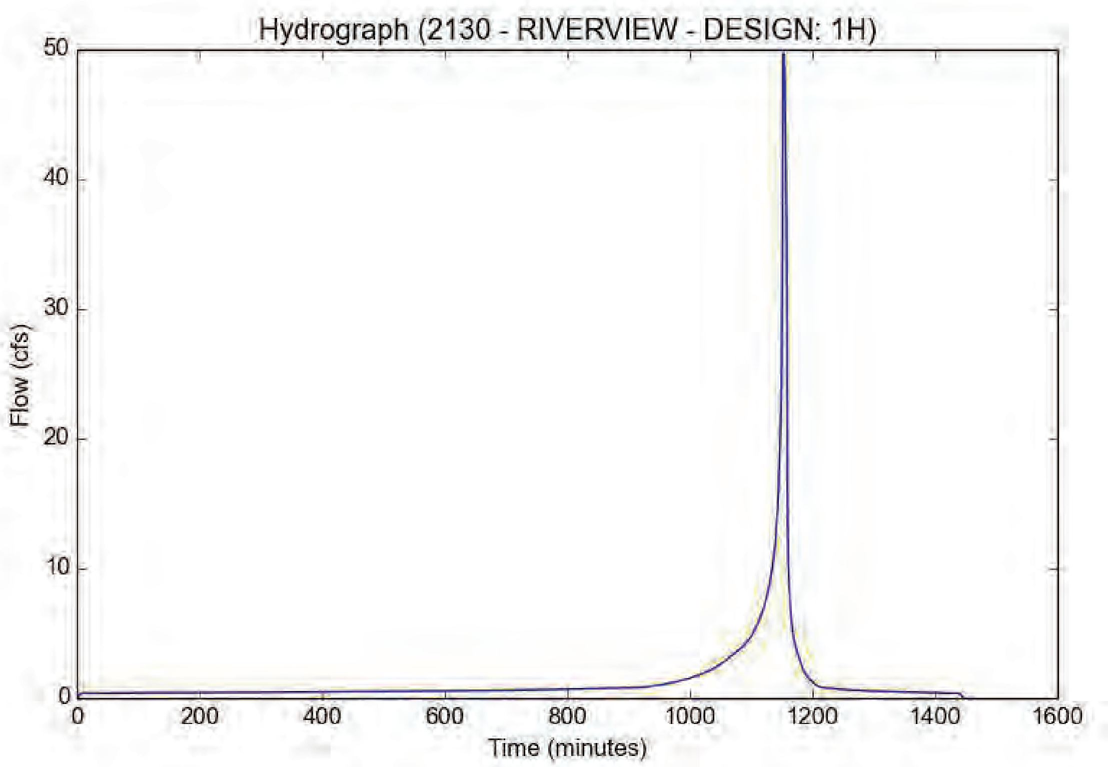
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1H
Area (ac)	18.9
Flow Path Length (ft)	1095.0
Flow Path Slope (vft/hft)	0.246
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.7518
Developed Runoff Coefficient (Cd)	0.7592
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	49.6982
Burned Peak Flow Rate (cfs)	49.6982
24-Hr Clear Runoff Volume (ac-ft)	2.7354
24-Hr Clear Runoff Volume (cu-ft)	119155.2677



Peak Flow Hydrologic Analysis

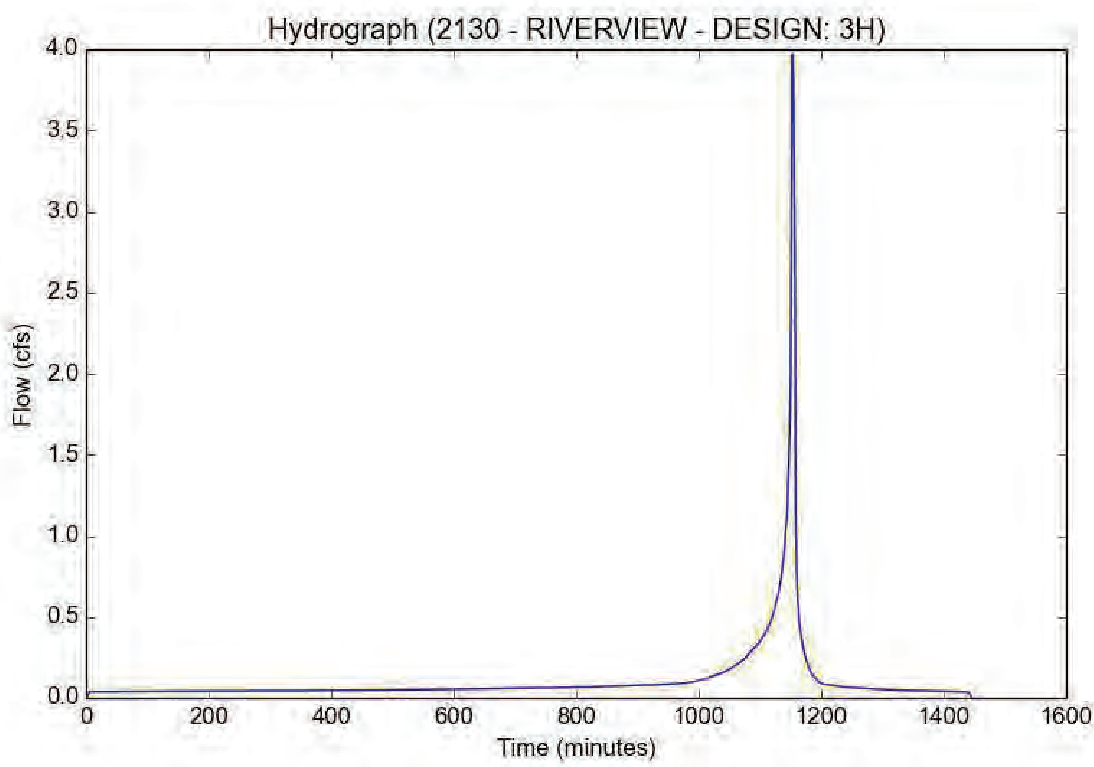
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	3H
Area (ac)	1.6
Flow Path Length (ft)	490.0
Flow Path Slope (vft/hft)	0.043
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.1
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	3.2696
Undeveloped Runoff Coefficient (Cu)	0.7426
Developed Runoff Coefficient (Cd)	0.7583
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.9669
Burned Peak Flow Rate (cfs)	3.9669
24-Hr Clear Runoff Volume (ac-ft)	0.2179
24-Hr Clear Runoff Volume (cu-ft)	9493.2998



Peak Flow Hydrologic Analysis

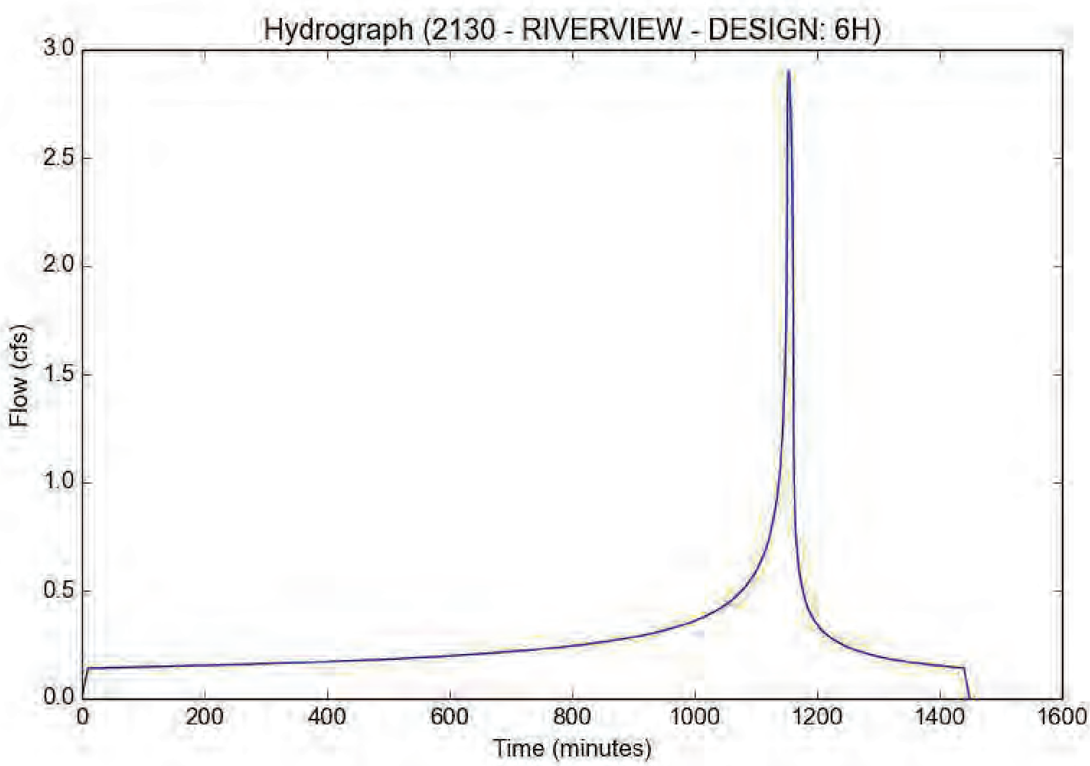
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	6H
Area (ac)	1.3
Flow Path Length (ft)	900.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.5717
Undeveloped Runoff Coefficient (Cu)	0.5678
Developed Runoff Coefficient (Cd)	0.8668
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	2.8978
Burned Peak Flow Rate (cfs)	2.8978
24-Hr Clear Runoff Volume (ac-ft)	0.5302
24-Hr Clear Runoff Volume (cu-ft)	23096.3178



Peak Flow Hydrologic Analysis

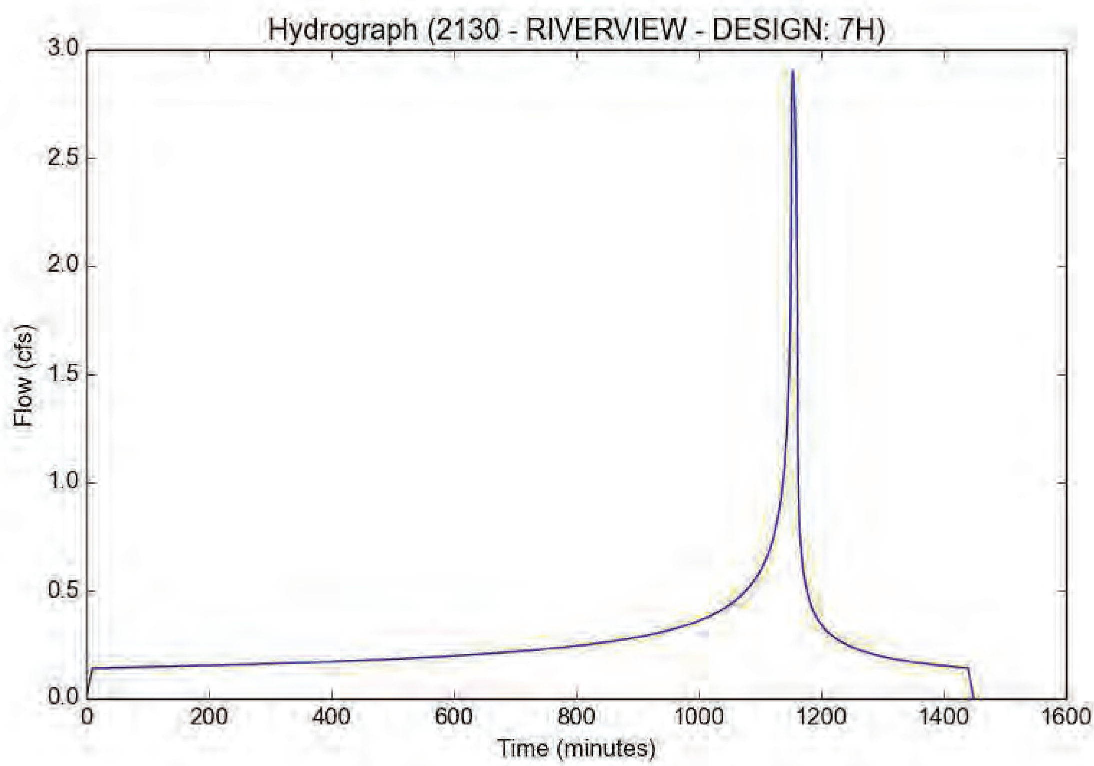
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	7H
Area (ac)	1.3
Flow Path Length (ft)	895.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.5717
Undeveloped Runoff Coefficient (Cu)	0.5678
Developed Runoff Coefficient (Cd)	0.8668
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	2.8978
Burned Peak Flow Rate (cfs)	2.8978
24-Hr Clear Runoff Volume (ac-ft)	0.5302
24-Hr Clear Runoff Volume (cu-ft)	23096.3178



Peak Flow Hydrologic Analysis

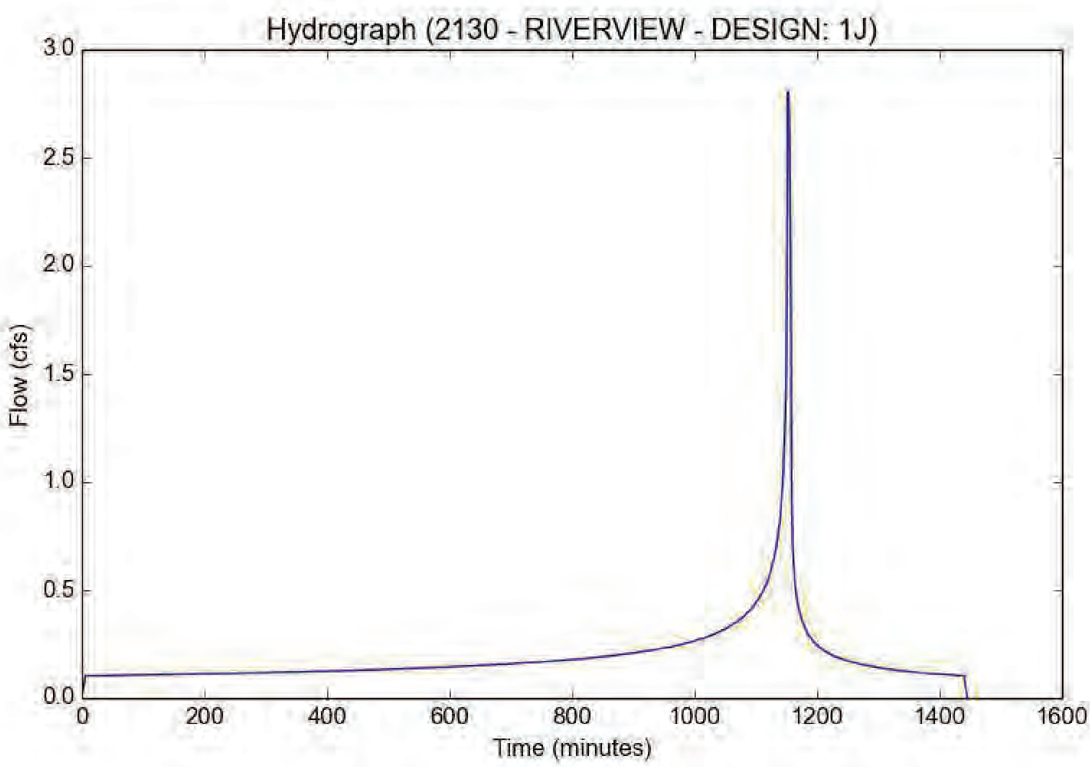
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1J
Area (ac)	1.0
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.029
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	3.2696
Undeveloped Runoff Coefficient (Cu)	0.6215
Developed Runoff Coefficient (Cd)	0.8582
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	2.806
Burned Peak Flow Rate (cfs)	2.806
24-Hr Clear Runoff Volume (ac-ft)	0.3898
24-Hr Clear Runoff Volume (cu-ft)	16981.3717



RIVERVIEW

DEVELOPED CONDITION TC's

50-YR

Peak Flow Hydrologic Analysis

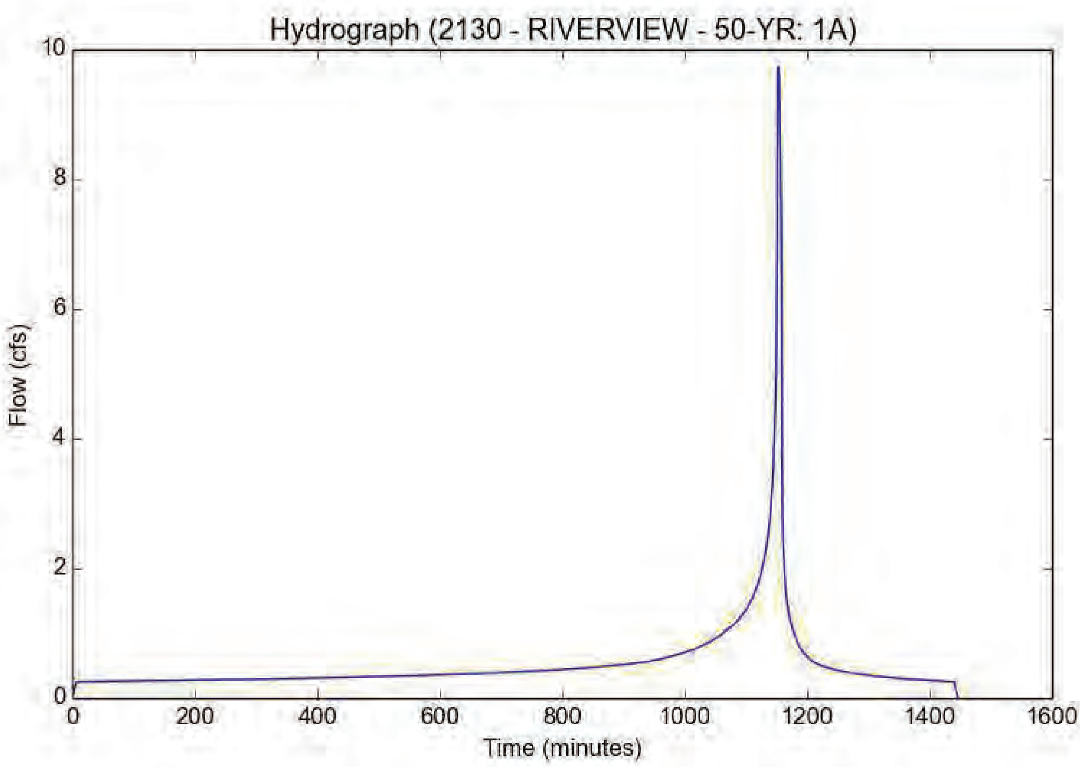
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1A
Area (ac)	3.4
Flow Path Length (ft)	440.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.5
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.7518
Developed Runoff Coefficient (Cd)	0.8259
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	9.7259
Burned Peak Flow Rate (cfs)	9.7259
24-Hr Clear Runoff Volume (ac-ft)	1.0736
24-Hr Clear Runoff Volume (cu-ft)	46764.8951



Peak Flow Hydrologic Analysis

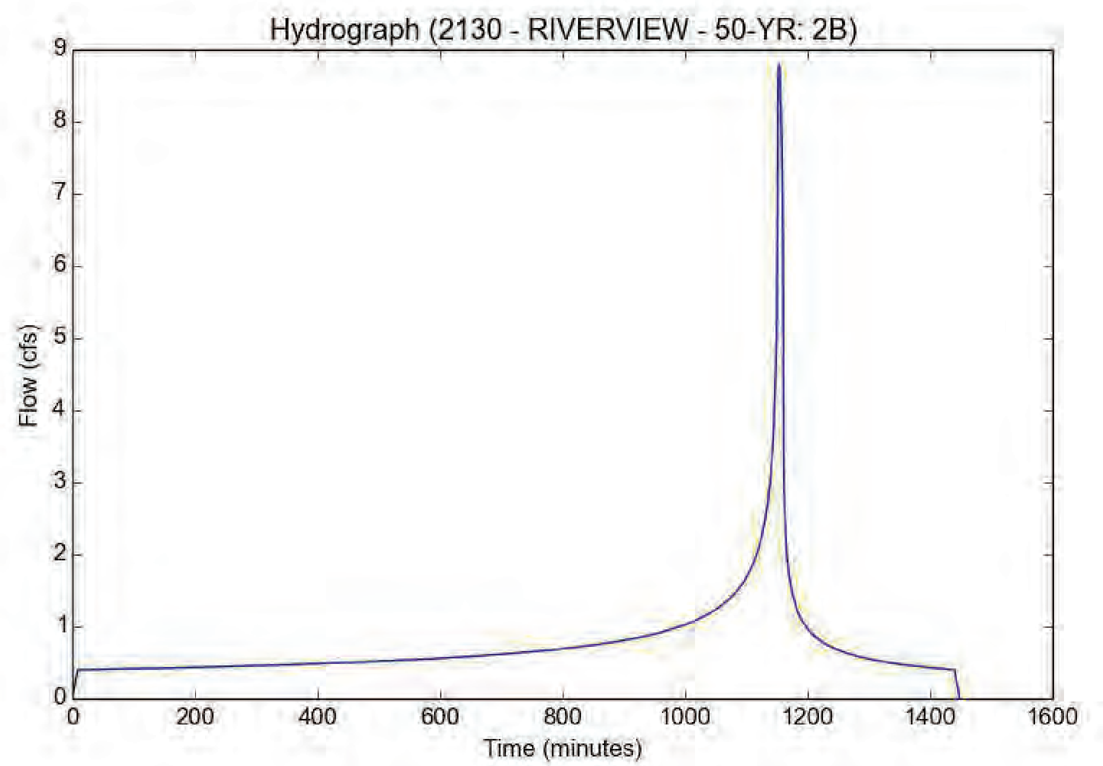
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	2B
Area (ac)	3.3
Flow Path Length (ft)	680.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.0778
Undeveloped Runoff Coefficient (Cu)	0.6109
Developed Runoff Coefficient (Cd)	0.8653
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	8.7885
Burned Peak Flow Rate (cfs)	8.7885
24-Hr Clear Runoff Volume (ac-ft)	1.5083
24-Hr Clear Runoff Volume (cu-ft)	65701.8779



Peak Flow Hydrologic Analysis

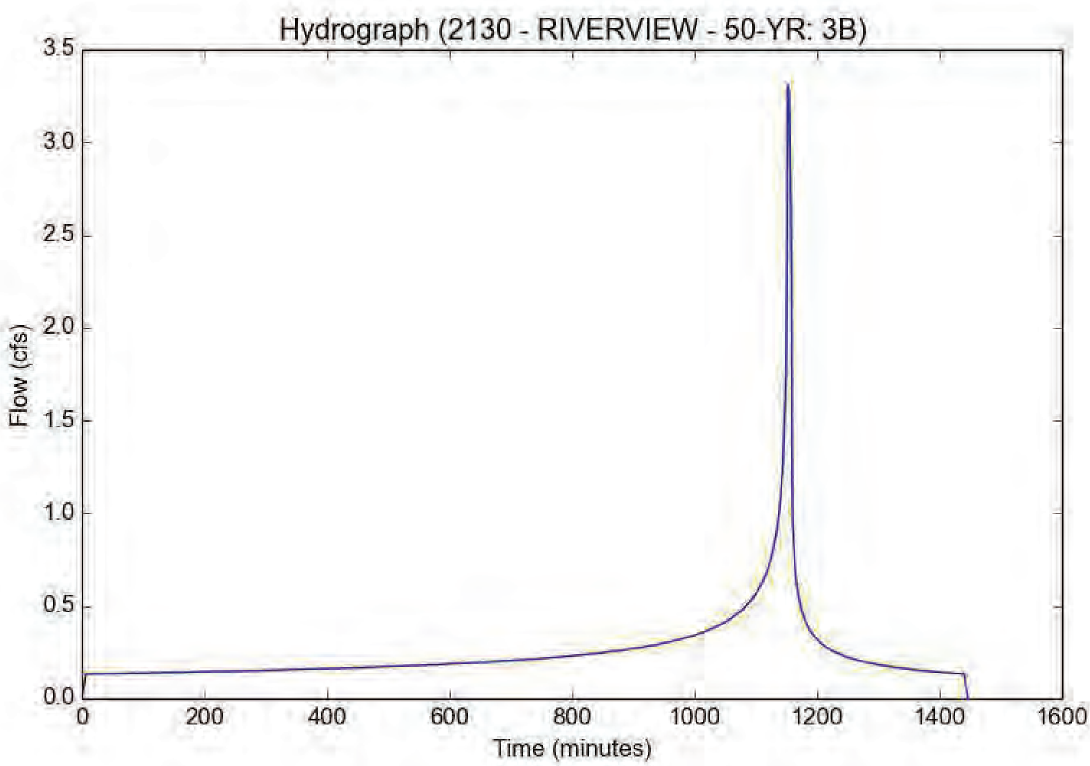
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	3B
Area (ac)	1.1
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.6323
Developed Runoff Coefficient (Cd)	0.8679
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	3.3066
Burned Peak Flow Rate (cfs)	3.3066
24-Hr Clear Runoff Volume (ac-ft)	0.5028
24-Hr Clear Runoff Volume (cu-ft)	21901.9997



Peak Flow Hydrologic Analysis

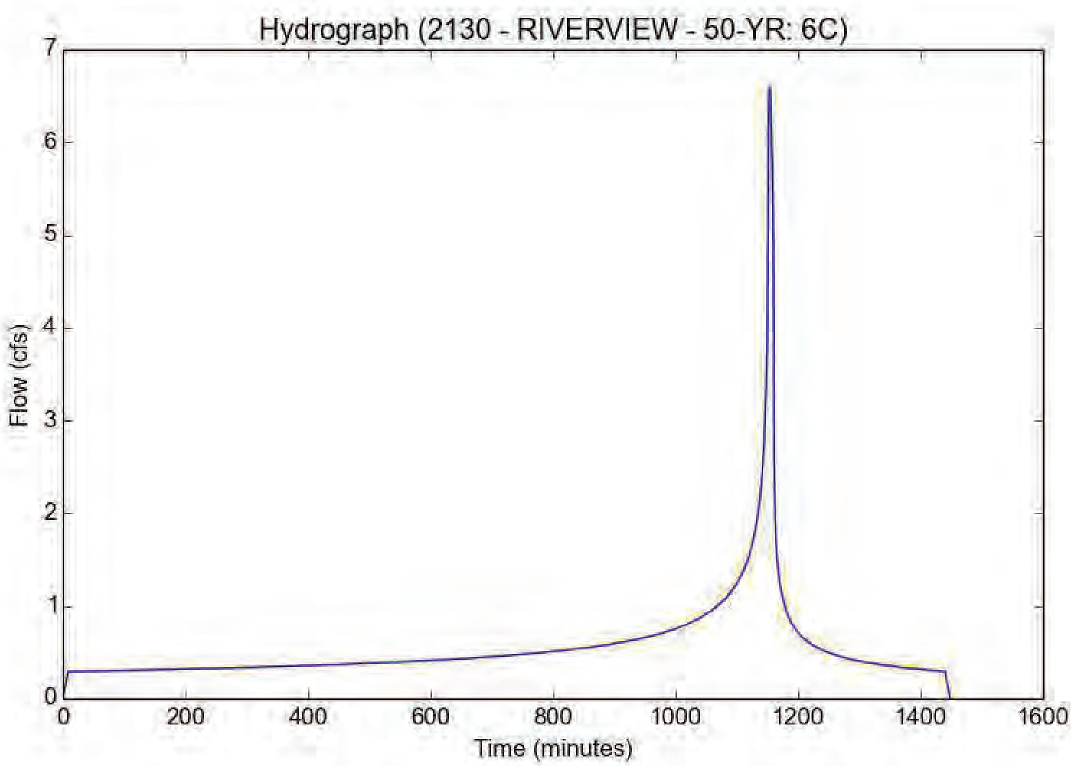
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	6C
Area (ac)	2.5
Flow Path Length (ft)	755.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.0778
Undeveloped Runoff Coefficient (Cu)	0.6109
Developed Runoff Coefficient (Cd)	0.8566
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	6.5913
Burned Peak Flow Rate (cfs)	6.5913
24-Hr Clear Runoff Volume (ac-ft)	1.1122
24-Hr Clear Runoff Volume (cu-ft)	48447.6734



Peak Flow Hydrologic Analysis

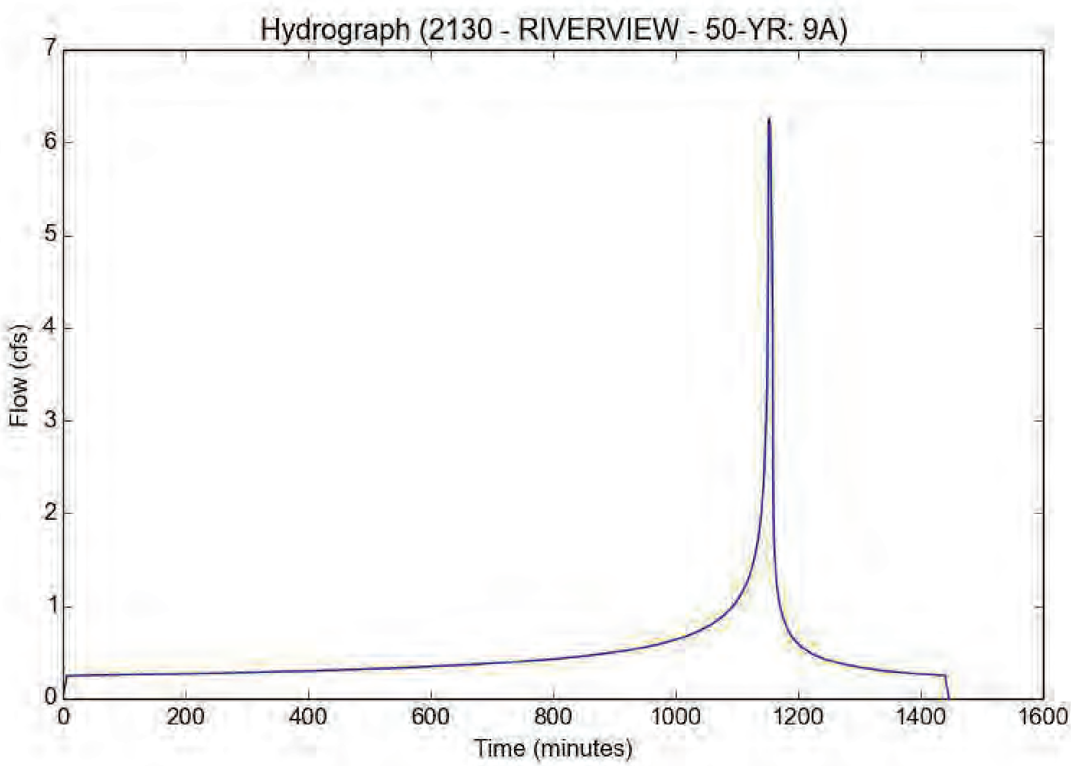
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	9A
Area (ac)	2.1
Flow Path Length (ft)	550.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.6323
Developed Runoff Coefficient (Cd)	0.8598
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	6.2541
Burned Peak Flow Rate (cfs)	6.2541
24-Hr Clear Runoff Volume (ac-ft)	0.9343
24-Hr Clear Runoff Volume (cu-ft)	40699.3285



Peak Flow Hydrologic Analysis

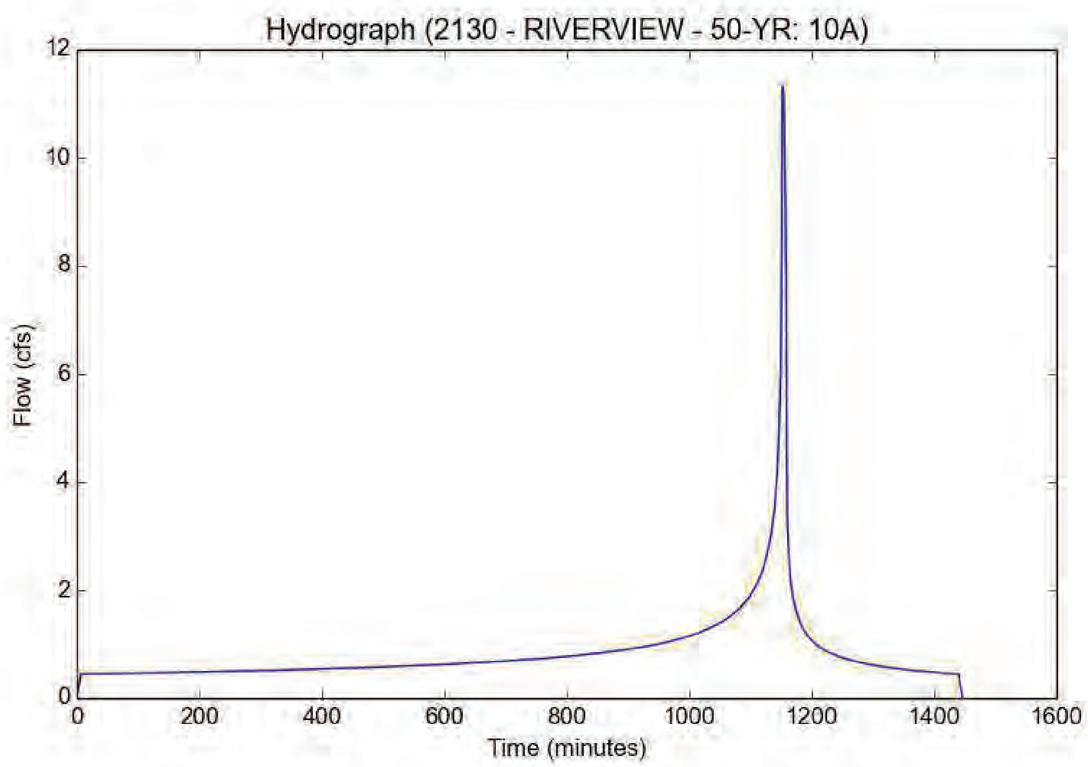
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	10A
Area (ac)	3.8
Flow Path Length (ft)	580.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.6323
Developed Runoff Coefficient (Cd)	0.8598
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	11.317
Burned Peak Flow Rate (cfs)	11.317
24-Hr Clear Runoff Volume (ac-ft)	1.6907
24-Hr Clear Runoff Volume (cu-ft)	73646.404



Peak Flow Hydrologic Analysis

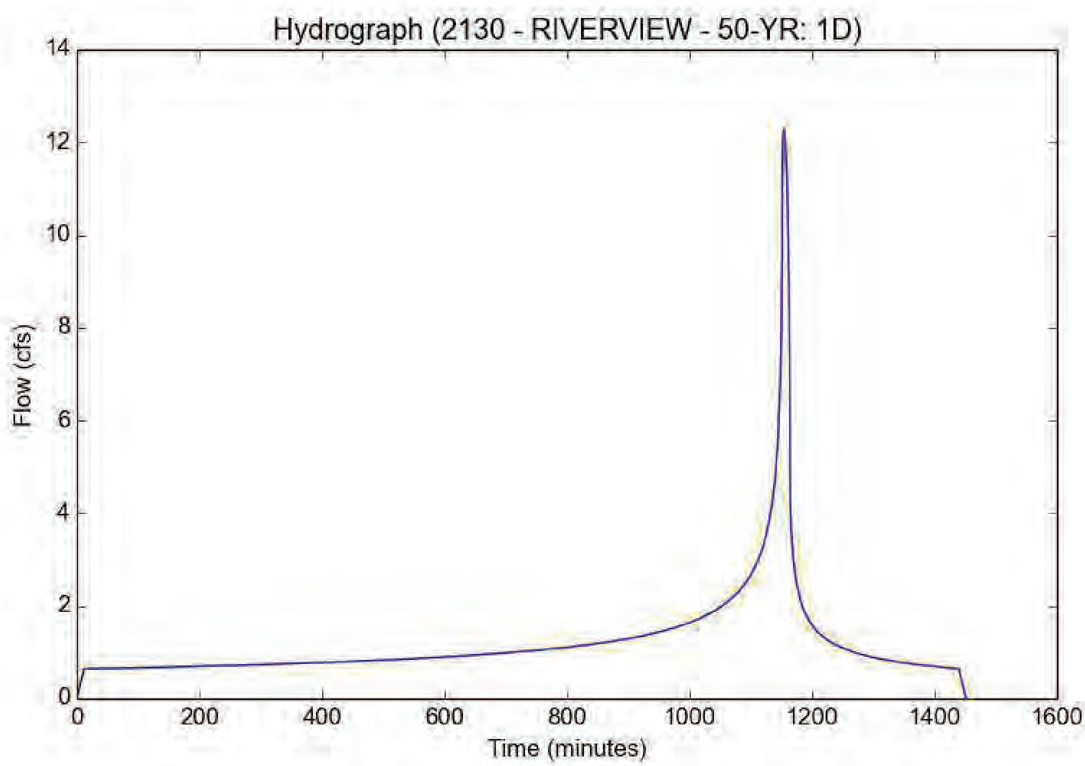
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1D
Area (ac)	5.3
Flow Path Length (ft)	1140.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.6885
Undeveloped Runoff Coefficient (Cu)	0.5784
Developed Runoff Coefficient (Cd)	0.8614
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	12.2743
Burned Peak Flow Rate (cfs)	12.2743
24-Hr Clear Runoff Volume (ac-ft)	2.4221
24-Hr Clear Runoff Volume (cu-ft)	105507.8535



Peak Flow Hydrologic Analysis

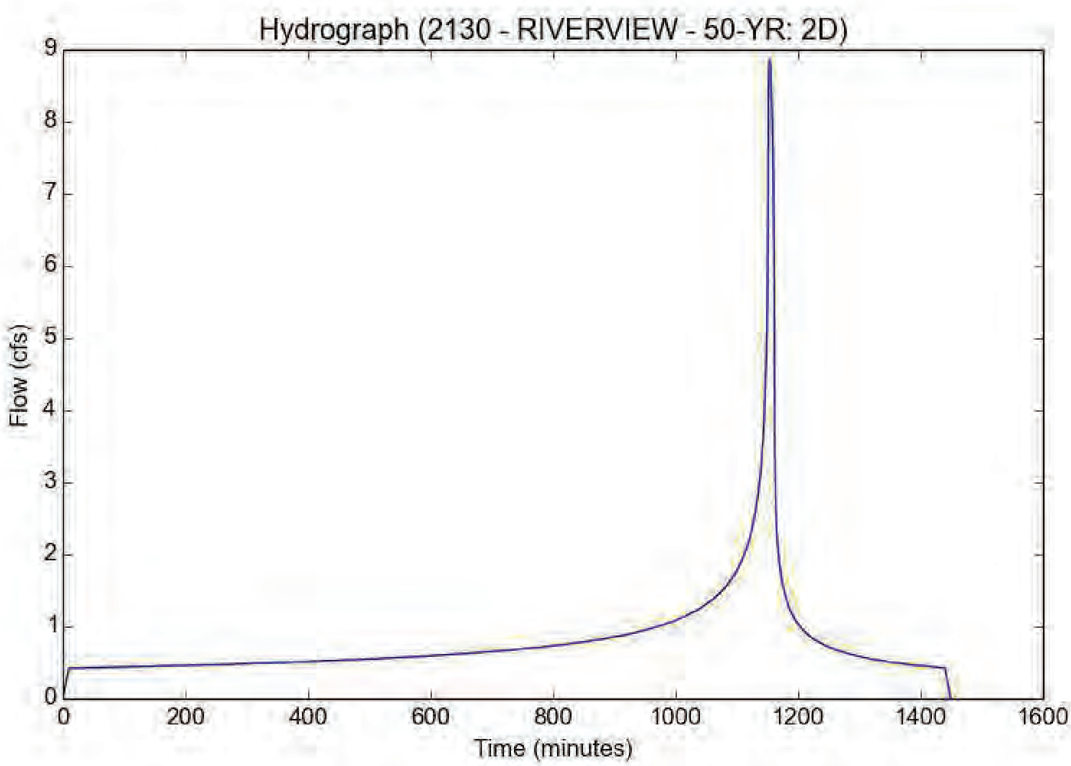
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	2D
Area (ac)	3.5
Flow Path Length (ft)	840.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.9291
Undeveloped Runoff Coefficient (Cu)	0.6001
Developed Runoff Coefficient (Cd)	0.864
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	8.8577
Burned Peak Flow Rate (cfs)	8.8577
24-Hr Clear Runoff Volume (ac-ft)	1.5997
24-Hr Clear Runoff Volume (cu-ft)	69680.7606



Peak Flow Hydrologic Analysis

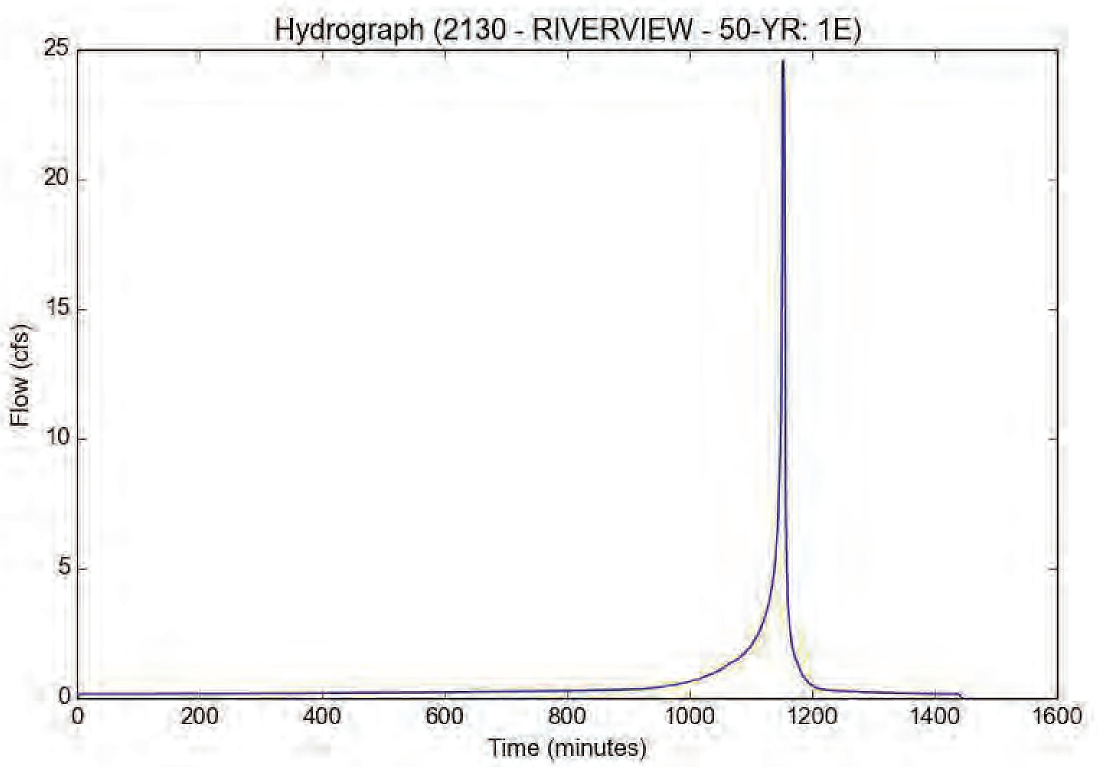
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1E
Area (ac)	7.8
Flow Path Length (ft)	640.0
Flow Path Slope (vft/hft)	0.338
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	24.5614
Burned Peak Flow Rate (cfs)	24.5614
24-Hr Clear Runoff Volume (ac-ft)	1.1298
24-Hr Clear Runoff Volume (cu-ft)	49212.4637



Peak Flow Hydrologic Analysis

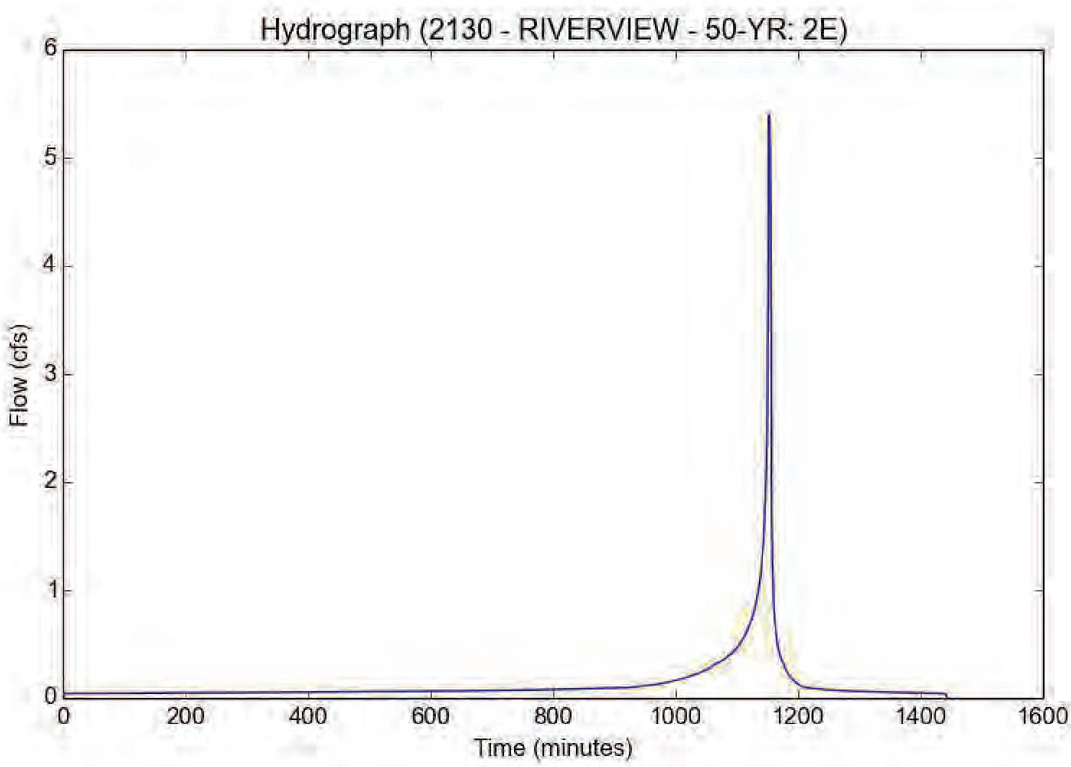
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	2E
Area (ac)	1.7
Flow Path Length (ft)	380.0
Flow Path Slope (vft/hft)	0.061
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.1
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7827
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.3981
Burned Peak Flow Rate (cfs)	5.3981
24-Hr Clear Runoff Volume (ac-ft)	0.2785
24-Hr Clear Runoff Volume (cu-ft)	12132.5627



Peak Flow Hydrologic Analysis

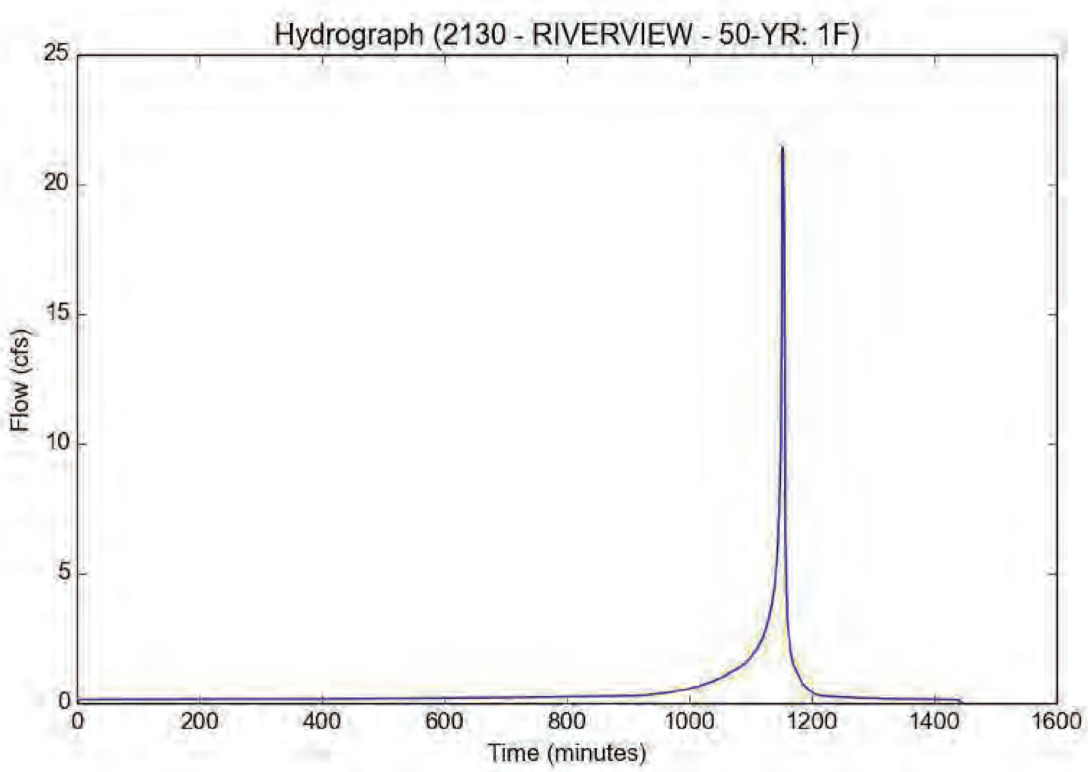
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1F
Area (ac)	6.8
Flow Path Length (ft)	725.0
Flow Path Slope (vft/hft)	0.306
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	21.4125
Burned Peak Flow Rate (cfs)	21.4125
24-Hr Clear Runoff Volume (ac-ft)	0.9849
24-Hr Clear Runoff Volume (cu-ft)	42903.1734



Peak Flow Hydrologic Analysis

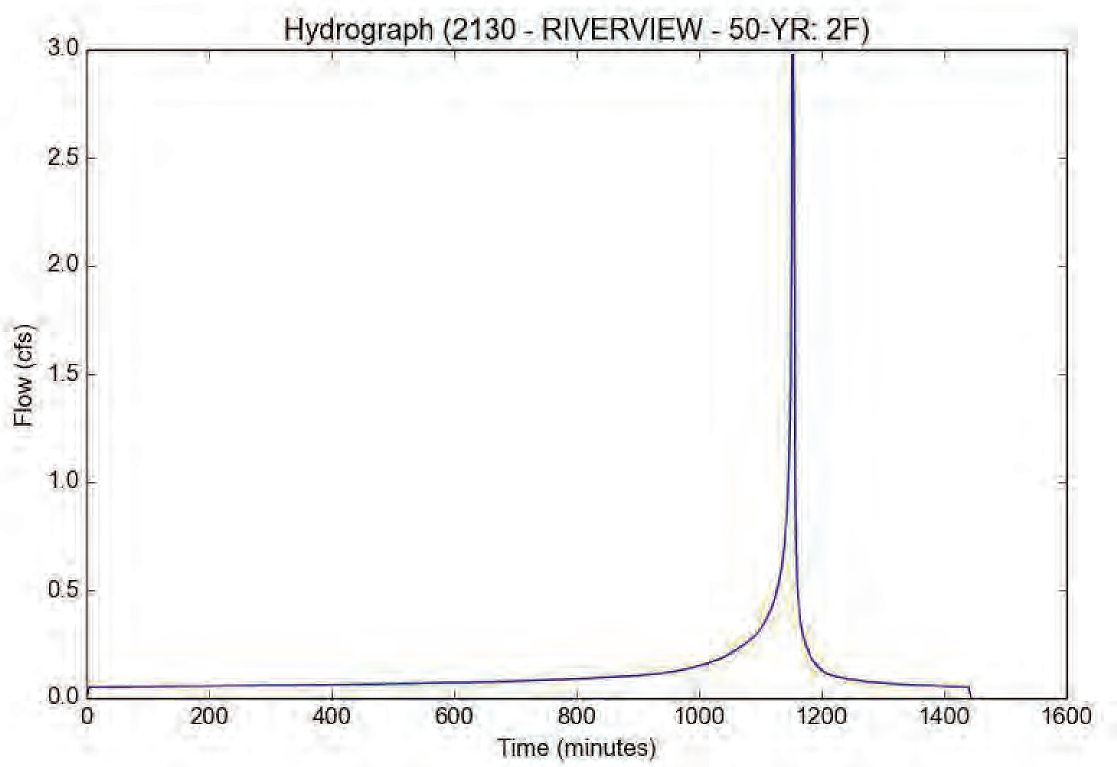
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	2F
Area (ac)	0.9
Flow Path Length (ft)	290.0
Flow Path Slope (vft/hft)	0.086
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.35
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.8153
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.9768
Burned Peak Flow Rate (cfs)	2.9768
24-Hr Clear Runoff Volume (ac-ft)	0.2329
24-Hr Clear Runoff Volume (cu-ft)	10146.9228



Peak Flow Hydrologic Analysis

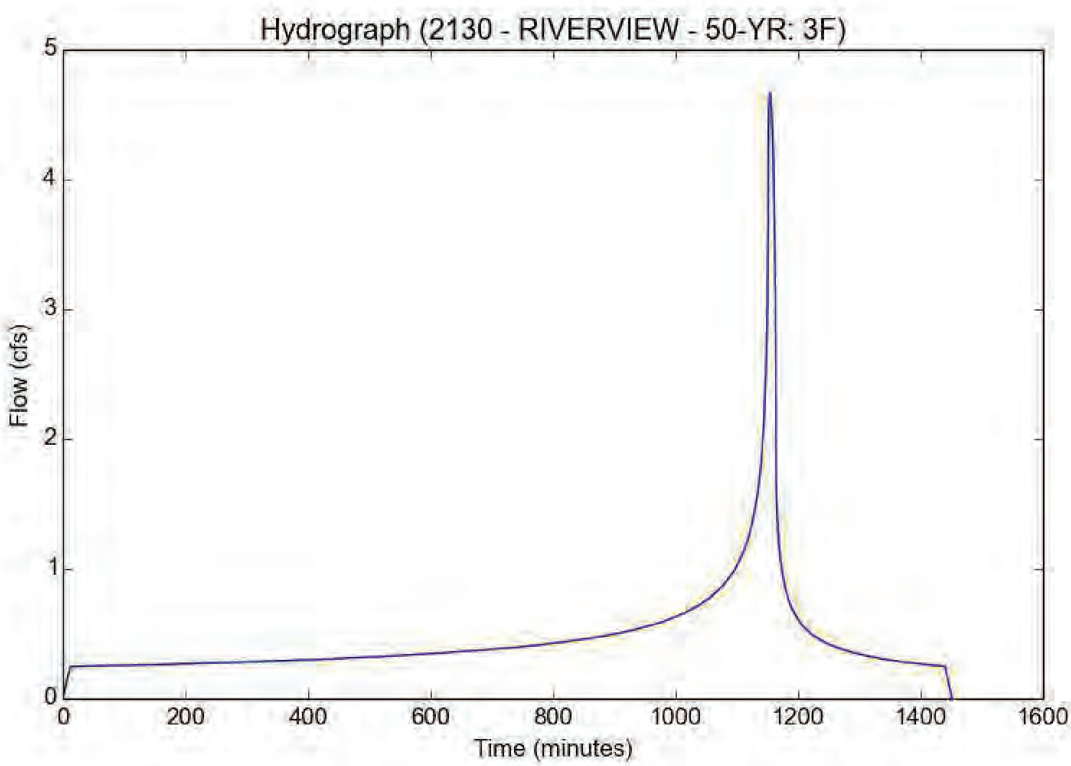
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	3F
Area (ac)	2.0
Flow Path Length (ft)	1240.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.6885
Undeveloped Runoff Coefficient (Cu)	0.5784
Developed Runoff Coefficient (Cd)	0.8678
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	4.6664
Burned Peak Flow Rate (cfs)	4.6664
24-Hr Clear Runoff Volume (ac-ft)	0.9303
24-Hr Clear Runoff Volume (cu-ft)	40522.5836



Peak Flow Hydrologic Analysis

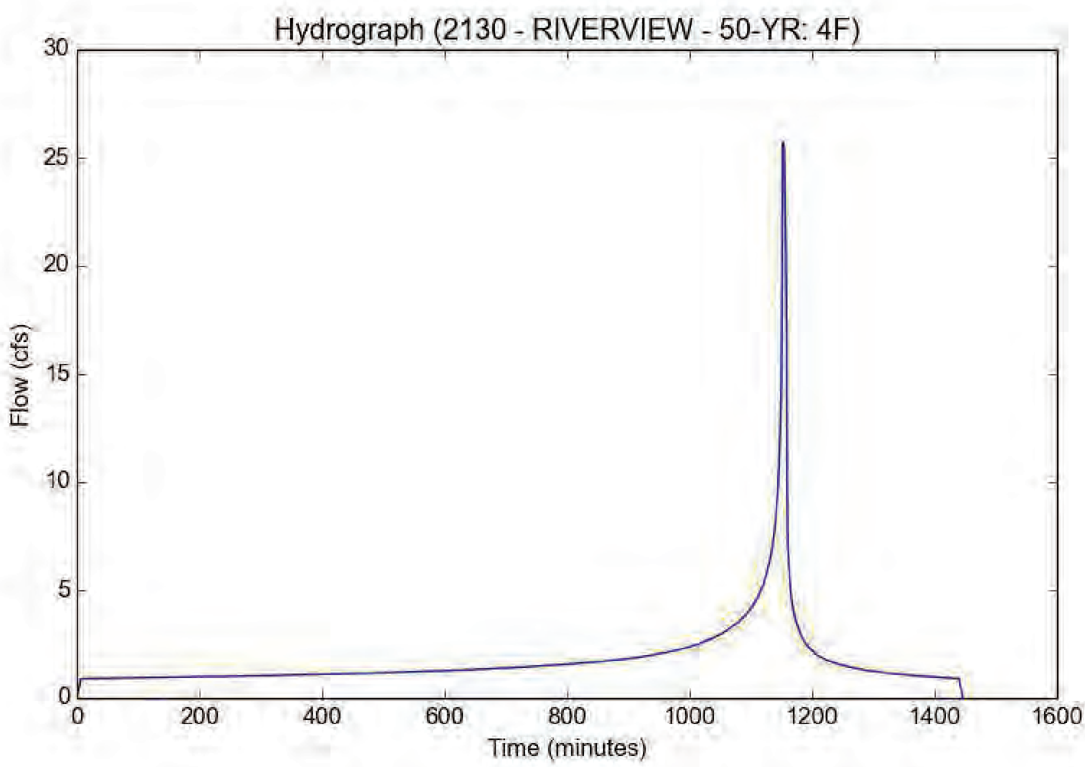
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	4F
Area (ac)	8.6
Flow Path Length (ft)	850.0
Flow Path Slope (vft/hft)	0.034
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.75
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.7518
Developed Runoff Coefficient (Cd)	0.8629
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	25.7047
Burned Peak Flow Rate (cfs)	25.7047
24-Hr Clear Runoff Volume (ac-ft)	3.5326
24-Hr Clear Runoff Volume (cu-ft)	153881.4962



Peak Flow Hydrologic Analysis

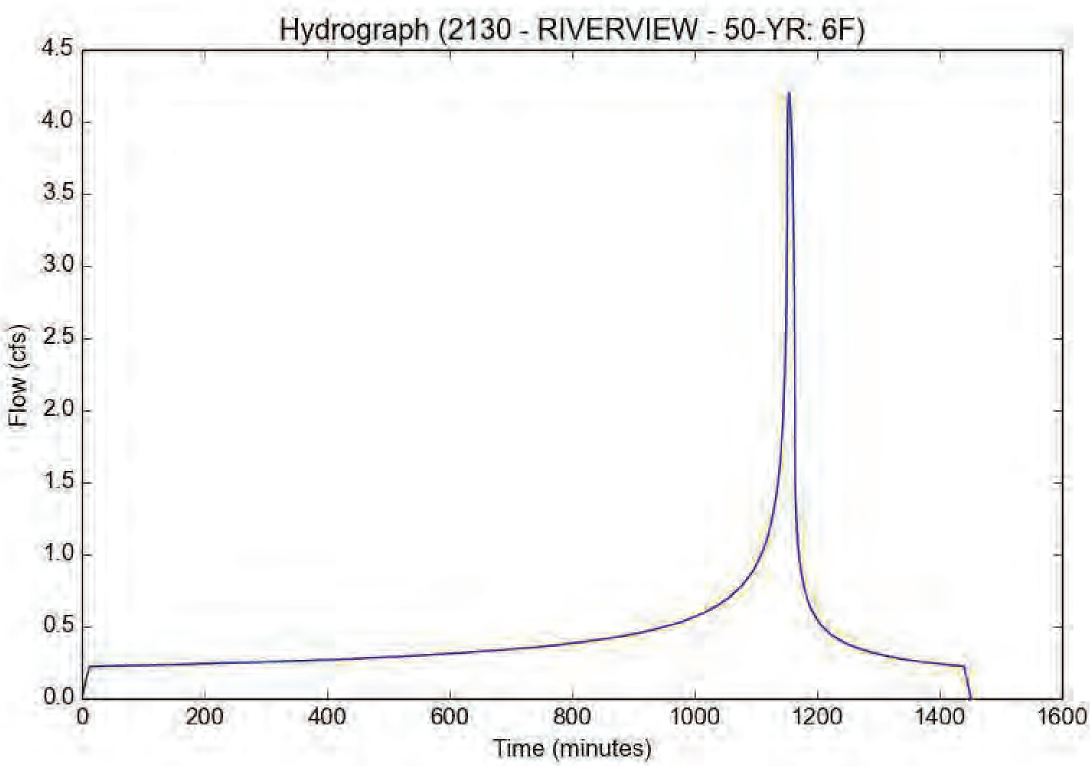
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	6F
Area (ac)	1.8
Flow Path Length (ft)	1175.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.6885
Undeveloped Runoff Coefficient (Cu)	0.5784
Developed Runoff Coefficient (Cd)	0.8678
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	4.1998
Burned Peak Flow Rate (cfs)	4.1998
24-Hr Clear Runoff Volume (ac-ft)	0.8372
24-Hr Clear Runoff Volume (cu-ft)	36470.3253



Peak Flow Hydrologic Analysis

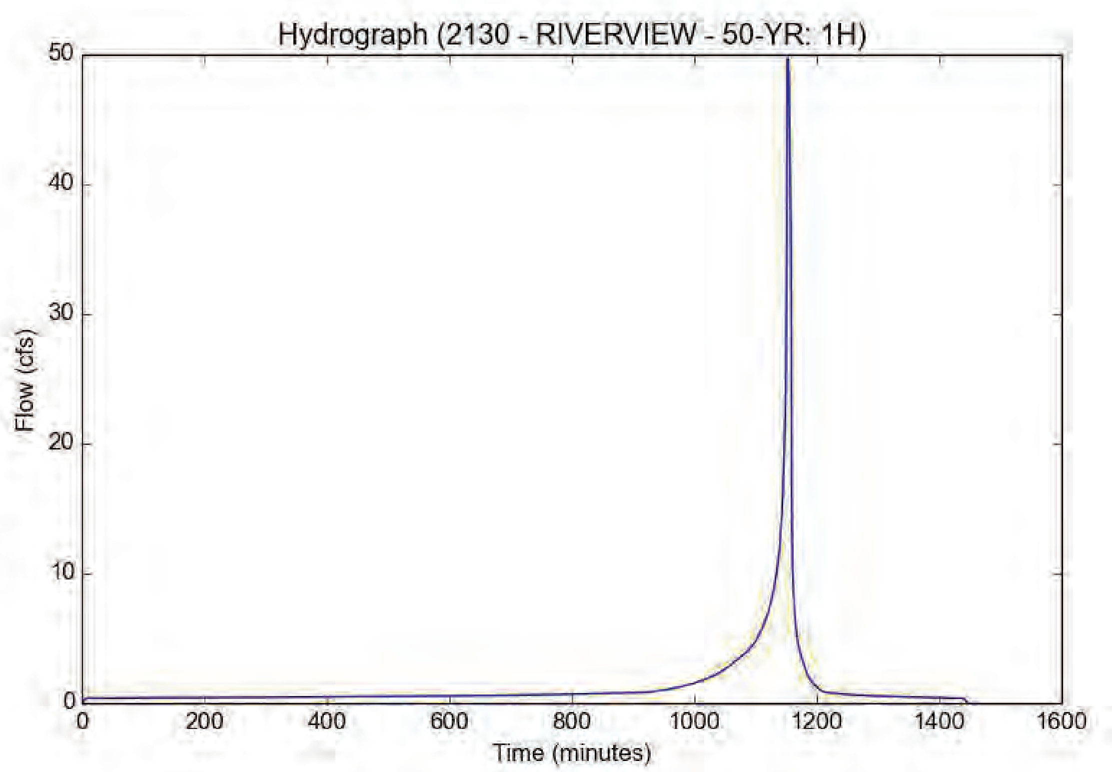
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1H
Area (ac)	18.9
Flow Path Length (ft)	1095.0
Flow Path Slope (vft/hft)	0.246
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.7518
Developed Runoff Coefficient (Cd)	0.7592
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	49.6982
Burned Peak Flow Rate (cfs)	49.6982
24-Hr Clear Runoff Volume (ac-ft)	2.7354
24-Hr Clear Runoff Volume (cu-ft)	119155.2677



Peak Flow Hydrologic Analysis

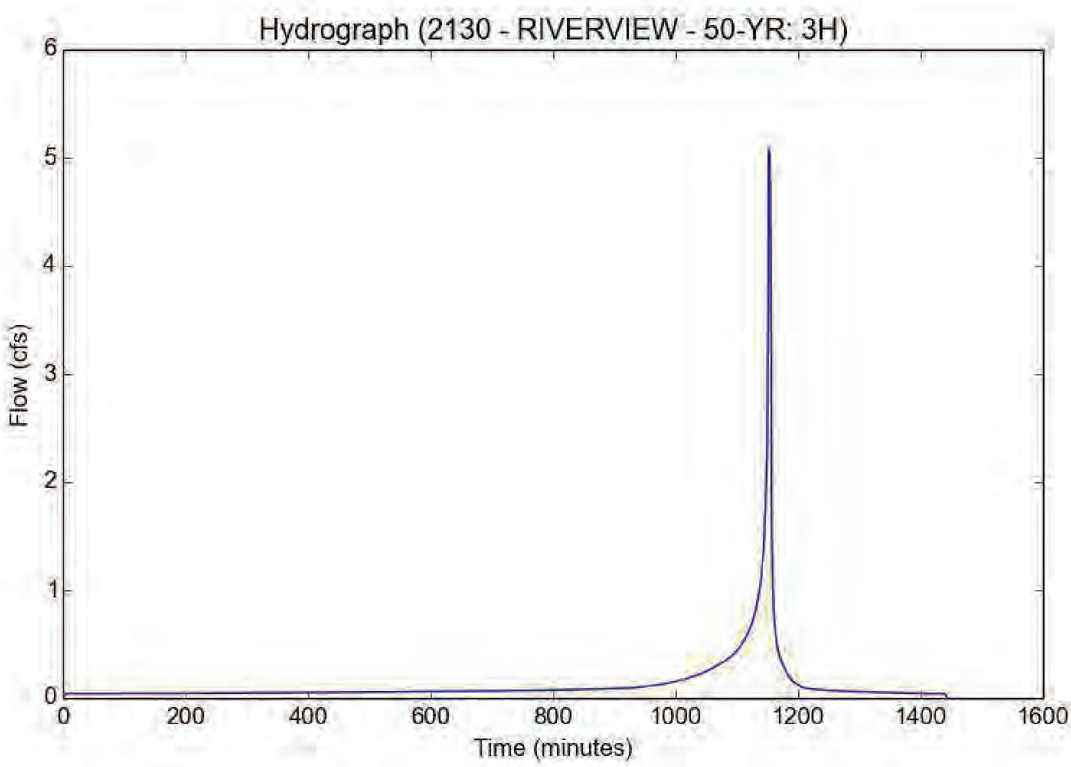
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	3H
Area (ac)	1.6
Flow Path Length (ft)	490.0
Flow Path Slope (vft/hft)	0.043
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.1
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7827
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.0805
Burned Peak Flow Rate (cfs)	5.0805
24-Hr Clear Runoff Volume (ac-ft)	0.2621
24-Hr Clear Runoff Volume (cu-ft)	11418.8826



Peak Flow Hydrologic Analysis

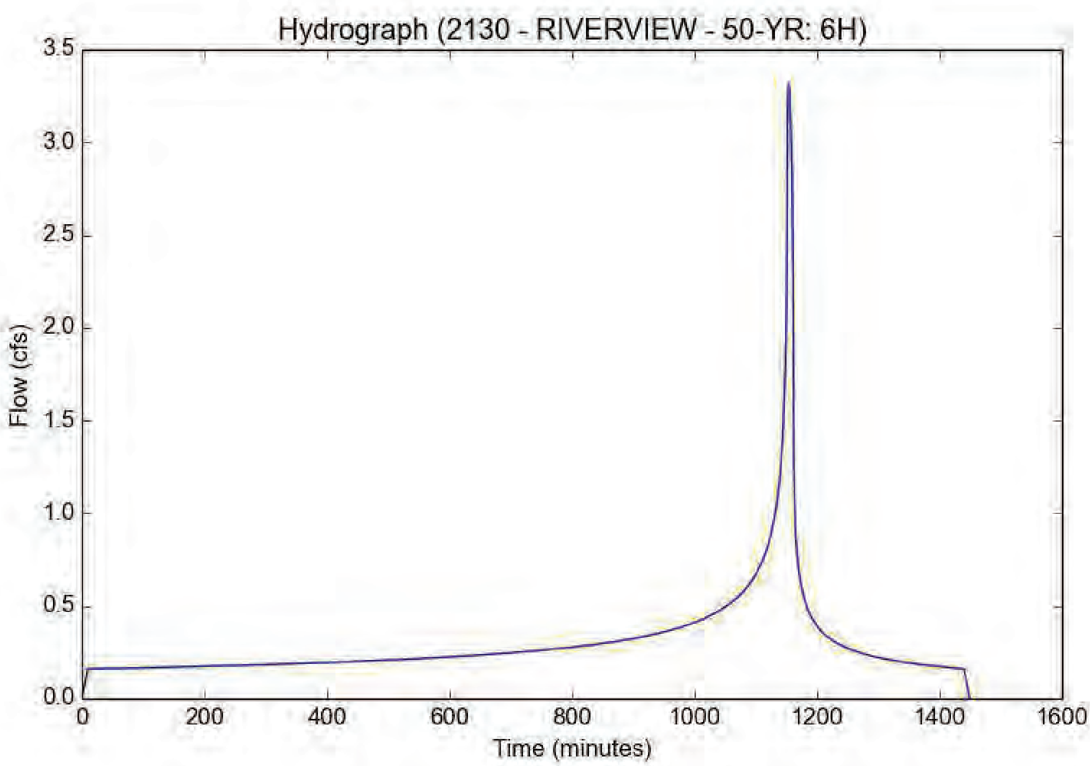
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	6H
Area (ac)	1.3
Flow Path Length (ft)	900.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.9291
Undeveloped Runoff Coefficient (Cu)	0.6001
Developed Runoff Coefficient (Cd)	0.87
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	3.3128
Burned Peak Flow Rate (cfs)	3.3128
24-Hr Clear Runoff Volume (ac-ft)	0.6047
24-Hr Clear Runoff Volume (cu-ft)	26341.4605



Peak Flow Hydrologic Analysis

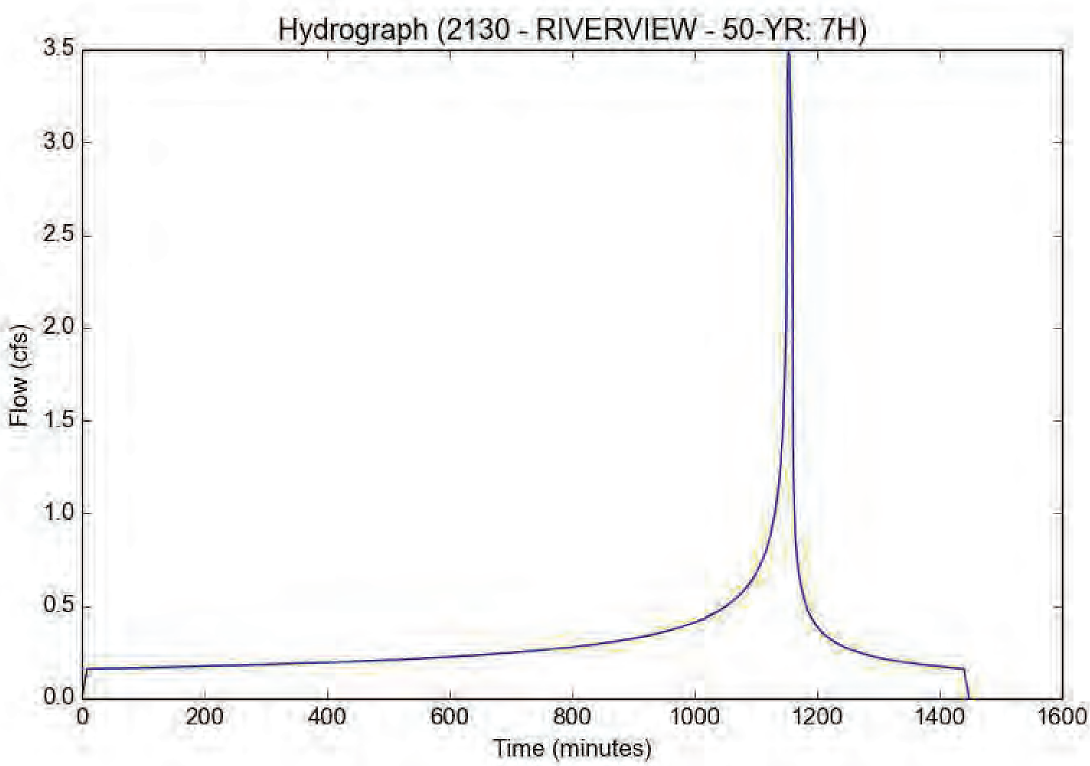
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	7H
Area (ac)	1.3
Flow Path Length (ft)	895.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.0778
Undeveloped Runoff Coefficient (Cu)	0.6109
Developed Runoff Coefficient (Cd)	0.8711
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	3.4853
Burned Peak Flow Rate (cfs)	3.4853
24-Hr Clear Runoff Volume (ac-ft)	0.6047
24-Hr Clear Runoff Volume (cu-ft)	26342.4032



Peak Flow Hydrologic Analysis

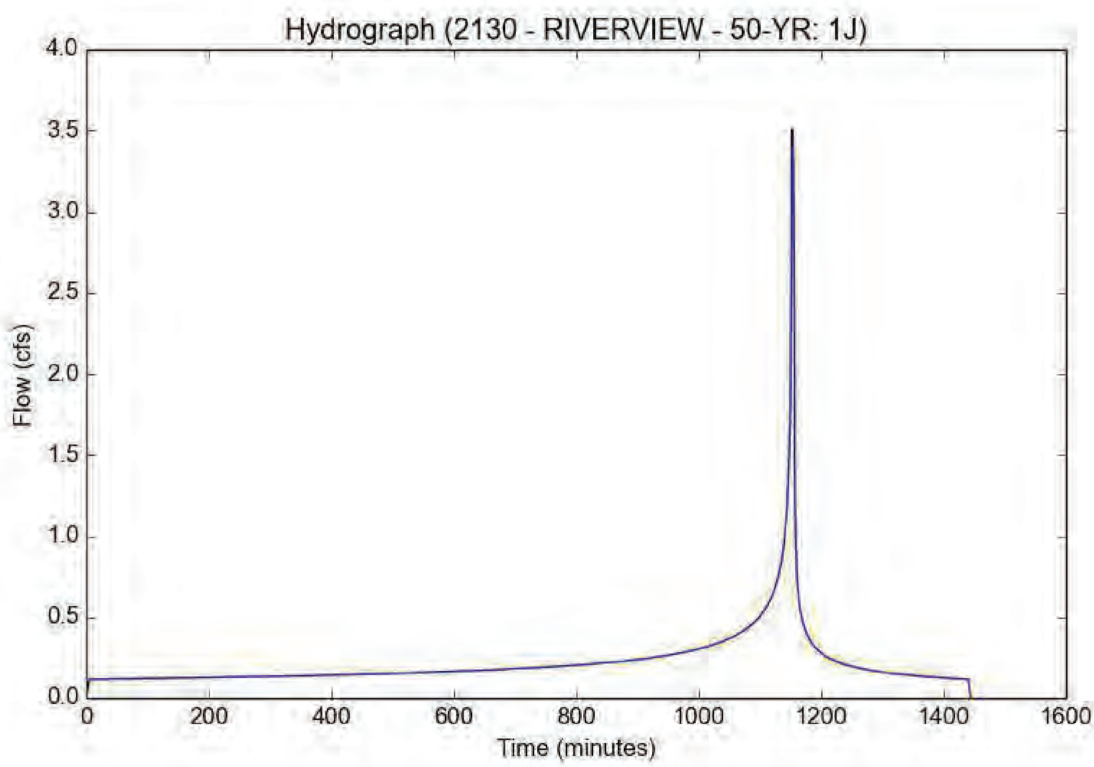
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1J
Area (ac)	1.0
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.029
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.6638
Developed Runoff Coefficient (Cd)	0.8646
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5076
Burned Peak Flow Rate (cfs)	3.5076
24-Hr Clear Runoff Volume (ac-ft)	0.445
24-Hr Clear Runoff Volume (cu-ft)	19382.5798



RIVERVIEW

EXISTING CONDITION TC

25-YR

Peak Flow Hydrologic Analysis

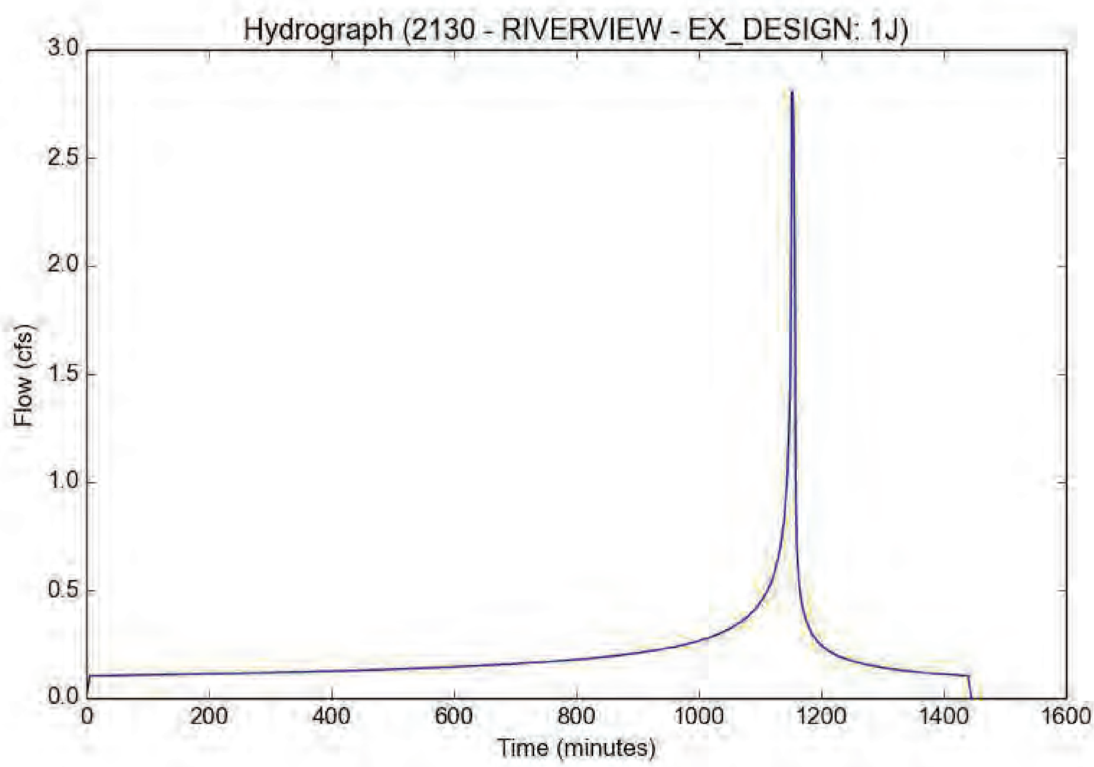
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-1J_051022.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	1J
Area (ac)	1.0
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.029
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	3.2696
Undeveloped Runoff Coefficient (Cu)	0.6215
Developed Runoff Coefficient (Cd)	0.8582
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	2.806
Burned Peak Flow Rate (cfs)	2.806
24-Hr Clear Runoff Volume (ac-ft)	0.3898
24-Hr Clear Runoff Volume (cu-ft)	16981.3717



RIVERVIEW

EXISTING CONDITION TC's

50-YR

Peak Flow Hydrologic Analysis

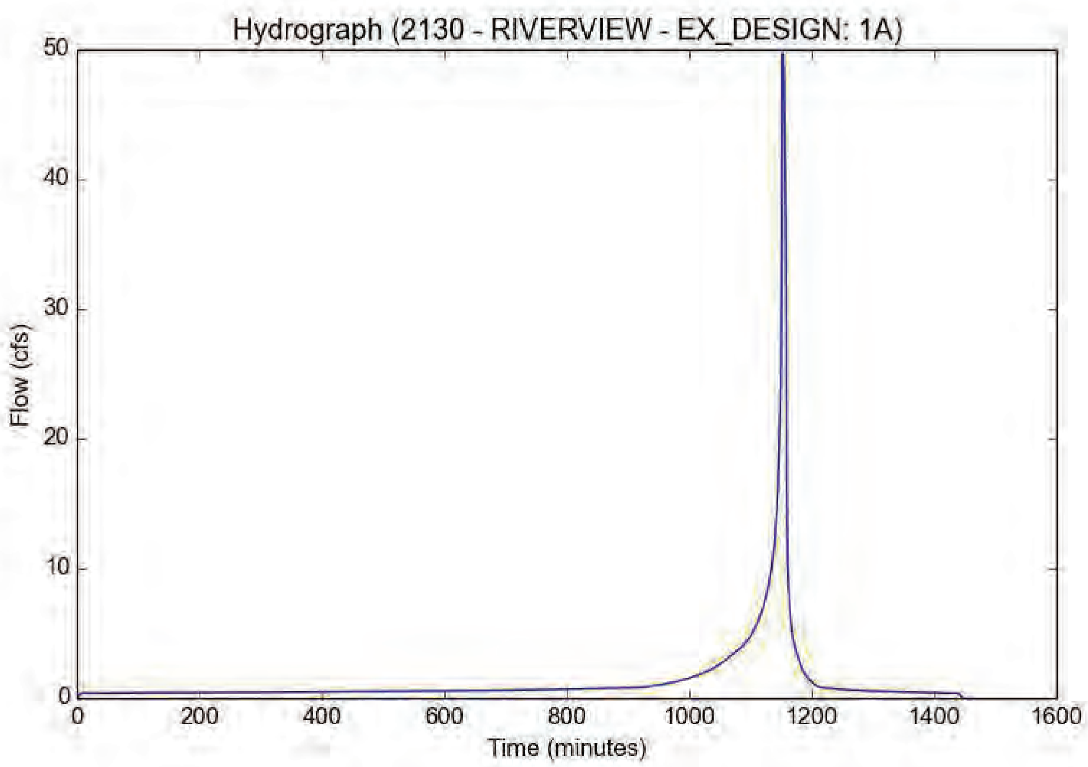
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	1A
Area (ac)	18.9
Flow Path Length (ft)	1095.0
Flow Path Slope (vft/hft)	0.246
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.7518
Developed Runoff Coefficient (Cd)	0.7592
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	49.6982
Burned Peak Flow Rate (cfs)	49.6982
24-Hr Clear Runoff Volume (ac-ft)	2.7354
24-Hr Clear Runoff Volume (cu-ft)	119155.2677



Peak Flow Hydrologic Analysis

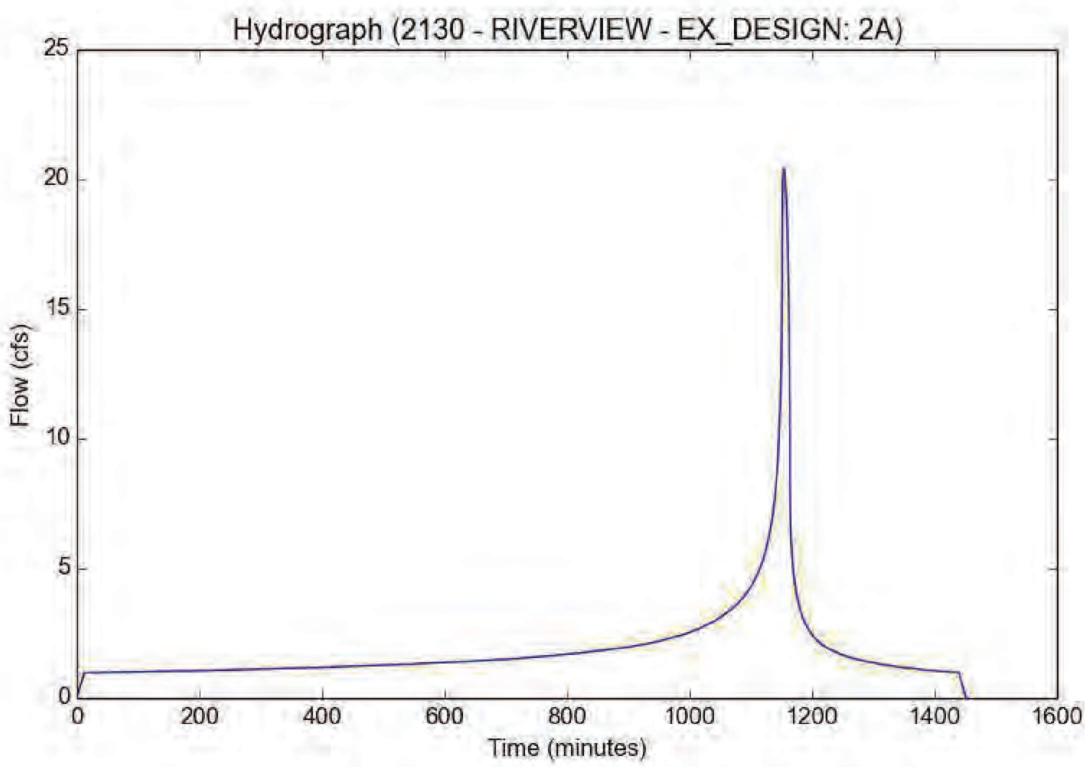
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	2A
Area (ac)	8.8
Flow Path Length (ft)	1535.0
Flow Path Slope (vft/hft)	0.018
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.8
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.6885
Undeveloped Runoff Coefficient (Cu)	0.715
Developed Runoff Coefficient (Cd)	0.863
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	20.4175
Burned Peak Flow Rate (cfs)	20.4175
24-Hr Clear Runoff Volume (ac-ft)	3.7815
24-Hr Clear Runoff Volume (cu-ft)	164723.5147



Peak Flow Hydrologic Analysis

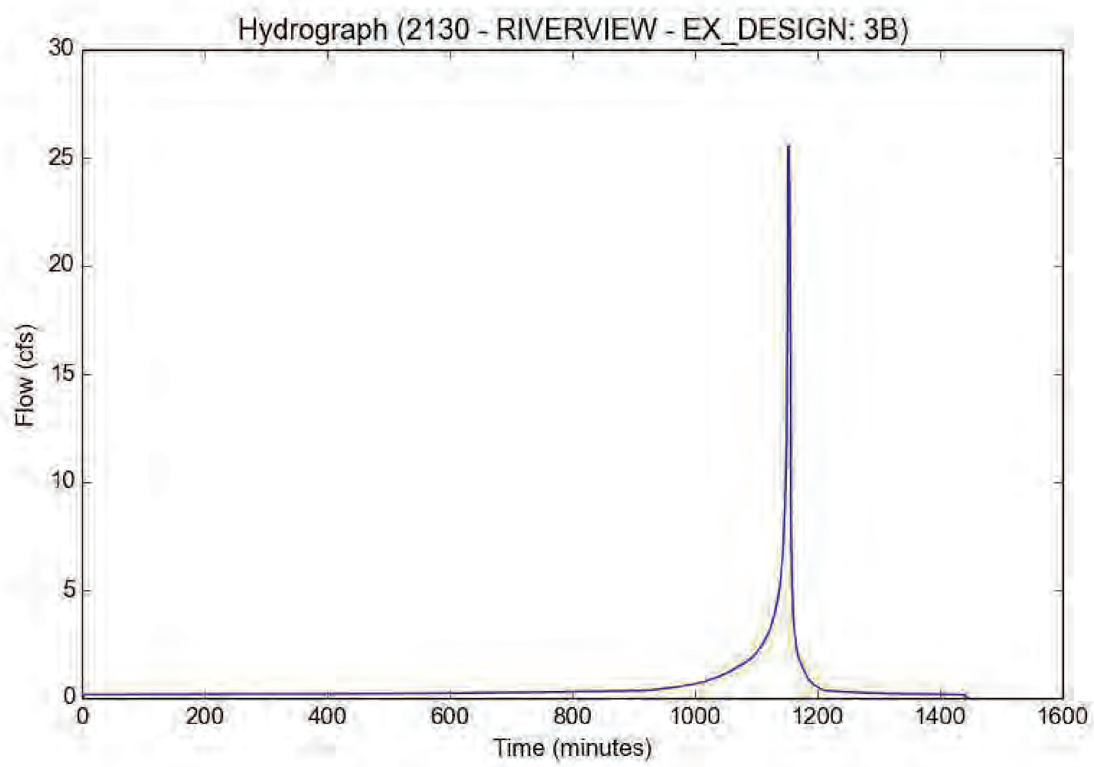
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	3B
Area (ac)	8.1
Flow Path Length (ft)	640.0
Flow Path Slope (vft/hft)	0.338
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	25.5061
Burned Peak Flow Rate (cfs)	25.5061
24-Hr Clear Runoff Volume (ac-ft)	1.1732
24-Hr Clear Runoff Volume (cu-ft)	51105.2507



Peak Flow Hydrologic Analysis

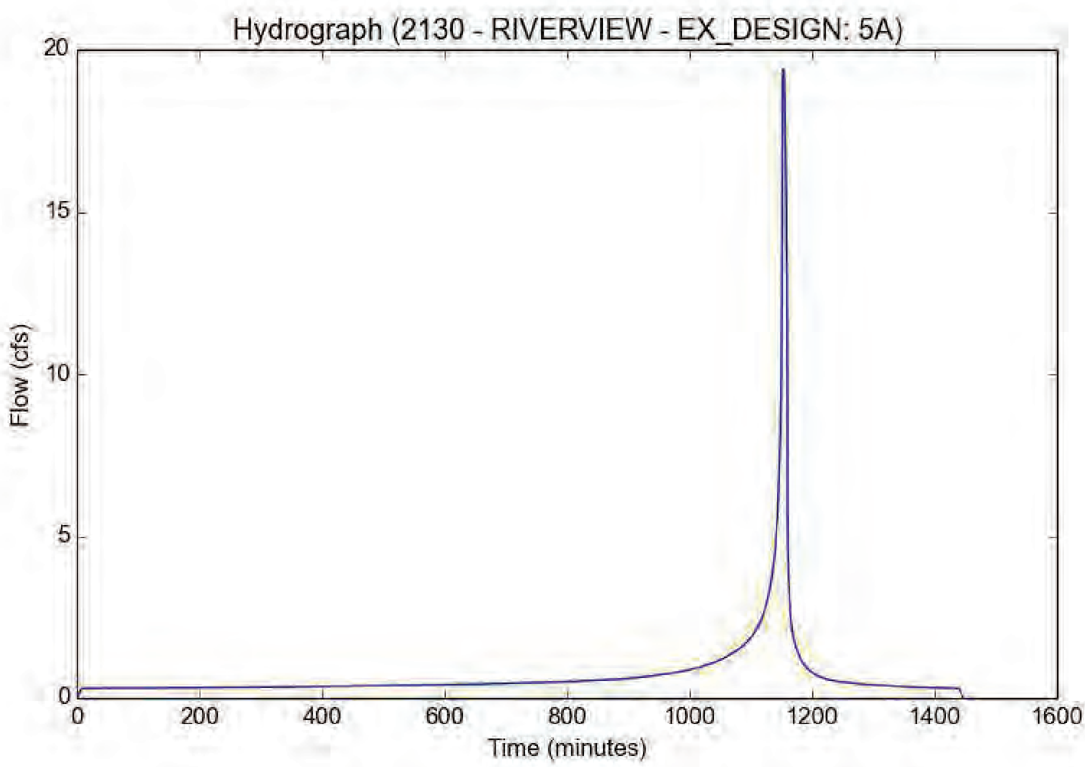
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	5A
Area (ac)	9.0
Flow Path Length (ft)	770.0
Flow Path Slope (vft/hft)	0.042
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.15
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.2529
Undeveloped Runoff Coefficient (Cu)	0.6206
Developed Runoff Coefficient (Cd)	0.6625
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	19.3954
Burned Peak Flow Rate (cfs)	19.3954
24-Hr Clear Runoff Volume (ac-ft)	1.4469
24-Hr Clear Runoff Volume (cu-ft)	63028.2207



Peak Flow Hydrologic Analysis

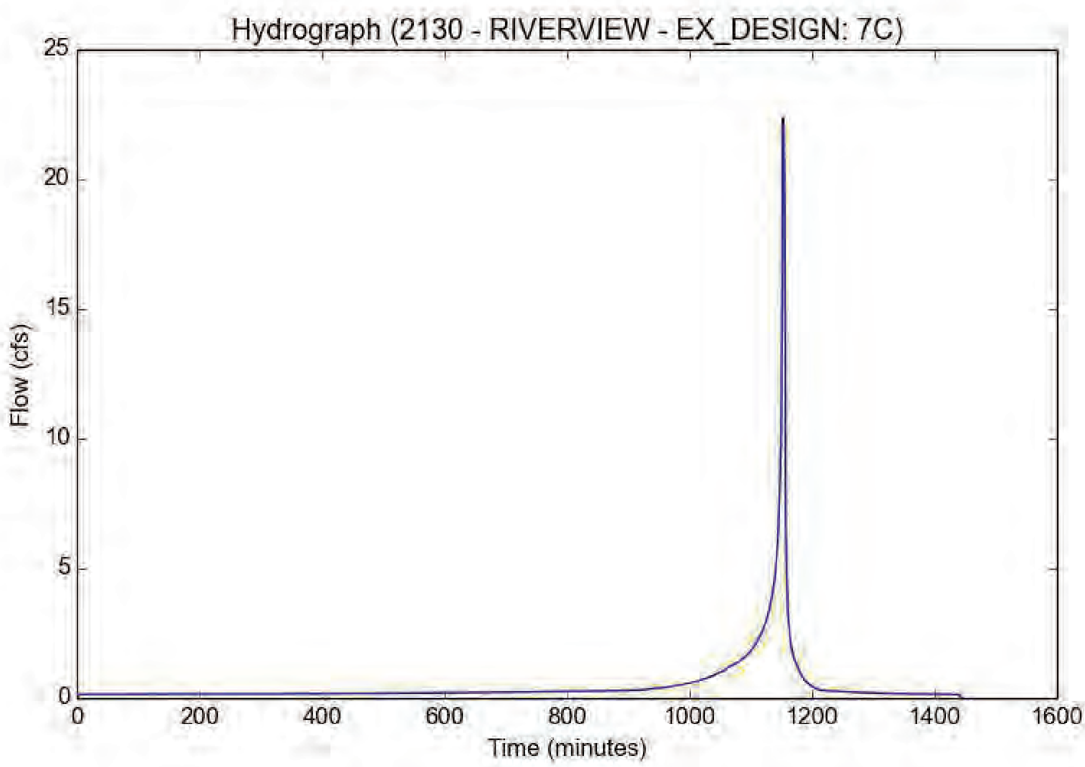
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	7C
Area (ac)	7.1
Flow Path Length (ft)	725.0
Flow Path Slope (vft/hft)	0.303
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	22.3572
Burned Peak Flow Rate (cfs)	22.3572
24-Hr Clear Runoff Volume (ac-ft)	1.0284
24-Hr Clear Runoff Volume (cu-ft)	44795.9605



Peak Flow Hydrologic Analysis

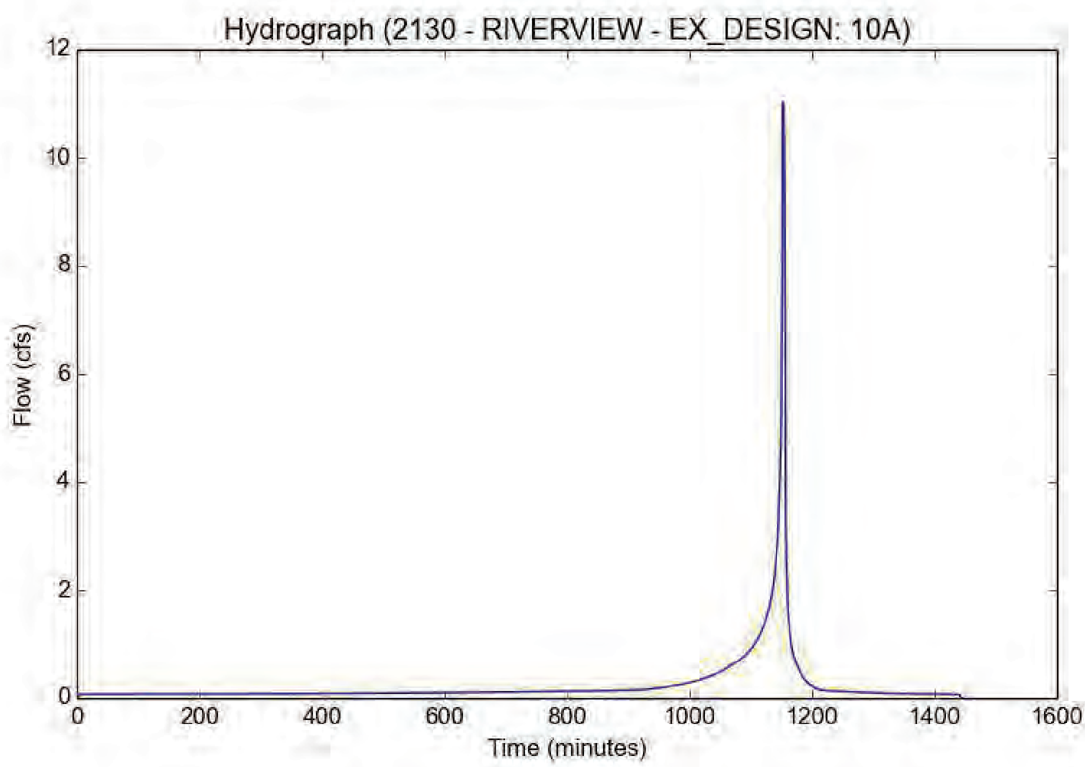
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	10A
Area (ac)	3.5
Flow Path Length (ft)	720.0
Flow Path Slope (vft/hft)	0.142
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	11.0211
Burned Peak Flow Rate (cfs)	11.0211
24-Hr Clear Runoff Volume (ac-ft)	0.5069
24-Hr Clear Runoff Volume (cu-ft)	22082.5157



Peak Flow Hydrologic Analysis

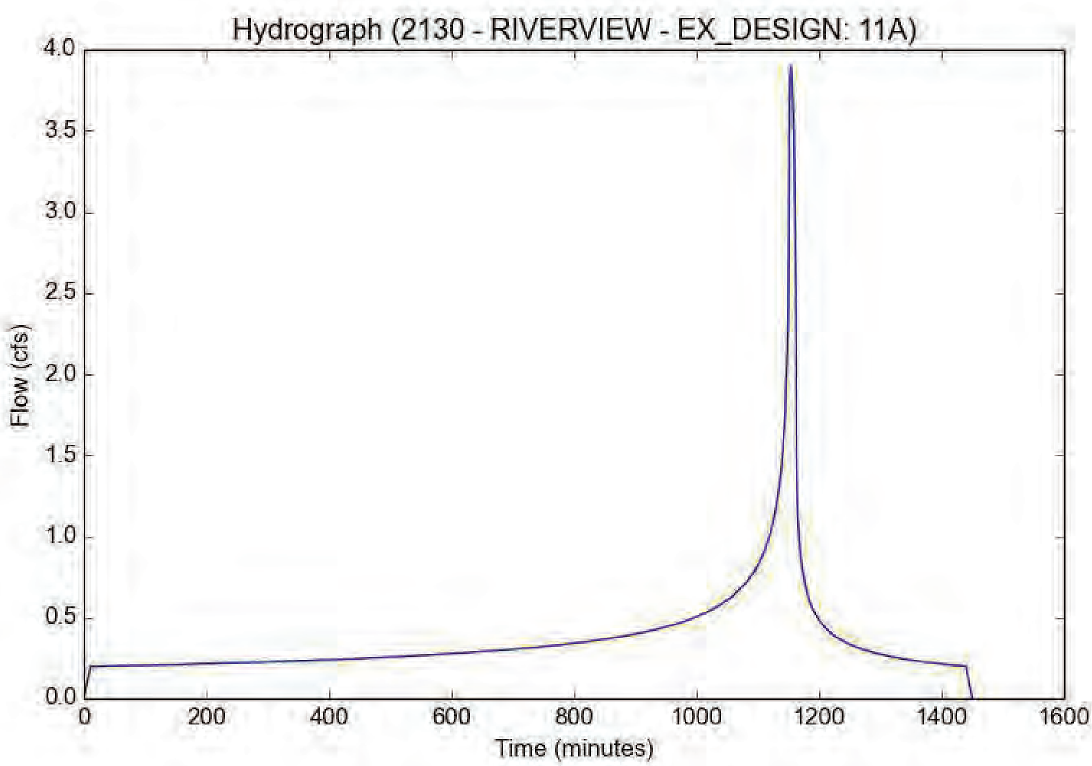
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	11A
Area (ac)	1.6
Flow Path Length (ft)	1165.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.8007
Undeveloped Runoff Coefficient (Cu)	0.5885
Developed Runoff Coefficient (Cd)	0.8689
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	3.8935
Burned Peak Flow Rate (cfs)	3.8935
24-Hr Clear Runoff Volume (ac-ft)	0.7442
24-Hr Clear Runoff Volume (cu-ft)	32419.0942



Peak Flow Hydrologic Analysis

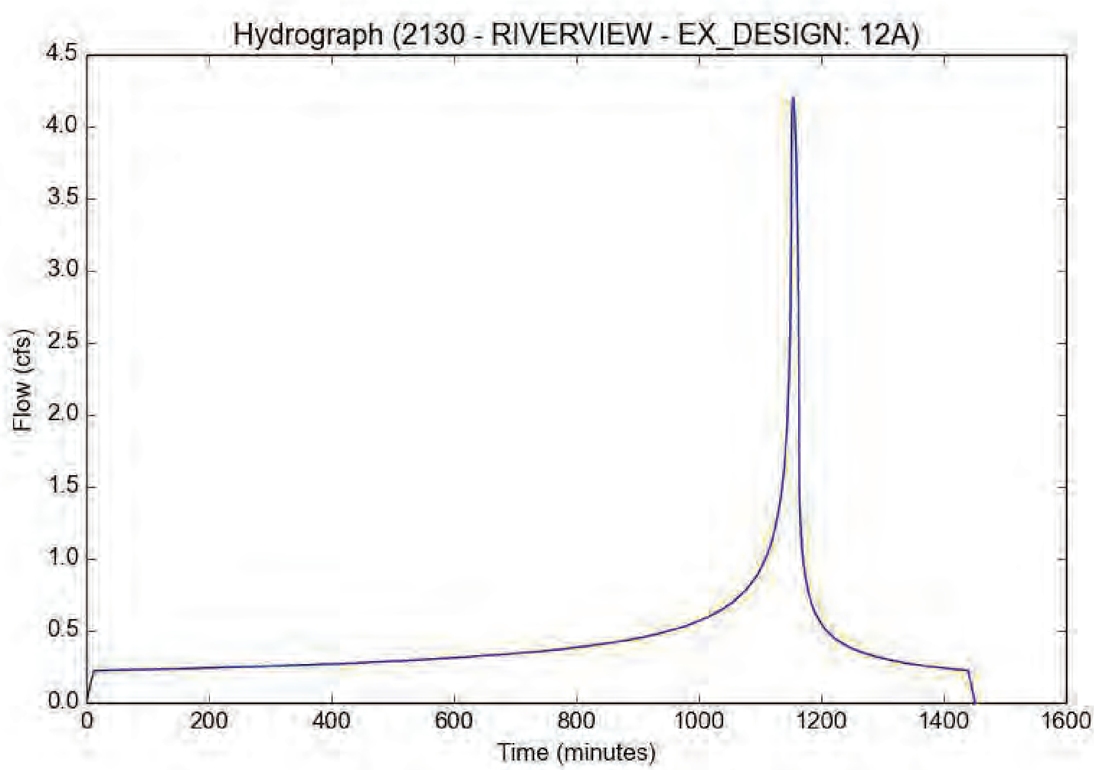
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	12A
Area (ac)	1.8
Flow Path Length (ft)	1175.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.6885
Undeveloped Runoff Coefficient (Cu)	0.5784
Developed Runoff Coefficient (Cd)	0.8678
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	4.1998
Burned Peak Flow Rate (cfs)	4.1998
24-Hr Clear Runoff Volume (ac-ft)	0.8372
24-Hr Clear Runoff Volume (cu-ft)	36470.3253



Peak Flow Hydrologic Analysis

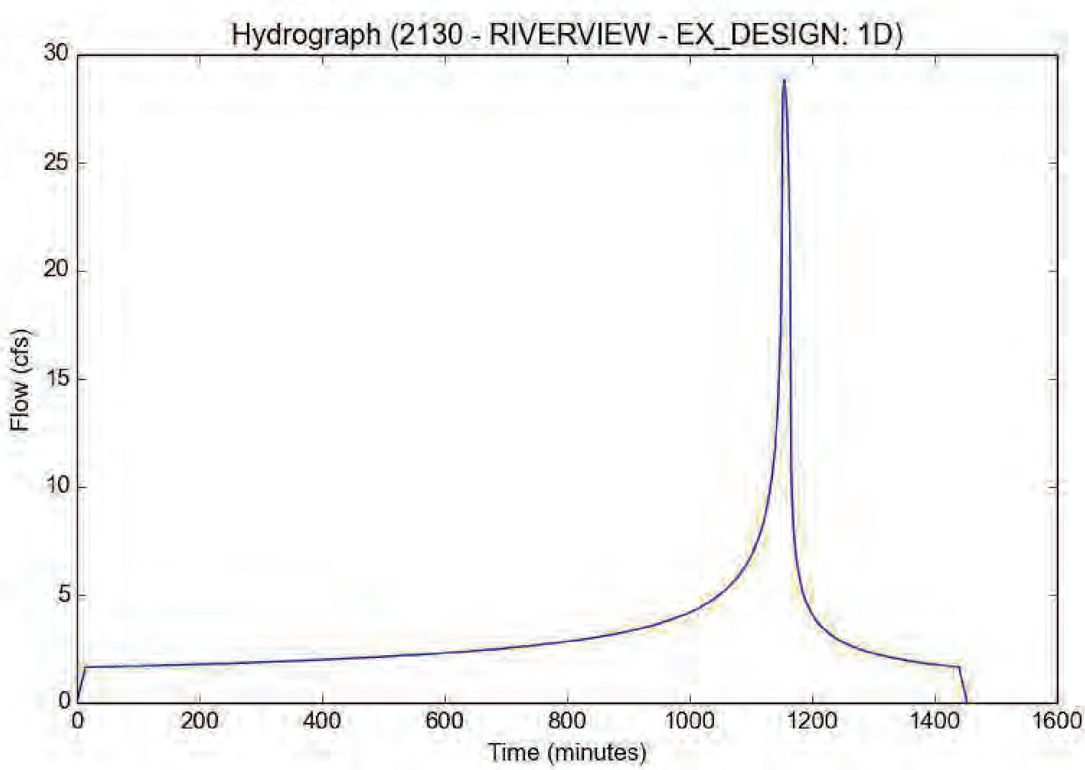
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	1D
Area (ac)	13.3
Flow Path Length (ft)	1520.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.5006
Undeveloped Runoff Coefficient (Cu)	0.5614
Developed Runoff Coefficient (Cd)	0.8661
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	28.8063
Burned Peak Flow Rate (cfs)	28.8063
24-Hr Clear Runoff Volume (ac-ft)	6.186
24-Hr Clear Runoff Volume (cu-ft)	269460.5283



Peak Flow Hydrologic Analysis

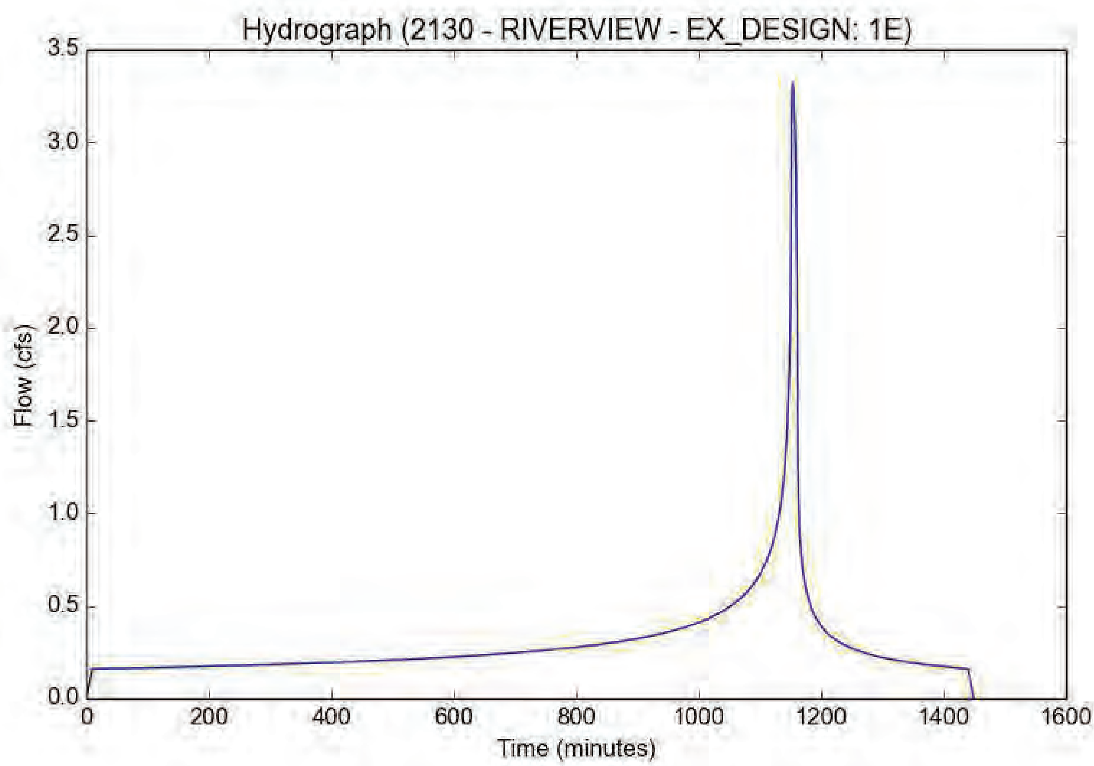
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	1E
Area (ac)	1.3
Flow Path Length (ft)	900.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.9291
Undeveloped Runoff Coefficient (Cu)	0.6001
Developed Runoff Coefficient (Cd)	0.87
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	3.3128
Burned Peak Flow Rate (cfs)	3.3128
24-Hr Clear Runoff Volume (ac-ft)	0.6047
24-Hr Clear Runoff Volume (cu-ft)	26341.4605



Peak Flow Hydrologic Analysis

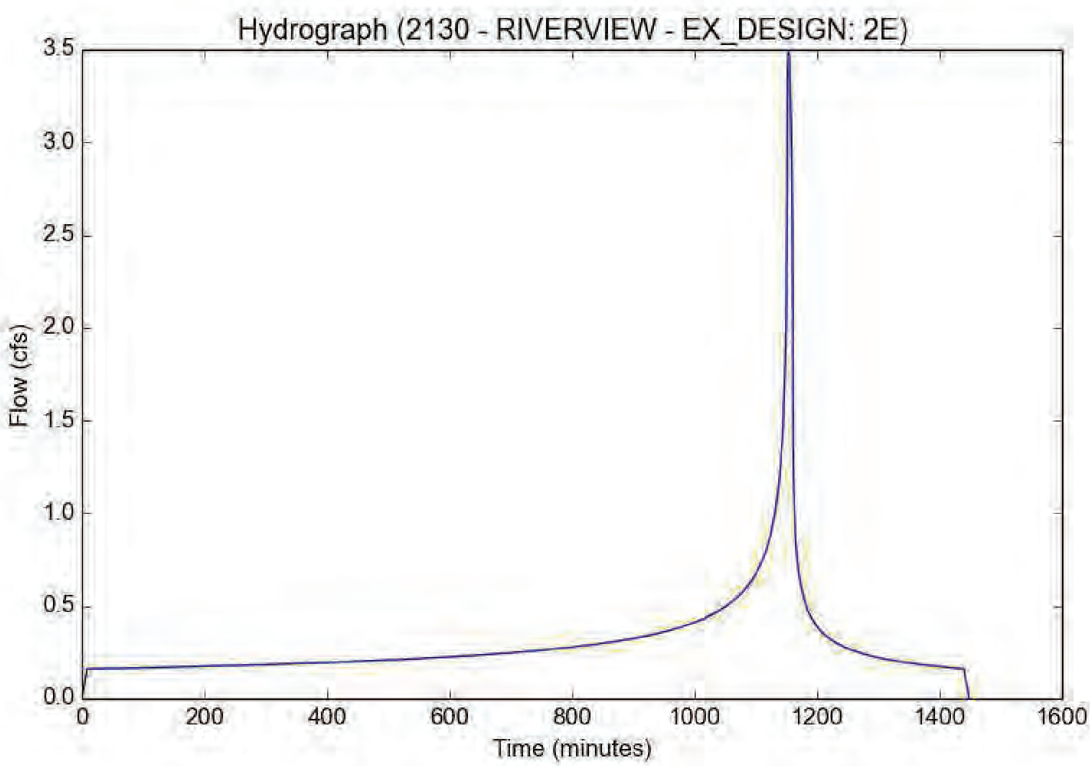
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	2E
Area (ac)	1.3
Flow Path Length (ft)	895.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.0778
Undeveloped Runoff Coefficient (Cu)	0.6109
Developed Runoff Coefficient (Cd)	0.8711
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	3.4853
Burned Peak Flow Rate (cfs)	3.4853
24-Hr Clear Runoff Volume (ac-ft)	0.6047
24-Hr Clear Runoff Volume (cu-ft)	26342.4032



Peak Flow Hydrologic Analysis

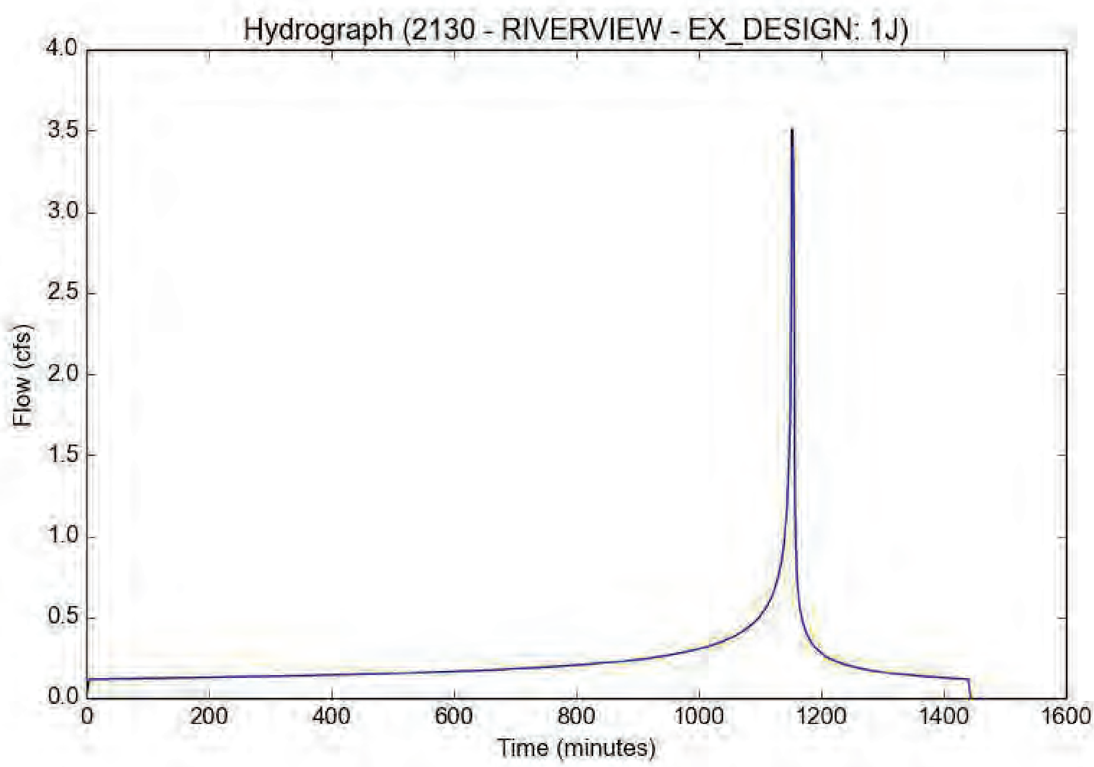
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	1J
Area (ac)	1.0
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.029
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.6638
Developed Runoff Coefficient (Cd)	0.8646
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5076
Burned Peak Flow Rate (cfs)	3.5076
24-Hr Clear Runoff Volume (ac-ft)	0.445
24-Hr Clear Runoff Volume (cu-ft)	19382.5798



APPENDIX C

LAR04 MODELS

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTEKER
NO. 51929
EXP 6-30-24
CIVIL
STATE OF CALIFORNIA

RIVERVIEW

DESIGN EVENT

DEVELOPED CONDITION

HYBRID OF
Q50 BURNED for NATURAL SUBAREA
&
Q25 CLEAR for URBAN SUBAREA

```
006  2130    1A  97 50 3.4 8A344400.0000800                 0  G1
006  2130    2B  20 88 3.3 9A344255.0000600                 0
006  2130    3B  20 88 1.1 8A344 60.0001800                 0
006  2130    4AB 20  0  .0 0A344505.0001100                 0
006  2130    5A  20  0  .099A344  1.0001000                 0
006  2130    6C  20 85 2.510A344630.0000600                 0
006  2130    7AC 20  0  .0 0A344 30.0000500                 0
006  2130    8A  20  0  .099A344  1.0001000                 0
006  2130    9A  20 85 2.1 8A344 25.0008300                 0
006  2130   10A  20 85 3.8 8A344100.0001200                 02  2
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Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN A - DESIGN DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	3.4	7.80	3.4	7.80	4	400.	.00800	2.00	.00	0.	97	8	A34	.50
2130	2B	3.3	7.65	3.3	7.65	4	255.	.00600	2.00	.00	0.	20	9	A34	.88
2130	3B	1.1	2.68	4.4	10.23	4	60.	.01800	2.00	.00	0.	20	8	A34	.88
2130	4AB	4.4	10.20	7.8	17.85	4	505.	.01100	2.00	.00	0.	20	0	A34	.00
2130	5A	.0	.00	7.8	17.64	4	1.	.01000	2.00	.00	0.	20	99	A34	.00
2130	6C	2.5	5.48	2.5	5.48	4	630.	.00600	2.00	.00	0.	20	10	A34	.85
2130	7AC	2.5	5.25	10.3	22.86	4	30.	.00500	2.25	.00	0.	20	0	A34	.00
2130	8A	.0	.00	10.3	22.78	4	1.	.01000	2.00	.00	0.	20	99	A34	.00
2130	9A	2.1	5.07	12.4	27.02	4	25.	.08300	2.00	.00	0.	20	8	A34	.85
2130	10A	3.8	9.17	16.2	35.63	4	100.	.01200	2.25	.00	0.	20	8	A34	.85

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
RIVERVIEW BASIN A - DESIGN DEV MODEL
HYDROGRAPH AT 2130 10A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.59	200	1.65	300	1.74	400	1.84
500	1.96	600	2.10	700	2.29	800	2.54	900	2.91
1000	3.52	1050	4.42	1100	5.76	1110	6.96	1120	8.14
1130	9.44	1131	9.57	1132	9.71	1133	9.92	1134	10.13
1135	10.30	1136	10.53	1137	10.83	1138	11.15	1139	11.45
1140	11.78	1141	12.18	1142	12.63	1143	13.11	1144	13.57
1145	14.20	1146	14.85	1147	15.58	1148	16.38	1149	18.38
1150	20.56	1151	23.13	1152	26.40	1153	29.92	1154	32.37
1155	34.33	1156	35.63	1157	34.71	1158	32.92	1159	30.42
1160	27.21	1161	23.38	1162	20.44	1163	17.68	1164	15.14
1165	13.01	1166	11.36	1167	10.18	1168	9.32	1169	8.68
1170	8.18	1171	7.73	1172	7.39	1173	7.05	1174	6.78
1175	6.54	1176	6.32	1177	6.12	1178	5.95	1179	5.79
1180	5.61	1181	5.52	1182	5.36	1183	5.25	1184	5.14
1185	5.04	1186	4.94	1187	4.84	1188	4.78	1189	4.66
1190	4.60	1191	4.52	1192	4.47	1193	4.39	1194	4.31
1195	4.24	1196	4.17	1197	4.13	1198	4.06	1199	4.02
1200	3.94	1201	3.90	1202	3.87	1203	3.80	1204	3.78
1205	3.75	1206	3.70	1207	3.67	1208	3.63	1209	3.58
1210	3.56	1211	3.54	1212	3.48	1213	3.43	1214	3.43
1215	3.38	1216	3.36	1217	3.34	1218	3.29	1219	3.28
1220	3.26	1221	3.24	1222	3.20	1223	3.16	1224	3.14
1225	3.13	1226	3.11	1227	3.10	1228	3.05	1229	3.03
1230	3.02	1231	3.01	1232	2.99	1233	2.95	1234	2.94
1235	2.90	1236	2.92	1237	2.88	1238	2.87	1239	2.86
1240	2.81	1241	2.83	1242	2.79	1243	2.81	1244	2.77
1245	2.76	1246	2.73	1247	2.75	1248	2.74	1249	2.70
1250	2.70	1251	2.66	1252	2.65	1253	2.64	1254	2.66
1255	2.62	1256	2.60	1257	2.60	1258	2.59	1259	2.59
1260	2.58	1261	2.58	1262	2.54	1263	2.53	1264	2.50
1265	2.50	1266	2.49	1267	2.48	1268	2.46	1269	2.45
1270	2.44	1271	2.40	1272	2.42	1273	2.42	1274	2.41
1275	2.38	1276	2.37	1277	2.37	1278	2.36	1279	2.36
1280	2.35	1281	2.35	1282	2.31	1283	2.34	1284	2.30
1285	2.30	1286	2.30	1287	2.29	1288	2.28	1289	2.24
1290	2.27	1291	2.24	1292	2.26	1293	2.22	1294	2.21
1295	2.21	1296	2.20	1297	2.20	1298	2.20	1299	2.19
1300	2.19	1310	2.09	1320	2.06	1330	2.01	1340	1.95
1350	1.89	1360	1.87	1370	1.79	1380	1.78	1390	1.72
1400	1.68	1420	1.65	1440	1.60	1460	1.19	1500	1.19

TOTAL VOLUME THIS HYDROGRAPH = 5.78(Ac.Ft)

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006  2130    2A 297  0  .099A344  1.0001000                0
006  2130    3A  97 55 1.6 6A304670.0000800                01
006  2130    4A  20  0  .0 0A304  1.0001000                0    A
006  2130    5A  20  0  .099A304  1.0001000                0
006  2130    6A  20 90 1.310A304 90.0000500                0
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8 10 500.     2.0 600.     2.1 700.     2.3 800.     2.5 900.     2.9
8 151000.     3.51050.     4.41100.     5.81110.     7.01120.     8.1
8 201130.     9.41131.     9.61132.     9.71133.     9.91134.    10.1
8 251135.    10.31136.    10.51137.    10.81138.    11.11139.    11.4
8 301140.    11.81141.    12.21142.    12.61143.    13.11144.    13.6
8 351145.    14.21146.    14.91147.    15.61148.    16.41149.    18.4
8 401150.    20.61151.    23.11152.    26.41153.    29.91154.    32.4
8 451155.    34.31156.    35.61157.    34.71158.    32.91159.    30.4
8 501160.    27.21161.    23.41162.    20.41163.    17.71164.    15.1
8 551165.    13.01166.    11.41167.    10.21168.     9.31169.     8.7
8 601170.     8.21171.     7.71172.     7.41173.     7.11174.     6.8
8 651175.     6.51176.     6.31177.     6.11178.     5.91179.     5.8
8 701180.     5.61181.     5.51182.     5.41183.     5.21184.     5.1
8 751185.     5.01186.     4.91187.     4.81188.     4.81189.     4.7
8 801190.     4.61191.     4.51192.     4.51193.     4.41194.     4.3
8 851195.     4.21196.     4.21197.     4.11198.     4.11199.     4.0
8 901200.     3.91201.     3.91202.     3.91203.     3.81204.     3.8
8 951205.     3.81206.     3.71207.     3.71208.     3.61209.     3.6
81001210.     3.61211.     3.51212.     3.51213.     3.41214.     3.4
81051215.     3.41216.     3.41217.     3.31218.     3.31219.     3.3
81101220.     3.31221.     3.21222.     3.21223.     3.21224.     3.1
81151225.     3.11226.     3.11227.     3.11228.     3.01229.     3.0
81201230.     3.01231.     3.01232.     3.01233.     3.01234.     2.9
81251235.     2.91236.     2.91237.     2.91238.     2.91239.     2.9
81301240.     2.81241.     2.81242.     2.81243.     2.81244.     2.8
81351245.     2.81246.     2.71247.     2.71248.     2.71249.     2.7
81401250.     2.71251.     2.71252.     2.61253.     2.61254.     2.7
81451255.     2.61256.     2.61257.     2.61258.     2.61259.     2.6
81501260.     2.61261.     2.61262.     2.51263.     2.51264.     2.5
81551265.     2.51266.     2.51267.     2.51268.     2.51269.     2.4
81601270.     2.41271.     2.41272.     2.41273.     2.41274.     2.4
81651275.     2.41276.     2.41277.     2.41278.     2.41279.     2.4
81701280.     2.41281.     2.41282.     2.31283.     2.31284.     2.3
81751285.     2.31286.     2.31287.     2.31288.     2.31289.     2.2
81801290.     2.31291.     2.21292.     2.31293.     2.21294.     2.2
81851295.     2.21296.     2.21297.     2.21298.     2.21299.     2.2
81901300.     2.21310.     2.11320.     2.11330.     2.01340.     2.0
81951350.     1.91360.     1.91370.     1.81380.     1.81390.     1.7
82001400.     1.71420.     1.71440.     1.61460.     1.21500.     1.2
```

Program Package Serial Number: 2229

05/05/22 FILE: 2130DH INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

RIVERVIEW BASIN H & A - DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	18.9	51.08	18.9	51.08	4	245.	.02000	2.50	.00	0.	297	7	A34	.05
2130	2A	.0	.00	18.9	50.97	4	1.	.01000	2.75	.00	0.	297	99	A34	.00
2130	3A	1.6	4.31	20.5	55.28	4	670.	.00800	3.00	.00	0.	97	6	A30	.55
2130	4A	16.2	35.60	36.7	89.21	4	1.	.01000	3.50	.00	0.	20	0	A30	.00
2130	5A	.0	.00	36.7	89.20	4	1.	.01000	3.50	.00	0.	20	99	A30	.00
2130	6A	1.3	2.92	38.0	92.01	4	90.	.00500	4.00	.00	0.	20	10	A30	.90
2130	7A	1.3	2.92	39.3	93.97	4	50.	.00500	4.00	.00	0.	20	10	A30	.90

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN H & A - DEV MODEL
HYDROGRAPH AT   2130   1A   STORM DAY 4   REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.60	200	.63	300	.66	400	.70
500	.75	600	.80	700	.87	800	.97	900	1.12
1000	1.59	1050	2.76	1100	4.40	1110	6.33	1120	7.45
1130	9.34	1131	9.51	1132	9.68	1133	10.11	1134	10.53
1135	10.83	1136	11.26	1137	11.98	1138	12.52	1139	13.06
1140	13.33	1141	14.01	1142	14.96	1143	15.64	1144	16.04
1145	17.40	1146	18.75	1147	20.29	1148	21.28	1149	27.33
1150	33.72	1151	40.06	1152	45.57	1153	51.08	1154	50.94
1155	49.92	1156	43.11	1157	35.86	1158	28.61	1159	21.14
1160	13.74	1161	11.44	1162	10.00	1163	8.97	1164	8.07
1165	7.42	1166	6.93	1167	6.44	1168	6.08	1169	5.83
1170	5.47	1171	5.22	1172	4.98	1173	4.61	1174	4.49
1175	4.25	1176	4.00	1177	3.88	1178	3.76	1179	3.64
1180	3.52	1181	3.40	1182	3.28	1183	3.16	1184	3.04
1185	2.92	1186	2.79	1187	2.80	1188	2.67	1189	2.55
1190	2.55	1191	2.43	1192	2.43	1193	2.31	1194	2.19
1195	2.07	1196	2.07	1197	1.95	1198	1.95	1199	1.83
1200	1.83	1201	1.83	1202	1.83	1203	1.71	1204	1.71
1205	1.71	1206	1.59	1207	1.59	1208	1.47	1209	1.35
1210	1.47	1211	1.35	1212	1.25	1213	1.25	1214	1.25
1215	1.25	1216	1.25	1217	1.22	1218	1.22	1219	1.22
1220	1.22	1221	1.19	1222	1.19	1223	1.15	1224	1.15
1225	1.15	1226	1.15	1227	1.15	1228	1.12	1229	1.12
1230	1.15	1231	1.12	1232	1.12	1233	1.08	1234	1.08
1235	1.08	1236	1.08	1237	1.05	1238	1.08	1239	1.05
1240	1.05	1241	1.05	1242	1.05	1243	1.05	1244	1.05
1245	1.02	1246	1.02	1247	1.05	1248	1.02	1249	1.02
1250	.98	1251	.98	1252	.98	1253	.98	1254	.98
1255	.98	1256	.98	1257	.98	1258	.98	1259	.98
1260	.98	1261	.95	1262	.95	1263	.95	1264	.91
1265	.91	1266	.91	1267	.91	1268	.91	1269	.91
1270	.91	1271	.91	1272	.91	1273	.91	1274	.91
1275	.88	1276	.88	1277	.88	1278	.91	1279	.88
1280	.88	1281	.88	1282	.88	1283	.88	1284	.84
1285	.84	1286	.88	1287	.84	1288	.84	1289	.84
1290	.84	1291	.84	1292	.84	1293	.81	1294	.84
1295	.81	1296	.84	1297	.81	1298	.84	1299	.81
1300	.84	1310	.78	1320	.78	1330	.76	1340	.73
1350	.71	1360	.71	1370	.66	1380	.68	1390	.64
1400	.64	1420	.62	1440	.60	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH =   3.25(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN H & A - DEV MODEL
HYDROGRAPH AT   2130   3A   STORM DAY 4   REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.72	200	.75	300	.79	400	.84
500	.89	600	.96	700	1.04	800	1.16	900	1.33
1000	1.84	1050	3.08	1100	4.86	1110	6.76	1120	8.18
1130	10.00	1131	10.30	1132	10.46	1133	10.78	1134	11.21
1135	11.63	1136	12.03	1137	12.62	1138	13.31	1139	13.88

1140	14.34	1141	14.86	1142	15.72	1143	16.59	1144	17.19
1145	18.17	1146	19.61	1147	21.17	1148	22.52	1149	26.49
1150	33.27	1151	40.20	1152	46.61	1153	52.53	1154	55.28
1155	54.22	1156	49.74	1157	42.11	1158	34.23	1159	26.38
1160	19.03	1161	14.02	1162	11.80	1163	10.50	1164	9.45
1165	8.60	1166	7.95	1167	7.44	1168	6.96	1169	6.61
1170	6.29	1171	5.97	1172	5.68	1173	5.39	1174	5.11
1175	4.88	1176	4.67	1177	4.45	1178	4.28	1179	4.15
1180	4.03	1181	3.90	1182	3.76	1183	3.63	1184	3.51
1185	3.39	1186	3.26	1187	3.17	1188	3.10	1189	3.00
1190	2.91	1191	2.84	1192	2.77	1193	2.71	1194	2.62
1195	2.50	1196	2.39	1197	2.33	1198	2.27	1199	2.20
1200	2.13	1201	2.10	1202	2.10	1203	2.06	1204	2.00
1205	1.97	1206	1.94	1207	1.88	1208	1.82	1209	1.74
1210	1.66	1211	1.66	1212	1.62	1213	1.53	1214	1.50
1215	1.49	1216	1.50	1217	1.48	1218	1.47	1219	1.45
1220	1.45	1221	1.45	1222	1.42	1223	1.41	1224	1.39
1225	1.38	1226	1.38	1227	1.37	1228	1.36	1229	1.35
1230	1.34	1231	1.35	1232	1.34	1233	1.33	1234	1.31
1235	1.30	1236	1.29	1237	1.28	1238	1.27	1239	1.27
1240	1.26	1241	1.25	1242	1.25	1243	1.26	1244	1.25
1245	1.24	1246	1.23	1247	1.22	1248	1.22	1249	1.22
1250	1.21	1251	1.19	1252	1.17	1253	1.17	1254	1.17
1255	1.17	1256	1.16	1257	1.17	1258	1.17	1259	1.16
1260	1.17	1261	1.16	1262	1.15	1263	1.13	1264	1.12
1265	1.11	1266	1.09	1267	1.09	1268	1.09	1269	1.09
1270	1.09	1271	1.09	1272	1.09	1273	1.09	1274	1.09
1275	1.08	1276	1.07	1277	1.05	1278	1.05	1279	1.07
1280	1.06	1281	1.05	1282	1.04	1283	1.04	1284	1.05
1285	1.02	1286	1.02	1287	1.02	1288	1.02	1289	1.01
1290	1.01	1291	1.01	1292	1.01	1293	1.00	1294	.99
1295	.99	1296	.98	1297	.98	1298	.98	1299	.98
1300	.98	1310	.94	1320	.93	1330	.91	1340	.87
1350	.85	1360	.84	1370	.80	1380	.80	1390	.78
1400	.75	1420	.75	1440	.72	1460	.60	1500	.60

TOTAL VOLUME THIS HYDROGRAPH = 3.74(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN H & A - DEV MODEL
HYDROGRAPH AT 2130 7A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	2.61	200	2.75	300	2.81	400	2.97
500	3.24	600	3.44	700	3.76	800	4.11	900	4.75
1000	5.95	1050	8.14	1100	11.57	1110	14.26	1120	17.34
1130	20.44	1131	20.87	1132	21.23	1133	21.65	1134	22.12
1135	22.62	1136	23.20	1137	23.92	1138	24.74	1139	25.62
1140	26.63	1141	27.70	1142	28.73	1143	29.87	1144	31.18
1145	32.65	1146	34.25	1147	36.04	1148	38.19	1149	41.72
1150	46.56	1151	53.24	1152	62.68	1153	73.27	1154	82.58
1155	89.69	1156	93.97	1157	93.49	1158	88.12	1159	78.98
1160	67.98	1161	56.51	1162	46.19	1163	38.03	1164	31.90
1165	27.45	1166	24.15	1167	21.71	1168	19.77	1169	18.36
1170	17.22	1171	16.24	1172	15.43	1173	14.76	1174	14.11
1175	13.49	1176	12.94	1177	12.45	1178	11.98	1179	11.59
1180	11.23	1181	10.88	1182	10.62	1183	10.30	1184	10.00
1185	9.77	1186	9.52	1187	9.28	1188	9.11	1189	8.92
1190	8.69	1191	8.50	1192	8.34	1193	8.20	1194	8.03
1195	7.84	1196	7.70	1197	7.57	1198	7.42	1199	7.28
1200	7.08	1201	6.95	1202	6.88	1203	6.75	1204	6.63
1205	6.59	1206	6.51	1207	6.41	1208	6.31	1209	6.22
1210	6.17	1211	6.07	1212	5.96	1213	5.84	1214	5.74
1215	5.68	1216	5.63	1217	5.52	1218	5.43	1219	5.40
1220	5.38	1221	5.32	1222	5.24	1223	5.23	1224	5.17

1225	5.11	1226	5.08	1227	5.07	1228	4.99	1229	4.93
1230	4.93	1231	4.91	1232	4.90	1233	4.89	1234	4.83
1235	4.77	1236	4.77	1237	4.75	1238	4.74	1239	4.73
1240	4.66	1241	4.59	1242	4.58	1243	4.58	1244	4.56
1245	4.55	1246	4.50	1247	4.45	1248	4.44	1249	4.43
1250	4.43	1251	4.41	1252	4.36	1253	4.30	1254	4.33
1255	4.33	1256	4.26	1257	4.25	1258	4.25	1259	4.24
1260	4.23	1261	4.23	1262	4.18	1263	4.12	1264	4.11
1265	4.11	1266	4.10	1267	4.09	1268	4.07	1269	4.02
1270	3.95	1271	3.94	1272	3.94	1273	3.93	1274	3.93
1275	3.92	1276	3.92	1277	3.92	1278	3.91	1279	3.91
1280	3.90	1281	3.89	1282	3.83	1283	3.78	1284	3.78
1285	3.78	1286	3.77	1287	3.76	1288	3.75	1289	3.69
1290	3.69	1291	3.69	1292	3.68	1293	3.68	1294	3.62
1295	3.61	1296	3.61	1297	3.60	1298	3.60	1299	3.60
1300	3.58	1310	3.45	1320	3.40	1330	3.29	1340	3.23
1350	3.13	1360	3.07	1370	2.96	1380	2.91	1390	2.83
1400	2.76	1420	2.76	1440	2.61	1460	2.46	1500	2.46

TOTAL VOLUME THIS HYDROGRAPH = 10.58(Ac.Ft)

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006  2130    1A  20 88 5.313A344 30.0000600                 0  G1
006  2130    2A  20 88 3.511A344465.0000700                 02  2
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Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN D - DESIGN DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	5.3	10.30	5.3	10.30	4	30.	.00600	2.00	.00	0.	20	13	A34	.88
2130	2A	3.5	7.38	8.8	17.67	4	465.	.00700	2.00	.00	0.	20	11	A34	.88

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
RIVERVIEW BASIN D - DESIGN DEV MODEL
HYDROGRAPH AT 2130 2A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.95	200	1.00	300	1.05	400	1.11
500	1.18	600	1.27	700	1.38	800	1.53	900	1.76
1000	2.13	1050	2.66	1100	3.41	1110	4.13	1120	4.72
1130	5.49	1131	5.60	1132	5.68	1133	5.82	1134	5.94
1135	6.01	1136	6.12	1137	6.28	1138	6.46	1139	6.63
1140	6.80	1141	7.06	1142	7.35	1143	7.60	1144	7.81
1145	8.22	1146	8.65	1147	9.07	1148	9.47	1149	10.94
1150	12.62	1151	14.16	1152	15.76	1153	17.31	1154	17.67
1155	17.66	1156	17.46	1157	17.19	1158	16.73	1159	16.22
1160	15.12	1161	13.98	1162	12.27	1163	10.34	1164	8.52
1165	7.16	1166	5.97	1167	5.31	1168	4.99	1169	4.68
1170	4.45	1171	4.23	1172	4.07	1173	3.90	1174	3.78
1175	3.66	1176	3.55	1177	3.45	1178	3.37	1179	3.28
1180	3.19	1181	3.14	1182	3.06	1183	2.99	1184	2.94
1185	2.88	1186	2.84	1187	2.80	1188	2.76	1189	2.70
1190	2.66	1191	2.62	1192	2.58	1193	2.55	1194	2.51
1195	2.47	1196	2.44	1197	2.41	1198	2.38	1199	2.34
1200	2.33	1201	2.29	1202	2.29	1203	2.24	1204	2.22
1205	2.22	1206	2.18	1207	2.18	1208	2.15	1209	2.12
1210	2.11	1211	2.09	1212	2.05	1213	2.03	1214	2.03
1215	2.01	1216	1.99	1217	1.98	1218	1.94	1219	1.94
1220	1.93	1221	1.91	1222	1.91	1223	1.87	1224	1.86
1225	1.85	1226	1.85	1227	1.84	1228	1.80	1229	1.80
1230	1.80	1231	1.78	1232	1.77	1233	1.75	1234	1.75
1235	1.73	1236	1.73	1237	1.72	1238	1.71	1239	1.70
1240	1.66	1241	1.67	1242	1.67	1243	1.66	1244	1.66
1245	1.64	1246	1.63	1247	1.63	1248	1.63	1249	1.61
1250	1.60	1251	1.59	1252	1.57	1253	1.57	1254	1.57
1255	1.57	1256	1.56	1257	1.55	1258	1.54	1259	1.54
1260	1.53	1261	1.52	1262	1.52	1263	1.52	1264	1.50
1265	1.48	1266	1.48	1267	1.46	1268	1.46	1269	1.46
1270	1.46	1271	1.43	1272	1.43	1273	1.43	1274	1.43
1275	1.42	1276	1.41	1277	1.43	1278	1.43	1279	1.40
1280	1.40	1281	1.40	1282	1.39	1283	1.38	1284	1.37
1285	1.37	1286	1.38	1287	1.36	1288	1.36	1289	1.34
1290	1.35	1291	1.33	1292	1.33	1293	1.33	1294	1.32
1295	1.32	1296	1.32	1297	1.31	1298	1.32	1299	1.29
1300	1.31	1310	1.26	1320	1.23	1330	1.20	1340	1.16
1350	1.13	1360	1.11	1370	1.06	1380	1.07	1390	1.02
1400	1.00	1420	.99	1440	.95	1460	.57	1500	.57

TOTAL VOLUME THIS HYDROGRAPH = 3.41(Ac.Ft)

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006  2130    1A 297  5 7.8 5A344125.0013200                0  G1
006  2130    2A  97 10 1.7 5A304 1220000600                01
006  2130    3A  97  0  .099A344  1.0001000                0
006  2130    4A  20  0  .0 0A304  1.0001000                0    A
006  2130    5A  20  0  .099A344120.0000900                02  2
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7  2130    4A     8.8 401154    17.7200  4
8  5   0.      .0 100.     1.0 200.     1.0 300.     1.0 400.     1.1
8 10 500.     1.2 600.     1.3 700.     1.4 800.     1.5 900.     1.8
8 151000.     2.11050.     2.71100.     3.41110.     4.11120.     4.7
8 201130.     5.51131.     5.61132.     5.71133.     5.81134.     5.9
8 251135.     6.01136.     6.11137.     6.31138.     6.51139.     6.6
8 301140.     6.81141.     7.11142.     7.31143.     7.61144.     7.8
8 351145.     8.21146.     8.71147.     9.11148.     9.51149.    10.9
8 401150.    12.61151.    14.21152.    15.81153.    17.31154.    17.7
8 451155.    17.71156.    17.51157.    17.21158.    16.71159.    16.2
8 501160.    15.11161.    14.01162.    12.31163.    10.31164.     8.5
8 551165.     7.21166.     6.01167.     5.31168.     5.01169.     4.7
8 601170.     4.51171.     4.21172.     4.11173.     3.91174.     3.8
8 651175.     3.71176.     3.51177.     3.41178.     3.41179.     3.3
8 701180.     3.21181.     3.11182.     3.11183.     3.01184.     2.9
8 751185.     2.91186.     2.81187.     2.81188.     2.81189.     2.7
8 801190.     2.71191.     2.61192.     2.61193.     2.61194.     2.5
8 851195.     2.51196.     2.41197.     2.41198.     2.41199.     2.3
8 901200.     2.31201.     2.31202.     2.31203.     2.21204.     2.2
8 951205.     2.21206.     2.21207.     2.21208.     2.11209.     2.1
81001210.     2.11211.     2.11212.     2.11213.     2.01214.     2.0
81051215.     2.01216.     2.01217.     2.01218.     1.91219.     1.9
81101220.     1.91221.     1.91222.     1.91223.     1.91224.     1.9
81151225.     1.91226.     1.81227.     1.81228.     1.81229.     1.8
81201230.     1.81231.     1.81232.     1.81233.     1.71234.     1.8
81251235.     1.71236.     1.71237.     1.71238.     1.71239.     1.7
81301240.     1.71241.     1.71242.     1.71243.     1.71244.     1.7
81351245.     1.61246.     1.61247.     1.61248.     1.61249.     1.6
81401250.     1.61251.     1.61252.     1.61253.     1.61254.     1.6
81451255.     1.61256.     1.61257.     1.61258.     1.51259.     1.5
81501260.     1.51261.     1.51262.     1.51263.     1.51264.     1.5
81551265.     1.51266.     1.51267.     1.51268.     1.51269.     1.5
81601270.     1.51271.     1.41272.     1.41273.     1.41274.     1.4
81651275.     1.41276.     1.41277.     1.41278.     1.41279.     1.4
81701280.     1.41281.     1.41282.     1.41283.     1.41284.     1.4
81751285.     1.41286.     1.41287.     1.41288.     1.41289.     1.3
81801290.     1.31291.     1.31292.     1.31293.     1.31294.     1.3
81851295.     1.31296.     1.31297.     1.31298.     1.31299.     1.3
81901300.     1.31310.     1.31320.     1.21330.     1.21340.     1.2
81951350.     1.11360.     1.11370.     1.11380.     1.11390.     1.0
82001400.     1.01420.     1.01440.     1.01460.      .61500.      .6
```

Program Package Serial Number: 2229
05/06/22 FILE: 2130DE INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN E - DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	7.8	25.56	7.8	25.56	4	125.	.13200	2.00	.00	0.	297	5	A34	.05
2130	2A	1.7	4.70	9.5	29.77	4	1220.	.00600	2.50	.00	0.	97	5	A30	.10
2130	3A	.0	.00	9.5	24.30	4	1.	.01000	2.00	.00	0.	97	99	A34	.00
2130	4A	8.8	17.70	18.3	41.49	4	1.	.01000	2.50	.00	0.	20	0	A30	.00
2130	5A	.0	.00	18.3	41.49	4	120.	.00900	2.50	.00	0.	20	99	A34	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN E - DEV MODEL
HYDROGRAPH AT   2130   2A   STORM DAY 4   REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.29	200	.30	300	.32	400	.34
500	.36	600	.39	700	.42	800	.47	900	.54
1000	.75	1050	1.30	1100	2.10	1110	3.02	1120	3.60
1130	4.49	1131	4.62	1132	4.72	1133	4.98	1134	5.26
1135	5.50	1136	5.68	1137	6.01	1138	6.26	1139	6.42
1140	6.69	1141	7.12	1142	7.52	1143	7.80	1144	8.09
1145	8.89	1146	9.66	1147	10.27	1148	10.97	1149	14.61
1150	18.73	1151	22.20	1152	26.09	1153	29.77	1154	27.27
1155	22.36	1156	18.14	1157	13.05	1158	8.41	1159	6.20
1160	5.61	1161	4.76	1162	4.36	1163	3.90	1164	3.62
1165	3.29	1166	3.14	1167	2.96	1168	2.78	1169	2.67
1170	2.55	1171	2.37	1172	2.27	1173	2.15	1174	2.03
1175	1.95	1176	1.87	1177	1.79	1178	1.74	1179	1.70
1180	1.62	1181	1.57	1182	1.53	1183	1.45	1184	1.37
1185	1.34	1186	1.31	1187	1.26	1188	1.27	1189	1.20
1190	1.16	1191	1.12	1192	1.08	1193	1.04	1194	1.02
1195	.97	1196	.92	1197	.90	1198	.85	1199	.85
1200	.85	1201	.85	1202	.85	1203	.80	1204	.77
1205	.78	1206	.73	1207	.70	1208	.71	1209	.66
1210	.63	1211	.64	1212	.61	1213	.59	1214	.62
1215	.61	1216	.59	1217	.59	1218	.59	1219	.58
1220	.57	1221	.57	1222	.57	1223	.55	1224	.55
1225	.55	1226	.55	1227	.55	1228	.55	1229	.54
1230	.55	1231	.53	1232	.53	1233	.53	1234	.53
1235	.51	1236	.51	1237	.51	1238	.51	1239	.51
1240	.50	1241	.50	1242	.50	1243	.50	1244	.50
1245	.50	1246	.49	1247	.49	1248	.49	1249	.48
1250	.48	1251	.48	1252	.47	1253	.46	1254	.47
1255	.48	1256	.48	1257	.48	1258	.48	1259	.47
1260	.46	1261	.46	1262	.46	1263	.45	1264	.44
1265	.43	1266	.43	1267	.43	1268	.43	1269	.44
1270	.45	1271	.44	1272	.43	1273	.43	1274	.43
1275	.42	1276	.42	1277	.43	1278	.43	1279	.42
1280	.42	1281	.43	1282	.42	1283	.41	1284	.41
1285	.41	1286	.41	1287	.41	1288	.41	1289	.41
1290	.41	1291	.40	1292	.40	1293	.40	1294	.40
1295	.40	1296	.40	1297	.40	1298	.40	1299	.40
1300	.40	1310	.38	1320	.37	1330	.37	1340	.35
1350	.35	1360	.34	1370	.32	1380	.32	1390	.31
1400	.30	1420	.30	1440	.29	1460	.25	1500	.25

TOTAL VOLUME THIS HYDROGRAPH =   1.58(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN E - DEV MODEL
HYDROGRAPH AT   2130   5A   STORM DAY 4   REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.29	200	1.30	300	1.32	400	1.43
500	1.56	600	1.68	700	1.82	800	1.96	900	2.33
1000	2.82	1050	3.88	1100	5.38	1110	6.52	1120	7.84
1130	9.42	1131	9.61	1132	9.79	1133	9.98	1134	10.17
1135	10.37	1136	10.60	1137	10.97	1138	11.37	1139	11.67

1140	12.09	1141	12.63	1142	13.06	1143	13.61	1144	14.10
1145	14.82	1146	15.65	1147	16.39	1148	17.24	1149	19.19
1150	21.51	1151	24.01	1152	27.36	1153	31.47	1154	34.92
1155	38.20	1156	40.76	1157	41.49	1158	40.09	1159	37.39
1160	33.42	1161	29.20	1162	24.71	1163	20.51	1164	17.14
1165	14.58	1166	12.46	1167	10.97	1168	10.11	1169	9.29
1170	8.71	1171	8.07	1172	7.71	1173	7.26	1174	6.98
1175	6.68	1176	6.33	1177	6.06	1178	5.93	1179	5.69
1180	5.49	1181	5.27	1182	5.19	1183	4.99	1184	4.84
1185	4.75	1186	4.60	1187	4.53	1188	4.48	1189	4.30
1190	4.26	1191	4.09	1192	4.06	1193	4.00	1194	3.87
1195	3.82	1196	3.69	1197	3.63	1198	3.61	1199	3.47
1200	3.44	1201	3.40	1202	3.37	1203	3.23	1204	3.20
1205	3.17	1206	3.15	1207	3.13	1208	3.02	1209	2.99
1210	2.97	1211	2.94	1212	2.93	1213	2.80	1214	2.79
1215	2.76	1216	2.74	1217	2.72	1218	2.61	1219	2.59
1220	2.58	1221	2.56	1222	2.56	1223	2.54	1224	2.54
1225	2.53	1226	2.43	1227	2.41	1228	2.41	1229	2.40
1230	2.40	1231	2.38	1232	2.38	1233	2.27	1234	2.37
1235	2.27	1236	2.26	1237	2.26	1238	2.26	1239	2.25
1240	2.25	1241	2.24	1242	2.24	1243	2.23	1244	2.23
1245	2.13	1246	2.12	1247	2.12	1248	2.12	1249	2.12
1250	2.11	1251	2.11	1252	2.11	1253	2.11	1254	2.10
1255	2.10	1256	2.10	1257	2.10	1258	1.99	1259	1.99
1260	1.98	1261	1.98	1262	1.98	1263	1.98	1264	1.98
1265	1.98	1266	1.98	1267	1.97	1268	1.97	1269	1.97
1270	1.97	1271	1.86	1272	1.86	1273	1.86	1274	1.85
1275	1.85	1276	1.85	1277	1.85	1278	1.85	1279	1.85
1280	1.84	1281	1.84	1282	1.84	1283	1.84	1284	1.83
1285	1.84	1286	1.83	1287	1.83	1288	1.83	1289	1.73
1290	1.72	1291	1.73	1292	1.72	1293	1.72	1294	1.72
1295	1.72	1296	1.71	1297	1.72	1298	1.71	1299	1.71
1300	1.71	1310	1.70	1320	1.58	1330	1.58	1340	1.56
1350	1.46	1360	1.44	1370	1.44	1380	1.43	1390	1.32
1400	1.31	1420	1.31	1440	1.30	1460	1.29	1500	1.29

TOTAL VOLUME THIS HYDROGRAPH = 5.03(Ac.Ft)

```
006  2130    1A 297  5 6.8 5A344200.0003100                 0  G1
006  2130    2A  97 35 0.9 5A304820.0001000                 01
006  2130    3A  20 90 2.013A304 25.0000500                 0
006  2130    4A  97 75 8.6 8A304230.0000400                 0
006  2130    5A  20  0  .099A304  1.0001000                 0
006  2130    6A  20 90 1.813A304 35.0000500                 02  2
```

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN F - DEV MODEL   STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	6.8	22.28	6.8	22.28	4	200.	.03100	2.00	.00	0.	297	5	A34	.05
2130	2A	.9	2.60	7.7	23.78	4	820.	.01000	2.00	.00	0.	97	5	A30	.35
2130	3A	2.0	3.94	9.7	25.36	4	25.	.00500	2.50	.00	0.	20	13	A30	.90
2130	4A	8.6	20.88	18.3	45.32	4	230.	.00400	3.00	.00	0.	97	8	A30	.75
2130	5A	.0	.00	18.3	44.25	4	1.	.01000	2.75	.00	0.	20	99	A30	.00
2130	6A	1.8	3.54	20.1	47.73	4	35.	.00500	3.00	.00	0.	20	13	A30	.90

Program Package Serial Number: 2229
05/06/22 FILE: 2130DF INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

RIVERVIEW BASIN F - DEV MODEL

HYDROGRAPH AT 2130 2A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.26	200	.27	300	.29	400	.31
500	.33	600	.35	700	.38	800	.42	900	.49
1000	.67	1050	1.13	1100	1.80	1110	2.51	1120	3.03
1130	3.72	1131	3.84	1132	3.92	1133	4.09	1134	4.32
1135	4.53	1136	4.69	1137	4.93	1138	5.16	1139	5.32
1140	5.50	1141	5.81	1142	6.15	1143	6.43	1144	6.66
1145	7.18	1146	7.82	1147	8.38	1148	8.93	1149	11.20
1150	14.55	1151	17.61	1152	20.67	1153	23.78	1154	23.08
1155	19.44	1156	15.81	1157	11.94	1158	8.07	1159	5.74
1160	4.82	1161	4.25	1162	3.78	1163	3.42	1164	3.13
1165	2.88	1166	2.71	1167	2.56	1168	2.42	1169	2.31
1170	2.21	1171	2.08	1172	1.97	1173	1.88	1174	1.78
1175	1.70	1176	1.64	1177	1.57	1178	1.51	1179	1.48
1180	1.43	1181	1.38	1182	1.35	1183	1.30	1184	1.23
1185	1.19	1186	1.16	1187	1.12	1188	1.11	1189	1.08
1190	1.04	1191	1.01	1192	.98	1193	.95	1194	.92
1195	.88	1196	.85	1197	.82	1198	.79	1199	.77
1200	.76	1201	.76	1202	.76	1203	.74	1204	.71
1205	.70	1206	.68	1207	.65	1208	.64	1209	.62
1210	.59	1211	.57	1212	.57	1213	.55	1214	.55
1215	.55	1216	.55	1217	.53	1218	.54	1219	.53
1220	.52	1221	.52	1222	.52	1223	.51	1224	.50
1225	.50	1226	.50	1227	.50	1228	.50	1229	.49
1230	.50	1231	.49	1232	.48	1233	.48	1234	.48
1235	.47	1236	.47	1237	.46	1238	.46	1239	.46
1240	.46	1241	.45	1242	.46	1243	.46	1244	.45
1245	.45	1246	.45	1247	.44	1248	.44	1249	.44
1250	.44	1251	.43	1252	.43	1253	.42	1254	.42
1255	.43	1256	.43	1257	.43	1258	.43	1259	.43
1260	.42	1261	.41	1262	.41	1263	.41	1264	.41
1265	.40	1266	.39	1267	.39	1268	.39	1269	.40
1270	.41	1271	.41	1272	.40	1273	.39	1274	.39
1275	.39	1276	.38	1277	.38	1278	.39	1279	.39
1280	.38	1281	.38	1282	.39	1283	.38	1284	.37
1285	.37	1286	.37	1287	.37	1288	.37	1289	.37
1290	.37	1291	.37	1292	.36	1293	.36	1294	.36
1295	.36	1296	.36	1297	.36	1298	.36	1299	.36
1300	.36	1310	.34	1320	.34	1330	.33	1340	.32
1350	.31	1360	.31	1370	.29	1380	.29	1390	.28
1400	.28	1420	.27	1440	.26	1460	.22	1500	.22

TOTAL VOLUME THIS HYDROGRAPH = 1.37(Ac.Ft)

Program Package Serial Number: 2229
05/06/22 FILE: 2130DF INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 3

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

RIVERVIEW BASIN F - DEV MODEL

HYDROGRAPH AT 2130 6A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.50	200	1.56	300	1.65	400	1.74
500	1.85	600	1.99	700	2.17	800	2.40	900	2.76
1000	3.41	1050	4.53	1100	6.29	1110	7.67	1120	9.27
1130	10.92	1131	11.13	1132	11.31	1133	11.53	1134	11.77
1135	12.05	1136	12.34	1137	12.70	1138	13.18	1139	13.69
1140	14.18	1141	14.69	1142	15.26	1143	15.89	1144	16.54
1145	17.31	1146	18.20	1147	19.19	1148	20.25	1149	22.17
1150	25.21	1151	29.04	1152	33.48	1153	38.45	1154	42.74
1155	45.72	1156	47.41	1157	47.73	1158	45.66	1159	40.12

1160	33.80	1161	27.76	1162	22.47	1163	18.75	1164	16.16
1165	14.09	1166	12.36	1167	11.13	1168	10.22	1169	9.51
1170	8.95	1171	8.50	1172	8.09	1173	7.75	1174	7.46
1175	7.16	1176	6.89	1177	6.68	1178	6.46	1179	6.23
1180	6.04	1181	5.87	1182	5.70	1183	5.57	1184	5.44
1185	5.30	1186	5.18	1187	5.10	1188	5.00	1189	4.87
1190	4.75	1191	4.65	1192	4.56	1193	4.48	1194	4.40
1195	4.32	1196	4.24	1197	4.17	1198	4.11	1199	4.05
1200	3.96	1201	3.89	1202	3.82	1203	3.74	1204	3.68
1205	3.65	1206	3.60	1207	3.56	1208	3.53	1209	3.51
1210	3.48	1211	3.44	1212	3.39	1213	3.36	1214	3.32
1215	3.27	1216	3.22	1217	3.17	1218	3.13	1219	3.10
1220	3.07	1221	3.03	1222	3.01	1223	2.99	1224	2.97
1225	2.95	1226	2.94	1227	2.90	1228	2.87	1229	2.85
1230	2.83	1231	2.82	1232	2.83	1233	2.81	1234	2.78
1235	2.77	1236	2.76	1237	2.74	1238	2.72	1239	2.67
1240	2.64	1241	2.63	1242	2.63	1243	2.62	1244	2.60
1245	2.58	1246	2.57	1247	2.58	1248	2.57	1249	2.55
1250	2.53	1251	2.52	1252	2.50	1253	2.49	1254	2.49
1255	2.48	1256	2.45	1257	2.44	1258	2.44	1259	2.43
1260	2.42	1261	2.42	1262	2.40	1263	2.39	1264	2.38
1265	2.36	1266	2.35	1267	2.33	1268	2.32	1269	2.31
1270	2.29	1271	2.27	1272	2.28	1273	2.28	1274	2.28
1275	2.25	1276	2.24	1277	2.23	1278	2.24	1279	2.23
1280	2.22	1281	2.21	1282	2.19	1283	2.18	1284	2.18
1285	2.17	1286	2.17	1287	2.17	1288	2.15	1289	2.12
1290	2.12	1291	2.13	1292	2.14	1293	2.13	1294	2.10
1295	2.10	1296	2.09	1297	2.08	1298	2.08	1299	2.06
1300	2.03	1310	2.00	1320	1.95	1330	1.88	1340	1.83
1350	1.80	1360	1.75	1370	1.69	1380	1.67	1390	1.66
1400	1.62	1420	1.54	1440	1.51	1460	1.30	1500	1.30

TOTAL VOLUME THIS HYDROGRAPH = 5.89(Ac.Ft)

RIVERVIEW

50-YEAR BURNED

DEVELOPED CONDITION

```
006  2130    1A  97 50 3.4 7A344400.0000800                0  G1
006  2130    2B  20 88 3.3 9A344255.0000600                0
006  2130    3B  20 88 1.1 7A344 60.0001800                0
006  2130    4AB 20  0  .0 0A344505.0001100                0
006  2130    5A  20  0  .099A344  1.0001000                0
006  2130    6C  20 85 2.5 9A344630.0000600                0
006  2130    7AC 20  0  .0 0A344 30.0000500                0
006  2130    8A  20  0  .099A344  1.0001000                0
006  2130    9A  20 85 2.1 7A344 25.0008300                0
006  2130   10A  20 85 3.8 7A344100.0001200                02  2
```

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN A 50YR BURNED DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	3.4	9.59	3.4	9.59	4	400.	.00800	2.00	.00	0.	97	7	A34	.50
2130	2B	3.3	8.74	3.3	8.74	4	255.	.00600	2.00	.00	0.	20	9	A34	.88
2130	3B	1.1	3.27	4.4	11.89	4	60.	.01800	2.00	.00	0.	20	7	A34	.88
2130	4AB	4.4	11.86	7.8	21.27	4	505.	.01100	2.00	.00	0.	20	0	A34	.00
2130	5A	.0	.00	7.8	20.83	4	1.	.01000	2.00	.00	0.	20	99	A34	.00
2130	6C	2.5	6.55	2.5	6.55	4	630.	.00600	2.00	.00	0.	20	9	A34	.85
2130	7AC	2.5	6.28	10.3	27.11	4	30.	.00500	2.50	.00	0.	20	0	A34	.00
2130	8A	.0	.00	10.3	27.07	4	1.	.01000	2.25	.00	0.	20	99	A34	.00
2130	9A	2.1	6.18	12.4	31.70	4	25.	.08300	2.00	.00	0.	20	7	A34	.85
2130	10A	3.8	11.18	16.2	41.50	4	100.	.01200	2.50	.00	0.	20	7	A34	.85

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN A 50YR BURNED DEV MODEL
HYDROGRAPH AT 2130 10A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.81	200	1.88	300	1.98	400	2.10
500	2.23	600	2.40	700	2.61	800	2.89	900	3.32
1000	4.05	1050	5.09	1100	6.64	1110	8.02	1120	9.36
1130	10.85	1131	11.01	1132	11.17	1133	11.43	1134	11.69
1135	11.91	1136	12.19	1137	12.60	1138	12.97	1139	13.36
1140	13.71	1141	14.21	1142	14.80	1143	15.32	1144	15.80
1145	16.60	1146	17.42	1147	18.34	1148	19.21	1149	21.71
1150	24.57	1151	27.90	1152	31.81	1153	36.25	1154	39.20
1155	41.50	1156	41.27	1157	39.73	1158	37.02	1159	33.26
1160	28.69	1161	25.13	1162	21.73	1163	18.59	1164	15.90
1165	13.73	1166	12.18	1167	11.02	1168	10.23	1169	9.60
1170	9.08	1171	8.65	1172	8.30	1173	7.91	1174	7.67
1175	7.38	1176	7.13	1177	6.92	1178	6.73	1179	6.55
1180	6.39	1181	6.23	1182	6.10	1183	5.97	1184	5.85
1185	5.73	1186	5.62	1187	5.54	1188	5.43	1189	5.32
1190	5.26	1191	5.16	1192	5.11	1193	5.01	1194	4.93
1195	4.84	1196	4.80	1197	4.72	1198	4.67	1199	4.58
1200	4.53	1201	4.48	1202	4.44	1203	4.37	1204	4.34
1205	4.31	1206	4.24	1207	4.22	1208	4.16	1209	4.09
1210	4.11	1211	4.04	1212	3.96	1213	3.93	1214	3.90
1215	3.87	1216	3.84	1217	3.77	1218	3.75	1219	3.73
1220	3.71	1221	3.66	1222	3.64	1223	3.59	1224	3.57
1225	3.55	1226	3.53	1227	3.51	1228	3.45	1229	3.43
1230	3.46	1231	3.41	1232	3.39	1233	3.34	1234	3.33
1235	3.32	1236	3.30	1237	3.26	1238	3.28	1239	3.23
1240	3.21	1241	3.20	1242	3.19	1243	3.18	1244	3.16
1245	3.12	1246	3.11	1247	3.14	1248	3.09	1249	3.08
1250	3.04	1251	3.03	1252	3.02	1253	3.01	1254	2.99
1255	2.98	1256	2.96	1257	2.95	1258	2.95	1259	2.95
1260	2.94	1261	2.90	1262	2.89	1263	2.89	1264	2.84
1265	2.84	1266	2.83	1267	2.81	1268	2.80	1269	2.78
1270	2.77	1271	2.76	1272	2.75	1273	2.74	1274	2.74
1275	2.69	1276	2.69	1277	2.69	1278	2.72	1279	2.68
1280	2.67	1281	2.67	1282	2.66	1283	2.65	1284	2.61
1285	2.60	1286	2.63	1287	2.59	1288	2.58	1289	2.57
1290	2.57	1291	2.56	1292	2.55	1293	2.51	1294	2.54
1295	2.50	1296	2.52	1297	2.49	1298	2.51	1299	2.48
1300	2.50	1310	2.39	1320	2.34	1330	2.29	1340	2.22
1350	2.16	1360	2.12	1370	2.04	1380	2.03	1390	1.96
1400	1.91	1420	1.89	1440	1.82	1460	1.36	1500	1.36

TOTAL VOLUME THIS HYDROGRAPH = 6.60(Ac.Ft)

```
006  2130    1A 297  518.9 7A344245.0002000                 0  G1
006  2130    2A 297  0  .099A344  1.0001000                 0
006  2130    3A  97 55 1.6 5A344670.0000800                 01
006  2130    4A  20  0  .0 0A344  1.0001000                 0    A
006  2130    5A  20  0  .099A344  1.0001000                 0
006  2130    6A  20 90 1.310A344 90.0000500                 0
006  2130    7A  20 90 1.3 9A344 50.0000500                 02  2
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7  2130    4A    16.2 411155    41.5200  4
8  5   0.      .0 100.     1.8 200.     1.9 300.     2.0 400.     2.1
8 10 500.     2.2 600.     2.4 700.     2.6 800.     2.9 900.     3.3
8 151000.     4.11050.     5.11100.     6.61110.     8.01120.     9.4
8 201130.    10.91131.    11.01132.    11.21133.    11.41134.    11.7
8 251135.    11.91136.    12.21137.    12.61138.    13.01139.    13.4
8 301140.    13.71141.    14.21142.    14.81143.    15.31144.    15.8
8 351145.    16.61146.    17.41147.    18.31148.    19.21149.    21.7
8 401150.    24.61151.    27.91152.    31.81153.    36.31154.    39.2
8 451155.    41.51156.    41.31157.    39.71158.    37.01159.    33.3
8 501160.    28.71161.    25.11162.    21.71163.    18.61164.    15.9
8 551165.    13.71166.    12.21167.    11.01168.    10.21169.     9.6
8 601170.     9.11171.     8.61172.     8.31173.     7.91174.     7.7
8 651175.     7.41176.     7.11177.     6.91178.     6.71179.     6.5
8 701180.     6.41181.     6.21182.     6.11183.     6.01184.     5.9
8 751185.     5.71186.     5.61187.     5.51188.     5.41189.     5.3
8 801190.     5.31191.     5.21192.     5.11193.     5.01194.     4.9
8 851195.     4.81196.     4.81197.     4.71198.     4.71199.     4.6
8 901200.     4.51201.     4.51202.     4.41203.     4.41204.     4.3
8 951205.     4.31206.     4.21207.     4.21208.     4.21209.     4.1
81001210.     4.11211.     4.01212.     4.01213.     3.91214.     3.9
81051215.     3.91216.     3.81217.     3.81218.     3.81219.     3.7
81101220.     3.71221.     3.71222.     3.61223.     3.61224.     3.6
81151225.     3.61226.     3.51227.     3.51228.     3.41229.     3.4
81201230.     3.51231.     3.41232.     3.41233.     3.31234.     3.3
81251235.     3.31236.     3.31237.     3.31238.     3.31239.     3.2
81301240.     3.21241.     3.21242.     3.21243.     3.21244.     3.2
81351245.     3.11246.     3.11247.     3.11248.     3.11249.     3.1
81401250.     3.01251.     3.01252.     3.01253.     3.01254.     3.0
81451255.     3.01256.     3.01257.     3.01258.     2.91259.     2.9
81501260.     2.91261.     2.91262.     2.91263.     2.91264.     2.8
81551265.     2.81266.     2.81267.     2.81268.     2.81269.     2.8
81601270.     2.81271.     2.81272.     2.71273.     2.71274.     2.7
81651275.     2.71276.     2.71277.     2.71278.     2.71279.     2.7
81701280.     2.71281.     2.71282.     2.71283.     2.71284.     2.6
81751285.     2.61286.     2.61287.     2.61288.     2.61289.     2.6
81801290.     2.61291.     2.61292.     2.61293.     2.51294.     2.5
81851295.     2.51296.     2.51297.     2.51298.     2.51299.     2.5
81901300.     2.51310.     2.41320.     2.31330.     2.31340.     2.2
81951350.     2.21360.     2.11370.     2.01380.     2.01390.     2.0
82001400.     1.91420.     1.91440.     1.81460.     1.41500.     1.4
```

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN H & A 50YR BURNED DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	18.9	51.08	18.9	51.08	4	245.	.02000	2.50	.00	0.	297	7	A34	.05
2130	2A	.0	.00	18.9	50.97	4	1.	.01000	2.75	.00	0.	297	99	A34	.00
2130	3A	1.6	5.46	20.5	55.79	4	670.	.00800	3.00	.00	0.	97	5	A34	.55
2130	4A	16.2	41.50	36.7	95.47	4	1.	.01000	3.50	.00	0.	20	0	A34	.00
2130	5A	.0	.00	36.7	95.46	4	1.	.01000	3.50	.00	0.	20	99	A34	.00
2130	6A	1.3	3.32	38.0	98.66	4	90.	.00500	4.00	.00	0.	20	10	A34	.90
2130	7A	1.3	3.47	39.3	101.69	4	50.	.00500	4.00	.00	0.	20	9	A34	.90

↑
Program Package Serial Number: 2229
05/13/22 FILE: 2130DH INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN H & A 50YR BURNED DEV MODEL
HYDROGRAPH AT 2130 3A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.73	200	.77	300	.81	400	.85
500	.91	600	.98	700	1.07	800	1.18	900	1.36
1000	1.88	1050	3.14	1100	4.95	1110	6.87	1120	8.28
1130	10.14	1131	10.44	1132	10.61	1133	10.94	1134	11.40
1135	11.82	1136	12.22	1137	12.83	1138	13.49	1139	14.08
1140	14.56	1141	15.10	1142	15.95	1143	16.83	1144	17.45
1145	18.45	1146	19.90	1147	21.48	1148	22.88	1149	27.05
1150	33.91	1151	41.02	1152	47.58	1153	53.68	1154	55.79
1155	54.52	1156	49.85	1157	41.98	1158	33.88	1159	26.43
1160	19.10	1161	14.11	1162	11.88	1163	10.58	1164	9.52
1165	8.67	1166	8.04	1167	7.52	1168	7.05	1169	6.71
1170	6.38	1171	6.04	1172	5.76	1173	5.45	1174	5.17
1175	4.96	1176	4.73	1177	4.50	1178	4.36	1179	4.23
1180	4.09	1181	3.97	1182	3.84	1183	3.70	1184	3.56
1185	3.44	1186	3.31	1187	3.22	1188	3.16	1189	3.06
1190	2.97	1191	2.90	1192	2.84	1193	2.76	1194	2.67
1195	2.54	1196	2.45	1197	2.37	1198	2.31	1199	2.25
1200	2.19	1201	2.16	1202	2.16	1203	2.11	1204	2.05
1205	2.02	1206	1.98	1207	1.92	1208	1.86	1209	1.76
1210	1.69	1211	1.69	1212	1.63	1213	1.56	1214	1.54
1215	1.52	1216	1.52	1217	1.52	1218	1.50	1219	1.48
1220	1.48	1221	1.47	1222	1.46	1223	1.43	1224	1.41
1225	1.40	1226	1.40	1227	1.40	1228	1.39	1229	1.38
1230	1.37	1231	1.37	1232	1.37	1233	1.35	1234	1.34
1235	1.32	1236	1.32	1237	1.31	1238	1.31	1239	1.30
1240	1.29	1241	1.28	1242	1.28	1243	1.28	1244	1.28
1245	1.27	1246	1.25	1247	1.25	1248	1.25	1249	1.24
1250	1.23	1251	1.21	1252	1.19	1253	1.19	1254	1.20
1255	1.20	1256	1.20	1257	1.20	1258	1.20	1259	1.19
1260	1.19	1261	1.18	1262	1.17	1263	1.16	1264	1.14
1265	1.12	1266	1.11	1267	1.11	1268	1.11	1269	1.12
1270	1.12	1271	1.11	1272	1.11	1273	1.11	1274	1.11
1275	1.09	1276	1.09	1277	1.08	1278	1.08	1279	1.08
1280	1.09	1281	1.08	1282	1.07	1283	1.07	1284	1.06
1285	1.05	1286	1.04	1287	1.05	1288	1.04	1289	1.03
1290	1.03	1291	1.02	1292	1.03	1293	1.02	1294	1.02
1295	1.00	1296	1.01	1297	1.00	1298	1.01	1299	1.00
1300	1.01	1310	.96	1320	.95	1330	.93	1340	.89
1350	.87	1360	.86	1370	.81	1380	.82	1390	.79
1400	.77	1420	.77	1440	.73	1460	.60	1500	.60

TOTAL VOLUME THIS HYDROGRAPH = 3.80(Ac.Ft)

↑
Program Package Serial Number: 2229
05/13/22 FILE: 2130DH INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 3

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN H & A 50YR BURNED DEV MODEL
HYDROGRAPH AT 2130 7A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	2.86	200	3.00	300	3.16	400	3.33
500	3.51	600	3.81	700	4.13	800	4.60	900	5.25
1000	6.68	1050	9.02	1100	12.59	1110	15.55	1120	18.93
1130	22.30	1131	22.67	1132	23.06	1133	23.54	1134	24.08
1135	24.65	1136	25.32	1137	26.18	1138	27.10	1139	28.10
1140	29.09	1141	30.19	1142	31.44	1143	32.67	1144	33.97
1145	35.61	1146	37.38	1147	39.38	1148	41.72	1149	45.75
1150	51.41	1151	59.11	1152	69.46	1153	81.12	1154	91.10
1155	98.42	1156	101.69	1157	99.92	1158	93.33	1159	82.61

1160	70.04	1161	58.19	1162	47.74	1163	39.23	1164	32.98
1165	28.42	1166	25.14	1167	22.74	1168	20.86	1169	19.48
1170	18.35	1171	17.37	1172	16.55	1173	15.82	1174	15.18
1175	14.60	1176	13.97	1177	13.43	1178	12.96	1179	12.52
1180	12.16	1181	11.82	1182	11.50	1183	11.24	1184	10.99
1185	10.68	1186	10.39	1187	10.15	1188	9.91	1189	9.67
1190	9.51	1191	9.35	1192	9.15	1193	8.97	1194	8.78
1195	8.60	1196	8.46	1197	8.31	1198	8.16	1199	8.01
1200	7.82	1201	7.69	1202	7.56	1203	7.44	1204	7.34
1205	7.25	1206	7.15	1207	7.06	1208	7.01	1209	6.90
1210	6.80	1211	6.68	1212	6.57	1213	6.44	1214	6.34
1215	6.29	1216	6.18	1217	6.08	1218	6.05	1219	5.97
1220	5.90	1221	5.88	1222	5.81	1223	5.73	1224	5.72
1225	5.70	1226	5.64	1227	5.57	1228	5.49	1229	5.43
1230	5.47	1231	5.46	1232	5.40	1233	5.34	1234	5.28
1235	5.26	1236	5.25	1237	5.24	1238	5.23	1239	5.16
1240	5.10	1241	5.09	1242	5.08	1243	5.07	1244	5.07
1245	5.00	1246	4.94	1247	4.94	1248	4.93	1249	4.92
1250	4.86	1251	4.80	1252	4.79	1253	4.77	1254	4.77
1255	4.76	1256	4.75	1257	4.74	1258	4.68	1259	4.63
1260	4.63	1261	4.62	1262	4.62	1263	4.61	1264	4.55
1265	4.49	1266	4.47	1267	4.47	1268	4.46	1269	4.45
1270	4.44	1271	4.42	1272	4.37	1273	4.32	1274	4.31
1275	4.31	1276	4.30	1277	4.30	1278	4.29	1279	4.28
1280	4.28	1281	4.28	1282	4.26	1283	4.26	1284	4.21
1285	4.15	1286	4.15	1287	4.13	1288	4.13	1289	4.12
1290	4.11	1291	4.11	1292	4.10	1293	4.05	1294	4.00
1295	3.98	1296	3.98	1297	3.97	1298	3.97	1299	3.96
1300	3.97	1310	3.82	1320	3.68	1330	3.65	1340	3.52
1350	3.46	1360	3.36	1370	3.20	1380	3.19	1390	3.15
1400	3.04	1420	3.00	1440	2.88	1460	2.70	1500	2.70

TOTAL VOLUME THIS HYDROGRAPH = 11.61(Ac.Ft)

```
006  2130    1A  20 88 5.312A344 30.0000600                 0  G1
006  2130    2A  20 88 3.510A344465.0000700                 02  2
```

Attachment B

USMP/LID Report, Alliance Land Planning and Engineering

USMP/LID REPORT

City of Santa Clarita

RIVERVIEW

Tract No. 83605

Prepared For:
Integral Communities
888 San C;emente Drive
Newport Beach, CA 92660

Prepared By:
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2248 Faraday Ave.
Carlsbad, CA 92008

OCTOBER 6, 2022

JN 2244 & 2218

City of
Santa Clarita
Engineering Services
Phone: (661) 286-4060
www.santa-clarita.com

SUSMP/LID INFORMATION

Date Received:

PROJECT INFORMATION	FOR STAFF USE ONLY
Project Name: RIVERVIEW	Engineering Project No.: ENG
Project Description: MULTI FAMILY AND COMMERCIAL	Engineering Record No(s): USP
Tract No. (if any): 83605	
Project Size (acres): ~33.0	

PROJECT LOCATION:	
APN(s):	Address (if assigned):
Latitude: 34°24'59.24"N	Longitude: 118°31'43.80"W

DEVELOPMENT INFORMATION

☐ New Development | or | ☐ Re-development

Type of Development:

- ☐ Project is > 1 ac and adds impervious area > 10,000 sf
- ☐ Single Family Hillside Home
- ☐ Industrial Park with > 10,000 sf
- ☐ Commercial Mall with > 10,000 sf
- ☐ Auto Service facility with > 5,000 sf
- ☐ Retail Gasoline outlets with > 5,000 sf
- ☐ Restaurants with > 5,000 sf
- ☐ Parking Lots with > 5,000 sf
- ☐ Street or Road construction with > 10,000 sf
- ☐ Near or discharging directly to a Significant Ecological Area (SEA)

Required Volume to be retained (SWQDv) : ~84527 cf	
Estimated Vol retained on site VIA INFILTRATION (SWQDv): 0	% of required : 0 %
Estimated UNTREATED Volume on site (SWQDv): ~84527 cf	% of required : 100 %

Note : 1.5 factor x UNTREATED Volume is required for Alternative Compliance Volume

Estimated Alternative Compliance Volume (SWQDv): ~84527 cf

Alternative Compliance Method used: (please check all that applies)

- ☐ Onsite biofiltration 147,695 cf to be treated via biofiltration
- ☐ Offsite biofiltration / Location : ____
- ☐ Water re-use
- ☐ Others: Treated via flowrate treatment unit, required Q_total=0.357cfs, provided Q_total=0.412cfs

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Appendices

Project Overview

The Riverview project is located on the southwest corner of Soledad Canyon Road and Commuter Way. The project consists of a commercial site section with parking structure in addition to multi-family residential, park and rec area, access roads, parking, landscaping, and hardscape. The project site is considered a Designated Project as greater than one acre of land is to be disturbed and adds more then 10k sq-ft of impervious surface area. The project will capture stormwater runoff in a water quality biofiltration basin or biofiltration units for treatment.

Drainage Patterns and Low Flow Routing

The drainage flows from the southwest to the northeast. Stormwater is collected in private storm drain system. Before being conveyed to the existing storm drain system the storm water is routed to a low flow splitter. The splitter will send the first flush flows to the biofiltration basin to be treated. The splitter will convey high flows to the existing downstream storm drain system. For the portion of the site that cannot be treated in the basin the low flow will be treated in one of two proprietary biofiltration units.

Modeling and Methodology

LID flowrates and volumes for the 85th percentile rainfall event have been analyzed using methods prescribed in the LA County Low Impact Development Manual. The following hydrologic parameters and software have been used during this analysis:

- 85th % rainfall depth = 0.91 in
- 95th % rainfall depth = 1.79 in
- Soil Classification Area = 020
- Time of concentration = HydroCalc software
- Flow rates and volumes = HydroCalc software

Results

The water quality biofiltration basin will be used to treat low impact development flows of the 85th percentile, 24-hr event. The tables below show a summary the design parameters and required/provided treatment volume and flowrate. See appendix B for drawdown calculations and appendix D for the soils report.

RIVERVIEW - WATER QUALITY PARAMETERS - VOLUME TREATMENT											
SUBAREA	AREA	OVERLAND (Tc)				85% RAIN	IMP	SOIL	V_BMP	V_BMP * 1.5	V_PROV
		HI	LO	LENGTH	SLOPE						
	ac	ft	ft	ft	ft/ft	in	%		cf	cf	min
1A	31.5	1210	1196.5	2235	0.006	0.91	85	20	80498	**120747**	147695

RIVERVIEW - WATER QUALITY PARAMETERS - FLOWRATE TREATMENT										
SUBAREA	AREA	OVERLAND (Tc)				85% RAIN	IMP	SOIL	Q_BMP	Q_PROV
		HI	LO	LENGTH	SLOPE					
	ac	ft	ft	ft	ft/ft	in	%		cfs	cfs
1B	1.5	1197	1191	345	0.017	0.91	90	20	0.357	**0.412**

LID Specific Requirements

The following list discusses additional aspects of the project's LID specific requirements:

Hydromodification
This project is considered exempt from hydromodification requirements within Los Angeles County since all points discharge into existing MS4 drain concrete drainpipes. Runoff impacts are considered to have negligible impact on existing site conditions because of this development.

Natural Areas
There existing natural areas within the project site make up approximately 20% of the area which is currently a large parking lot and racetrack being used for swap meets. The developed condition site will include landscaped or open space areas.

Stormwater Pollutants of Concern
The primary pollutants of concern anticipated for this project are associated with rooftops, private driveways, asphalt paved streets, and landscaped areas. These pollutants have been listed below for regions both on-site and downstream of the proposed development.

Pollutants of concern
Pathogens, nutrients, pesticides, organic compounds, oxygen demanding substances, trash and debris, oils and grease, sediments, and metals. No legacy pollutants are present. Pollutants shall be removed through the treatment control BMP described herein.

Pollutant Removal
The biofiltration basin and biofiltration treatment units will remove nutrients at medium effectiveness. However, they remove everything else listed above with high effectiveness. The effectiveness is per CASQA's BMP handbook on New Development and Redevelopment section on Biofiltration/Bioretention.

Slopes and Channels
Where feasible, surface runoff generated from slopes in open space landscaped areas will drain to the primary storm drain system. Channels are proposed for the developed site to route surface runoff to storm drain inlets. See Landscape Irrigation Practices section below for info on how natural slope will be conserved.

Landscape/Irrigation Practices

Landscaped areas are designed to minimize/eliminate runoff and the need for fertilizer/pesticides. Harvest and re-use are not feasible for this project due to use of drought resistant vegetation that is proposed by project landscape architect. They are also designed to include comprehensive irrigation systems that only water areas as needed to ensure healthy vegetation growth and to conserve natural areas.

Storm Drain System Stenciling
Storm drain catch basins and low flow grated inlet catch basins are proposed for this project. “NO DUMPING. DRAINS TO RIVER” stencils will be painted at each inlet location per directives shown on the LID Map. Since this project will contain curbs, stencils shall be painted upon the concrete face of the curb above the gutter flowline where practical.

Outdoor Material Storage Areas
No outdoor material storage areas are proposed for this project.

Properly Design Trash Storage Areas
Trash storage areas are proposed for the project and will have three (3) side walls and covered roofs per the City of Santa Clarita guidelines. This is done to prevent contact with stormwater.

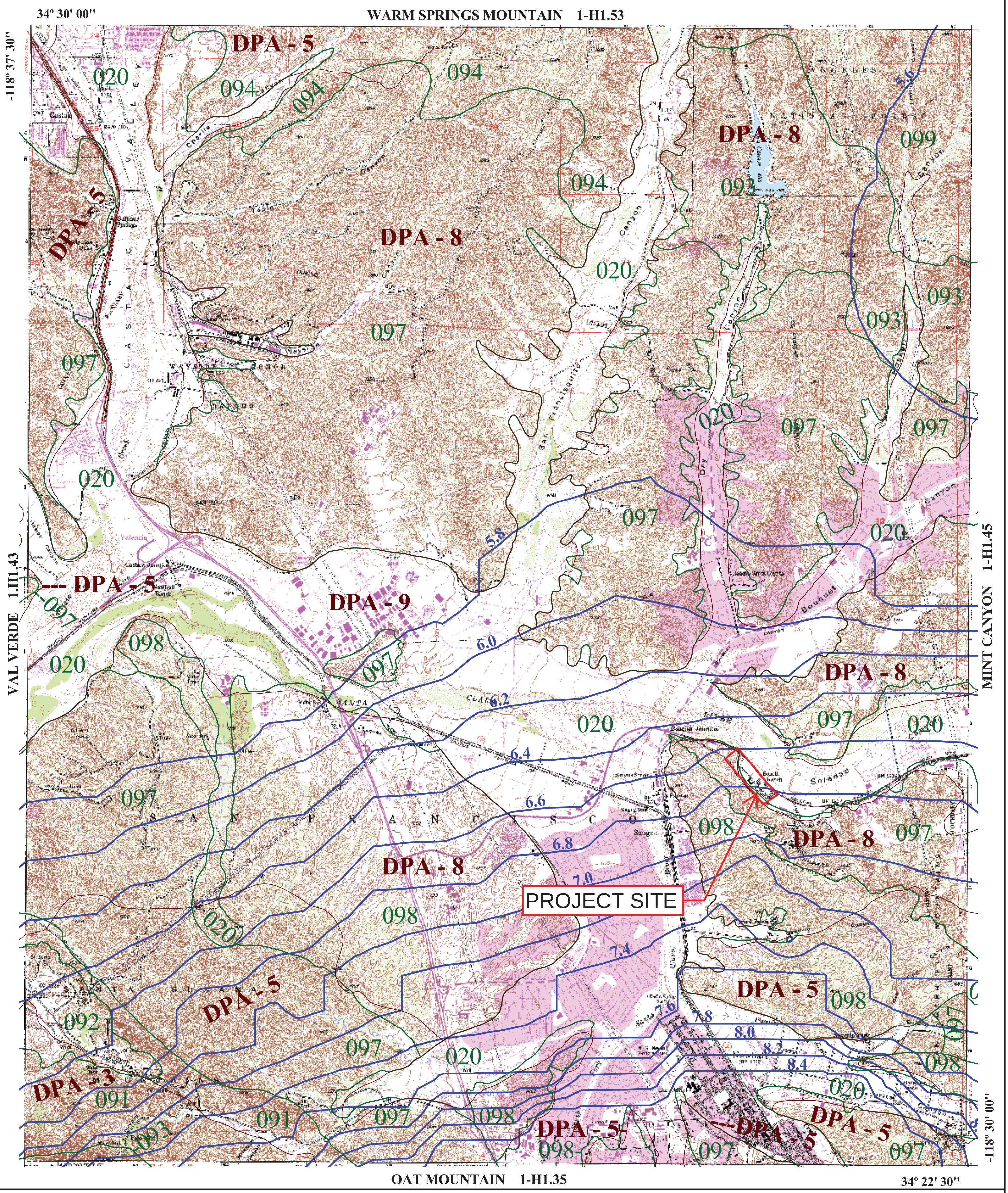
BMP Maintenance (O&M)
Per BMP covenant in Appendix C of this report, it is the responsibility of the owner and/or future HOA to maintain the treatment units and basin. The operations and maintenance (O&M) manuals are also included with this report in Appendix C.

Conclusion

Low impact development modeling and the tables above show that the capacity of the proposed basin and treatment units are adequate for the treatment of all site runoff. All areas of development will be treated per methods outlined by the City of Santa Clarita. This report therefore concludes that the Riverview Project is considered acceptable for development in terms of water quality design.

APPENDIX A

HydroCalc Model Output



016	SOIL CLASSIFICATION AREA
7.2	INCHES OF RAINFALL
DPA - 6	DEBRIS POTENTIAL AREA

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

N E W H A L L

50-YEAR 24-HOUR ISOHYET

1-H1.44

Peak Flow Hydrologic Analysis

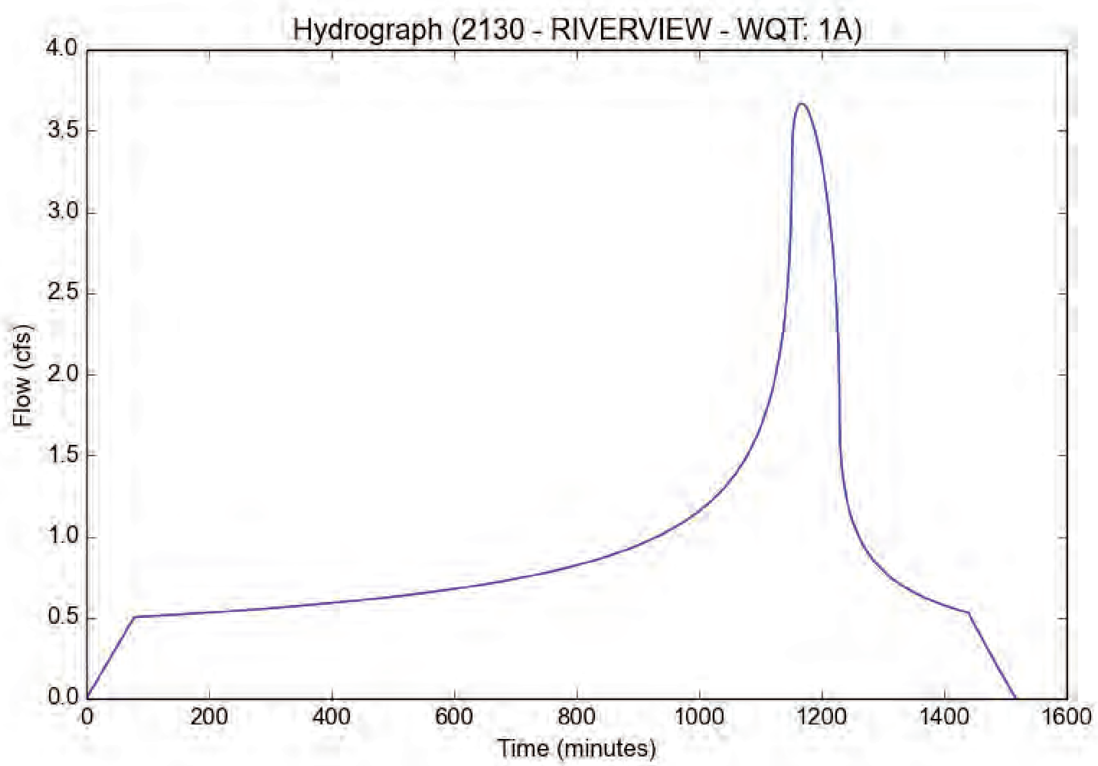
File location: I:/Project Files/2130 - RIVERVIEW/USMP/HYDROCALC/2130 - RIVERVIEW - WQT Report_100622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - WQT
Subarea ID	1A
Area (ac)	31.5
Flow Path Length (ft)	2235.0
Flow Path Slope (vft/hft)	0.006
85th Percentile Rainfall Depth (in)	0.91
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.91
Peak Intensity (in/hr)	0.1493
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.78
Time of Concentration (min)	78.0
Clear Peak Flow Rate (cfs)	3.6676
Burned Peak Flow Rate (cfs)	3.6676
24-Hr Clear Runoff Volume (ac-ft)	1.848
24-Hr Clear Runoff Volume (cu-ft)	80497.769



Peak Flow Hydrologic Analysis

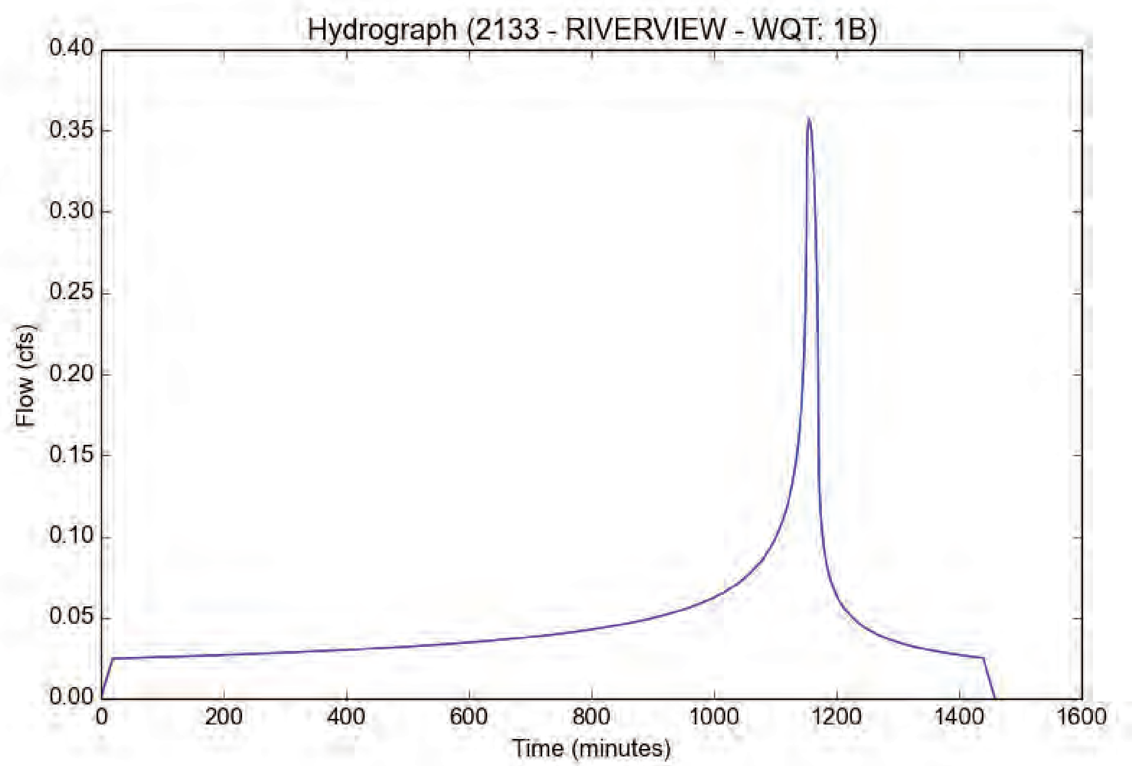
File location: I:/Project Files/2130 - RIVERVIEW/USMP/HYDROCALC/2130 - RIVERVIEW - WQT Report_100622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2133 - RIVERVIEW - WQT
Subarea ID	1B
Area (ac)	1.5
Flow Path Length (ft)	345.0
Flow Path Slope (vft/hft)	0.017
85th Percentile Rainfall Depth (in)	0.91
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.91
Peak Intensity (in/hr)	0.2899
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	0.3566
Burned Peak Flow Rate (cfs)	0.3566
24-Hr Clear Runoff Volume (ac-ft)	0.0925
24-Hr Clear Runoff Volume (cu-ft)	4029.4984



APPENDIX B

LID Design
&
Drawdown Calculations

Peak Flow Hydrologic Analysis

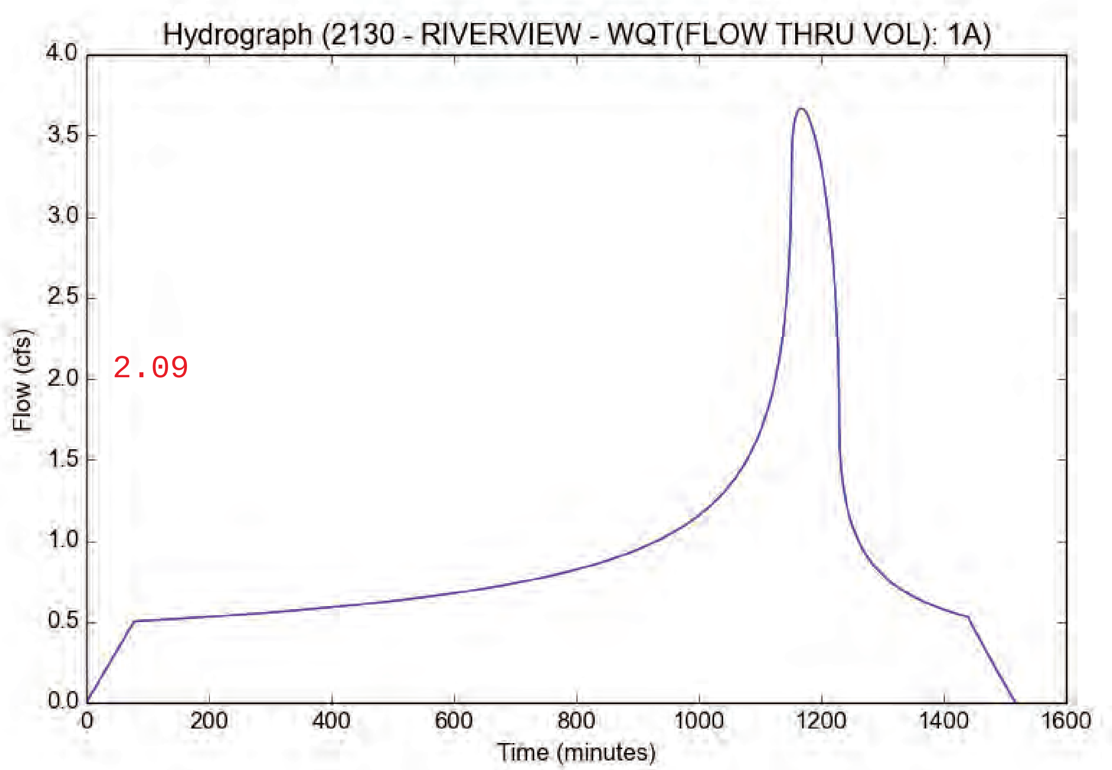
File location: I:/Project Files/2130 - RIVERVIEW/USMP/HYDROCALC/FLOWTHRU/2130 - RIVERVIEW - WQT(FLOW THRU VOL) - 1A.pdf
Version: HydroCalc 1.0.3

Input Parameters

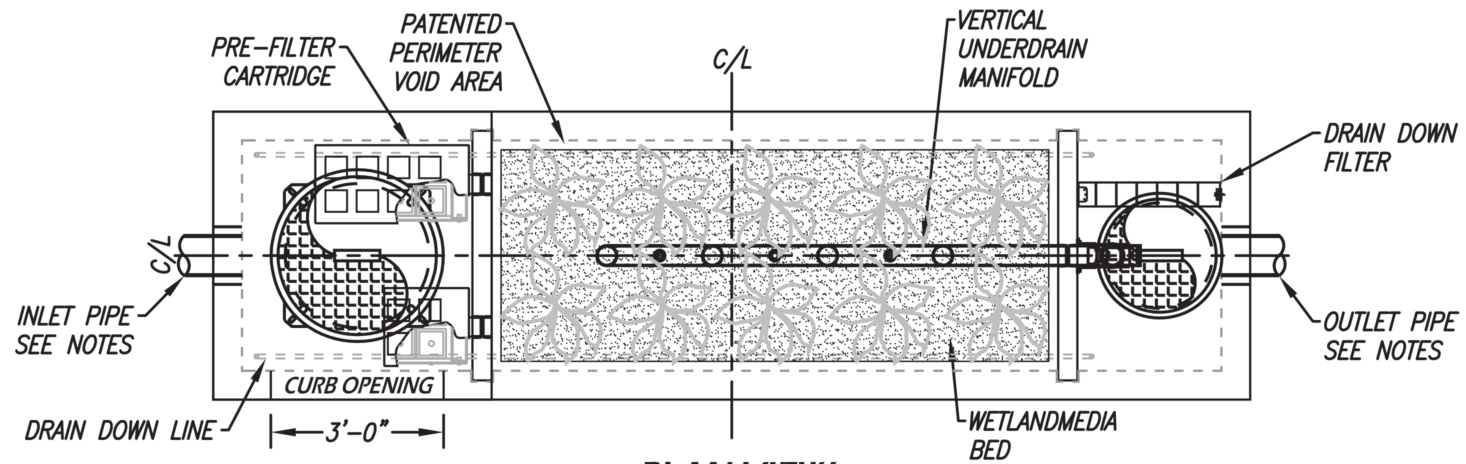
Project Name	2130 - RIVERVIEW - WQT(FLOW THRU VOL)
Subarea ID	1A
Area (ac)	31.5
Flow Path Length (ft)	2235.0
Flow Path Slope (vft/hft)	0.006
85th Percentile Rainfall Depth (in)	0.91
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

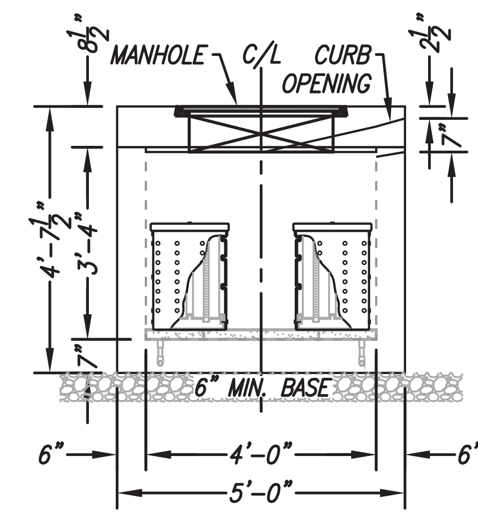
Modeled (85th percentile storm) Rainfall Depth (in)	0.91
Peak Intensity (in/hr)	0.1493
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.78
Time of Concentration (min)	78.0
Clear Peak Flow Rate (cfs)	3.6676
Burned Peak Flow Rate (cfs)	3.6676
24-Hr Clear Runoff Volume (ac-ft)	1.848
24-Hr Clear Runoff Volume (cu-ft)	80497.769



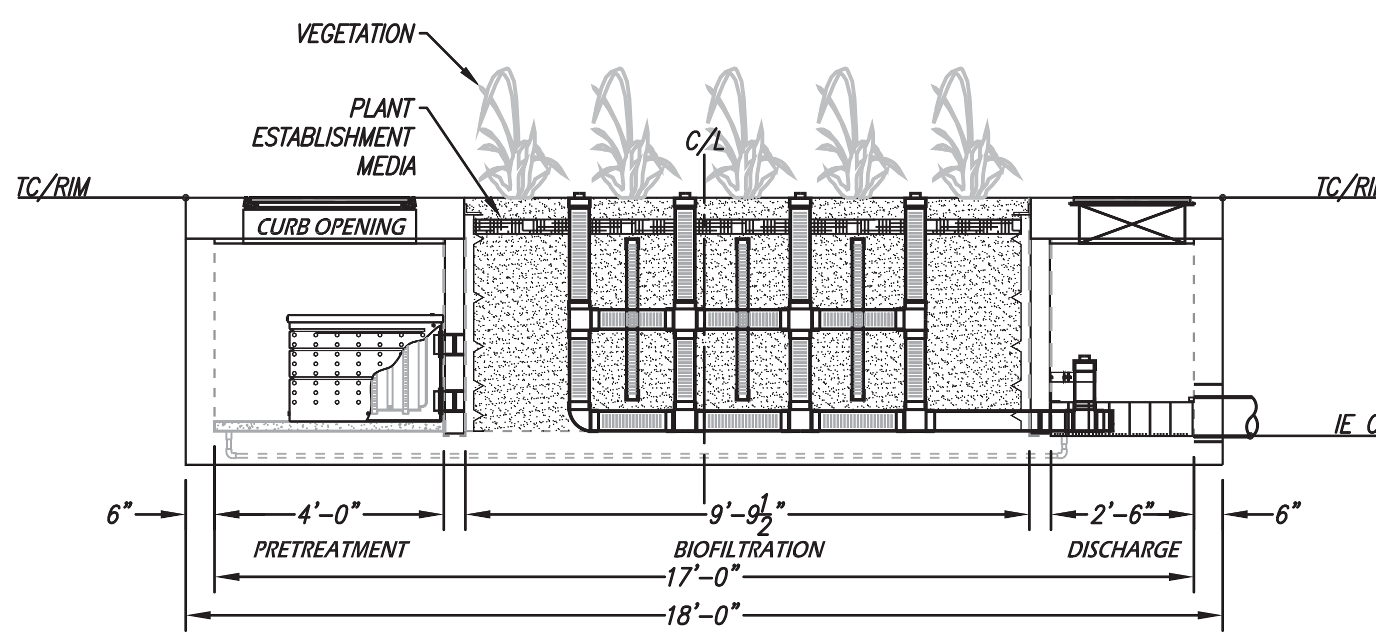
SITE SPECIFIC DATA			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	ø30"	N/A	ø24"
WETLANDMEDIA VOLUME (CY)			5.41
WETLANDMEDIA DELIVERY METHOD			TBD
ORIFICE SIZE (DIA. INCHES)			ø2.05"
MAXIMUM PICK WEIGHT (LBS)			36000
NOTES:			



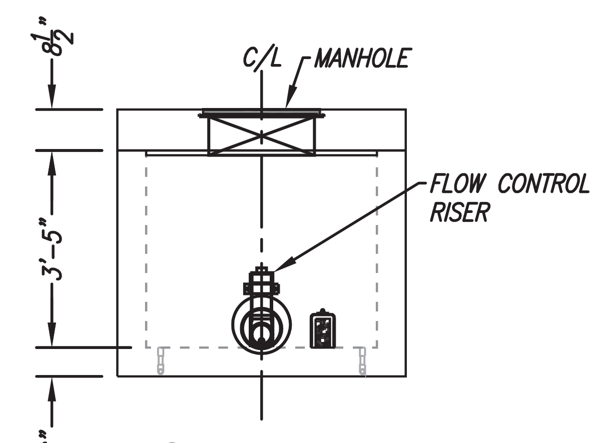
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON-SHRINK GROUT PER MANUFACTURERS STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.

TREATMENT FLOW (CFS)	0.206
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	TBD
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

www.ModularWetlands.com | (855) 5MOD-WET

MWS-L-4-17-C
STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

APPENDIX C

BMP Covenant
&
Operations and Maintenance Plan

RECORDING REQUESTED BY:
(insert owner(s) name(s))
(insert number and street)
(insert city, state, and zip)

WHEN RECORDED MAIL TO:
Mary Cusick, City Clerk
City of Santa Clarita
23920 Valencia Boulevard, Suite 120
Santa Clarita, CA 91355

Space above this line for Recorder's use

TITLE(S)

MAINTENANCE COVENANT FOR PARCELS SUBJECT TO STANDARD URBAN STORMWATER MITIGATION PROGRAM (SUSMP) REQUIREMENTS

RECORDING REQUESTED BY:
(insert owner(s) name(s))
(insert number and street)
(insert city, state, and zip)

WHEN RECORDED MAIL TO:
Mary Cusick, City Clerk
City of Santa Clarita
23920 Valencia Boulevard, Suite 120
Santa Clarita, CA 91355

Recording Fee: ____________________________ Space above this line for Recorder's use

Documentary Transfer Tax:

The property is located in the City of Santa Clarita.

MAINTENANCE COVENANT FOR PARCELS SUBJECT TO STANDARD URBAN STORMWATER MITIGATION PROGRAM (SUSMP) REQUIREMENTS

Pursuant to Section 17.95.110 of the Santa Clarita Municipal Code and Title 10, Chapter 10.04 of the Santa Clarita Municipal Code relating to the control of pollutants carried by storm water runoff, structural and/or treatment control Best Management Practices (BMPs) have been installed on the following property:

LEGAL DESCRIPTION

Assessor Parcel No(s): ______

Tract/Parcel Map No.: 53074 Lot No.: 01

Address: (insert number and street)
(insert city, state, and zip)

I/We (insert owner(s) name(s)), hereby certify that I/we am/are the legal owner(s) of property described above, and as such owners for the mutual benefit of future purchasers and transferees, their heirs, successors, and assigns (collectively "owner"), do hereby affix the following protective conditions to which their property, or portions thereof, shall be held, sold and/or conveyed:

1. That the owner(s) shall maintain the drainage devices such as paved swales, bench drains, inlets, catch basins, down-drains, pipes, and water quality devices on the property described above and as shown on plans submitted to the City of Santa Clarita, in a good and functional condition to safeguard the property and adjoining properties from damage and pollution.
2. That owner(s) shall conduct maintenance inspection of all Structural or Treatment Control BMPs on the property at least once a year and retain proof of the inspection. The annual maintenance inspections shall verify the legibility of all required stencils and signs and the owner shall repaint and label as necessary.
3. That owner(s) shall provide to new owner(s) with any conveyance of the property printed educational materials giving information on which storm water management facilities are present, the type(s) and location(s) of required maintenance signs, and required maintenance instructions.

(type name of company/corporation/partnership/agency - leave blank for all others)

____ Date:__________________________
(owner signs and dates above, type name and title here)

____ Date:__________________________
(owner signs and dates above, type name and title here)

____ Date:__________________________
(owner signs and dates above, type name and title here)

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California }
County of ____

On ___________________________ before me, ____, Notary Public,
Date / Name of Notary

personally appeared ____
Name(s) of Signer(s)

____,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature ____
Signature of Notary Public

Place Notary Seal Above

-- ***OPTIONAL*** ---

Though the information below is not required by law, it may prove valuable to person relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or type of Document: ____

Document Date: ____ Number of Pages: __________________________

Signer(s) Other Than Named Above: ____

Capacity(ies) Claimed by Signer(s)

Signer's Name: __________________________________

☐ Individual
☐ Corporate Officer --Title(s): ____________________
☐ Partner -- ☐ Limited ☐ General
☐ Attorney-in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: _____________________
____

Signer Is Representing: __________
____
____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: __________________________________

☐ Individual
☐ Corporate Officer -- Title(s): ____________________
☐ Partner – ☐ Limited ☐ General
☐ Attorney-in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: _____________________
____

Signer Is Representing: __________
____
____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Bio Clean
A Forterra Company

Modular Wetlands® Linear

A Stormwater Biofiltration Solution

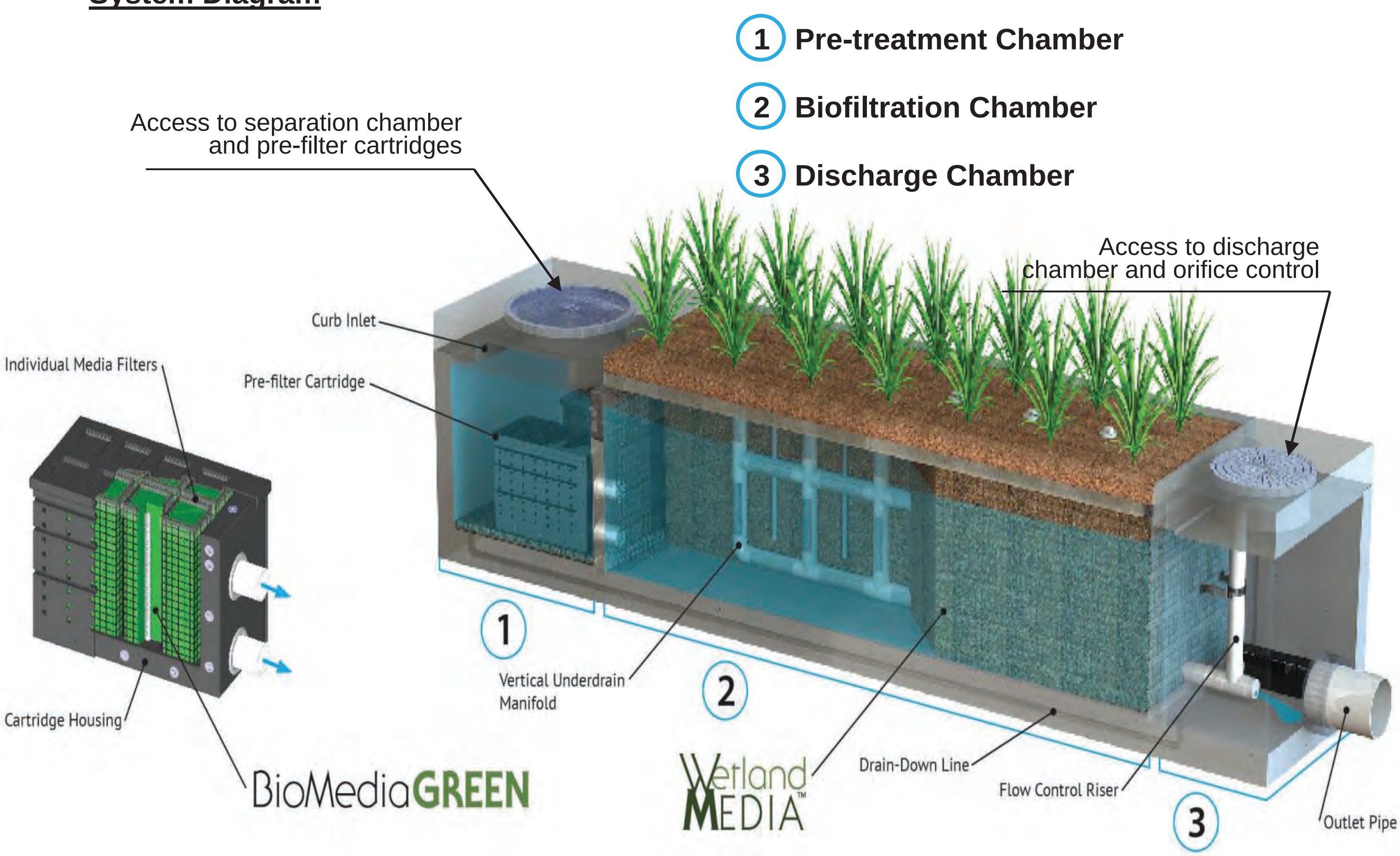
OPERATION & MAINTENANCE MANUAL

Inspection Guidelines for
Modular Wetland System - Linear

Inspection Summary

- Inspect Pre-Treatment, Biofiltration and Discharge Chambers – average inspection interval is 6 to 12 months.
  - (*15 minute average inspection time*).
- NOTE: Pollutant loading varies greatly from site to site and no two sites are the same. Therefore, the first year requires inspection monthly during the wet season and every other month during the dry season in order to observe and record the amount of pollutant loading the system is receiving.

System Diagram



Inspection Overview

As with all stormwater BMPs inspection and maintenance on the MWS Linear is necessary. Stormwater regulations require that all BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess the site specific loading conditions. This is recommended because pollutant loading and pollutant characteristics can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding on roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided. Without appropriate maintenance a BMP will exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the MWS Linear:

- Modular Wetland Inspection Form
- Flashlight
- Manhole hook or appropriate tools to remove access hatches and covers
- Appropriate traffic control signage and procedures
- Measuring pole and/or tape measure.
- Protective clothing and eye protection.
- 7/16” open or closed ended wrench.
- Large permanent black marker (initial inspections only – first year)
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections of the system.

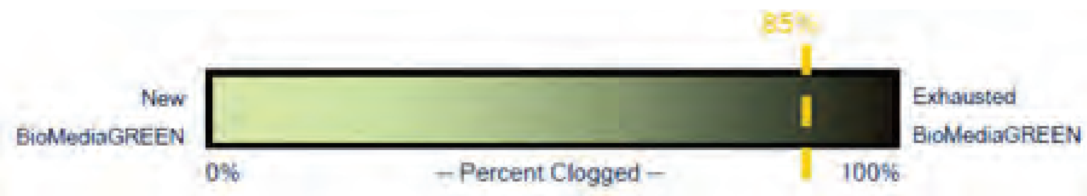
Inspection Steps

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the MWS Linear are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long term inspection and maintenance interval requirements.

The MWS Linear can be inspected though visual observation without entry into the system. All necessary pre-inspection steps must be carried out before inspection occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once these access covers have been safely opened the inspection process can proceed:

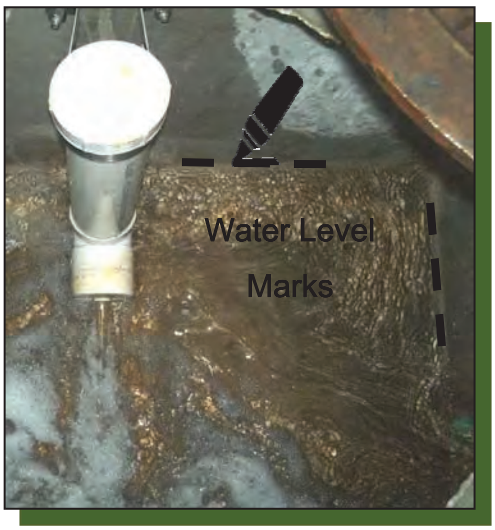
- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other info (see inspection form).
- Observe the inside of the system through the access hatches. If minimal light is available and vision into the unit is impaired utilize a flashlight to see inside the system and all of its chambers.
- Look for any out of the ordinary obstructions in the inflow pipe, pre-treatment chamber, biofiltration chamber, discharge chamber or outflow pipe. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, debris and sediment accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick estimate the amount of trash, debris and sediment in this chamber. Record this depth on the inspection form.

- Through visual observation inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediments on the cartridges, any build-up on the top of the cartridges, or clogging of the holes. Record this information on the inspection form. The pre-filter cartridges can further be inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber – see notes above regarding confined space entry). Record the color of the material. New material is a light green in color. As the media becomes clogged it will turn darker in color, eventually becoming dark brown or black. Using the below color indicator record the percentage of media exhausted.



The biofiltration chamber is generally maintenance free due to the system's advanced pre-treatment chamber. For units which have open planters with vegetation it is recommended that the vegetation be inspected. Look for any plants that are dead or showing signs of disease or other negative stressors. Record the general health of the plants on the inspection and indicate through visual observation or digital photographs if trimming of the vegetation is needed.
The discharge chamber houses the orifice control structure, drain down filter and is connected to the outflow pipe. It is important to check to ensure the orifice is in proper operating conditions and free of any obstructions. It is also important to assess the condition of the drain down filter media which utilizes a block form of the BioMediaGREEN. Assess in the same manner as the cubes in the Pre-Filter Cartridge as mentioned above. Generally, the discharge chamber will be clean and free of debris. Inspect the water marks on the side walls. If possible, inspect the discharge chamber during a rain event to assess the amount of flow leaving the system while it is at 100% capacity (pre-treatment chamber water level at peak hydraulic grade lines or HGL). The water level of the flowing water should be compared to the watermark level on the side walls which is an indicator of the highest discharge rate the system achieved when initially installed. Record on the form is there is any difference in level from watermark in inches.

- NOTE: During the first few storms the water level in the outflow chamber should be observed and a 6 inch long horizontal watermark line drawn (using a large permanent marker) at the water level in the discharge chamber while the system is operating at 100% capacity. The diagram below illustrates where a line should be drawn. This line is a reference point for future inspections of the system:



Using a permanent marker draw a 6 inch long horizontal line, as shown, at the higher water level in the MWS Linear discharge chamber.

- Water level in the discharge chamber is a function of flow rate and pipe size. Observation of water level during the first few months of operation can be used as a benchmark level for future inspections. The initial mark and all future observations shall be made when system is at 100% capacity (water level at maximum level in pre-treatment chamber). If future water levels are below this mark when system is at 100% capacity this is an indicator that maintenance to the pre-filter cartridges may be needed.
- *Finalize inspection report for analysis by the maintenance manager to determine if* maintenance is required.

Maintenance Indicators

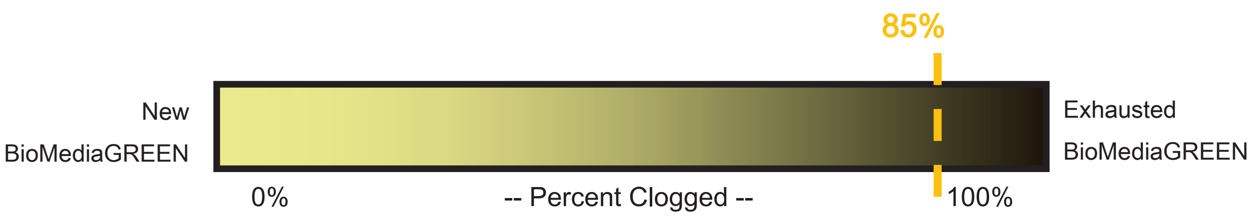
Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or cartridges.
- Obstructions in the system or its inlet or outlet.
- Excessive accumulation of floatables in the pre-treatment chamber in which the length and width of the chamber is fully impacted more than 18”.

Excessive accumulation of sediment in the pre-treatment chamber of more than 6 inches in depth.

- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pre-filter cartridges. The following chart shows photos of the condition of the BioMediaGREEN contained within the pre-filter cartridges. When media is more than 85% clogged replacement is required.





- Excessive accumulation of sediment on the BioMediaGREEN media housed within the drain down filter. The following photos show of the condition of the BioMediaGREEN contained within the drain down filter. When media is more than 85% clogged replacement is required.

- Overgrown vegetation.

- Water level in discharge chamber during 100% operating capacity (pre-treatment chamber water level at max height) is lower than the watermark by 20%.

Inspection Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

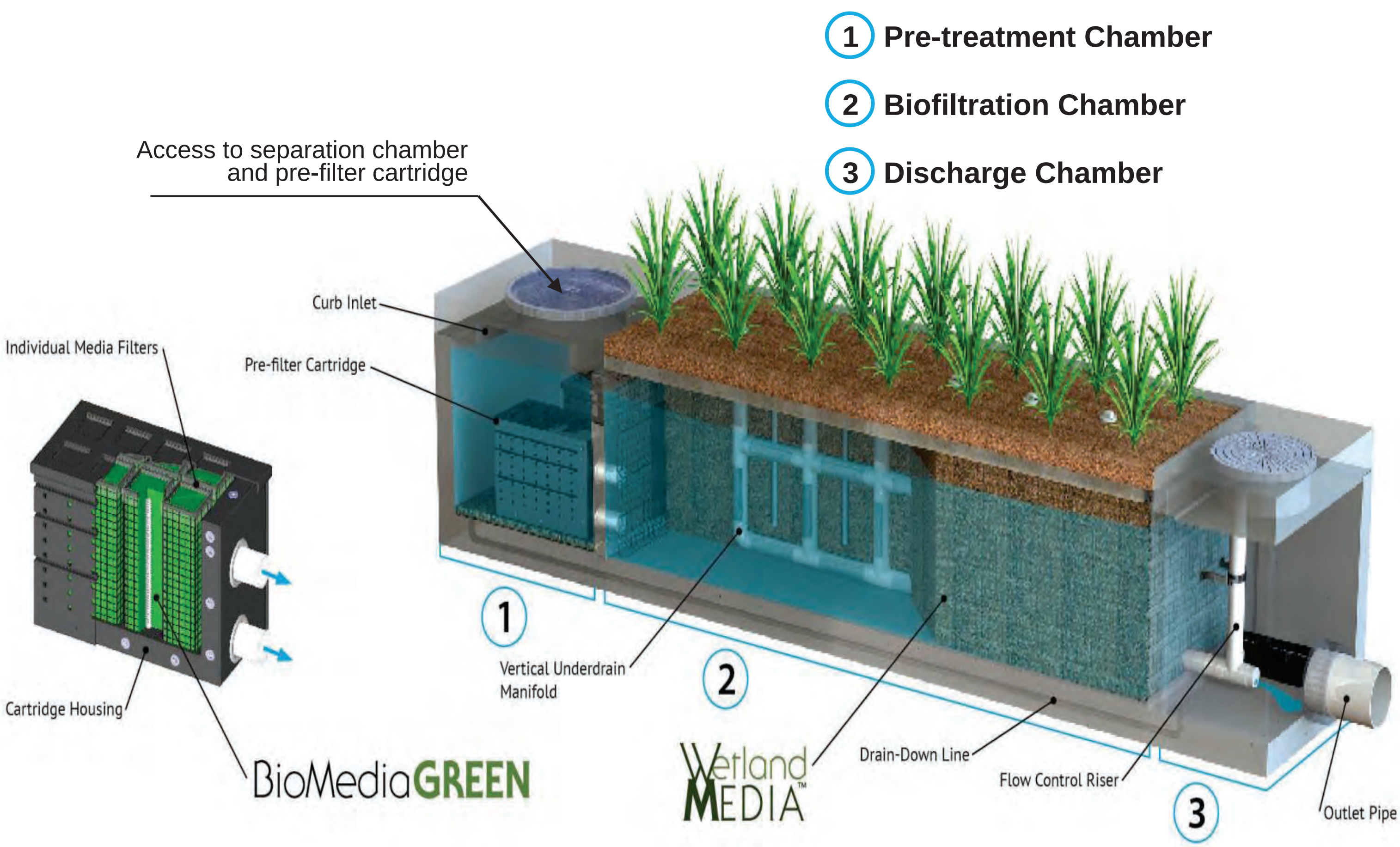
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.

Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- o <u>Remove Sediment from Pre-Treatment Chamber</u> – average maintenance interval is 12 to 24 months.
    - *(10 minute average service time)*.
- o <u>Replace Pre-Filter Cartridge Media</u> – average maintenance interval 12 to 24 months.
    - *(10-15 minute per cartridge average service time)*.
- o <u>Trim Vegetation</u> – average maintenance interval is 6 to 12 months.
    - *(Service time varies)*.

System Diagram



www.modularwetlands.com

Maintenance Overview

The time has come to maintain your Modular Wetland System Linear (MWS Linear). To ensure successful and efficient maintenance on the system we recommend the following. The MWS Linear can be maintained by removing the access hatches over the systems various chambers. All necessary pre-maintenance steps must be carried out before maintenance occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once traffic control has been set up per local and state regulations and access covers have been safely opened the maintenance process can begin. It should be noted that some maintenance activities require confined space entry. All confined space requirements must be strictly followed before entry into the system. In addition the following is recommended:

- Prepare the maintenance form by writing in the necessary information including project name, location, date & time, unit number and other info (see maintenance form).
- Set up all appropriate safety and cleaning equipment.
- Ensure traffic control is set up and properly positioned.
- Prepare a pre-checks (OSHA, safety, confined space entry) are performed.

Maintenance Equipment

Following is a list of equipment required for maintenance of the MWS Linear:

- Modular Wetland Maintenance Form
- Manhole hook or appropriate tools to access hatches and covers
- Protective clothing, flashlight and eye protection.
- 7/16” open or closed ended wrench.
- Vacuum assisted truck with pressure washer.
- Replacement BioMediaGREEN for Pre-Filter Cartridges if required (order from manufacturer).

Maintenance Steps

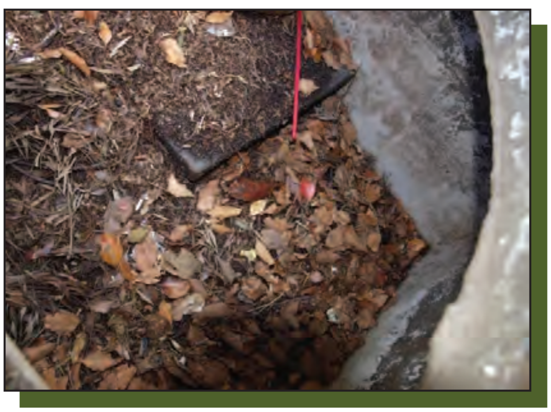
1. Pre-treatment Chamber (bottom of chamber)

A. Remove access hatch or manhole cover over pre-treatment chamber and position vacuum truck accordingly.

B. With a pressure washer spray down pollutants accumulated on walls and pre-filter cartridges.

C. Vacuum out Pre-Treatment Chamber and remove all accumulated pollutants including trash, debris and sediments. Be sure to vacuum the floor until pervious pavers are visible and clean.

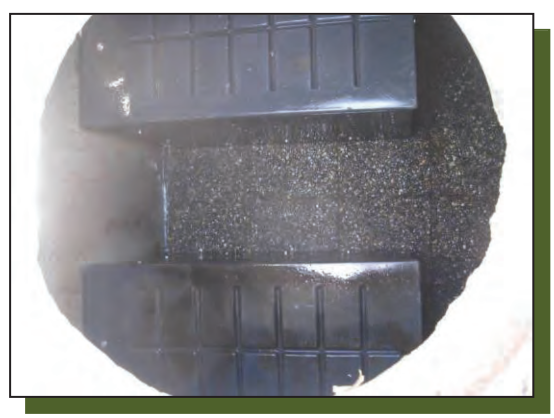
D. If Pre-Filter Cartridges require media replacement move onto step 2. If not, replace access hatch or manhole cover.



Removal of access hatch to gain access below.

Insertion of vacuum hose into separation chamber.

Removal of trash, sediment and debris.



Fully cleaned separation chamber.

2. <u>Pre-Filter Cartridges (attached to wall of pre-treatment chamber)</u>

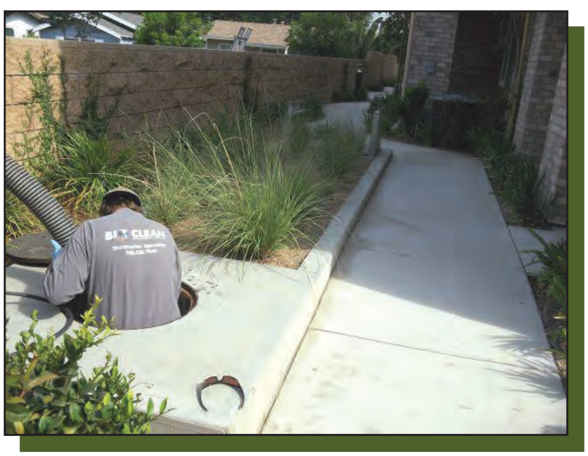
   A. After finishing step 1 enter pre-treatment chamber.

   B. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.

Pre-filter cartridges with tops on.

Inside cartridges showing media filters ready for replacement.

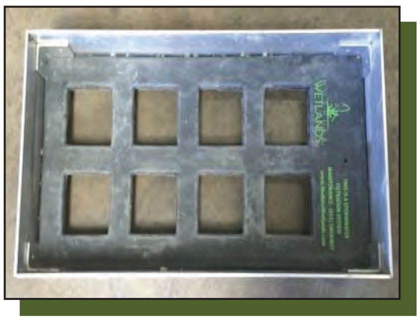
   C. Place the vacuum hose over each individual media filter to suck out filter media.



Vacuuming out of media filters.

   D. Once filter media has been sucked use a pressure washer to spray down inside of the cartridge and it’s containing media cages. Remove cleaned media cages and place to the side. Once removed the vacuum hose can be inserted into the cartridge to vacuum out any remaining material near the bottom of the cartridge.

E. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. Utilize the manufacture provided refilling trey and place on top of cartridge. Fill trey with new bulk media and shake down into place. Using your hands slightly compact media into each filter cage. Once cages are full removed refilling trey and replace cartridge top ensuring bolts are properly tightened.



Refilling trey for media replacement.

Refilling trey on cartridge with bulk media.

F. Exit pre-treatment chamber. Replace access hatch or manhole cover.

3. <u>Biofiltration Chamber (middle vegetated chamber)</u>

A. In general, the biofiltration chamber is maintenance free with the exception of maintaining the vegetation. Using standard gardening tools properly trim back the vegetation to healthy levels. The MWS Linear utilizes vegetation similar to surrounding landscape areas therefore trim vegetation to match surrounding vegetation. If any plants have died replace plants with new ones:

B. Over time, sediment will accumulate in the perimeter void area and will need to be vacuumed out. The media surface may also require power washing if it becomes occluded with sediment. In addition, the wetland media will eventually need to be replaced after 10 plus years of service. A vacuum truck is recommended to fully remove all wetland media. Once old media is removed the entire chamber, media cage, and netting should be power washed. The netting may require replacement before installing new media. New wetland media should be purchased directly from the manufacture. It can be delivered either in bulk or in super sacks for easy installation.

4. <u>Discharge Chamber (contains drain down cartridge & connected to pipe)</u>

A. Remove access hatch or manhole cover over discharge chamber.
B. Enter chamber to gain access to the drain down filter. Unlock the locking mechanism and left up drain down filter housing to remove used BioMediaGREEN filter block as shown below:

C. Insert new BioMediaGREEN filter block and lock drain down filter housing back in place. Replace access hatch or manhole cover over discharge chamber.

Inspection Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.

Inspection Form

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Inspection Report
Modular Wetlands System

Project Name		For Office Use Only
Project Address	(city) (Zip Code)	(Reviewed By)
Owner / Management Company		(Date)
		Office personnel to complete section to the left.

Contact ______________________ Phone (   )   –

Inspector Name ______________________ Date ____/____/______ Time __________ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition ______________________ Additional Notes ______________________

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): __________ Size (22', 14' or etc.): __________

Structural Integrity:	Yes	No	Comments	
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?				
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?				
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?				
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?				
Working Condition:				
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?				
Is there standing water in inappropriate areas after a dry period?				
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?				
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.				Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:	
Any signs of improper functioning in the discharge chamber? Note issues in comments section.				
Other Inspection Items:				
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?				
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.				
Is there a septic or foul odor coming from inside the system?				

Waste:	Yes	No
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes:

MODULAR WETLANDS

Maintenance Report

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

Project Name ______________________________

Project Address ______________________________
(city) (Zip Code)

Owner / Management Company ______________________________

Contact ______________________________ Phone ( ) –

Inspector Name ______________________________ Date ____ / ____ / ______ Time __________ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition ______________________________ Additional Notes ______________________________

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

APPENDIX D

Soils Report

APPENDIX E

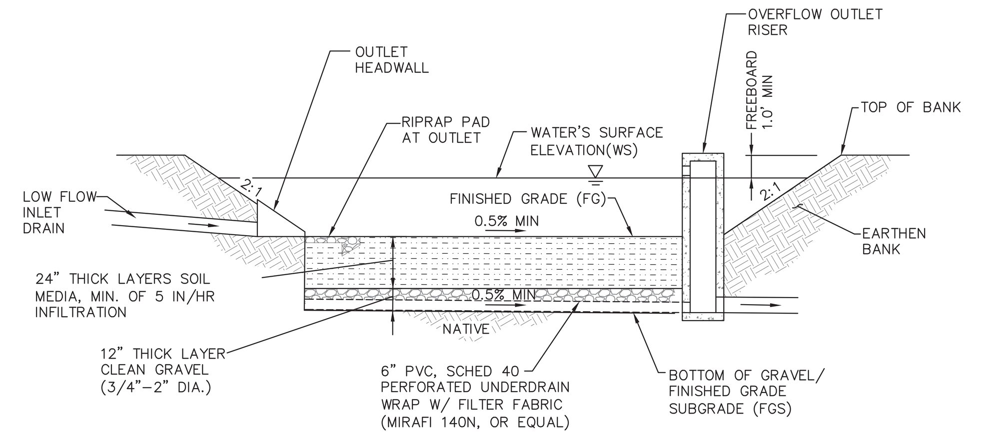
LID Exhibit

RIVERVIEW

DEVELOPED CONDITION USMP EXHIBIT

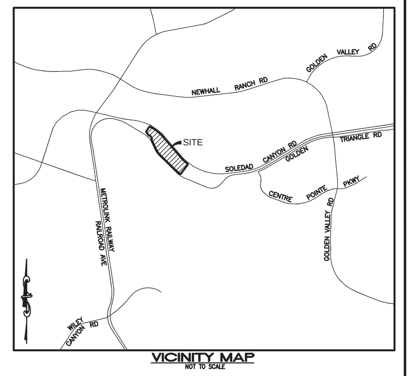
10/6/22

TRACT NO. 83605



EARTHEN BIOINFILTRATION BASIN

NOT TO SCALE



USMP NOTES

ALL STRUCTURAL BMP'S SHALL BE ACCESSIBLE FOR INSPECTION AND MAINTENANCE AND SHALL BEAR A "NO DUMPING – DRAINS TO RIVER" SYMBOL IN TRAFFIC RATED PAINT PER DETAIL HEREIN. STENCIL IS AVAILABLE AT ANY OF THE BUILDING AND SAFETY'S DISTRICT OFFICES.

NO DUMPING
THIS DRAINS TO RIVER

CATCH BASIN STENCIL DETAIL

ALL CATCH BASIN AND INLETS THAT DISCHARGE INTO AN EXISTING OR PROPOSED STORM DRAIN MUST BE STENCILED TO DISCOURAGE ILLEGAL DUMPING OF POLLUTANTS. STENCIL SHALL HAVE A MINIMUM DIAMETER OF 30 INCHES.

THIS SITE HAS APPROXIMATELY 20 CATCH BASINS/INLETS.

LEGEND:

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- EXISTING STORM DRAIN LINE
- SD — STORM DRAIN LINE (PVT)
- LF — LOW FLOW SD LINE (PVT)
- OVERLAND PATH
- XX — SUBAREA
- XX.X — SUBAREA ACREAGE
- WATER QUALITY TREATMENT BIOFILTRATION BASIN
- WATER QUALITY TREATMENT BIOFILTRATION UNIT (*MWS OR APPROVED EQUAL)

RIVERVIEW - WATER QUALITY PARAMETERS - VOLUME TREATMENT

SUBAREA	AREA	OVERLAND (Tc) HI	OVERLAND (Tc) LO	OVERLAND (Tc) LENGTH	OVERLAND (Tc) SLOPE	85% RAIN	IMP	SOIL	V_BMP	V_BMP * 1.5	V_PROV
	ac	ft	ft	ft	ft/ft	in	%		cf	cf	min
1A	31.5	1210	1196.5	2235	0.006	0.91	85	20	80498	120747	147695

RIVERVIEW - WATER QUALITY PARAMETERS - FLOWRATE TREATMENT

SUBAREA	AREA	OVERLAND (Tc) HI	OVERLAND (Tc) LO	OVERLAND (Tc) LENGTH	OVERLAND (Tc) SLOPE	85% RAIN	IMP	SOIL	Q_BMP	Q_PROV
	ac	ft	ft	ft	ft/ft	in	%		cfs	cfs
1B	1.5	1197	1191	345	0.017	0.91	90	20	0.357	0.412

IMPERVIOUS VS PERVIOUS

	%	AC
EXISTING CONDITION PERVIOUS	20%	6.6
DEVELOPED CONDITION PERVIOUS	15%	4.9
EXISTING CONDITION IMPERVIOUS	80%	26.4
DEVELOPED CONDITION IMPERVIOUS	85%	28.1

LID/WATER QUALITY

85th PERCENTILE STORM	0.91 IN
HYDROMOD DESIGN STORM	85th %
95th PERCENTILE STORM	1.79 IN

SCALE: 1"=50'

ALLIANCE
LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE.
CARLSBAD, CA 92008
TEL: (760) 431-9896
FAX: (760) 431-8802
27413 TOURNEY ROAD
SUITE 120
VALENCIA, CA 91355
TEL: (661) 799-2760
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

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DUDEK
MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 800.450.1818 F 760.632.0164

MEMORANDUM

To:	Peter Vanek, Integral Communities
From:	Eric Schniewind, Dudek
Subject:	Hydrology Technical Memorandum for Riverview Development Project
Date:	November 16, 2022
Attachments:	A — Hydrology Report, Alliance Land Planning and Engineering
	B — USMP/LID Report, Alliance Land Planning and Engineering

This section describes the existing hydrology and water quality setting and regulatory setting that would apply to the proposed Riverview Development Project (project or proposed project) in the City of Santa Clarita, California. The project site is located on the south bank of the Santa Clara River, between a Metrolink commuter railroad line to the south and Soledad Canyon Road to the north, and east of Commuter Way. The site encompasses approximately 35.4 acres. The following provides information and resources that can be used for the purposes of completing an environmental analysis of the proposed project pursuant to the requirements of the California Environmental Quality Act.

1 Setting

1.1 Regional Hydrology

1.1.1 Santa Clara River Watershed

The project site is located within the Santa Clara River watershed, which is the largest river system in southern California that remains in a relatively natural state and drains approximately 1,200 square miles (RWQCB 2022a). The Santa Clara River originates in the northern slope of the San Gabriel Mountains in Los Angeles County and traverses through Ventura County where it eventually empties into the Pacific Ocean between San Buenaventura and Oxnard. Land use on and around the project site is characterized by predominantly open space with the mainstem of the river flowing through residential, agricultural, and some industrial land uses. The river runs approximately 100 miles and is considered a high quality resource for much of its entire length (RWQCB 2022a). However, increasing loads of nitrogen and salts in supplies of groundwater threaten beneficial uses of the river including irrigation and drinking water. Other threats to water quality include increasing development in floodplain areas which has resulted in the construction of flood control measures such as channelized drainage structures that increases stormwater runoff volumes and velocities causing erosion and loss of habitat (RWQCB 2022a).

According to the Regional Water Quality Control Board (RWQCB) as part of federal Clean Water Act requirements, the RWQCB has identified the following beneficial uses in the watershed for the areas above the estuary:

- Contact and non-contact water recreation
- Wildlife habitat
- Preservation of rare & endangered species
- Migratory habitat
- Wetlands habitat
- Municipal supply
- Industrial service supply
- Industrial process supply
- Agricultural supply
- Groundwater recharge
- Freshwater replenishment
- Warmwater habitat
- Coldwater habitat

The project site is located within the Reach 6 segment of the Santa Clara River of what is defined as the Upper Santa Clara River (USCRWMG 2015). Reach 6 runs between Bouquet Canyon Road Bridge and West Pier Highway 99. According to the RWQCB, Reach 6 of the Santa Clara River is impaired by chlorpyrifos (insecticide), coliform bacteria, diazinon (insecticide), toxicity, and chloride (salts) (RWQCB 2022b). The project site is located immediately southwest Soledad Canyon Road, which traverses the southern bank of the Santa Clara River. Therefore, the Santa Clara River would be considered the nearest receiving body of water for any stormwater runoff discharging from the site.

1.1.2 Santa Clara River Valley East Groundwater Basin

The Santa Clara River Valley groundwater basin has a total of six subbasins. The project site is located within the Santa Clara River Valley East subbasin (DWR Basin 4-004.07) (DWR 2022), the easternmost of the six subbasins. It is bounded on the north by the Piru Mountains, on the east and southeast by the San Gabriel Mountains, and on the south by the Santa Susannah Mountains (SCVGSA 2022). The City of Santa Clarita is near the eastern boundary of this 66,200-acre subbasin. Groundwater is found in the alluvial deposits, terrace deposits, and the Saugus Formation. While the groundwater is generally unconfined it can also be found as confined or semi-confined within the Saugus Formation (SCVGSA 2022). The two principal aquifer systems of the subbasin include the Alluvial Aquifer System which overlies the Saugus Formation (SCVGSA 2022).

Average annual precipitation in the Santa Clara River Valley ranges from 14 to 16 inches. Rain falling in the upper elevations of the watershed infiltrates into the soil, where some of the water evaporates or is transpired by vegetation and the remainder becomes stormwater that can also infiltrate to underlying groundwater resources. A portion of the runoff occurs as overland flows into side canyons and tributaries to the Santa Clara River. In the urban areas, precipitation falling on impervious surfaces is directed to storm drains that flow to the river or the stormwater is directed to swales and allowed to infiltrate locally (SCVGSA 2022).

The subbasin is not adjudicated and in accordance with the California Groundwater Sustainability Management Act (SGMA) is being managed by the Santa Clara River Valley Water Agency as the Groundwater Sustainability Agency (GSA). As required by SGMA, the California Department of Water Resource (DWR) has evaluated the subbasin for sustainability and determined that it is a High Priority basin, with long term hydrographs showing groundwater levels declining (DWR 2022). However, according to the 2020 Urban Water Management Plan, the projected demands can be met by supplies in normal, single dry year, and multiple dry year scenarios although demands may require some passive and active conservation measures to end up below projected supplies (SCVWA 2021). According to the Groundwater Sustainability Plan for the subbasin, "the Basin is not likely to be in an overdraft condition under a sustained level of pumping at the full-build-out level of human demand for groundwater, even under the average climate change scenarios for 2030 and 2070; and the operating plan for the Basin's groundwater resources is expected to continue maintaining a condition that does not create an overdraft condition (chronic long-term declines in groundwater levels) in the future" (SCVGSA 2022).

The project would be served by the Santa Clarita Valley Water Agency (SCV Water). SCV Water has prepared a 2020 Urban Water Management Plan (UWMP) for its service area, including the project site. According to Table 4-1 of the SCV Water 2020 UWMP, in 2020, SCV Water received approximately 26% of its water supply from groundwater, 0.7% from recycled water, 38.8% from imported water, and 34.5% from banked water (SCVWA 2021). SCV Water has long planned to increase its supplies of recycled water for the purposes of irrigation and in implementing the recent GSP has identified projects and programs to achieve a sustainable yield for the subbasin.

1.2 Project Site Stormwater Drainage

The project site is currently predominantly covered by impervious surfaces (approximately 80%). Stormwater runoff at the site currently occurs as sheet flows that move from southwest to northeast and into two existing storm drain pipe culverts that are owned/maintained by the County of Los Angeles (RDD 234, Cash Contract No. 2674) (Attachment A). A third pipe also collects flows but for just a section of Soledad Canyon Road. These existing pipe culverts convey stormwater under Soledad Canyon Road and outlet to the Santa Clara River on the north side of Soledad Canyon Road. The hillsides southwest of the project site currently drain towards the Metrolink railroad and into three inlets leading to debris basins and 24-inch pipes that convey the flow under the railroad. The stormwater then sheet-flows across the project site.

1.3 Flood Zones

The project site is located in the Santa Clara River watershed adjacent to the riverbank which is just the other side of Soledad Canyon Road. According to mapping compiled by the Federal Emergency Management Agency (FEMA), the entire project site is located outside of any 100-year flood zone and is located within an area of minimal flood hazard (Zone X) (FEMA 2021). The floodplain associated with the Santa Clara River is confined and bounded on the south bank, nearest to the project site, by Soledad Canyon Road.

2 Regulatory Setting

2.1 Federal

2.1.1 Clean Water Act

Increasing public awareness and concern for controlling water pollution led to the enactment of the Federal Water Pollution Control Act Amendments of 1972. As amended in 1977, this law became commonly known as the Clean Water Act (CWA) (33 USC 1251 et seq.). The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The CWA established basic guidelines for regulating discharges of pollutants into the waters of the United States. The CWA requires that states adopt water quality standards to protect public health, enhance the quality of water resources, and ensure implementation of the CWA.

Section 303 of the Clean Water Act (Beneficial Use and Water Quality Objectives)

The Los Angeles RWQCB is responsible for the protection of the beneficial uses of waters within the proposed project area. The RWQCB uses its planning, permitting, and enforcement authority to meet its responsibilities adopted in the Basin Plan to implement plans, policies, and provisions for water quality management.

In accordance with state policy for water quality control, the RWQCB employs a range of beneficial use definitions for surface waters, groundwater basins, marshes, and mudflats that serve as the basis for establishing water quality objectives and discharge conditions and prohibitions. The Basin Plan for the Los Angeles Region has identified existing and potential beneficial uses supported by the key surface water drainages throughout its jurisdiction. Under CWA Section 303(d), the State of California is required to develop a list of impaired water bodies that do not meet water quality standards and objectives. A total maximum daily load defines how much of a specific pollutant/stressor a given water body can tolerate and still meet relevant water quality standards. The RWQCB has developed total maximum daily loads for select reaches of water bodies.

Section 401 of the Clean Water Act (Water Quality Certification)

Section 401 of the CWA requires that an applicant for any federal permit (e.g., a U.S. Army Corps of Engineers Section 404 permit) obtain certification from the state, requiring that discharge to waters of the United States would comply with provisions of the CWA and with state water quality standards. For example, an applicant for a permit under Section 404 of the CWA must also obtain water quality certification per Section 401 of the CWA. Section 404 of the CWA requires a permit from the U.S. Army Corps of Engineers prior to discharging dredged or fill material into waters of the United States unless such a discharge is exempt from CWA Section 404. For the project area, the Los Angeles RWQCB provides the water quality certification required under Section 401 of the CWA.

Section 402 of the Clean Water Act

The CWA was amended in 1972 to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES permit program, as authorized by Section 402 of the CWA, was established to control water pollution by regulating point sources that discharge pollutants into waters of the United States (33 USC 1342). In California, the EPA has authorized the State Water Resources Control Board (SWRCB) permitting authority to implement the NPDES program.

Regulations (Phase II Rule) that became final on December 8, 1999, expanded the existing NPDES Program to address stormwater discharges from construction sites that disturb land equal to or greater than 1 acre and less than 5 acres (small construction activity). The regulations also require that stormwater discharges from small MS4s be regulated by an NPDES General Permit for Storm Water Discharges Associated with Construction Activity, Order No. 99-08-DWQ (i.e., the General Construction Permit). Post-Construction stormwater controls to satisfy requirements of the NPDES Program are permitted under the Phase II Small Municipal Storm Sewer System (MS4) Permit (Order No. 2013-001 DWQ effective July 1, 2013).

To obtain coverage under the Construction General Permit, a project applicant must provide a Notice of Intent, a Stormwater Pollution Prevention Plan (SWPPP), and other documents required by Attachment B of the Construction General Permit. The SWPPP must contain a visual monitoring program, a chemical monitoring program for “non-visible” pollutants to be implemented if there is a failure of best management practices (BMPs), and a sediment-monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. On September 2, 2009, the SWRCB issued a new NPDES General Permit for Storm Water Associated with Construction Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002 - as amended by 2010-0014-DWQ and 2012-0006-DWQ), that became effective July 1, 2010.

Section 404 of the Clean Water Act

Section 404 of the CWA established a permitting program to regulate the discharge of dredged or fill material into waters of the United States, which include wetlands adjacent to national waters (33 USC 1344). This permitting program is administered by the U.S. Army Corps of Engineers and enforced by the EPA.

2.1.2 National Flood Insurance Program

The National Flood Insurance Act of 1968 established the National Flood Insurance Program in order to provide flood insurance within communities that were willing to adopt floodplain management programs to mitigate future flood losses. The Act also required the identification of all floodplain areas within the United States and the establishment of flood-risk zones within those areas. FEMA is the primary agency responsible for administering programs and coordinating with communities to establish effective floodplain management standards. FEMA is responsible for preparing Flood Insurance Rate Maps that delineate the areas of known special flood hazards and their risk applicable to the community. The program encourages the adoption and enforcement by local communities of floodplain management ordinances that reduce flood risks. In support of the program, FEMA identifies flood hazard areas throughout the United States on FEMA flood hazard boundary maps.

2.1.3 Federal Antidegradation Policy

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

2.2 State

2.2.1 Senate Bill 610 and Senate Bill 221: Water Supply Assessments and Water Supply Verifications

Senate Bill (SB) 610 and SB 221, effective January 1, 2002, improve the linkage between certain land use decisions made by cities and counties and water supply availability. The statutes require detailed information regarding water availability and reliability with respect to certain developments to be included in the administrative record. Under Water Code Section 10912(a), projects subject to the California Environmental Quality Act requiring a water supply assessment include residential development of more than 500 dwelling units; shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space; commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space; hotel, motel or both, having more than 500 rooms; industrial, manufacturing, or processing plants, or industrial parks planned to house more than 1,000 persons, occupying more than 40 acres of land or having more than 650,000 square feet of floor area; mixed-use projects that include one or more of the projects specified; or a project that would demand an amount of water equivalent to or greater than the amount required by a 500 dwelling unit project. A fundamental source document for compliance with SB 610 is the UWMP, which can be used by the water supplier to meet the standard for SB 610.

2.2.2 California Water Code Section 10610 et seq., Urban Water Management Planning Act

California urban water providers are required by state law to develop an UWMP to ensure sufficient water supplies are available to meet the long-term needs of its customers during normal, dry, or multiple-dry years. The Urban Water Management Planning Act requires urban water suppliers, which provide water for municipal purposes to more than 3,000 customers or supply more than 3,000 acre-feet of water annually, to develop an UWMP every 5 years, in the years ending in 0 and 5.

In the Act, the California Legislature declared that the waters of the state are a limited and renewable resource subject to ever increasing demands; that the conservation and efficient use of urban water supplies are of a statewide concern; that successful implementation of plans is best accomplished at the local level; that conservation and efficient use of water shall be actively pursued to protect both the people of the state and their water resources; that conservation and efficient use of urban water supplies shall be a guiding criterion in public decisions; and that urban water suppliers shall be required to develop water management plans to achieve conservation and efficient use.

The City of Santa Clarita 2020 UWMP has been prepared in compliance with these requirements of the Act, as well as the additional reporting requirements of the Water Conservation Act of 2009. The UWMP is intended to serve as a general, flexible, and open-ended document that periodically can be updated to reflect changes in regional water supply trends, conservation policies, and water use efficiency policies.

2.2.3 Sustainable Groundwater Management Act

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package—Assembly Bill 1739 (Dickinson), SB 1168 (Pavley), and SB 1319 (Pavley)—collectively known as SGMA, which requires governments and water agencies of high- and medium-priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, sustainability should be achieved by 2040. For the remaining high- and medium-priority basins, 2042 is the deadline. Through SGMA, the California Department of Water Resources provides ongoing support to local agencies through guidance, financial assistance, and technical assistance. SGMA empowers local agencies to form Groundwater Sustainability Agencies (GSAs) to manage basins sustainably and requires Groundwater Sustainability Plans (GSPs) for crucial (i.e., medium to high priority) groundwater basins in California. The Santa Clarita Valley Water Agency is the GSA for the subbasin beneath the project site which has developed a GSP.

2.2.4 California Porter-Cologne Water Quality Control Act

Since 1973, the California SWRCB and its nine RWQCBs have been delegated the responsibility for administering permitted discharge into the waters of California. The project site falls within the jurisdiction of the Santa Ana RWCQB. The Porter-Cologne Water Quality Act (California Water Code Section 13000 et seq.; California Code of Regulations, Title 23, Division 3, Chapter 15) provides a comprehensive water-quality management system for the protection of California waters. Under the Act, “any person discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the state” must file a report of the discharge with the appropriate RWQCB. Pursuant to the Act, the RWQCB may then prescribe “waste discharge requirements” that add conditions related to control of the discharge. Porter-Cologne defines “waste” broadly, and the term has been applied to a diverse array of materials, including non-point source pollution. When regulating discharges that are included in the federal Clean Water Act, the state essentially treats Waste Discharge Requirements and NPDES as a single permitting vehicle. In April 1991, the SWRCB and other state environmental agencies were incorporated into the California Environmental Protection Agency.

The RWQCB regulates urban runoff discharges under the NPDES permit regulations. NPDES permitting requirements cover runoff discharged from point (e.g., industrial outfall discharges) and nonpoint (e.g., stormwater runoff) sources. The RWQCB implements the NPDES program by issuing construction and industrial discharge permits.

Under the NPDES permit regulations, BMPs are required as part of a SWPPP. The EPA defines BMPs as “schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of Waters of the United States.” BMPs include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage” (40 CFR 122.2).

2.2.5 CALGreen

Formerly known as the California Green Building Standards Code, Title 24, Part 11, of the California Code of Regulations, CALGreen is designed to improve public health, safety, and general welfare by using design and construction methods that reduce the negative environmental impact of development and to encourage sustainable construction practices. CALGreen provides mandatory direction to developers of all new construction and renovations of residential and non-residential structures with regard to all aspects of design and construction, including, but not limited to, site drainage design, stormwater management, and water use efficiency. Required measures are accompanied by a set of voluntary standards designed to encourage developers and local agencies to aim for a higher standard of development.

2.2.6 California Water Code

The California Water Code includes 22 kinds of districts or local agencies with specific statutory provisions to manage surface water. Many of these agencies have statutory authority to exercise some forms of groundwater management. For example, a Water Replenishment District (Water Code Section 60000 et seq.) is authorized to establish groundwater replenishment programs and collect fees for that service, while a Water Conservation District (Water Code Section 75500 et seq.) can levy groundwater extraction fees. Through special acts of the Legislature, 13 local agencies have been granted greater authority to manage groundwater. Most of these agencies, formed since 1980, have the authority to limit export and control some in-basin extraction upon evidence of overdraft or the threat of an overdraft condition. These agencies can also generally levy fees for groundwater management activities and for water supply replenishment.

2.2.7 Assembly Bill 3030 – Groundwater Management Act

In 1992, Assembly Bill 3030 was passed, which increased the number of local agencies authorized to develop a groundwater management plan and set forth a common framework for management by local agencies throughout California. These agencies could possess the same authority as a water replenishment district to "fix and collect fees and assessments for groundwater management" (Water Code Section 10754), provided they receive a majority of votes in favor of the proposal in a local election (Water Code Section 10754.3).

2.3 Regional

2.3.1 Los Angeles Regional Water Quality Control Board

As previously detailed, the project site is located within the jurisdiction of the Los Angeles RWQCB. The Los Angeles RWQCB authorizes NPDES permits that ensure compliance with wastewater treatment and discharge requirements. The Los Angeles RWQCB enforces wastewater treatment and discharge requirements for properties near and surrounding the project site.

2.3.2 Municipal Separate Storm Sewer System Permit

Los Angeles County and 85 incorporated cities, including the City of Santa Clarita, have a joint Municipal Separate Storm Sewer System NPDES permit (MS4 Permit) (Permit Order No. R4-2021-0105, NPDES Permit No. CAS004004) that was granted on November 8, 2012, and recently modified in July 2018. The MS4 Permit is intended to implement BMPs to reduce pollutants in stormwater discharges to the maximum extent practicable. The permittees listed under the joint permit have the authority to develop, administer, implement, and enforce storm water management programs within their own jurisdiction. On April 7, 2016, the Los Angeles County, Los Angeles County Flood Control District, and the City of Santa Clarita formed the Upper Santa Clara River Watershed Group to develop a collaborative approach to meet the requirements of the MS4 Permit.

Urban storm water runoff is defined in the MS4 Permit as including stormwater and dry weather flows from a drainage area that reaches a receiving water body or subsurface. The permit regulates the discharge of all wet and dry weather urban storm water runoff within the County of Los Angeles (with the exception of the City of Long Beach). Part VI.C of the Los Angeles County MS4 permit allows permittees the flexibility to develop Watershed Management Programs or Enhanced Watershed Management Programs (EWMPs) to implement the requirements of the permit on a watershed scale through customized strategies, control measures, and BMPs. The Upper Santa Clara River Watershed Management Area Group developed a EWMP that was approved by the Los Angeles RWQCB on April 7, 2016. The EWMP includes water quality priorities for the Santa Clara River Watershed Management Area, watershed control measures consisting of both structural and non-structural BMPs, financial strategies, and legal authority (permittees have the necessary legal authority to implement the BMPs identified in the EWMP or the legal authority exists to compel implementation of the BMPs).

2.3.3 County of Los Angeles Low Impact Development Standards Manual

In 2014, the County of Los Angeles prepared the Low Impact Development Standards Manual (LID Standards Manual) to comply with the requirements of the NPDES MS4 Permit for stormwater and non-stormwater discharges from the MS4 within the coastal watersheds of Los Angeles County. The LID Standards Manual provides guidance for the implementation of stormwater quality control measures in new development and redevelopment projects in unincorporated areas of the County with the intention of improving water quality and mitigating potential water quality impacts from stormwater and non-stormwater discharges. The City of Santa Clarita implements these standards for projects within the city.

2.4 Local

2.4.1 Santa Clarita Municipal Code—Stormwater

Chapter 10.04 of the City of Santa Clarita Municipal Code provides the stormwater and urban runoff pollution control requirements for new development and redevelopment projects. Projects are required to implement best management practices for both operation and construction activities. Illicit discharges and illicit connections are prohibited as well as spills, dumping, or disposal of any solid or liquid waste including any pollutant as defined in Section 502(6) of the Clean Water Act, 33 U.S.C. Section 1362(6) or incorporated into California Water Code Section 13373.

2.4.2 Santa Clarita Floodplain Management Ordinance

City of Santa Clarita Floodplain Management Ordinance (SCMC Chapter 10.06) The City of Santa Clarita participates in the National Flood Insurance Program. The intention of the National Flood Insurance Program is to lessen the financial devastation caused by flooding in communities across the United States. It is a voluntary program based on a mutual agreement between FEMA and the local community. Participation in the program makes federally backed flood insurance available to City residents and allows them to obtain direct federal relief following declared flood disasters (City of Santa Clarita 2020). In cooperation with FEMA, the City has adopted a Floodplain Management Ordinance (Chapter 10.06 of the SCMC), which governs development in the City's floodplains. In order to remain a National Flood Insurance Program community, the City must regulate development in its flood hazard areas per the requirements of the Floodplain Management Ordinance along with other various technical documents published by FEMA. In order to accomplish reducing flood losses, the Floodplain Management Ordinance requires the following:

- Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- Require that uses vulnerable to floods, including facilities, which serve such uses, be protected against flood damage at the time of initial construction;

- Control the alteration of natural floodplains, stream channels and natural protective barriers, which help accommodate or channel floodwaters;
- Control filling, grading, dredging and other development, which may increase flood damage; and
- Prevent or regulate the construction of flood barriers, which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

2.4.3 City of Santa Clarita Stormwater Mitigation Plan

Chapter 17.95 of the Santa Clarita Municipal Code identifies certain requirements for post-construction stormwater activities for development projects to comply with the NPDES and MS4 permits. This chapter requires that each project develop and implement a mitigation plan to lessen the water quality impacts of development by using smart growth practices and BMPs and integrate low impact development (LID) design principles to mimic pre-development hydrology conditions through infiltration, evapotranspiration, rainfall harvest, and use.

2.4.4 Santa Clarita General Plan

The 2022 General Plan Safety Element for the City of Santa Clarita has the following goals, objectives and policies that would apply to the proposed project:

Goal S 2. Protection of public safety and property from unreasonable risks due to flooding.

Objective S 2.1. Plan for flood protection as part of a multi-objective watershed management approach for the Santa Clara River and its tributaries.

Policy S 2.1.2. Promote Low Impact Development standards on development sites, including but not limited to minimizing impervious surface area and promoting infiltration, in order to reduce the flow and velocity of stormwater runoff throughout the watershed.

Policy S 2.1.5. Promote the joint use of flood control facilities with other beneficial uses where feasible, such as by incorporating detention basins into parks and extending trails through floodplains.

In addition, following goals, objectives and policies from the Conservation and Open Space Element of the General Plan would apply:

Goal CO 4. An adequate supply of clean water to meet the needs of present and future residents and businesses, balanced with the needs of natural ecosystems.

Objective CO 4.3. Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing stormwater runoff at the source.

Policy CO 4.3.1. On undeveloped sites proposed for development, promote onsite stormwater infiltration through design techniques such as pervious paving, draining runoff into bioswales or properly designed landscaped areas, preservation of natural soils and vegetation, and limiting impervious surfaces.

Policy CO 4.3.2. On previously developed sites proposed for major alteration, provide stormwater management improvements to restore natural infiltration, as required by the reviewing authority.

Policy CO 4.3.3. Provide flexibility for design standards for street width, sidewalk width, parking, and other impervious surfaces when it can be shown that such reductions will not have negative impacts and will provide the benefits of stormwater retention, groundwater infiltration, reduction of heat islands, enhancement of habitat and biodiversity, saving of significant trees or planting of new trees, or other environmental benefit.

Policy CO 4.3.4. Encourage and promote the use of new materials and technology for improved stormwater management, such as pervious paving, green roofs, rain gardens, and vegetated swales.

Policy CO 4.3.5. Where detention and retention basins or ponds are required, seek methods to integrate these areas into the landscaping design of the site as amenity areas, such as a network of small ephemeral swales treated with attractive planting.

Policy CO 4.3.6. Discourage the use of mounded turf and lawn areas which drain onto adjacent sidewalks and parking lots, replacing these areas with landscape designs that retain runoff and allow infiltration.

Policy CO 4.3.7. Reduce the amount of pollutants entering the Santa Clara River and its tributaries by capturing and treating stormwater runoff at the source, to the extent possible.

3 Impact Analysis

Would the project violate water quality standards or waste discharge requirements or degrade surface or ground water quality?

Construction

The proposed project would involve earthwork activities and soil disturbance over the course of construction that could expose soils to the effects of wind and water erosion and sedimentation. Earthwork activities would include grading, excavations for foundations, and trenching for placement of utilities onsite as well as some perimeter areas just outside of the project site boundary. The primary potential pollutant associated with construction activity is sediment (i.e., high turbidity) generated from site preparation and grading activities. Although Reach 6 of the Santa Clara River is listed under CWA Section 303(d) as impaired for sedimentation/siltation, a measurable increase in sedimentation/siltation from construction activities on the site could temporarily violate Basin Plan objectives, if not properly controlled. In addition to sediment, other pollutants associated with construction activity could include heavy metals, oil/grease, fuels, demolition debris and trash, and other pollutants from accidental spills or releases of refuse, paints, solvents, sanitary wastes, and concrete curing compounds. Without adequate precautions, wind and/or rain events that occur during construction activities could generate pollutants and/or mobilize sediment such that it contributes to water quality degradation of receiving waters and/or violates Basin Plan objectives.

Standard construction management practices, as required through the Santa Clarita Municipal Code and the statewide NPDES Construction General Permit, would minimize construction-related impacts on water quality. The Construction General Permit would require implementation of a SWPPP to address potential construction-related impacts on water quality. The SWPPP must specify the location, type, and maintenance requirements for BMPs necessary to prevent stormwater runoff from carrying construction-related pollutants into the City's municipal storm drain system, Santa Clara River, and/or the underlying groundwater basin. BMPs must be implemented to address potential release of fuels, oil, and/or lubricants from construction vehicles and equipment (e.g., drip pans, secondary containment, washing stations); release of sediment from material stockpiles and other construction-related excavations (e.g., sediment barriers, soil binders); and other construction-related activities with the potential to adversely affect water quality. The number, type, location, and maintenance requirements of BMPs to be implemented as part of the SWPPP depend on site-specific risk factors such as soil erosivity, construction season/duration, and receiving water sensitivity.

The following list includes examples of treatment control BMPs commonly employed during construction, although these could vary based on the nature of construction activities, the characteristics of the site, and the existing receiving waters impairments (these features would appear as notes on any final design plans):

- Silt fences installed along limits of work and/or the construction site
- Stockpile containment (e.g., visqueen, fiber rolls, gravel bags)
- Exposed soil stabilization structures (e.g., fiber matrix on slopes and construction access stabilization mechanisms)
- Street sweeping
- Tire washes for equipment
- Runoff control devices (e.g., drainage swales, gravel bag barriers/chevrons, velocity check dams) and slope protection
- Drainage system inlet protection
- Wind erosion (dust) controls
- Tracking controls
- Prevention of fluid leaks (inspections and drip pans) from vehicles
- Materials pollution management
- Proper waste management (e.g., concrete waste management)
- Regular inspections and maintenance of BMPs

The standard requirements contained in a SWPPP, and enforced through the Santa Clara Municipal Code Chapters 10.04, are sufficient to minimize the project's potential to violate water quality standards or waste discharge requirements during construction. Therefore, construction-related impacts of the project on water quality would be less than significant.

Operation

Redevelopment of the project site would involve changes to existing drainage patterns. While the project site is already largely covered in impervious surfaces, estimated at 80% (Attachment B), the proposed changes would increase the impervious surfaces percentage to approximately 85%. These changes could become a source of pollution from incidental spills of vehicle oils and other chemicals that can be conveyed by storm and landscape irrigation flows. The impervious surfaces would prevent polluted surface waters from absorbing into the ground surface.

During storm events, pollutants from paved areas lacking in proper stormwater controls and BMPs could enter the municipal storm drain system, before eventually being discharged to the Santa Clara River. The majority of pollutants entering the storm drain system in this manner could be sediment, nutrients, organic compounds, oxygen demanding substances, trash, debris, bacteria, residual petroleum products (e.g., motor oil, gasoline, diesel fuel), and metals. Certain metals, along with nutrients and pesticides from landscape areas, can also be present in stormwater runoff. Between periods of rainfall, surface pollutants tend to accumulate, and runoff from the first significant storm of the year ("first flush") would likely have the largest concentration of pollutants.

However, all proposed improvements would be required to adhere to existing drainage control requirements including the MS4 NPDES permit and the City's drainage control requirements (Municipal Code Chapter 17.95 - Stormwater Mitigation Plan). Prior to issuance of a building permit, the proponent would have to submit their Urban Stormwater Mitigation Plan (USMP) to the City for review and approval. A USMP has been prepared for the proposed project and demonstrates how the proposed drainage control improvements, a biofiltration basin and biofiltration treatment units, would be incorporated into project design plans to address the specific water quality issues at the site (Attachment B). As part of these requirements, the USMP identifies that the applicable BMPs are consistent with LID requirements that meet all applicable MS4 and City requirements. The proposed project would include this biofiltration basin and biofiltration treatment units to remove a majority of pollutants with a capacity that is adequate to treat all site runoff (Attachment B). With adherence to these drainage control requirements, the proposed improvements post-construction BMPs, would minimize water quality concerns during operations. Therefore, compliance with these existing regulatory requirements for drainage control design measures would reduce potential impacts related to water quality standards and waste discharge requirements to a less than significant level.

Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

There are no groundwater extraction wells currently at the project site and no extraction wells are proposed as part of the project. The proposed project would not include any require deep excavation that would potentially encounter groundwater and thus no dewatering activities would be anticipated during construction.

The proposed project would be served by the Santa Clara Valley Water Agency (SCV Water) for all water supply demands. The developed project would receive all of its water from a piped water system, connected to a Santa Clarita Valley Water Agency water transmission main. According to the 2020 UWMP, SCV Water obtains approximately 26% of its water supplies from groundwater. Analysis of projected growth that would include the proposed project and projected supplies, the SCV Water's demands can be met by supplies in normal, single dry year, and multiple dry year scenarios although demands may require some passive and active conservation measures to end up below projected supplies (SCVWA 2021). In addition, according to the GSP for the underlying groundwater subbasin, "the Basin is not likely to be in an overdraft condition under a sustained level of pumping at the full-build-out level of human demand for groundwater, even under the average climate change scenarios for 2030 and 2070; and the operating plan for the Basin's groundwater resources is expected to continue maintaining a condition that does not create an overdraft condition (chronic long-term declines in groundwater levels) in the future" (SCVGSA 2022).

In addition, the City's Stormwater Mitigation Plan (SCMC Chapter 17.95) requires that projects develop and implement a mitigation plan to lessen the water quality impacts of the project by using smart growth practices and BMPs and integrate LID design principles to mimic pre-development hydrology conditions through infiltration, evapotranspiration, rainfall harvest, and use. The proposed project would include construction of an onsite biofiltration basin would allow much of the stormwater runoff from the site to provide local groundwater recharge. Therefore, while the project would increase the amount of new impervious surfaces at the site, the site also includes landscaped areas and the biofiltration basin where infiltration would occur during rainstorms. Therefore, the proposed project would not contribute to depletion of groundwater or interfere with recharge of a managed groundwater supply source. Impacts would be less than significant.

Would the project substantially alter the existing drainage pattern of the site or area through the addition of impervious surfaces resulting in erosion or siltation on- or off-site; increasing the rate or amount of surface runoff resulting in flooding on- or off-site; contributing runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide polluted runoff; or impede or redirect flood flows?

As noted above, the proposed project would alter the existing drainage patterns of the site, although the increase in impervious surfaces would only be from approximately 80 to 85% of the site. However, the proposed improvements would be required to adhere to MS4 permit requirements and local City drainage control requirements. All runoff from the project would be captured in a private drainage control system that routs through an underground system before eventually tying into the existing storm drain pipe culverts owned/maintained by Los Angeles County (Attachment A). Prior to discharging to the existing storm drain system, the storm water would be routed to a low flow splitter. The splitter would send the first flush flows to the biofiltration basin to be treated. The splitter would convey high flows to the existing downstream storm drain system. For the portion of the site that cannot be treated in the basin the low flow will be treated in one of two proprietary biofiltration units. Therefore, with adherence to the MS4 permit and local City drainage control requirements (Municipal Code Chapter 17.95 - Stormwater Mitigation Plan), the proposed changes to drainage patterns would not result in erosion or siltation on or off site.

As detailed in the Hydrology Report prepared for the project site, stormwater flows from the site currently occur as sheet flows in a northeast direction and into the two aforementioned storm drain culverts as well as a 3rd culvert that picks up flow for a section of Soledad Canyon Road (Attachment A). According to the analysis of the proposed drainage condition, all developed flows would be below the culvert capacities, and it was determined that these existing culverts can adequately convey the developed flow condition from the proposed project (Attachment A). As a result, the proposed project would not increase the rate or amount of surface runoff that would result in flooding on- or off-site nor would exceed the capacity of existing stormwater drainage systems. There would also be no other sources of polluted runoff that is not already discussed above.

The project site is not located in a Special Flood Hazard Area as mapped by FEMA (FEMA 2021), and is therefore not at threat for impeding or redirecting flood flows.

Overall, the project would adhere to the existing drainage control regulatory requirements of the NPDES MS4 permit and City drainage control requirements such that the proposed changes in drainage patterns would have a less than significant impact related to erosion/siltation, flooding, capacities of existing infrastructure, or impeding or redirecting flood flows.

Would the project release pollutants during flooding?

The project site is located well inland and outside of any tsunami hazard zone areas. The site is also not adjacent to an enclosed or semi-enclosed body of water and as a result would not be susceptible to seiche wave hazards. Finally, the project site is not located within a designated flood hazard zone. Therefore, the potential for release of pollutants during flooding would be considered less than significant.

Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The project site falls within the jurisdiction of the Los Angeles RWQCB (Region 4) Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties; and the RWQCB is given authority to issue waste discharge requirements, enforce actions against stormwater discharge violators, and monitor water quality. In California, the NPDES stormwater permitting program is administered by the SWRCB. The County of Los Angeles and the City are two of the Co-Permittees under the Los Angeles County NPDES MS4 Permit, and, as such, are required to implement development planning guidance and control measures regarding water quality impacts from new development. The Los Angeles County MS4 Permit contains provisions for implementation and enforcement of the City's Urban Stormwater Mitigation Plan. The City supports the requirements of the Los Angeles County MS4 Permit through SCMC Chapters 10.04 and 17.95, which identify requirements for pre- and postconstruction stormwater activities, respectively, for development projects to comply with the NPDES and MS4 permits. As discussed above, the project would be subject to the requirements of the NPDES Construction General Permit, which includes the preparation and implementation of a SWPPP. In addition, the project would comply with the requirements of the City's Municipal Code Section 10.04.070 (Construction Activity Stormwater Measures) and Chapter 17.95 (Stormwater Mitigation Plan) to ensure impacts to water quality would be less than significant. In regard to sustainable groundwater management, the SCV-GSA has prepared and is implementing the GSP for the subbasin. As the water supplier for the project, SCV Water is also complying with the GSP and the proposed project is consistent with the projected growth that is accounted for in the plan. Accordingly, the project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, and impacts would be less than significant.

4 References

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Attachment A

Hydrology Report, Alliance Land Planning and Engineering

LAND DEVELOPMENT DIVISION
STORM DRAIN & HYDROLOGY UNIT

TO:	Santa Clarita	DATE	8/8/22
ATTN:	Amalia Marreh		
CC:	Alliance Land Planning & Engineering		

REVIEW OF HYDROLOGY STUDY

CITY OF	**Santa Clarita**	**DATE OF REPORT**	**08/03/2022**
MTD. NO.	**1888**	**PLAN CHECK NO.**	**3**
TR NO.	**83605**	**PLAN CASE NO.**	**ESTU2021000659**

We have reviewed your Hydrology Study.

[X] This hydrology study was reviewed only to determine conformity to LACFCD transfer standards and for no other purpose. The hydrology study indicates that the capacity of the associated storm drain improvement or drainage system conforms to those standards. In addition, any review of the hydrology study for other purposes as may be required by the City must be done to the satisfaction of the City.

[X] Refer to comments below:

COMMENTS:

1. The foregoing notwithstanding, nothing herein is intended to express or imply any representation or commitment by the LACFCD that it will accept the transfer of the storm drain improvement or drainage system if constructed.

2. Water quality requirements have not been reviewed as part of this recommended approval. The City shall be responsible for review and approval of all water quality requirements. Any discrepancies between the water quality analysis and the Hydrology Study may require a revised Hydrology Study.

3. Please have the City approve and sign the plan and report and return a scanned copy to the Land Development Division of Los Angeles County Department of Public Works as soon as possible.

REVIEWED BY: ____________________
Alex Mikhailpoor (626) 458-4921

REVIEWED UNDER THE SUPERVISION OF: ____________________
Vilong Truong

RIVERVIEW
DEVELOPED CONDITION HYDROLOGY EXHIBIT
8/3/22
MTD 1888
ESTU2021000659
TRACT NO. 83605

EXISTING VS DEVELOPED CONDITION FLOWRATES						
CULVERT	Q_ALLOWABLE	DEV DESIGN Q	DEV 50-YR BURNED	EXISTING 50-YR CLEAR	EXISTING 50-YR BURNED	EXISTING 50-YR BURNED AND BULKED
	CFS	CFS	CFS	CFS	CFS	CFS
CULVERT 1	50	47.73	53.16	110.55	114.36	140.69
CULVERT 2	38	29.22	45.12	28.8	NA	NA
CULVERT 3	84	70.79	101.69	6.76	NA	NA

BASIN A -DEVELOPED CONDITION HYDROLOGIC PARAMETERS											
SUBAREA	AREA	OVERLAND (Tc)		FLOWPATH		50-Yr RAIN	IMP	SOIL	DPA #	Tc	
		LENGTH	SLOPE	LENGTH	SLOPE					25-YR	50-YR
	ac	ft	ft/ft	ft	ft/ft	in	%			min	min
1A	3.4	440.0	0.005	400	0.008	6.8	50	97	9	8	7
2B	3.3	680.0	0.006	255	0.006	6.8	88	20	9	9	9
3B	1.1	515.0	0.007	60	0.018	6.8	88	20	9	8	7
4AB				505	0.011	6.8		20	9		
6C	2.5	755.0	0.006	630	0.006	6.8	85	20	9	10	9
7AC				30	0.005	6.8		20	9		
9A	2.1	550.0	0.008	25	0.083	6.8	85	20	9	8	7
10A	3.8	580.0	0.010	100	0.012	6.8	85	20	9	8	7
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4E	BASIN D			120	0.009	6.8		20			
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2F	0.9	290	0.086	820	0.010	6.8	50	97	8	5	5
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6H	1.3	900	0.009	90.0	0.005	6.8	90	20	9	10	10
7H	1.3	895	0.009	50.0	0.005	6.8	90	20	9	10	9
1J	1.0	515.0	0.029	1.000	0.010	6.80	85	20	9	6	5

SCALE: 1"=80'

DEBRIS PRODUCING SUBAREAS	SURFACE AREA		DEBRIS PRODUCTION RATE (DPA 8)	DEBRIS PRODUCED (VOL_REQ)	DETENTION VOL REQUIRED	TOTAL REQ VOL (VOL_REQ)
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SUBAREA 1F	6.8	0.011	35000	372	0	372
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TOTAL		0.052		1832	84	1917

DEBRIS BASIN	depth	TOP(CONE LIMIT) area	mid area	bot area	VOL_PROV		VOL_REQ	DELTA
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NOTE: NOT WITHIN COUNTY ADOPTED FLOODWAY AND NOT WITHIN FEMA FLOOD ZONE "A".

ALLIANCE
LAND PLANNING & ENGINEERING INC.

2248 FARADAY AVE.
CARLSBAD, CA 92008
TEL: (760) 431-9896
FAX: (760) 431-8802

27413 TOURNEY ROAD
SUITE 120
VALENCIA, CA 91355
TEL: (661) 799-2760

CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

I:\CAD\2130\HYDRO & WQT\2130_HYDRO.dwg

HYDROLOGY STUDY
APPROVED BY CITY OF ________________

APPROVED BY:________________________________DATE__________

THIS HYDROLOGY STUDY WAS REVIEWED ONLY TO DETERMINE CONFORMITY TO LACFCD TRANSFER STANDARDS AND FOR NO OTHER PURPOSE. THE HYDROLOGY STUDY INDICATES THAT THE CAPACITY OF THE ASSOCIATED STORM DRAIN IMPROVEMENT OR DRAINAGE SYSTEM CONFORMS TO THOSE STANDARDS. THE FOREGOING NOTWITHSTANDING, NOTHING HEREIN IS INTENDED TO EXPRESS OR IMPLY ANY REPRESENTATION OR COMMITMENT BY THE LACFCD THAT IT WILL ACCEPT THE TRANSFER OF THE STORM DRAIN IMPROVEMENT OR DRAINAGE SYSTEM IF CONSTRUCTED. IN ADDITION, ANY REVIEW OF THE HYDROLOGY STUDY FOR OTHER PURPOSES AS MAY BE REQUIRED BY THE LOCAL JURISDICTION MUST BE DONE TO THE SATISFACTION OF THAT JURISDICTION.

CHECKED BY: ____________________ DATE 08/04/2022

REVIEWED UNDER THE SUPERVISION OF: ____________________ DATE 8/4/22

LOS ANGELES COUNTY PUBLIC WORKS
LAND DEVELOPMENT DIVISION

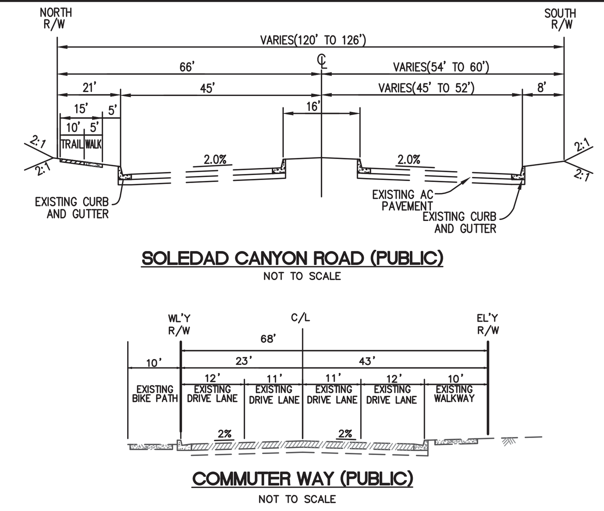
LEGEND:

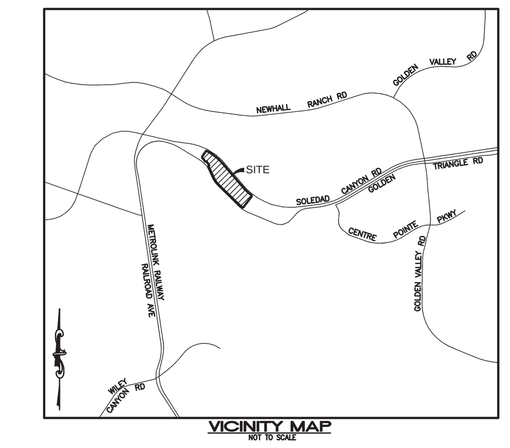
- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- STORM DRAIN LINE (PVT)
- STORM DRAIN LINE (LACFCD)
- MTA DRAIN LINE (PRIVATE)
- LACFCD SD/ACCESS EASEMENT
- LOW FLOW SD LINE (PVT)
- OVERLAND PATH
- FLOWPATH
- SOIL CLASSIFICATION DIVIDING LINE*
- DPA DIVIDING LINE*
- BASIN F (DRAINS TO CULVERT 1)
- BASIN'S D & E (DRAINS TO CULVERT 2)
- BASIN'S A & H (DRAINS TO CULVERT 3)
- XX — SUBAREA NAME
- X.X — SUBAREA ACREAGE (AC)
- EXISTING CONTOURS(MINOR)
- 1100 — EXISTING CONTOURS (MAJOR)
- 1100 — PROPOSED CONTOURS
- PROPOSED TOP/TOE OF SLOPE
- PROPOSED DAYLIGHT
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING CURB
- PROPOSED CURB
- DEBRIS CONE LIMIT
- Q_{25} — DEVELOPED SUBAREA FLOWRATE 25YR (CFS)
- Q_{50B} — UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED (CFS)
- ΣQ — SUM OF SUBAREAS FLOWRATE (CFS)
- ΣQ_{OUT} — ACTUAL FLOWRATE THAT LEAVES THE DEBRIS/DETENTION BASIN PER MODPULS CALCULATION
- $\Sigma Q_{ALLOWABLE}$ — FLOWRATE ALLOWED TO LEAVE DEBRIS/DETENTION BASIN
- A — SUBAREA ACREAGE (AC)
- ΣA — SUM SUBAREAS ACREAGE (AC)
- Tc — TIME OF CONCENTRATION
- DPV — DEBRIS VOLUME PRODUCED IN A GIVEN SUBAREA
- WATER QUALITY TREATMENT BIOFILTRATION BASIN

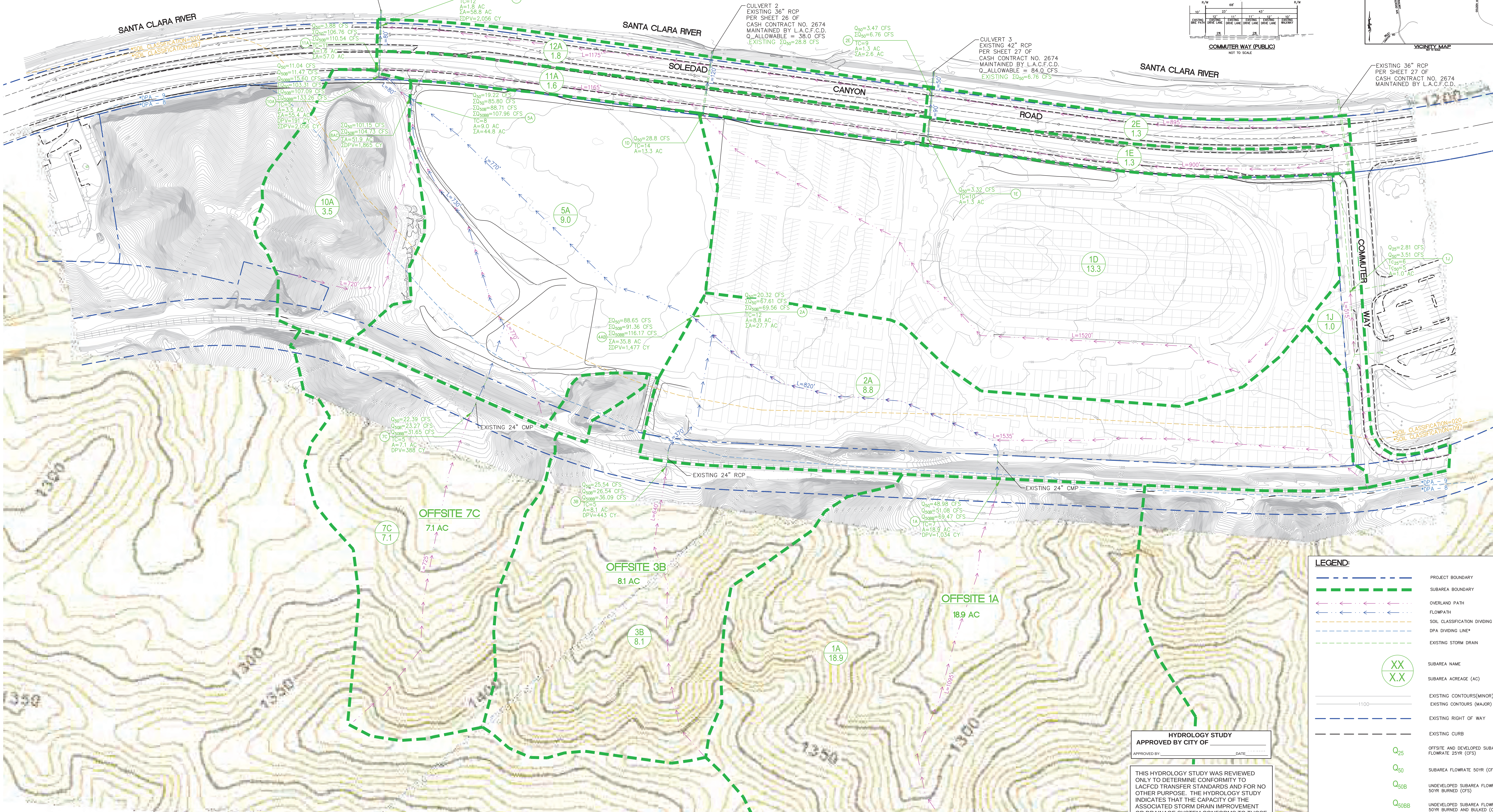
RIVERVIEW

EXISTING CONDITION HYDROLOGY EXHIBIT

7/28/22







SCALE: 1"=80'

NOTE: NOT WITHIN COUNTY ADOPTED FLOODWAY AND NOT WITHIN FEMA FLOOD ZONE "A".

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTEKER
NO. 51929
EXP 6-30-24
CIVIL
STATE OF CALIFORNIA

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CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

BASIN A -EXISTING CONDITION HYDROLOGIC PARAMETERS

SUBAREA	AREA	OVERLAND (Tc)		FLOWPATH		50-Yr RAIN	IMP	SOIL	DPA #	Tc	
		LENGTH	SLOPE	LENGTH	SLOPE					25-YR	50-YR
	ac	ft	ft/ft	ft	ft/ft	in	%			min	min
1A	18.9	1095	0.246	820	0.010	6.8	5	97	8	-	7
2A	8.8	1535	0.018	1.0	0.010	6.8	80	97	9	-	12
3B	8.1	640	0.338	370	0.057	6.8	5	97	8	-	5
4AB				770.0	0.006	6.8		20			
5A	9.0	770	0.042	1.0	0.010		15	20	9	-	8
7C	7.1	725	0.303	730	0.016	6.8	5	97	8	-	5
8AC				80.0	0.063			20			
10A	3.5	720	0.142	15.0	0.004	6.8	5	97	8	-	5
11A	1.6	1165	0.008	80	0.004	6.8	90	20	9	-	11
12A	1.8	1175	0.008	35	0.005	6.8	90	20	9	-	12
1D	13.3	1520	0.008	120	0.009	6.80	90	20	9	-	14
1E	1.3	900	0.009	90.0	0.005	6.8	90	20	9	-	10
2E	1.3	895	0.009	50.0	0.005	6.8	90	20	9	-	9
1J	1.0	515.0	0.029	1.000	0.0100	6.80	85	20	9	6	5

HYDROLOGY STUDY
APPROVED BY CITY OF ______________

APPROVED BY:______________________ DATE__________

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CHECKED BY: ______________ DATE 08/04/2022

REVIEWED UNDER THE SUPERVISION OF: ______________ DATE 8/4/22

LOS ANGELES COUNTY PUBLIC WORKS
LAND DEVELOPMENT DIVISION

LEGEND:

	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	OVERLAND PATH
	FLOWPATH
	SOIL CLASSIFICATION DIVIDING LINE*
	DPA DIVIDING LINE*
	EXISTING STORM DRAIN
XX	SUBAREA NAME
X.X	SUBAREA ACREAGE (AC)
	EXISTING CONTOURS(MINOR)
1100	EXISTING CONTOURS (MAJOR)
	EXISTING RIGHT OF WAY
	EXISTING CURB
Q_{25}	OFFSITE AND DEVELOPED SUBAREA FLOWRATE 25YR (CFS)
Q_{50}	SUBAREA FLOWRATE 50YR (CFS)
Q_{50B}	UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED (CFS)
Q_{50BB}	UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED AND BULKED (CFS)
ΣQ_{50}	SUM OF 50YR SUBAREA FLOWRATES(CFS)
ΣQ_{50B}	SUM OF 50YR DEVELOPED SUBAREAS AND 50YR BURNED UNDEVELOPED SUBAREAS FLOWRATES, DESIGN STORM EVENT (CFS)
ΣQ_{50BB}	SUM OF SUBAREAS DESIGN STORM EVENT FLOWRATES WITH BULKING (CFS)**
A	SUBAREA ACREAGE (AC)
ΣA	SUM SUBAREAS ACREAGE (AC)
Tc & Tc_{50}	TIME OF CONCENTRATION 50YR STORM EVENTS
Tc_{25}	TIME OF CONCENTRATION 25YR STORM EVENT
DPV	DEBRIS PRODUCTION VOLUME (CY)
ΣDPV	SUM OF DEBRIS (CY)**

**DEBRIS VOLUMES AND BULKED FLOWRATES PROVIDED AT KEY LOCATIONS ONLY

I:\CAD\2130\HYDRO & WQT\2130_HYDRO.dwg

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CHECKED BY: ____________ DATE 08/04/2022

REVIEWED UNDER THE SUPERVISION OF: ____________ DATE 8/4/22

LOS ANGELES COUNTY PUBLIC WORKS
LAND DEVELOPMENT DIVISION

HYDROLOGY STUDY
APPROVED BY CITY OF ____________

APPROVED BY: ____________ DATE ____________

HYDROLOGY REPORT

City of Santa Clarita

RIVERVIEW

Tract No. 83605

ESTU2021000659

MTD 1888

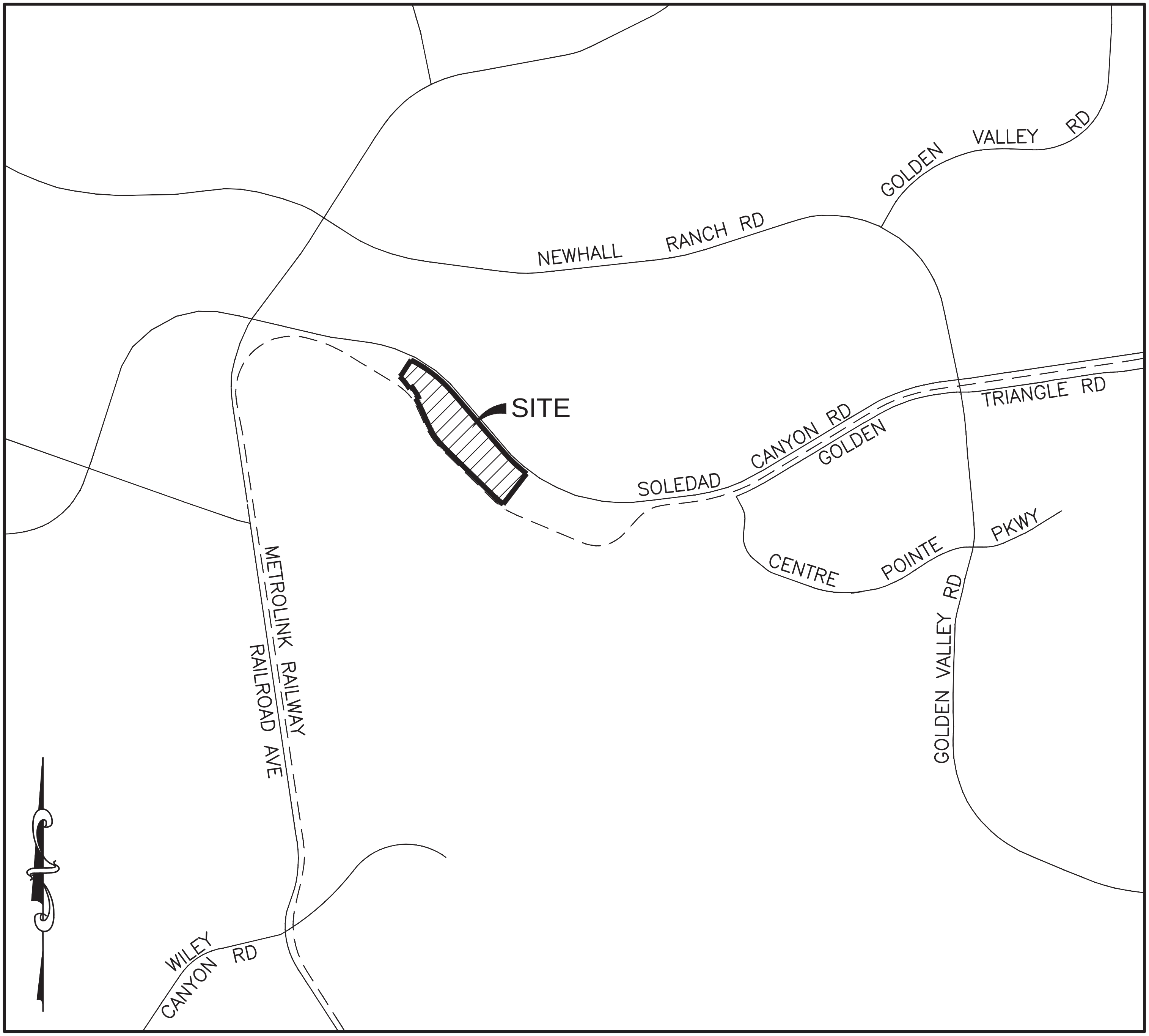
Prepared For:
Integral Communities
888 San Clemente Drive
Newport Beach, CA 92660

Prepared By:
Alliance Land Planning & Engineering, Inc.
2248 Faraday Ave.
Carlsbad, CA 92008

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTEKER
NO. 51929
EXP 6-30-24
CIVIL
STATE OF CALIFORNIA

AUGUST 3, 2022

JN 2130



VICINITY MAP

NOT TO SCALE

Table of Contents

List of Appendices

Project Description

The Riverview project is an approximately 37.7 ac mixed use project located in the City of Santa Clarita. The proposed project includes a commercial site section with parking structure in addition to multi-family residential, park and rec area, access roads, parking, landscaping, and hardscape. The project site is currently undeveloped land, a parking lot, and The Santa Clarita Swap Meet site. The site is bordered by MTA Railroad Tracks to the South, Soledad Canyon Road to the North, and a Metrolink Station to the East.

Methodology

Methods currently outlined in the Los Angeles County Hydrology Manual have been used throughout this study. Time of concentration (TC) values were calculated using County of Los Angeles, HydroCalc software. Flowrates were calculated using the Modified Rational Method and County of Los Angeles approved, LAR04 software. A summary of general hydrologic parameters was taken from the relevant 50-yr, 24-hr isohyetal map is provided in Table 1 below. The map and TC calcs are provided in Appendix B.

Table 1 - General Hydrologic Parameters

Parameter	***Value***
50-yr. 24-Hr Isohyetal Map	Oat Mountain
50-yr Inches of Rainfall (24 Hours)	6.8 in
Soil Classification Area	20 & 97
Debris Potential Area (DPA Zone)	8 & 9

Design Storm Event

The design storm event modeled for this project follows Los Angeles County criteria utilizing a 25-yr storm event for all developed subareas. The offsite hillside subareas to the South use the 50-yr burned storm event.

Existing Condition Drainage

The project site currently sheet flows in a northeast direction and into two existing storm drain pipe culverts that are owned/maintained by the County of Los Angeles (RDD 234, Cash Contract No. 2674). A third pipe also picks up flow for only a section of Soledad Canyon Road. These existing pipe culverts convey stormwater under Soledad Canyon Road and outlet to the Santa Clara River on the North side of Soledad Canyon Road. The southerly offsite hillsides northerly drain towards the railroad and at three locations have inlets on the south side of the railroad tract with basins to collect debris and 24-inch pipes that convey the flow under the railroad. The stormwater then sheet flows across the project site. See Appendix F for the existing RDD 234 pipe plans. Culvert 1 (aka “8 to 9” per RDD 234) and Culvert 2 (aka “10 to 11”) are currently undersized per the Existing condition map in Appendix A while

Culvert 3 (aka “12 to 13”) is oversized but the project site end of the pipe is capped with brick and mortar so that it only inlets catch basin runoff from Soledad Canyon Road.

Proposed Condition Drainage

In the proposed condition, all runoff from the project will be captured in private storm drains and routed through an underground storm drain system which will tie into the existing RDD 234 storm drains. All existing offsite stormwater will be kept in separate, underground lines that will also connect to the three RDD 234 pipes. Prior to connecting to RDD 234, onsite first-flush runoff from the project site will be treated in a water quality treatment (WQT) biofiltration basin proposed for the project.

Results

Table 2 shows a summary of developed condition Flows vs RDD 234 Allowable Flowrates. Developed condition flowrates include offsite flows.

Table 2 – DEVELOPED PROJECT FLOWRATES VS RDD 234 Pipe Culvert Capacities

CULVERT # PER DEV HYDRO EXHIBIT	DEV PROJECT FLOWRATE	CULVERT ALLOWABLE FLOWRATE
	CFS	CFS
CULVERT 1 (6F)	47.73	50
CULVERT 2 (4G)	29.22	38
CULVERT 3 (7H)	70.79	84

Debris/Detention Basins

Runoff from the natural hillside south of the railway will be conveyed into 3 debris basins. Two of the debris basins will also serve as detention facilities due to the downstream Q_Allowable restrictions. These two basins are designed with a flow restricting plates in the connection of the desilting perforated riser pipe to the debris wall/outlet structure. Two ModPuls calculations were done per basin, to accurately size and simulate the basins, to ensure the correct outflow. The first run was done under the assumption that the debris basins are empty.

The second ModPuls run is done under the assumption that the debris basin was not properly maintained and is filled with half the required debris prior to the design storm event. Per ModPuls both basins work within their design parameters and flowrates leaving the basin are below the max allowable.

Hydromodification

This project discharges to Los Angeles County Flood Control District maintained RDD 234 which discharges directly to the Santa Clarita River. Since the project outlets directly to the Santa Clarita River, the project is exempt from any additional hydromod.

Water Quality Treatment

Water quality aspects of this project are covered separately in detail within the SUSMP/LID Report which will be reviewed by the City of Santa Clarita. Water quality treatment will be achieved via a biofiltration basin. See the SUSMP report for additional info and details. The WQT basin is not to be maintained by LACFCD. Water quality aspects are not to be reviewed by LACFCD.

Conclusion

The proposed project conveys storm water runoff into LACFCD's RDD 234 under Soledad Commercial Road to the Santa Clarita River. Additionally, runoff from existing offsite areas south of the MTA Railroad is conveyed through the site and into the existing RDD 234 pipe culverts. Based on the Q_Allowable of the three existing pipe culverts per RDD 234 they can adequately convey the developed condition stormwater flow from this project.

APPENDIX A

HYDROLOGY MAPS

RIVERVIEW
DEVELOPED CONDITION HYDROLOGY EXHIBIT
8/3/22

MTD 1888

ESTU2021000659

TRACT NO. 83605

EXISTING VS DEVELOPED CONDITION FLOWRATES						
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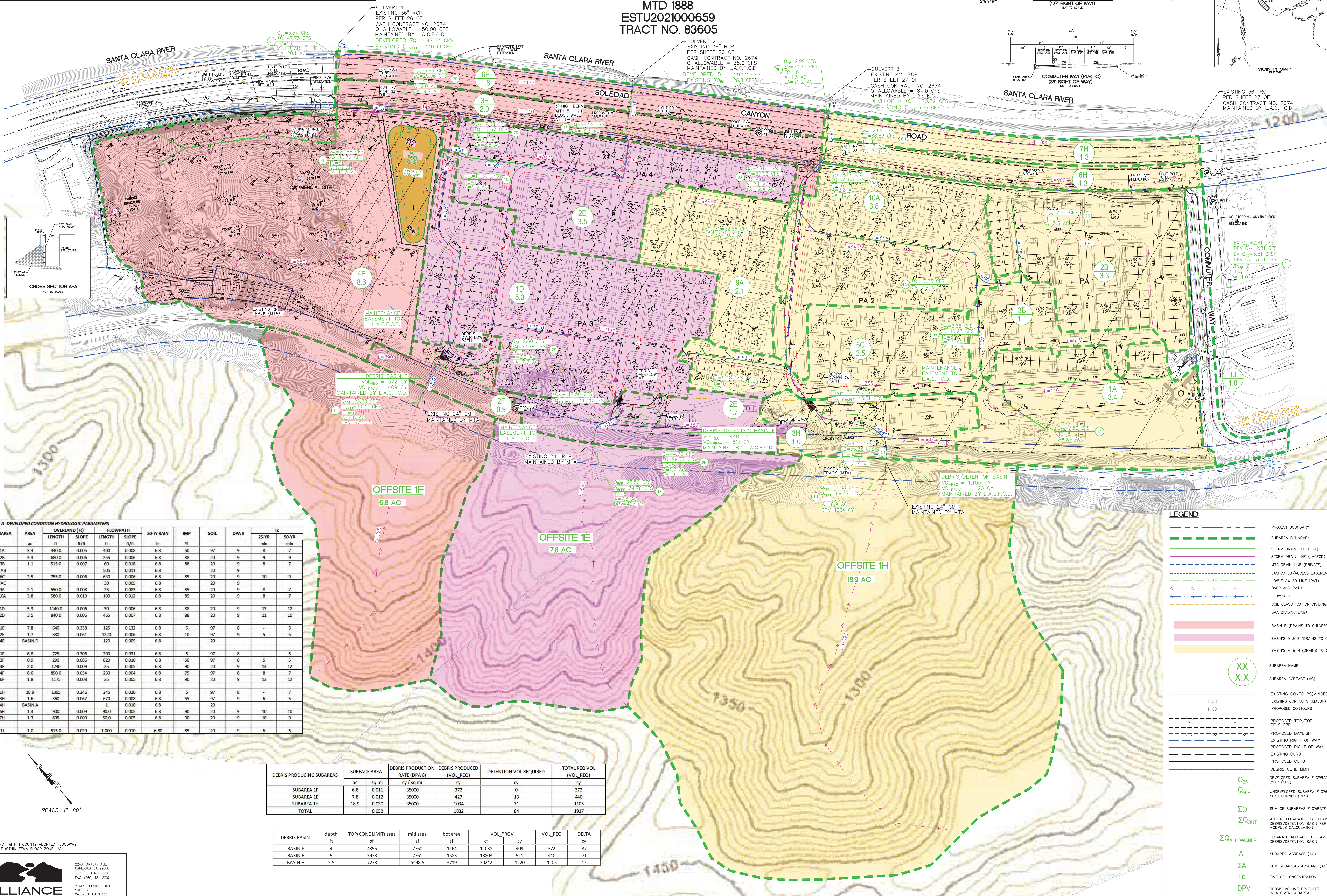

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2E	1.7	380	0.061	1220	0.006	6.8	10	97	9	5	5
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4F	8.6	850.0	0.034	230	0.004	6.8	75	97	8	8	7
6F	1.8	1175	0.008	35	0.005	6.8	90	20	9	13	12
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SCALE: 1"=80'

DEBRIS PRODUCING SUBAREAS	SURFACE AREA		DEBRIS PRODUCTION RATE (DPA 8)	DEBRIS PRODUCED (VOL_REQ)	DETENTION VOL REQUIRED	TOTAL REQ VOL (VOL_REQ)
	ac	sq mi	cy / sq mi	cy	cy	cy
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TOTAL		0.052		1832	84	1917

DEBRIS BASIN	depth	TOP(CONE LIMIT) area	mid area	bot area	VOL_PROV		VOL_REQ	DELTA
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LEGEND:

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- STORM DRAIN LINE (PVT)
- STORM DRAIN LINE (LACFCD)
- MTA DRAIN LINE (PRIVATE)
- LACFCD SD/ACCESS EASEMENT
- LF — LOW FLOW SD LINE (PVT)
- OVERLAND PATH
- FLOWPATH
- SOIL CLASSIFICATION DIVIDING LINE*
- DPA DIVIDING LINE*
- BASIN F (DRAINS TO CULVERT 1)
- BASIN'S D & E (DRAINS TO CULVERT 2)
- BASIN'S A & H (DRAINS TO CULVERT 3)
- XX — SUBAREA NAME
- X.X — SUBAREA ACREAGE (AC)
- EXISTING CONTOURS(MINOR)
- 1100 — EXISTING CONTOURS (MAJOR)
- 1100 — PROPOSED CONTOURS
- PROPOSED TOP/TOE OF SLOPE
- PROPOSED DAYLIGHT
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING CURB
- PROPOSED CURB
- DEBRIS CONE LIMIT
- Q_{25} — DEVELOPED SUBAREA FLOWRATE 25YR (CFS)
- Q_{50B} — UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED (CFS)
- ΣQ — SUM OF SUBAREAS FLOWRATE (CFS)
- ΣQ_{OUT} — ACTUAL FLOWRATE THAT LEAVES THE DEBRIS/DETENTION BASIN PER MODPULS CALCULATION
- $\Sigma Q_{ALLOWABLE}$ — FLOWRATE ALLOWED TO LEAVE DEBRIS/DETENTION BASIN
- A — SUBAREA ACREAGE (AC)
- ΣA — SUM SUBAREAS ACREAGE (AC)
- Tc — TIME OF CONCENTRATION
- DPV — DEBRIS VOLUME PRODUCED IN A GIVEN SUBAREA
- WATER QUALITY TREATMENT BIOFILTRATION BASIN

NOTE: NOT WITHIN COUNTY ADOPTED FLOODWAY AND NOT WITHIN FEMA FLOOD ZONE "A".

ALLIANCE
LAND PLANNING & ENGINEERING INC.

2248 FARADAY AVE.
CARLSBAD, CA 92008
TEL: (760) 431-9896
FAX: (760) 431-8802

27413 TOURNEY ROAD
SUITE 120
VALENCIA, CA 91355
TEL: (661) 799-2760

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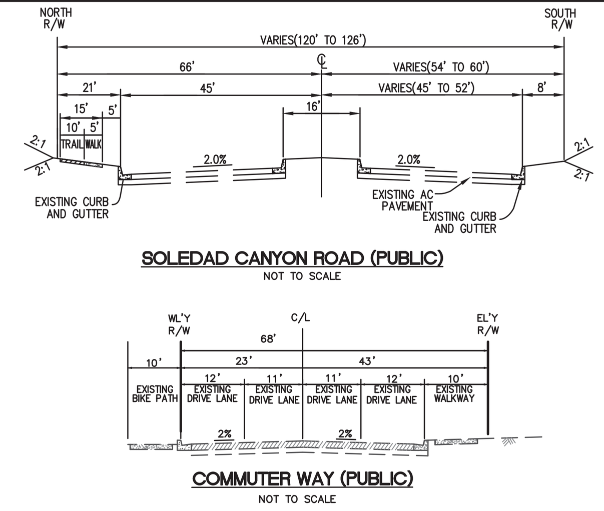
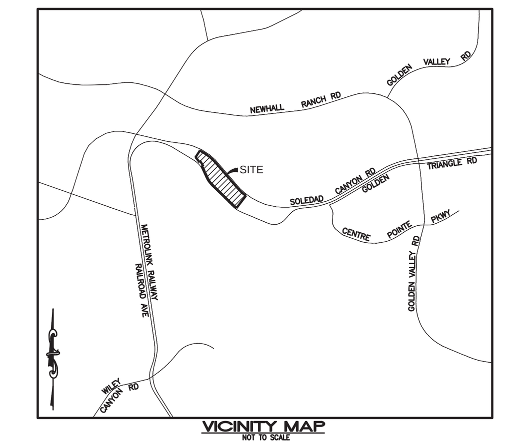
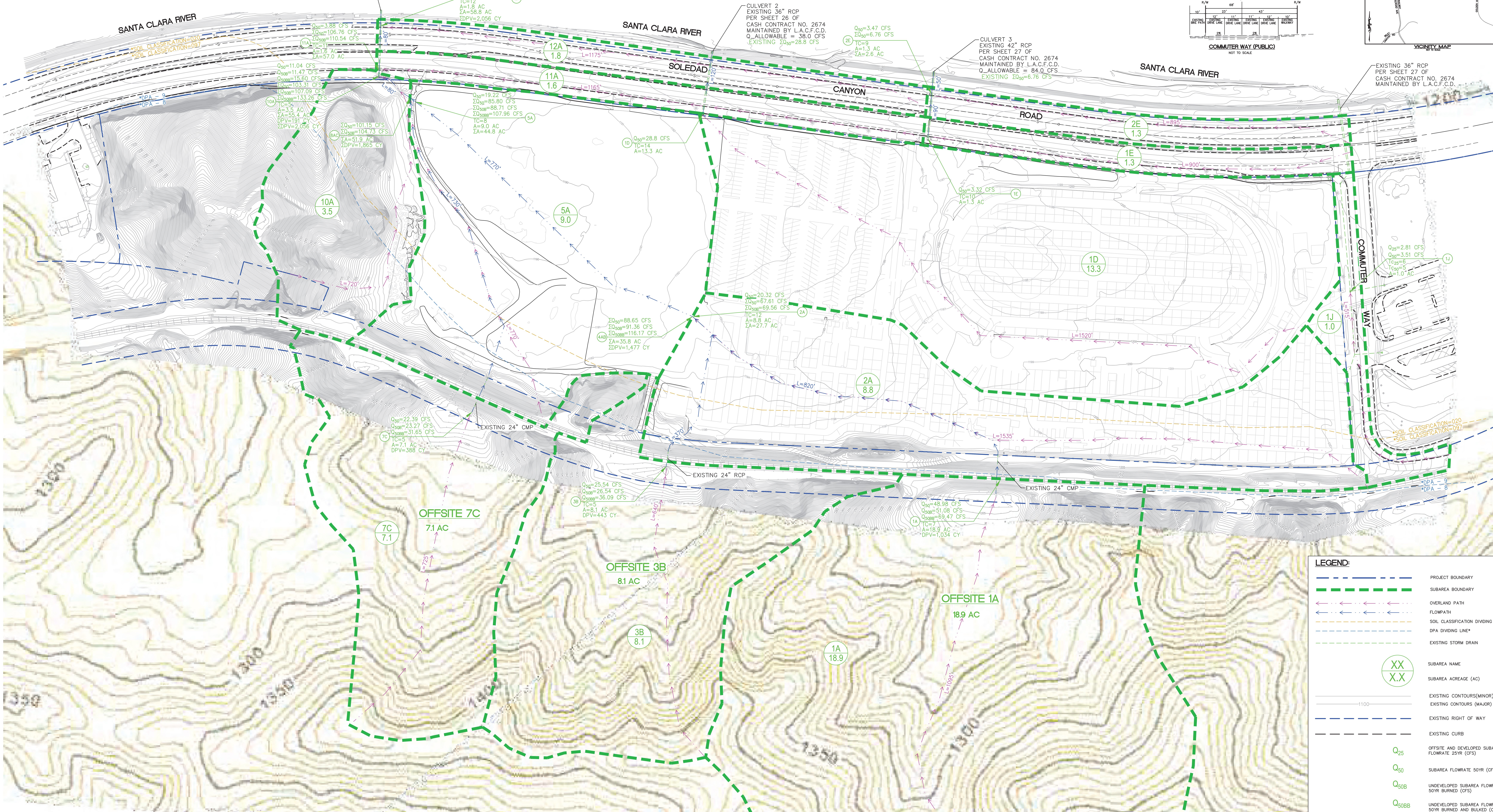
RIVERVIEW
EXISTING CONDITION HYDROLOGY EXHIBIT
7/28/22







SCALE: 1"=80'

NOTE: NOT WITHIN COUNTY ADOPTED FLOODWAY AND NOT WITHIN FEMA FLOOD ZONE "A".

BASIN A -EXISTING CONDITION HYDROLOGIC PARAMETERS											
SUBAREA	AREA	OVERLAND (Tc)		FLOWPATH		50-Yr RAIN	IMP	SOIL	DPA #	Tc	
		LENGTH	SLOPE	LENGTH	SLOPE					25-YR	50-YR
	ac	ft	ft/ft	ft	ft/ft	in	%			min	min
1A	18.9	1095	0.246	820	0.010	6.8	5	97	8	-	7
2A	8.8	1535	0.018	1.0	0.010	6.8	80	97	9	-	12
3B	8.1	640	0.338	370	0.057	6.8	5	97	8	-	5
4AB				770.0	0.006	6.8		20			
5A	9.0	770	0.042	1.0	0.010		15	20	9	-	8
7C	7.1	725	0.303	730	0.016	6.8	5	97	8	-	5
8AC				80.0	0.063			20			
10A	3.5	720	0.142	15.0	0.004	6.8	5	97	8	-	5
11A	1.6	1165	0.008	80	0.004	6.8	90	20	9	-	11
12A	1.8	1175	0.008	35	0.005	6.8	90	20	9	-	12
1D	13.3	1520	0.008	120	0.009	6.80	90	20	9	-	14
1E	1.3	900	0.009	90.0	0.005	6.8	90	20	9	-	10
2E	1.3	895	0.009	50.0	0.005	6.8	90	20	9	-	9
1J	1.0	515.0	0.029	1.000	0.0100	6.80	85	20	9	6	5

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTEKER
NO. 51929
EXP 6-30-24
CIVIL
STATE OF CALIFORNIA

LEGEND:

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- OVERLAND PATH
- FLOWPATH
- SOIL CLASSIFICATION DIVIDING LINE*
- DPA DIVIDING LINE*
- EXISTING STORM DRAIN
- XX — SUBAREA NAME
- X.X — SUBAREA ACREAGE (AC)
- EXISTING CONTOURS(MINOR)
- 1100 — EXISTING CONTOURS (MAJOR)
- EXISTING RIGHT OF WAY
- EXISTING CURB
- Q_{25} — OFFSITE AND DEVELOPED SUBAREA FLOWRATE 25YR (CFS)
- Q_{50} — SUBAREA FLOWRATE 50YR (CFS)
- Q_{50B} — UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED (CFS)
- Q_{50BB} — UNDEVELOPED SUBAREA FLOWRATE 50YR BURNED AND BULKED (CFS)
- ΣQ_{50} — SUM OF 50YR SUBAREA FLOWRATES(CFS)
- ΣQ_{50B} — SUM OF 50YR DEVELOPED SUBAREAS AND 50YR BURNED UNDEVELOPED SUBAREAS FLOWRATES, DESIGN STORM EVENT (CFS)
- ΣQ_{50BB} — SUM OF SUBAREAS DESIGN STORM EVENT FLOWRATES WITH BULKING (CFS)**
- A — SUBAREA ACREAGE (AC)
- ΣA — SUM SUBAREAS ACREAGE (AC)
- Tc & Tc_{50} — TIME OF CONCENTRATION 50YR STORM EVENTS
- Tc_{25} — TIME OF CONCENTRATION 25YR STORM EVENT
- DPV — DEBRIS PRODUCTION VOLUME (CY)
- ΣDPV — SUM OF DEBRIS (CY)**

**DEBRIS VOLUMES AND BULKED FLOWRATES PROVIDED AT KEY LOCATIONS ONLY

ALLIANCE
LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE.
CARLSBAD, CA 92008
TEL: (760) 431-9896
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27413 TOURNEY ROAD
SUITE 120
VALENCIA, CA 91355
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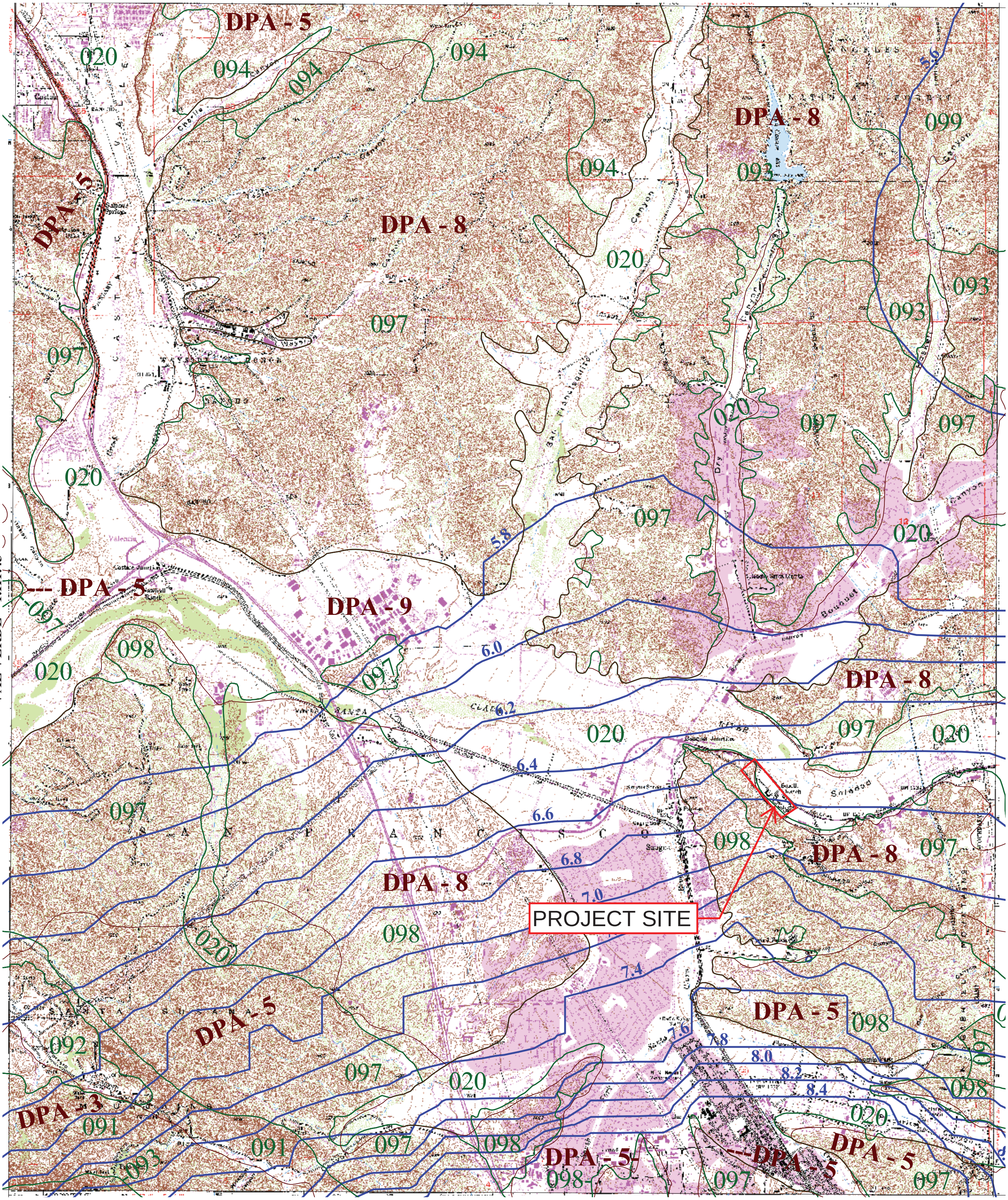
APPENDIX B

HYDROLOGIC DESIGN PARAMETERS



016	SOIL CLASSIFICATION AREA
7.2	INCHES OF RAINFALL
DPA - 6	DEBRIS POTENTIAL AREA

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

N E W H A L L 1-H1.44

50-YEAR 24-HOUR ISOHYET

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

RIVERVIEW

DEVELOPED CONDITION TC's

DESIGN STORM EVENT

Peak Flow Hydrologic Analysis

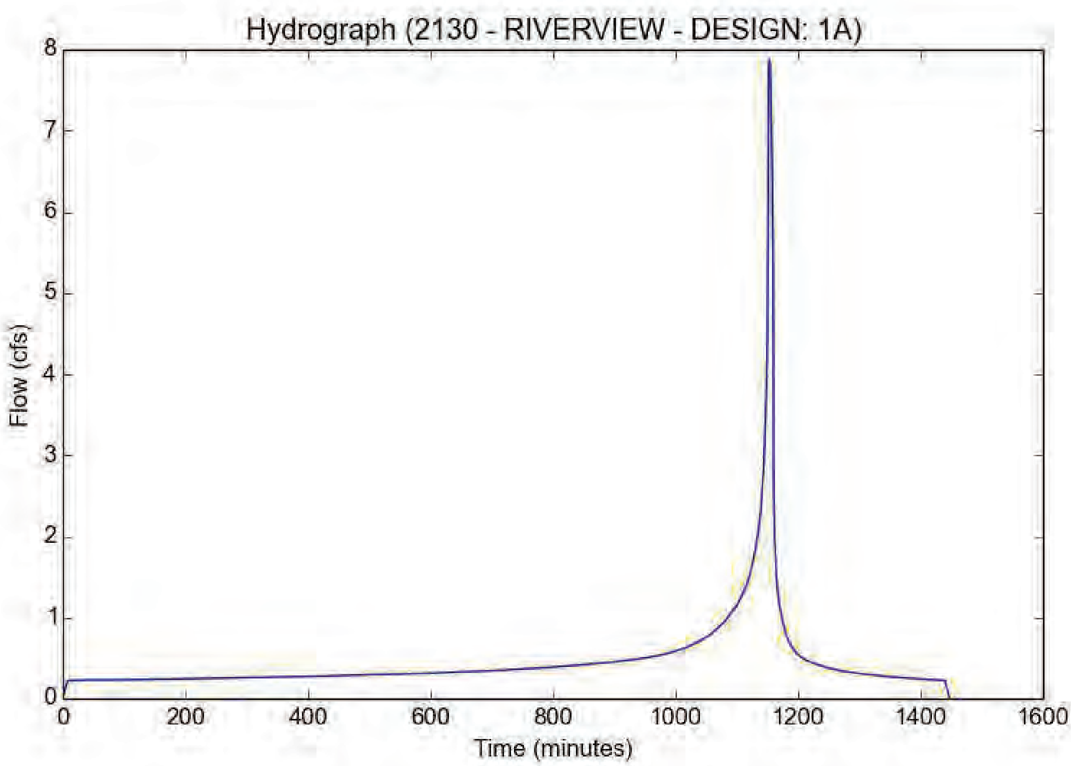
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1A
Area (ac)	3.4
Flow Path Length (ft)	440.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.5
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.8561
Undeveloped Runoff Coefficient (Cu)	0.7229
Developed Runoff Coefficient (Cd)	0.8115
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	7.8798
Burned Peak Flow Rate (cfs)	7.8798
24-Hr Clear Runoff Volume (ac-ft)	0.9282
24-Hr Clear Runoff Volume (cu-ft)	40430.2412



Peak Flow Hydrologic Analysis

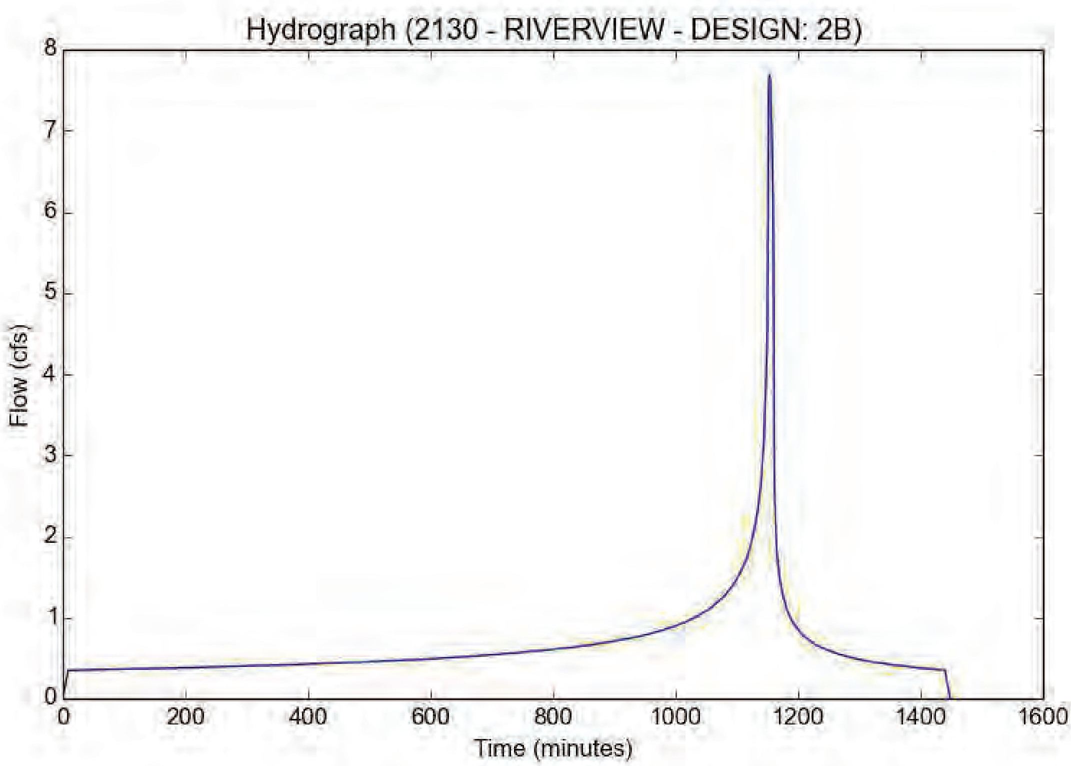
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	2B
Area (ac)	3.3
Flow Path Length (ft)	680.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.7023
Undeveloped Runoff Coefficient (Cu)	0.5796
Developed Runoff Coefficient (Cd)	0.8616
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	7.6829
Burned Peak Flow Rate (cfs)	7.6829
24-Hr Clear Runoff Volume (ac-ft)	1.3221
24-Hr Clear Runoff Volume (cu-ft)	57590.1081



Peak Flow Hydrologic Analysis

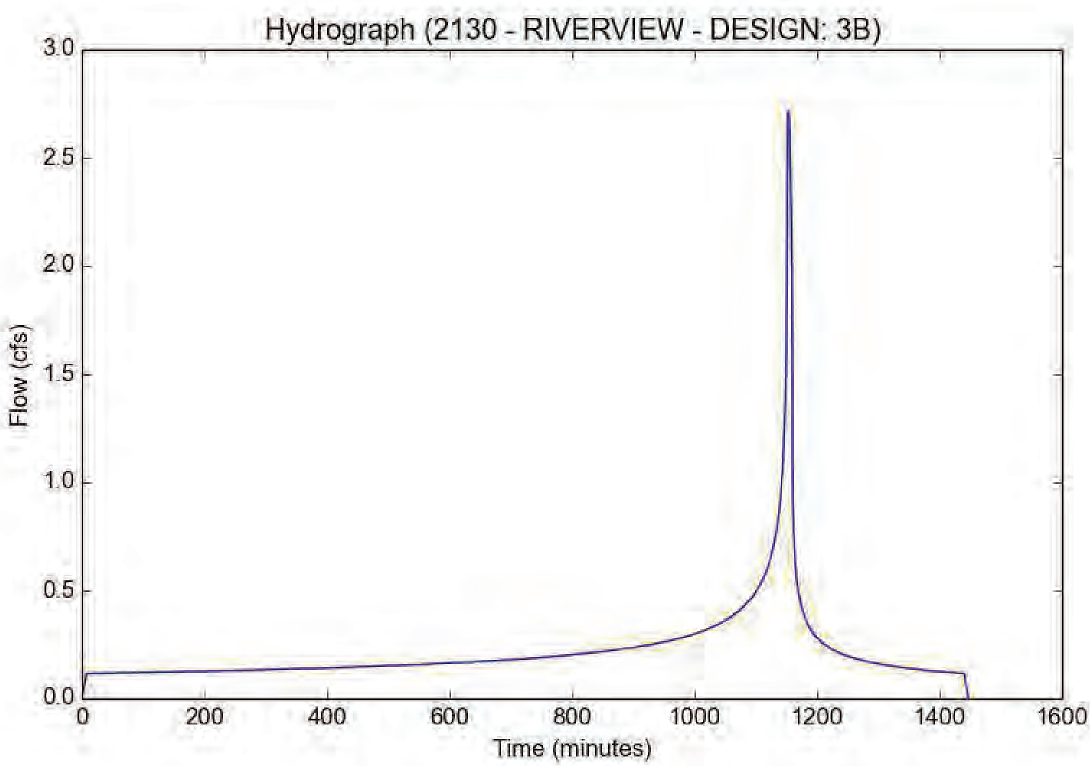
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	3B
Area (ac)	1.1
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.8561
Undeveloped Runoff Coefficient (Cu)	0.5935
Developed Runoff Coefficient (Cd)	0.8632
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	2.712
Burned Peak Flow Rate (cfs)	2.712
24-Hr Clear Runoff Volume (ac-ft)	0.4407
24-Hr Clear Runoff Volume (cu-ft)	19197.5857



Peak Flow Hydrologic Analysis

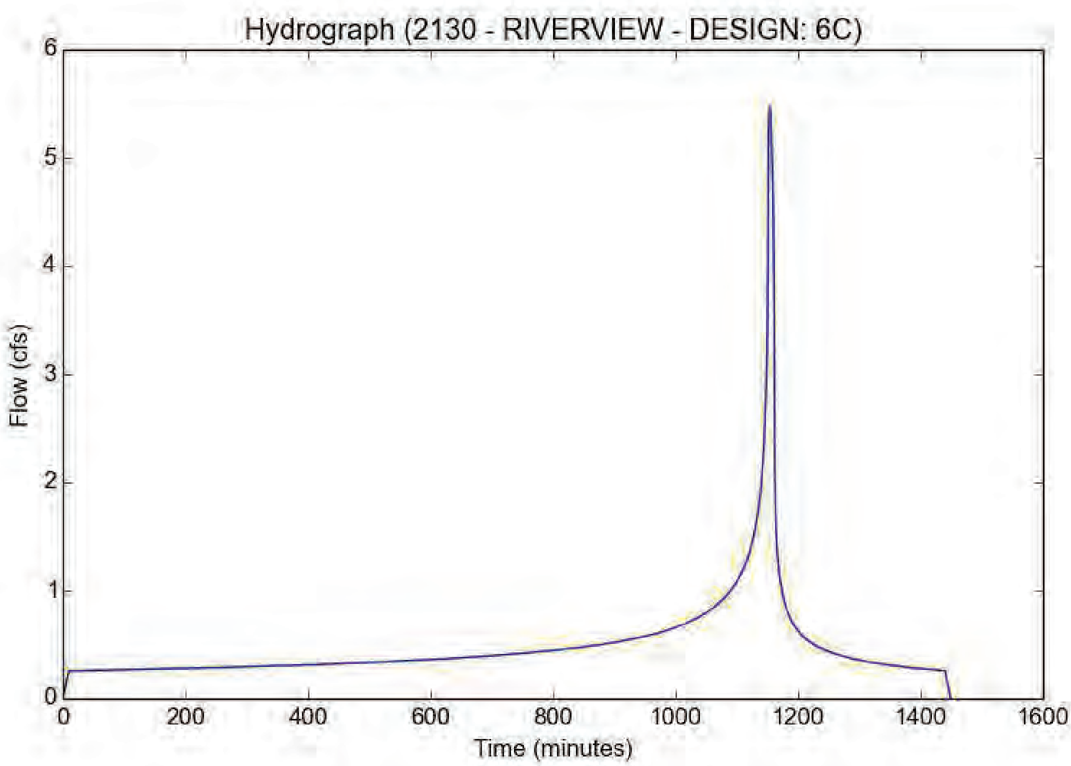
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	6C
Area (ac)	2.5
Flow Path Length (ft)	755.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.5717
Undeveloped Runoff Coefficient (Cu)	0.5678
Developed Runoff Coefficient (Cd)	0.8502
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	5.466
Burned Peak Flow Rate (cfs)	5.466
24-Hr Clear Runoff Volume (ac-ft)	0.9744
24-Hr Clear Runoff Volume (cu-ft)	42443.8433



Peak Flow Hydrologic Analysis

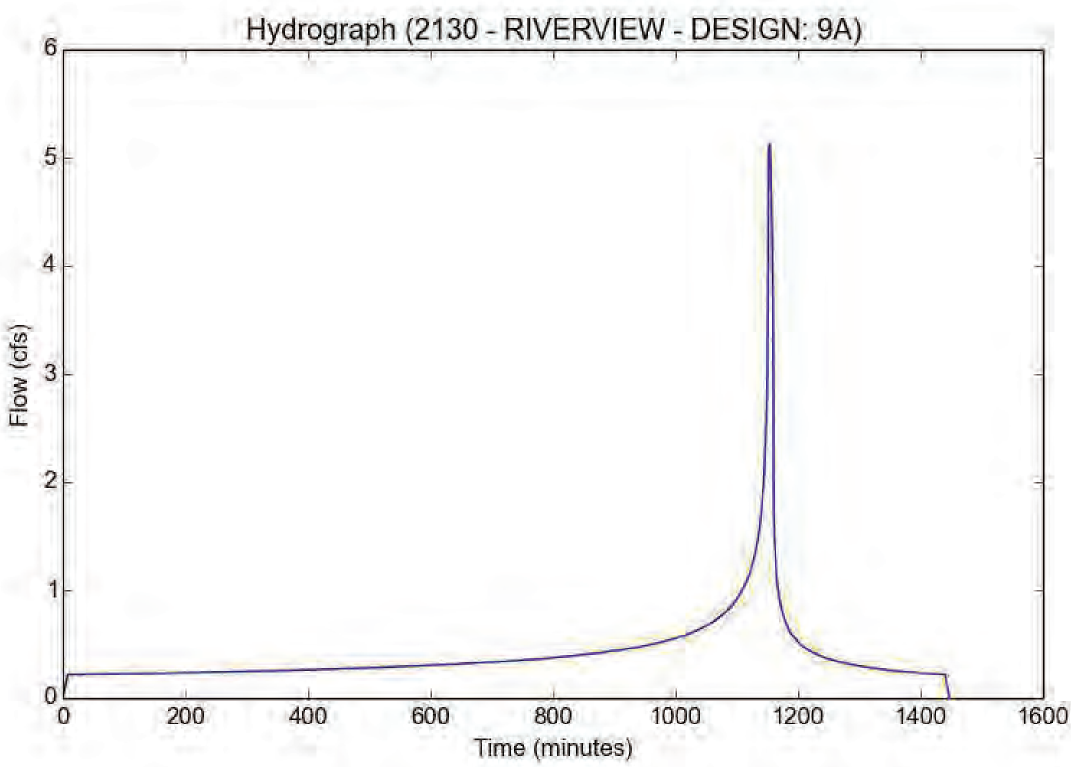
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	9A
Area (ac)	2.1
Flow Path Length (ft)	550.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.8561
Undeveloped Runoff Coefficient (Cu)	0.5935
Developed Runoff Coefficient (Cd)	0.854
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	5.1223
Burned Peak Flow Rate (cfs)	5.1223
24-Hr Clear Runoff Volume (ac-ft)	0.8186
24-Hr Clear Runoff Volume (cu-ft)	35656.7617



Peak Flow Hydrologic Analysis

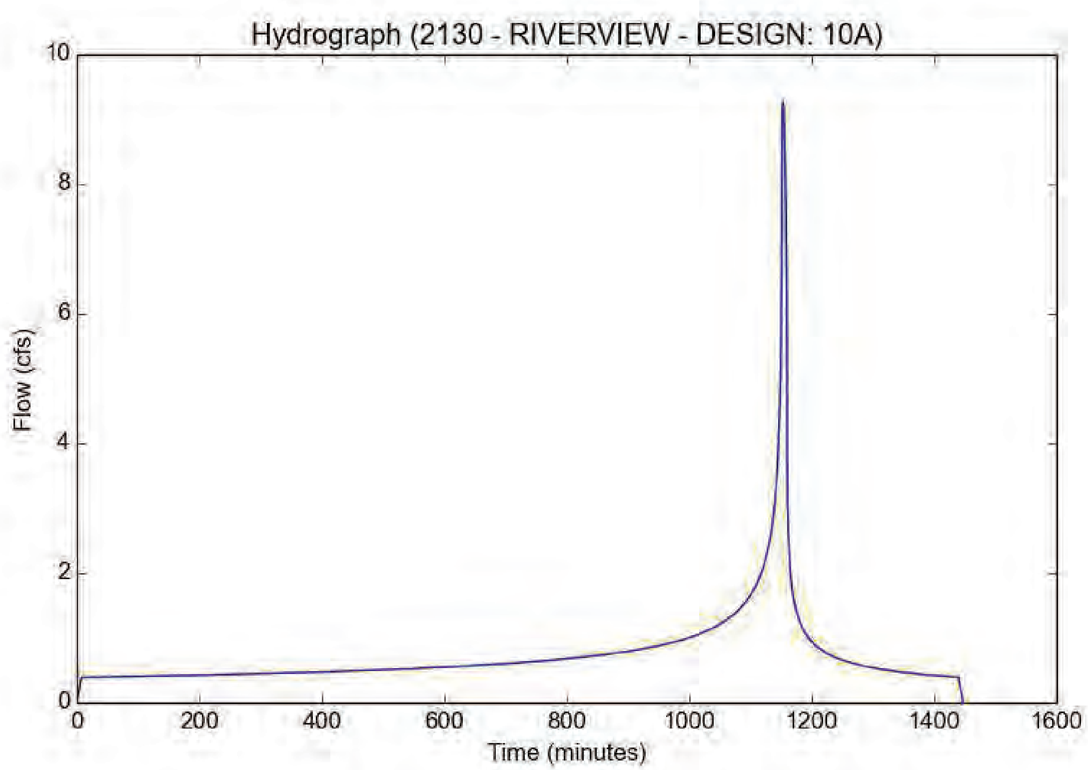
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	10A
Area (ac)	3.8
Flow Path Length (ft)	580.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.8561
Undeveloped Runoff Coefficient (Cu)	0.5935
Developed Runoff Coefficient (Cd)	0.854
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	9.2689
Burned Peak Flow Rate (cfs)	9.2689
24-Hr Clear Runoff Volume (ac-ft)	1.4812
24-Hr Clear Runoff Volume (cu-ft)	64521.7594



Peak Flow Hydrologic Analysis

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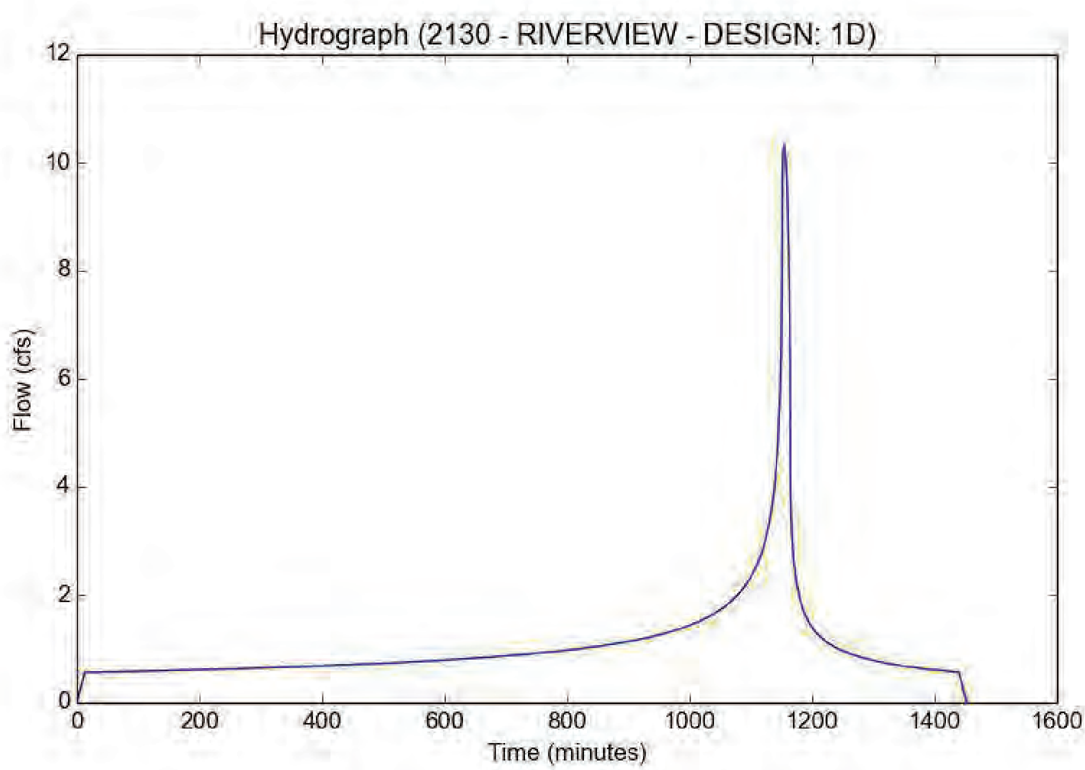
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1D
Area (ac)	5.3
Flow Path Length (ft)	1140.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.2734
Undeveloped Runoff Coefficient (Cu)	0.5408
Developed Runoff Coefficient (Cd)	0.8569
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	10.3246
Burned Peak Flow Rate (cfs)	10.3246
24-Hr Clear Runoff Volume (ac-ft)	2.1231
24-Hr Clear Runoff Volume (cu-ft)	92480.6519



Peak Flow Hydrologic Analysis

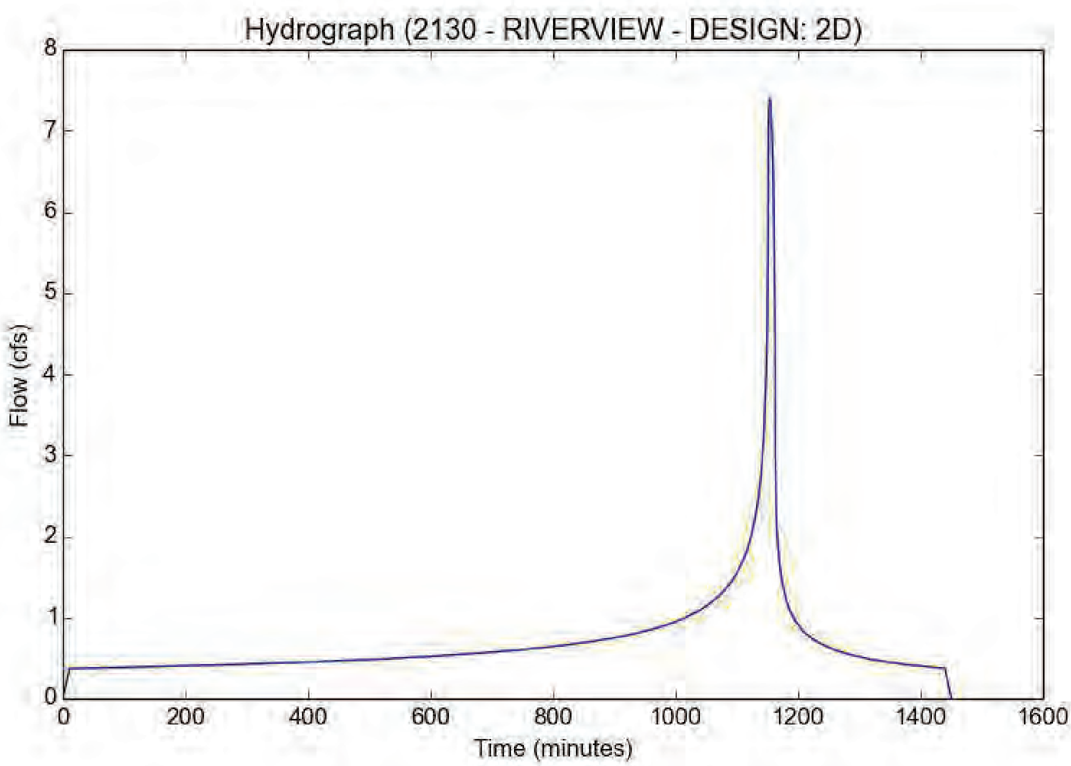
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	2D
Area (ac)	3.5
Flow Path Length (ft)	840.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.4591
Undeveloped Runoff Coefficient (Cu)	0.5576
Developed Runoff Coefficient (Cd)	0.8589
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	7.3924
Burned Peak Flow Rate (cfs)	7.3924
24-Hr Clear Runoff Volume (ac-ft)	1.4021
24-Hr Clear Runoff Volume (cu-ft)	61075.8417



Peak Flow Hydrologic Analysis

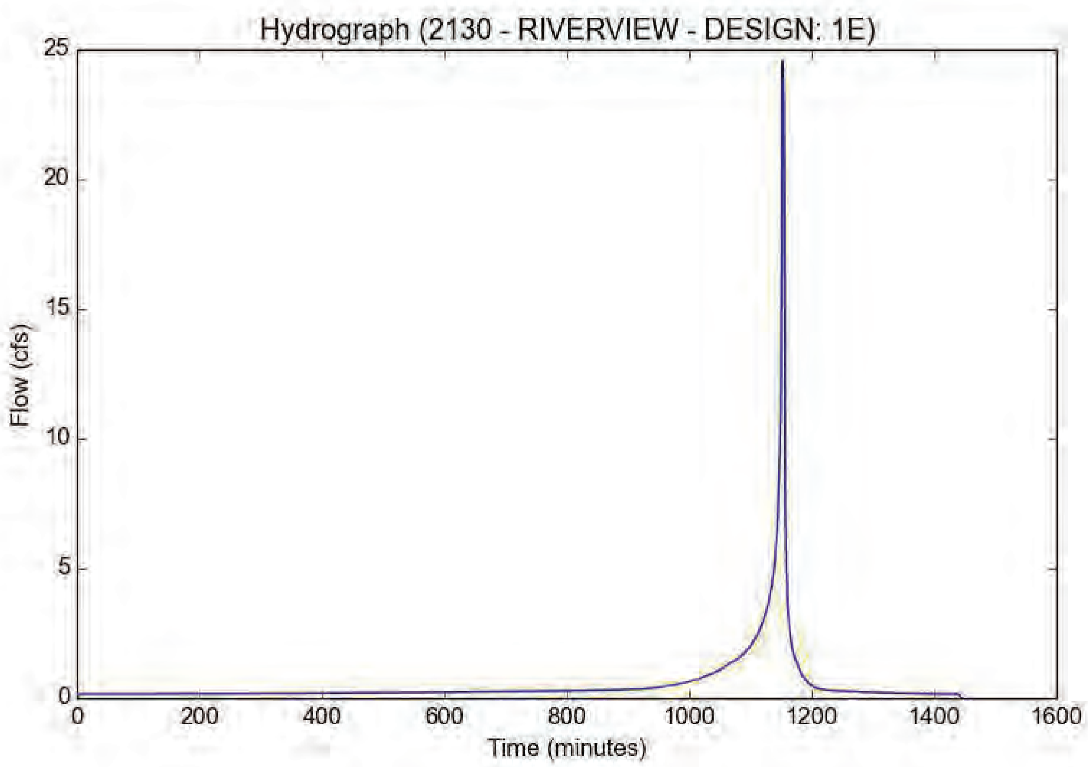
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1E
Area (ac)	7.8
Flow Path Length (ft)	640.0
Flow Path Slope (vft/hft)	0.338
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	24.5614
Burned Peak Flow Rate (cfs)	24.5614
24-Hr Clear Runoff Volume (ac-ft)	1.1298
24-Hr Clear Runoff Volume (cu-ft)	49212.4637



Peak Flow Hydrologic Analysis

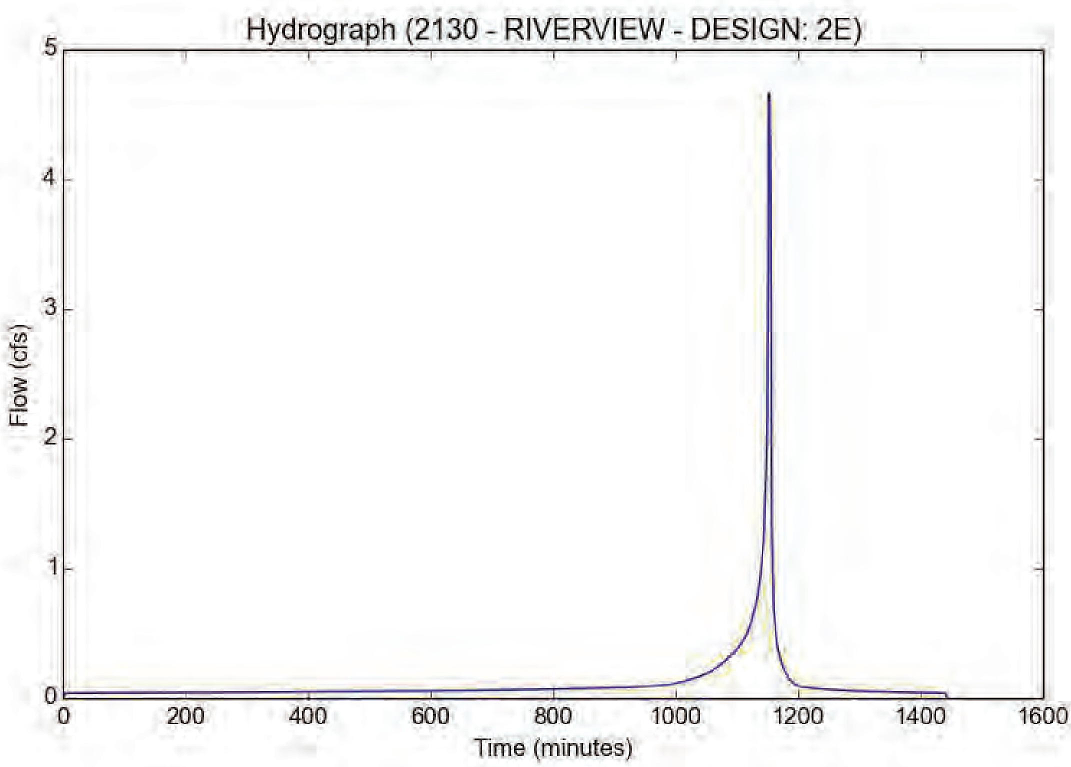
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	2E
Area (ac)	1.7
Flow Path Length (ft)	380.0
Flow Path Slope (vft/hft)	0.061
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.1
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	3.5621
Undeveloped Runoff Coefficient (Cu)	0.7553
Developed Runoff Coefficient (Cd)	0.7698
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.6614
Burned Peak Flow Rate (cfs)	4.6614
24-Hr Clear Runoff Volume (ac-ft)	0.2317
24-Hr Clear Runoff Volume (cu-ft)	10092.0681



Peak Flow Hydrologic Analysis

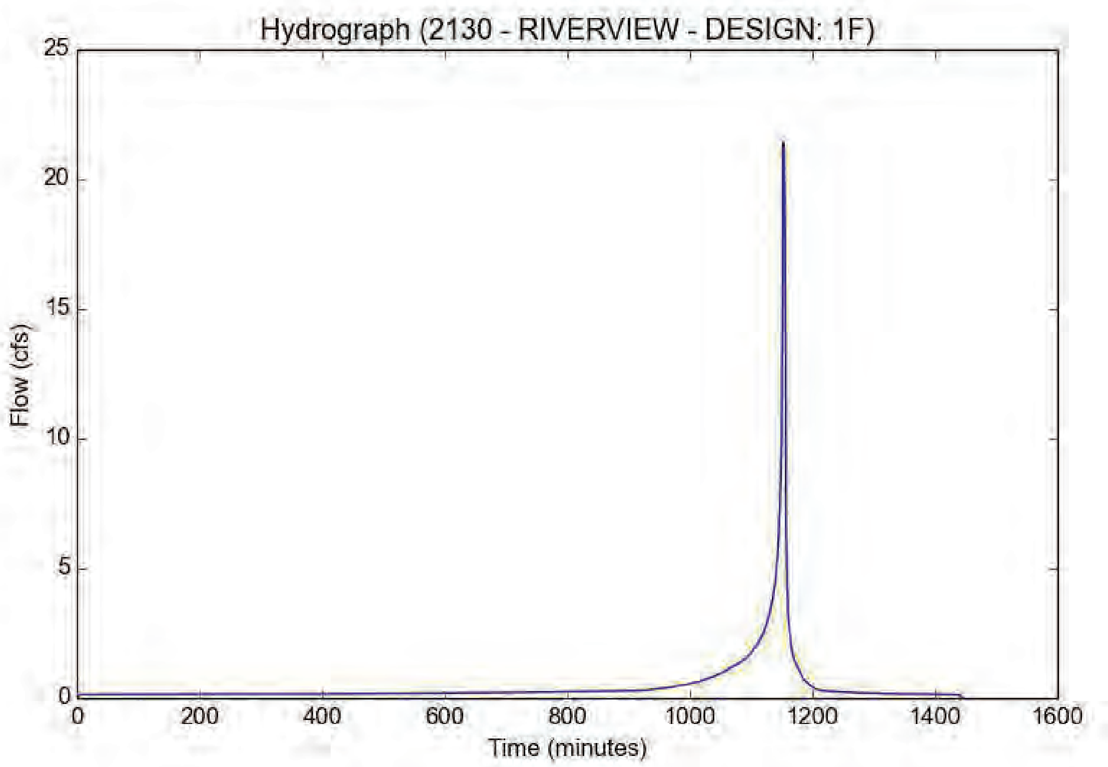
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1F
Area (ac)	6.8
Flow Path Length (ft)	725.0
Flow Path Slope (vft/hft)	0.306
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	21.4125
Burned Peak Flow Rate (cfs)	21.4125
24-Hr Clear Runoff Volume (ac-ft)	0.9849
24-Hr Clear Runoff Volume (cu-ft)	42903.1734



Peak Flow Hydrologic Analysis

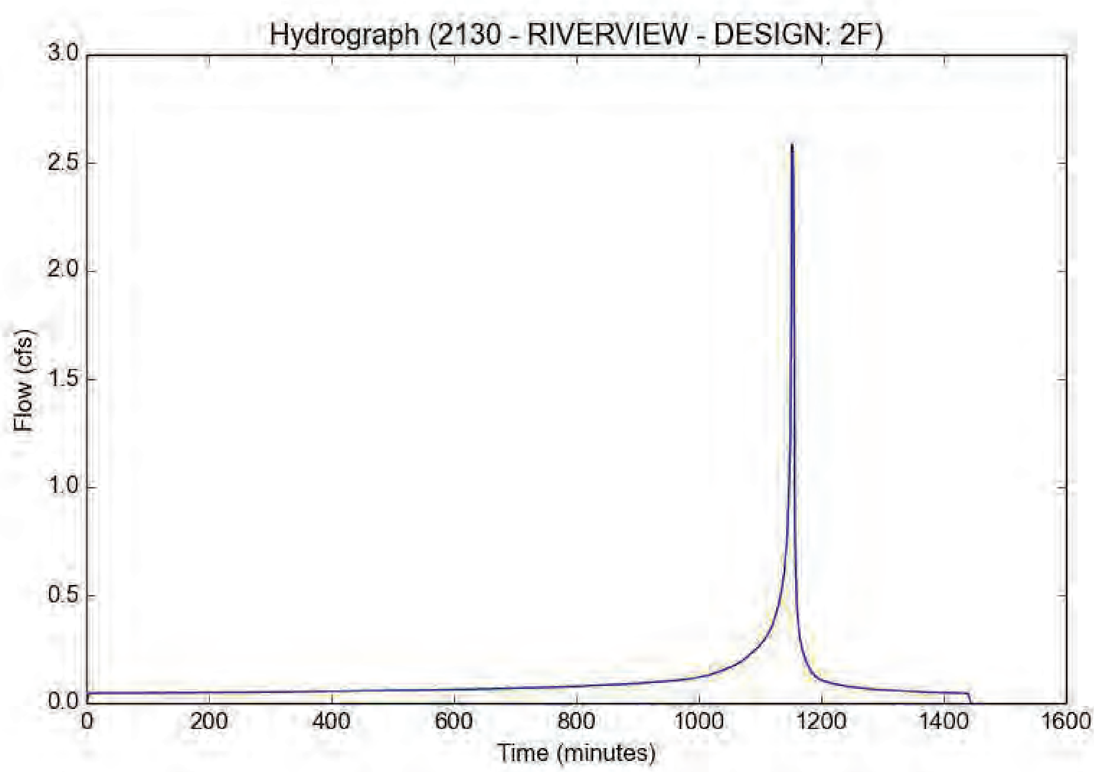
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	2F
Area (ac)	0.9
Flow Path Length (ft)	290.0
Flow Path Slope (vft/hft)	0.086
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.35
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	3.5621
Undeveloped Runoff Coefficient (Cu)	0.7553
Developed Runoff Coefficient (Cd)	0.8059
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.5838
Burned Peak Flow Rate (cfs)	2.5838
24-Hr Clear Runoff Volume (ac-ft)	0.1996
24-Hr Clear Runoff Volume (cu-ft)	8694.7574



Peak Flow Hydrologic Analysis

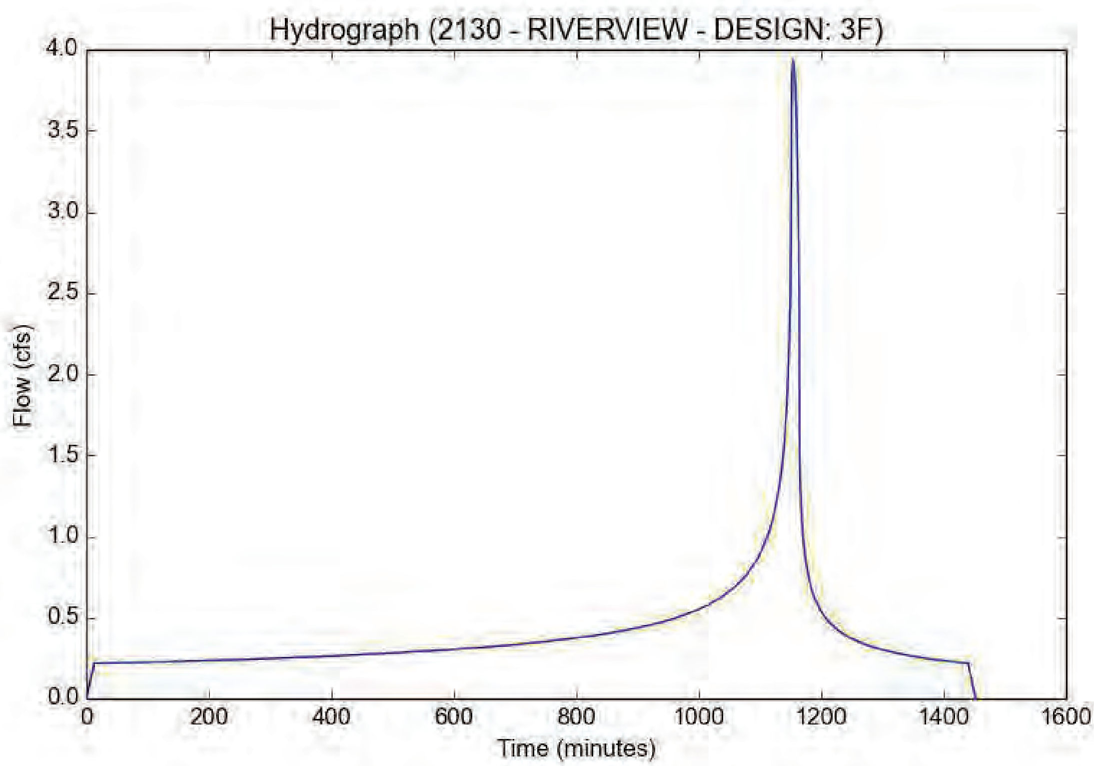
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	3F
Area (ac)	2.0
Flow Path Length (ft)	1240.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.2734
Undeveloped Runoff Coefficient (Cu)	0.5408
Developed Runoff Coefficient (Cd)	0.8641
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	3.9287
Burned Peak Flow Rate (cfs)	3.9287
24-Hr Clear Runoff Volume (ac-ft)	0.8157
24-Hr Clear Runoff Volume (cu-ft)	35530.0117



Peak Flow Hydrologic Analysis

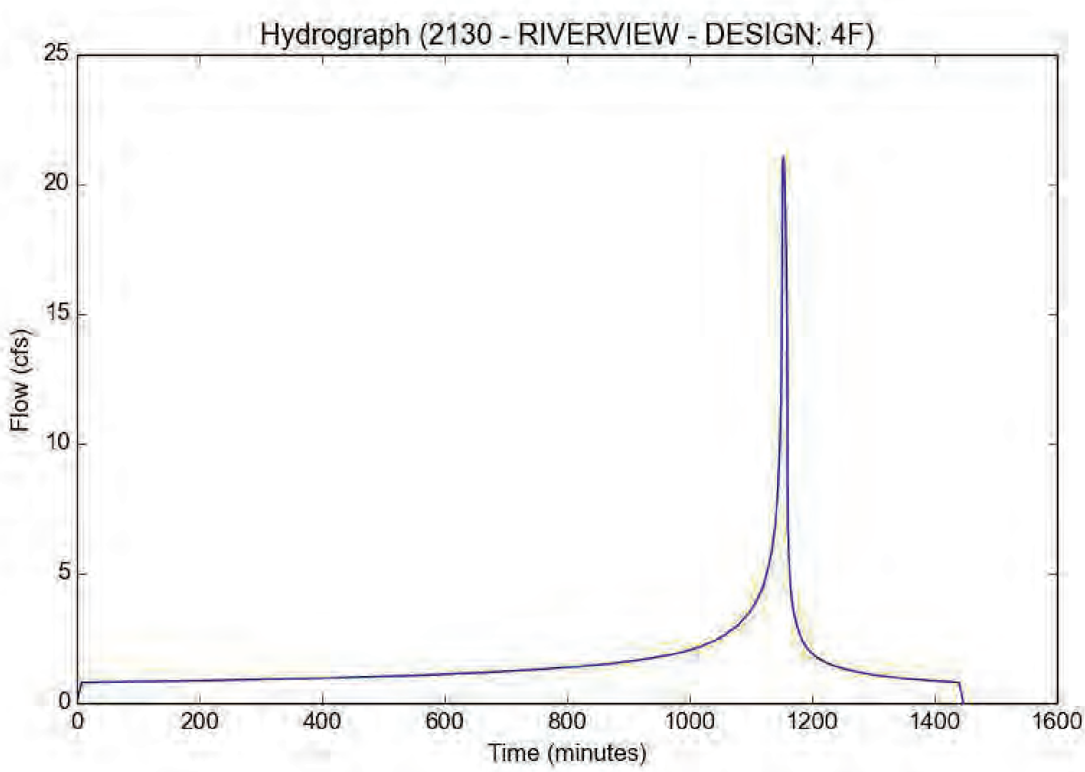
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	4F
Area (ac)	8.6
Flow Path Length (ft)	850.0
Flow Path Slope (vft/hft)	0.034
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.75
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.8561
Undeveloped Runoff Coefficient (Cu)	0.7229
Developed Runoff Coefficient (Cd)	0.8557
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	21.0187
Burned Peak Flow Rate (cfs)	21.0187
24-Hr Clear Runoff Volume (ac-ft)	3.0834
24-Hr Clear Runoff Volume (cu-ft)	134312.0436



Peak Flow Hydrologic Analysis

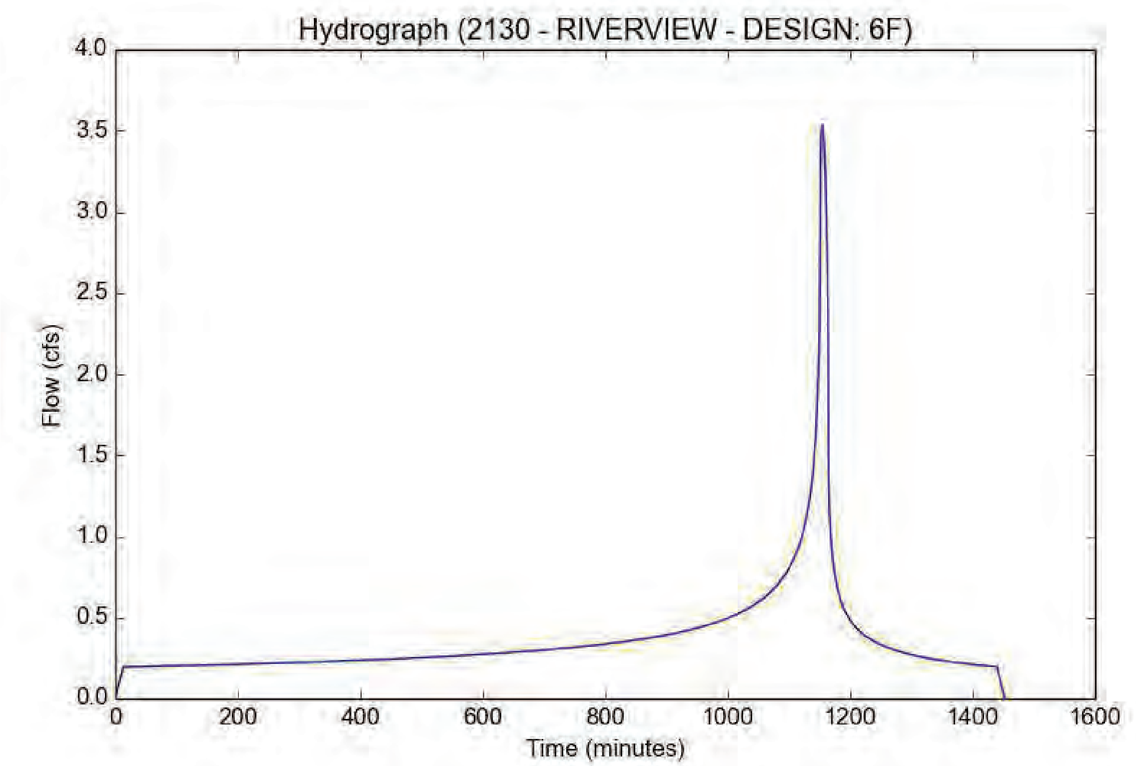
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	6F
Area (ac)	1.8
Flow Path Length (ft)	1175.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.2734
Undeveloped Runoff Coefficient (Cu)	0.5408
Developed Runoff Coefficient (Cd)	0.8641
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	3.5359
Burned Peak Flow Rate (cfs)	3.5359
24-Hr Clear Runoff Volume (ac-ft)	0.7341
24-Hr Clear Runoff Volume (cu-ft)	31977.0106



Peak Flow Hydrologic Analysis

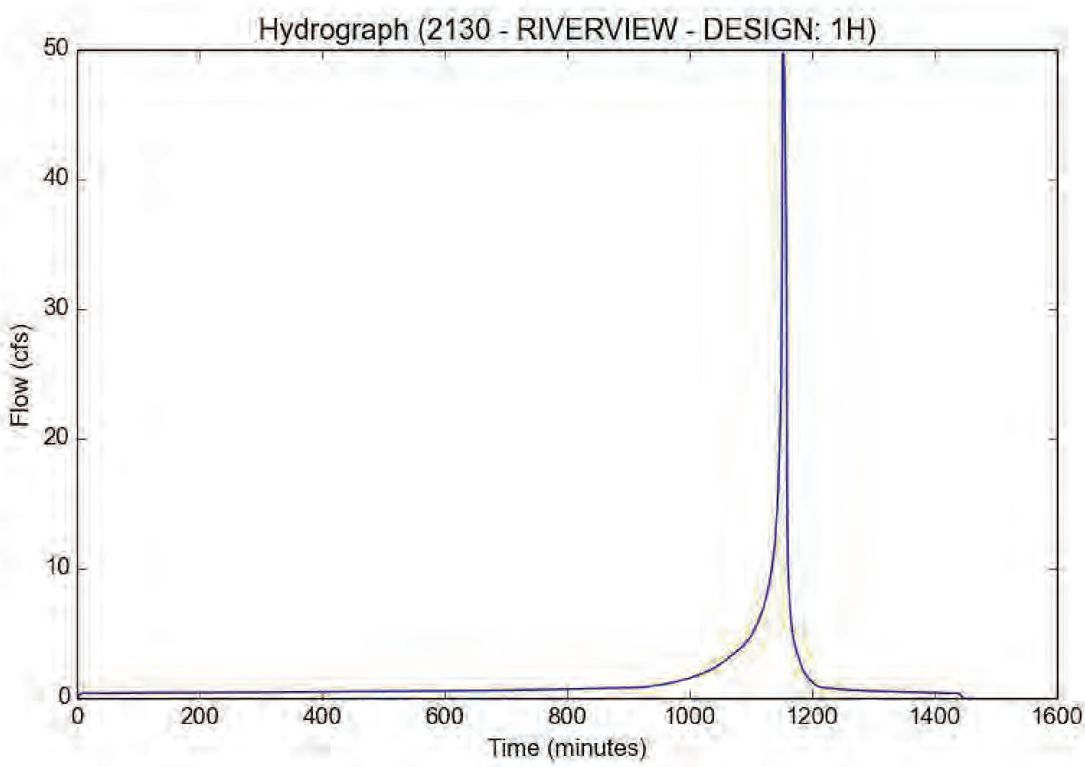
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1H
Area (ac)	18.9
Flow Path Length (ft)	1095.0
Flow Path Slope (vft/hft)	0.246
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.7518
Developed Runoff Coefficient (Cd)	0.7592
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	49.6982
Burned Peak Flow Rate (cfs)	49.6982
24-Hr Clear Runoff Volume (ac-ft)	2.7354
24-Hr Clear Runoff Volume (cu-ft)	119155.2677



Peak Flow Hydrologic Analysis

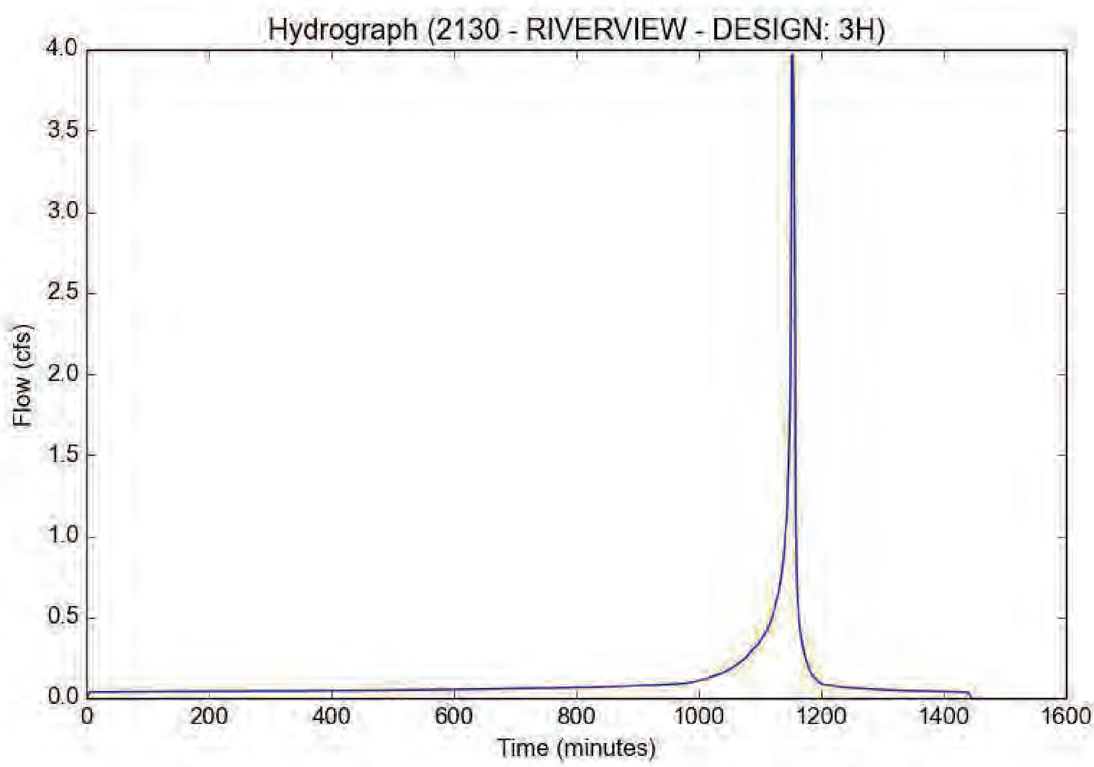
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	3H
Area (ac)	1.6
Flow Path Length (ft)	490.0
Flow Path Slope (vft/hft)	0.043
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.1
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	3.2696
Undeveloped Runoff Coefficient (Cu)	0.7426
Developed Runoff Coefficient (Cd)	0.7583
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.9669
Burned Peak Flow Rate (cfs)	3.9669
24-Hr Clear Runoff Volume (ac-ft)	0.2179
24-Hr Clear Runoff Volume (cu-ft)	9493.2998



Peak Flow Hydrologic Analysis

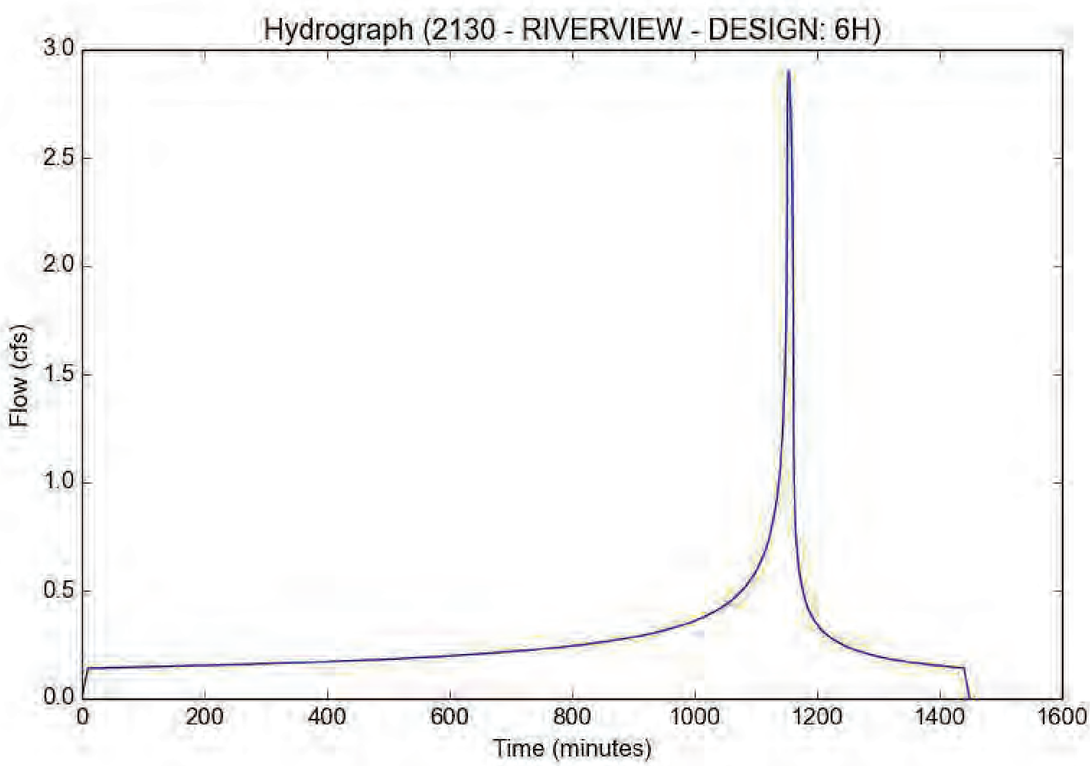
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	6H
Area (ac)	1.3
Flow Path Length (ft)	900.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.5717
Undeveloped Runoff Coefficient (Cu)	0.5678
Developed Runoff Coefficient (Cd)	0.8668
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	2.8978
Burned Peak Flow Rate (cfs)	2.8978
24-Hr Clear Runoff Volume (ac-ft)	0.5302
24-Hr Clear Runoff Volume (cu-ft)	23096.3178



Peak Flow Hydrologic Analysis

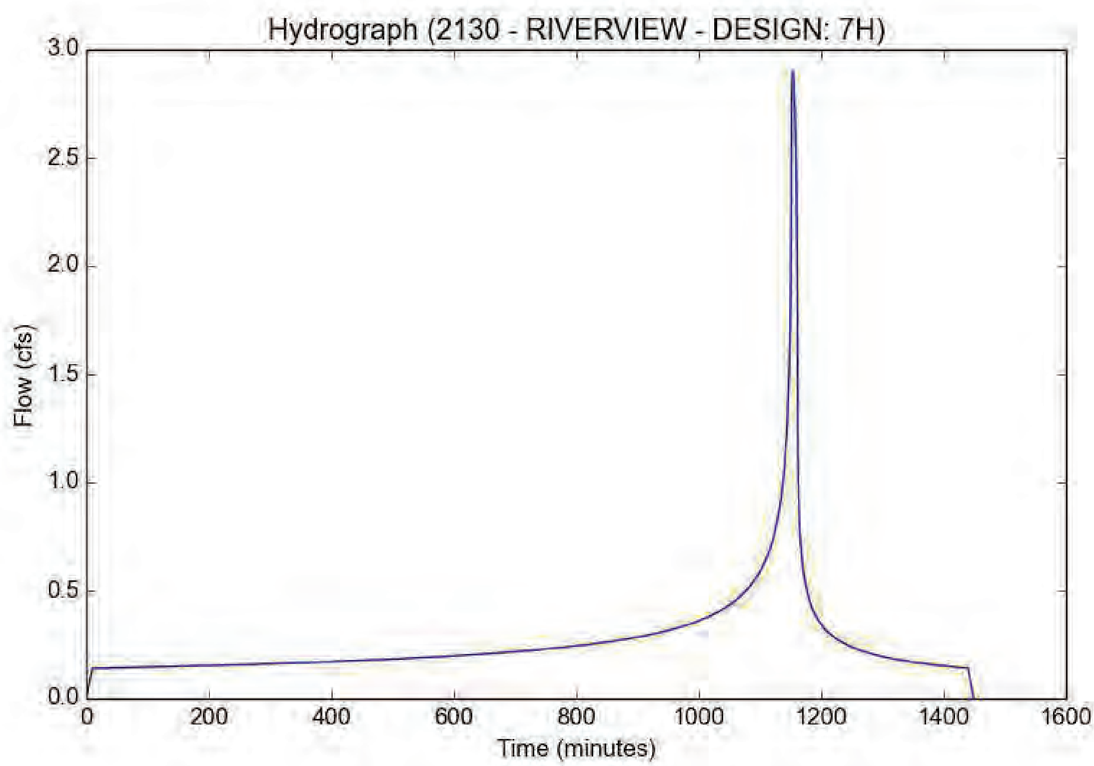
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	7H
Area (ac)	1.3
Flow Path Length (ft)	895.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	2.5717
Undeveloped Runoff Coefficient (Cu)	0.5678
Developed Runoff Coefficient (Cd)	0.8668
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	2.8978
Burned Peak Flow Rate (cfs)	2.8978
24-Hr Clear Runoff Volume (ac-ft)	0.5302
24-Hr Clear Runoff Volume (cu-ft)	23096.3178



Peak Flow Hydrologic Analysis

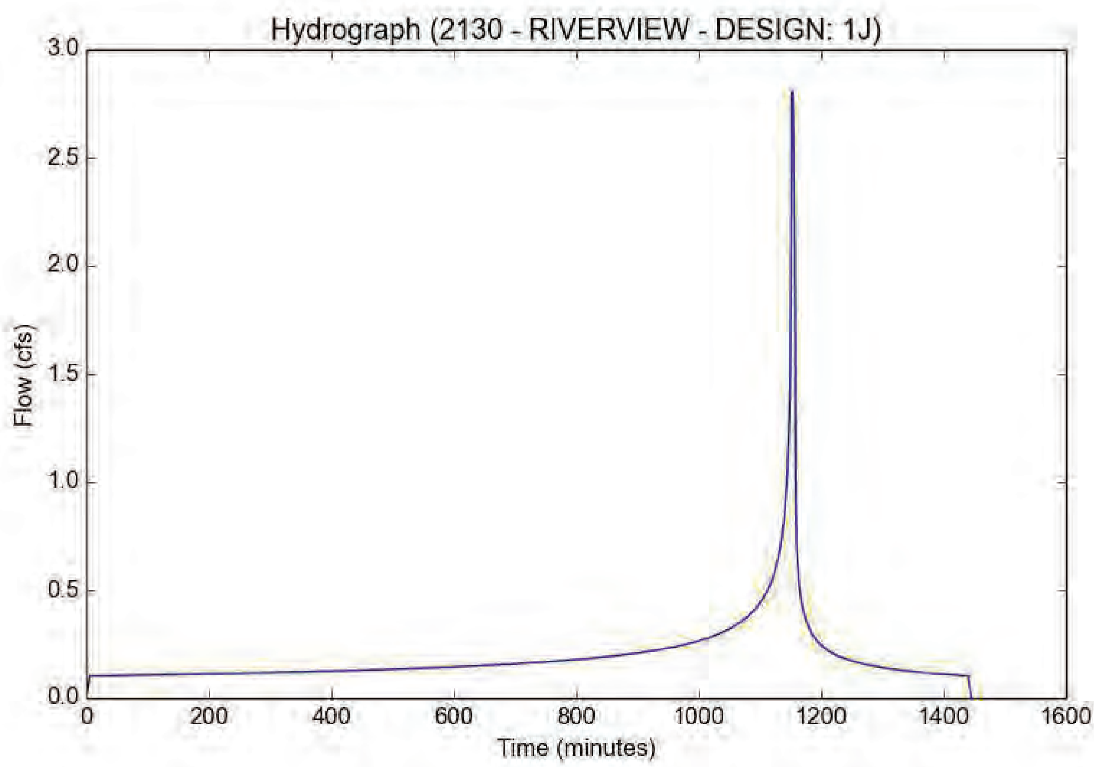
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - DESIGN Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - DESIGN
Subarea ID	1J
Area (ac)	1.0
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.029
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	3.2696
Undeveloped Runoff Coefficient (Cu)	0.6215
Developed Runoff Coefficient (Cd)	0.8582
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	2.806
Burned Peak Flow Rate (cfs)	2.806
24-Hr Clear Runoff Volume (ac-ft)	0.3898
24-Hr Clear Runoff Volume (cu-ft)	16981.3717



RIVERVIEW

DEVELOPED CONDITION TC's

50-YR

Peak Flow Hydrologic Analysis

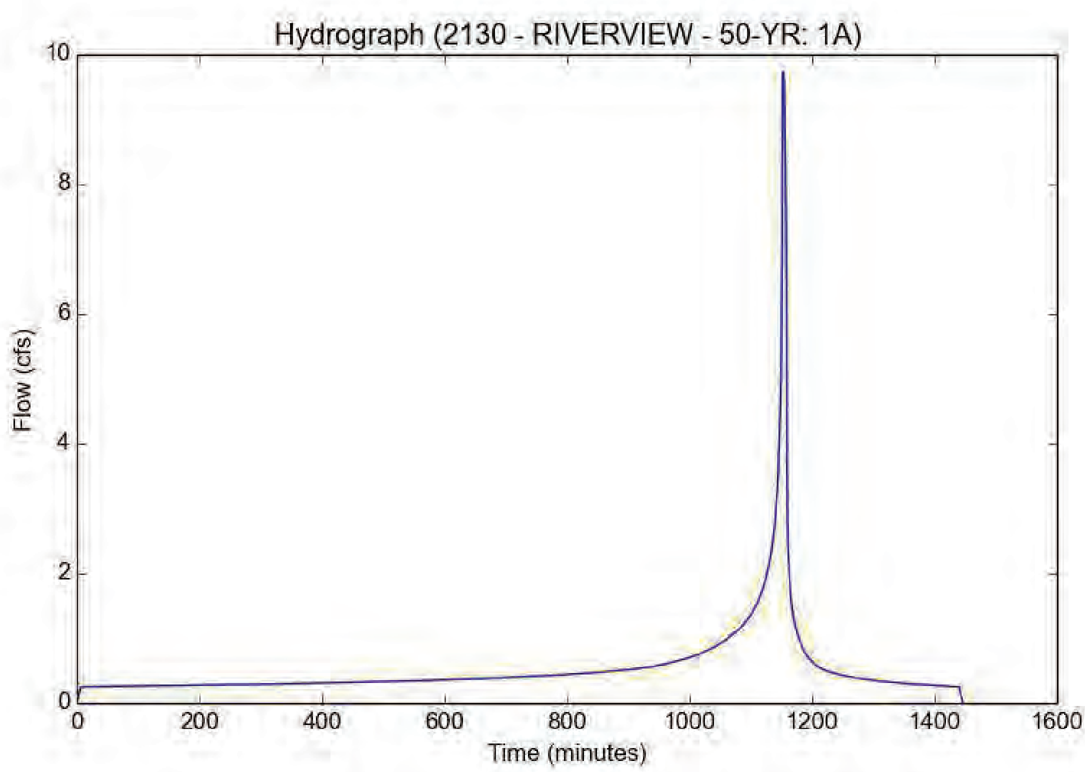
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1A
Area (ac)	3.4
Flow Path Length (ft)	440.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.5
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.7518
Developed Runoff Coefficient (Cd)	0.8259
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	9.7259
Burned Peak Flow Rate (cfs)	9.7259
24-Hr Clear Runoff Volume (ac-ft)	1.0736
24-Hr Clear Runoff Volume (cu-ft)	46764.8951



Peak Flow Hydrologic Analysis

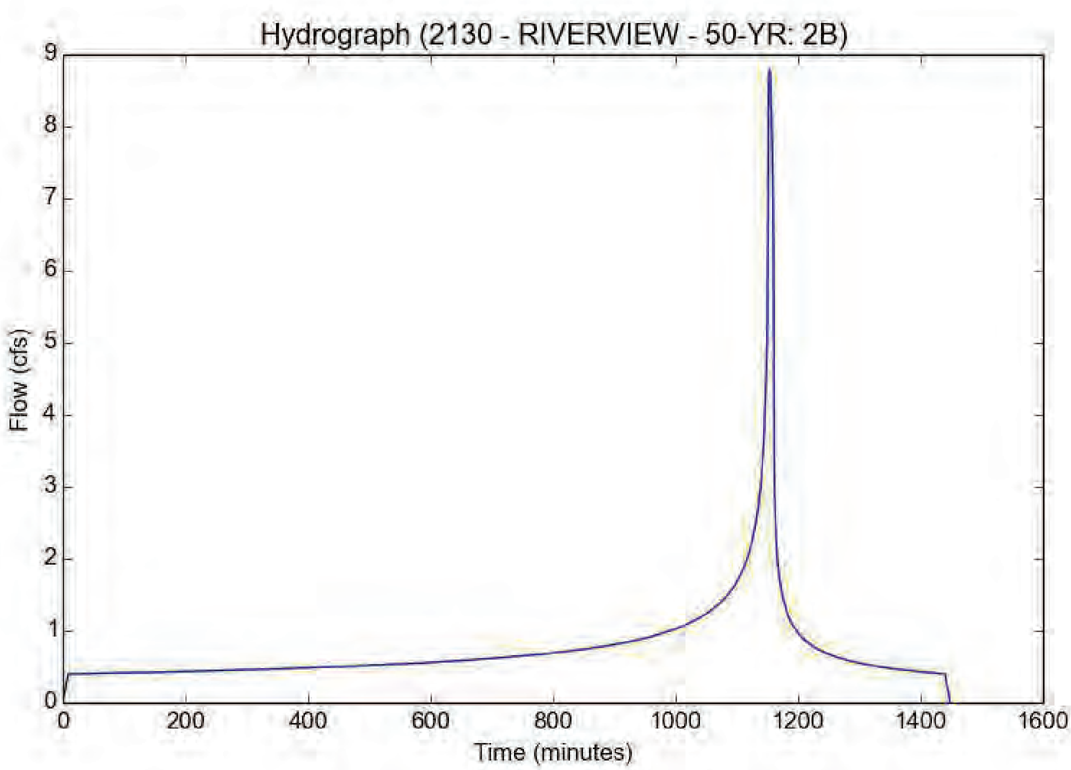
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	2B
Area (ac)	3.3
Flow Path Length (ft)	680.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.0778
Undeveloped Runoff Coefficient (Cu)	0.6109
Developed Runoff Coefficient (Cd)	0.8653
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	8.7885
Burned Peak Flow Rate (cfs)	8.7885
24-Hr Clear Runoff Volume (ac-ft)	1.5083
24-Hr Clear Runoff Volume (cu-ft)	65701.8779



Peak Flow Hydrologic Analysis

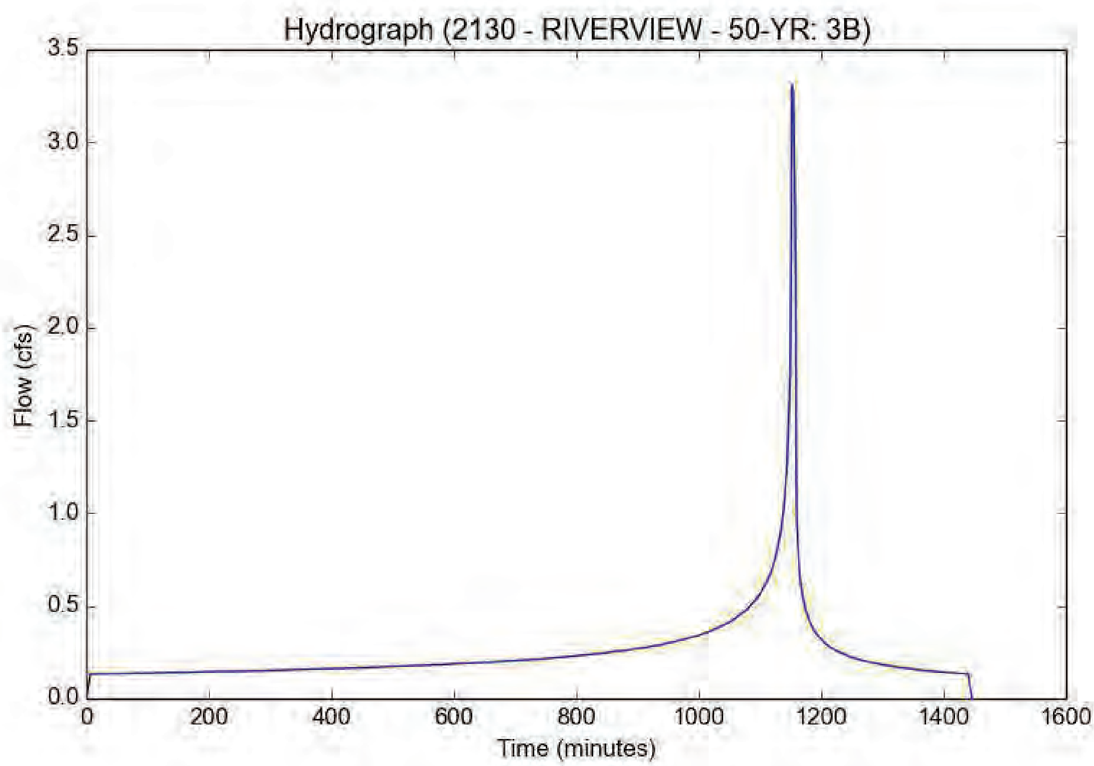
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	3B
Area (ac)	1.1
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.6323
Developed Runoff Coefficient (Cd)	0.8679
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	3.3066
Burned Peak Flow Rate (cfs)	3.3066
24-Hr Clear Runoff Volume (ac-ft)	0.5028
24-Hr Clear Runoff Volume (cu-ft)	21901.9997



Peak Flow Hydrologic Analysis

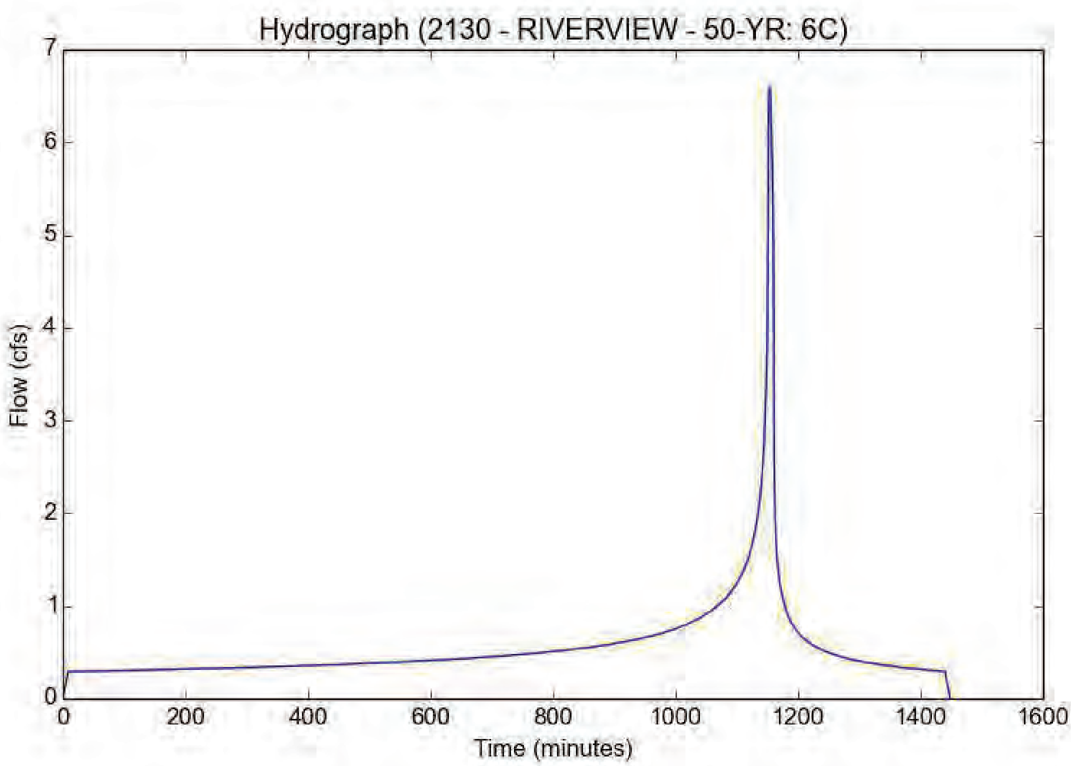
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	6C
Area (ac)	2.5
Flow Path Length (ft)	755.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.0778
Undeveloped Runoff Coefficient (Cu)	0.6109
Developed Runoff Coefficient (Cd)	0.8566
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	6.5913
Burned Peak Flow Rate (cfs)	6.5913
24-Hr Clear Runoff Volume (ac-ft)	1.1122
24-Hr Clear Runoff Volume (cu-ft)	48447.6734



Peak Flow Hydrologic Analysis

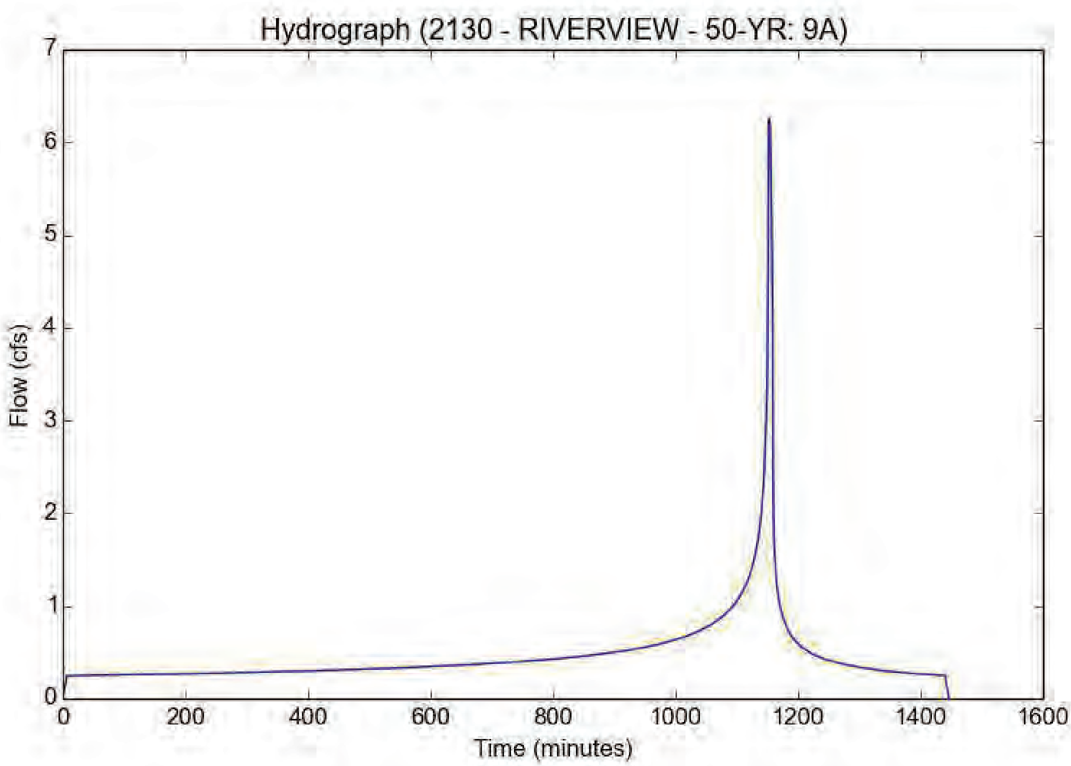
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	9A
Area (ac)	2.1
Flow Path Length (ft)	550.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.6323
Developed Runoff Coefficient (Cd)	0.8598
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	6.2541
Burned Peak Flow Rate (cfs)	6.2541
24-Hr Clear Runoff Volume (ac-ft)	0.9343
24-Hr Clear Runoff Volume (cu-ft)	40699.3285



Peak Flow Hydrologic Analysis

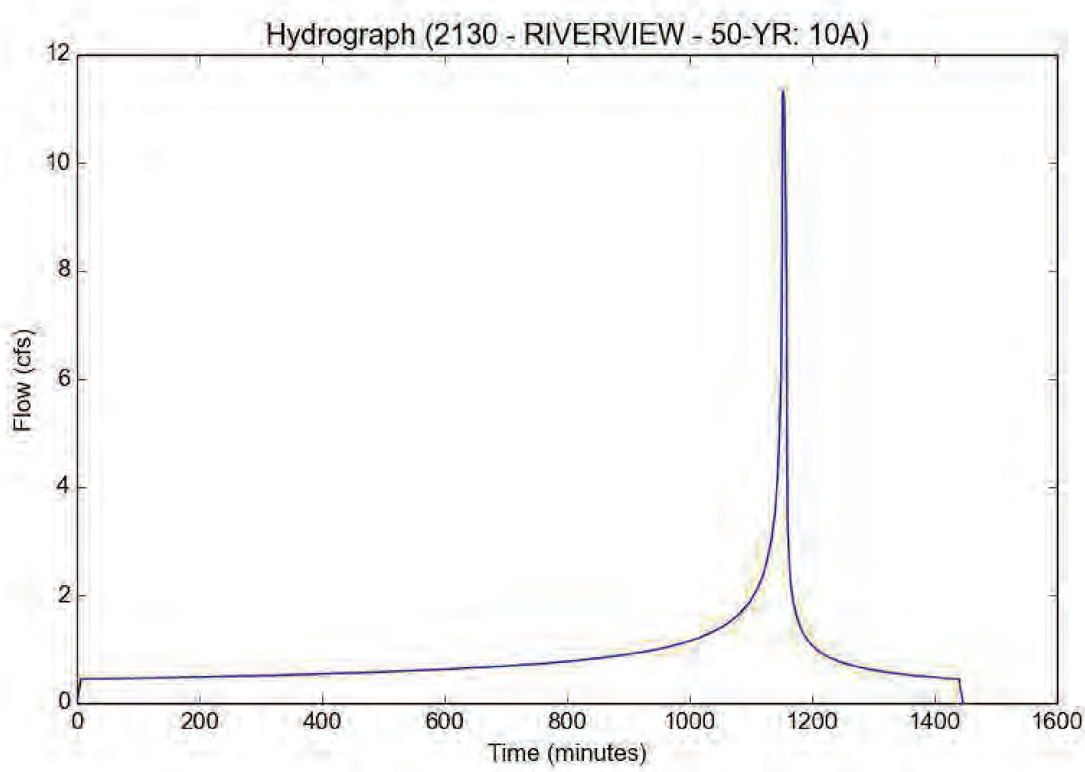
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	10A
Area (ac)	3.8
Flow Path Length (ft)	580.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.6323
Developed Runoff Coefficient (Cd)	0.8598
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	11.317
Burned Peak Flow Rate (cfs)	11.317
24-Hr Clear Runoff Volume (ac-ft)	1.6907
24-Hr Clear Runoff Volume (cu-ft)	73646.404



Peak Flow Hydrologic Analysis

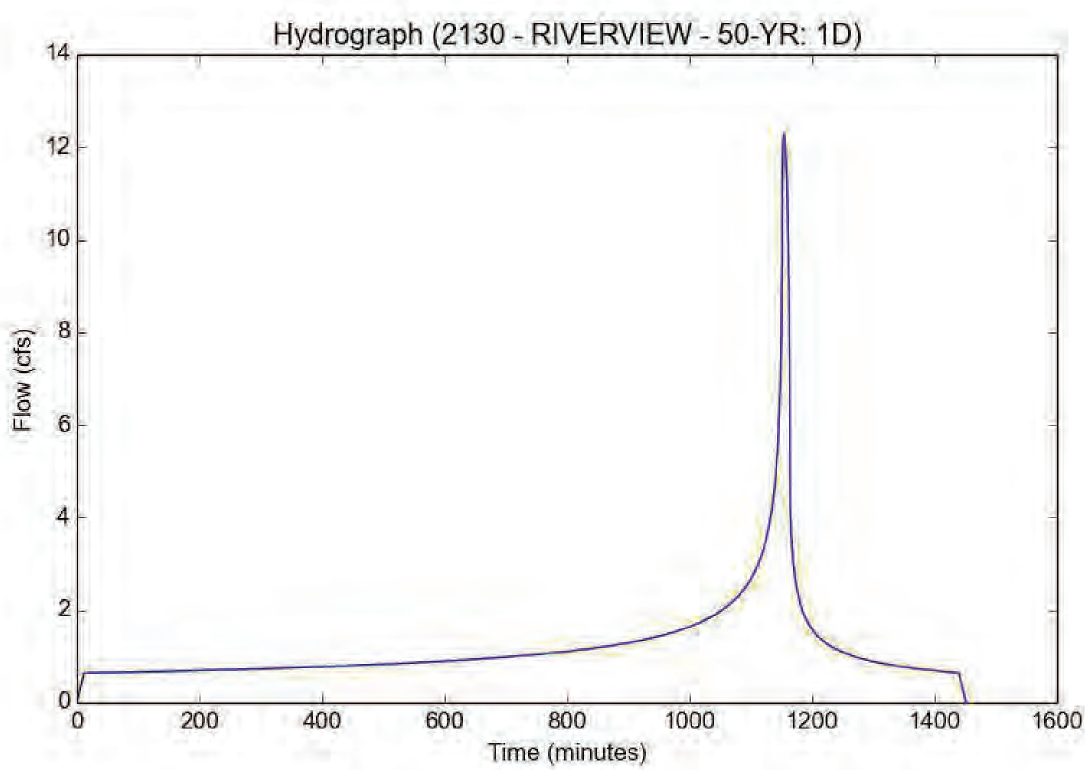
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1D
Area (ac)	5.3
Flow Path Length (ft)	1140.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.6885
Undeveloped Runoff Coefficient (Cu)	0.5784
Developed Runoff Coefficient (Cd)	0.8614
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	12.2743
Burned Peak Flow Rate (cfs)	12.2743
24-Hr Clear Runoff Volume (ac-ft)	2.4221
24-Hr Clear Runoff Volume (cu-ft)	105507.8535



Peak Flow Hydrologic Analysis

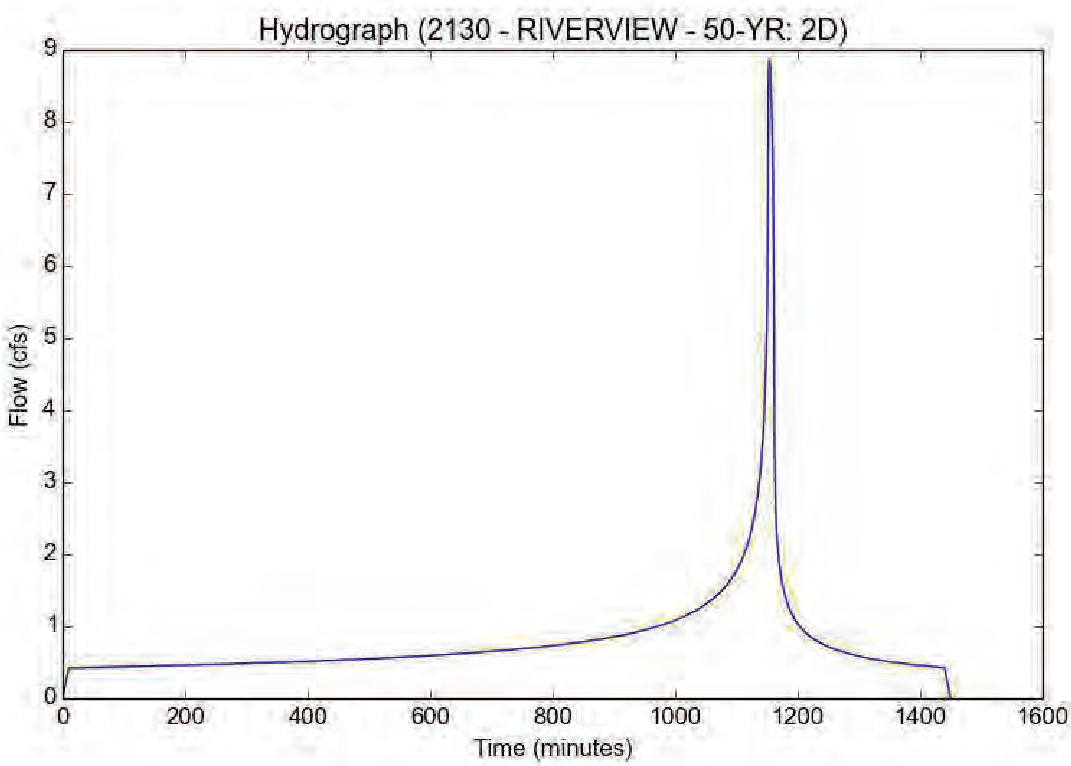
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	2D
Area (ac)	3.5
Flow Path Length (ft)	840.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.88
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.9291
Undeveloped Runoff Coefficient (Cu)	0.6001
Developed Runoff Coefficient (Cd)	0.864
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	8.8577
Burned Peak Flow Rate (cfs)	8.8577
24-Hr Clear Runoff Volume (ac-ft)	1.5997
24-Hr Clear Runoff Volume (cu-ft)	69680.7606



Peak Flow Hydrologic Analysis

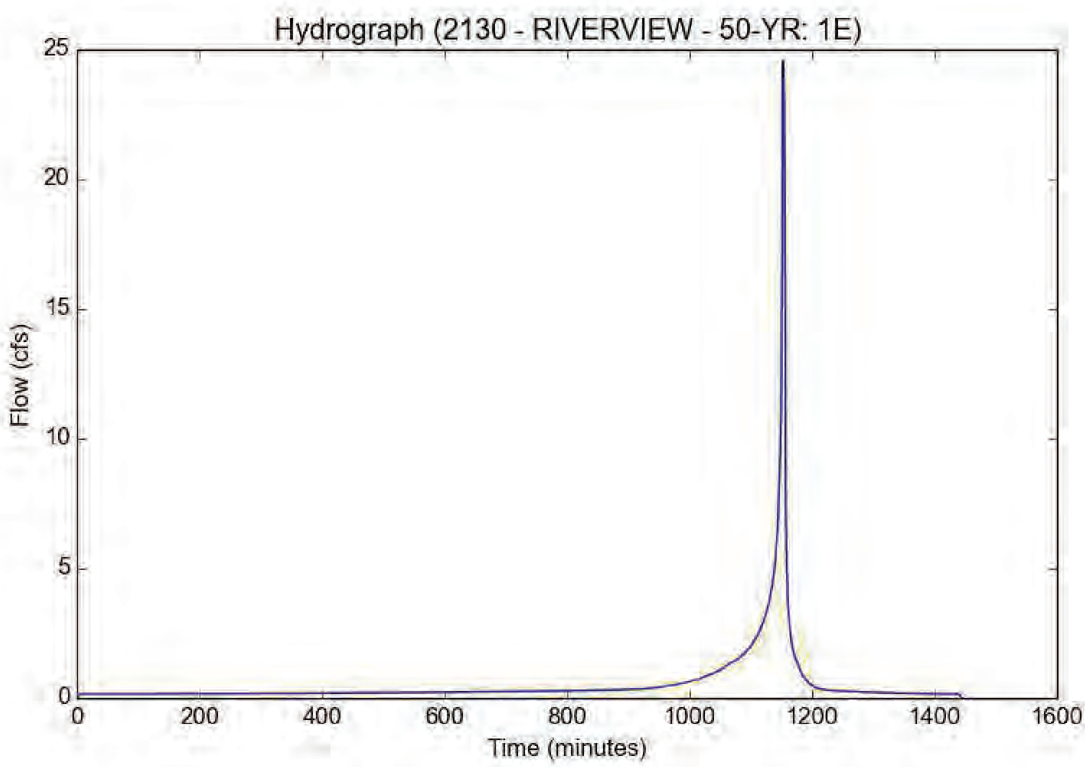
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1E
Area (ac)	7.8
Flow Path Length (ft)	640.0
Flow Path Slope (vft/hft)	0.338
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	24.5614
Burned Peak Flow Rate (cfs)	24.5614
24-Hr Clear Runoff Volume (ac-ft)	1.1298
24-Hr Clear Runoff Volume (cu-ft)	49212.4637



Peak Flow Hydrologic Analysis

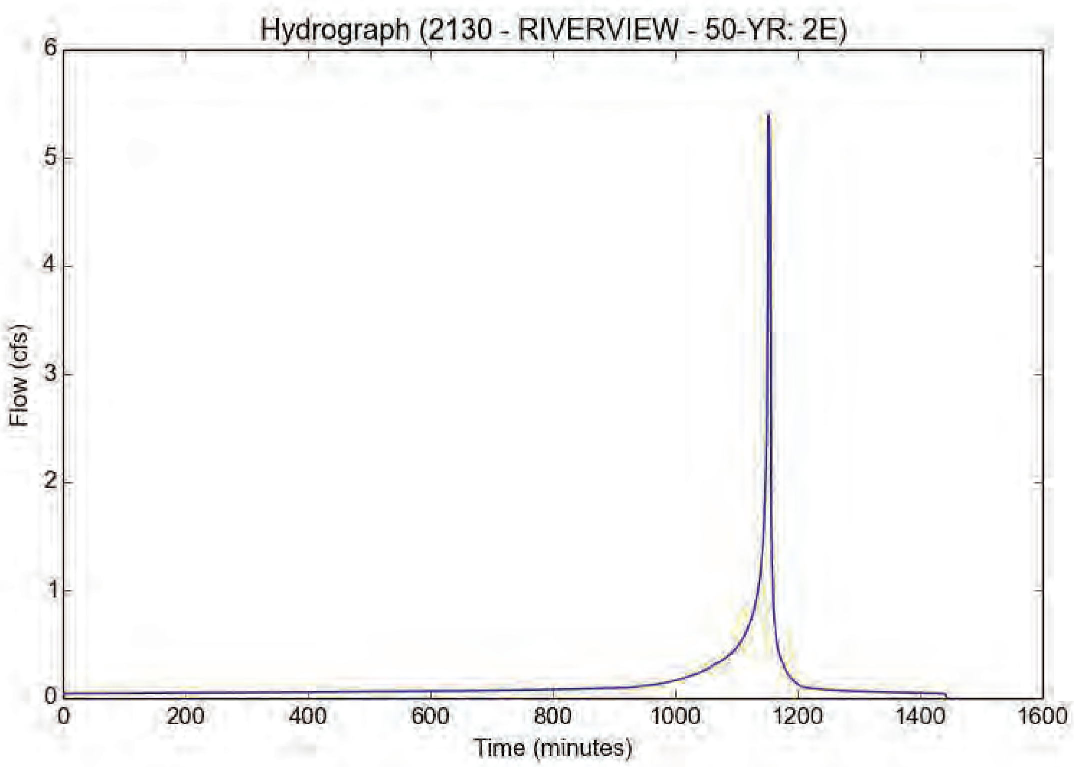
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	2E
Area (ac)	1.7
Flow Path Length (ft)	380.0
Flow Path Slope (vft/hft)	0.061
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.1
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7827
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.3981
Burned Peak Flow Rate (cfs)	5.3981
24-Hr Clear Runoff Volume (ac-ft)	0.2785
24-Hr Clear Runoff Volume (cu-ft)	12132.5627



Peak Flow Hydrologic Analysis

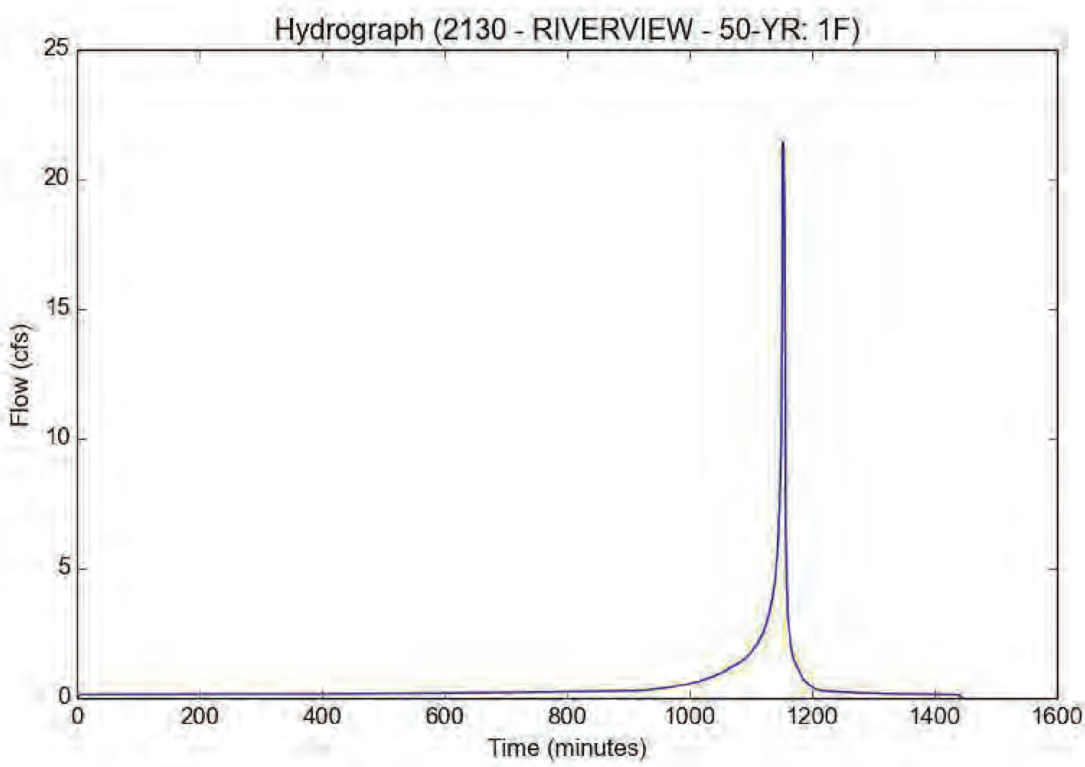
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1F
Area (ac)	6.8
Flow Path Length (ft)	725.0
Flow Path Slope (vft/hft)	0.306
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	21.4125
Burned Peak Flow Rate (cfs)	21.4125
24-Hr Clear Runoff Volume (ac-ft)	0.9849
24-Hr Clear Runoff Volume (cu-ft)	42903.1734



Peak Flow Hydrologic Analysis

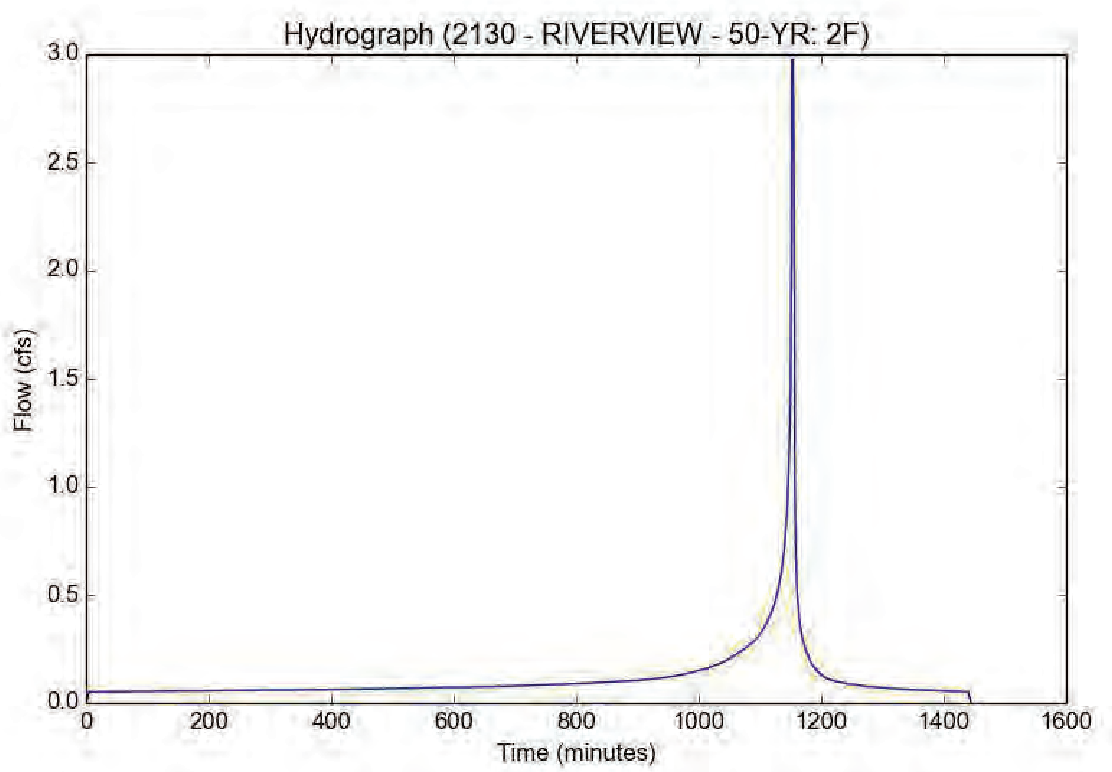
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	2F
Area (ac)	0.9
Flow Path Length (ft)	290.0
Flow Path Slope (vft/hft)	0.086
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.35
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.8153
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.9768
Burned Peak Flow Rate (cfs)	2.9768
24-Hr Clear Runoff Volume (ac-ft)	0.2329
24-Hr Clear Runoff Volume (cu-ft)	10146.9228



Peak Flow Hydrologic Analysis

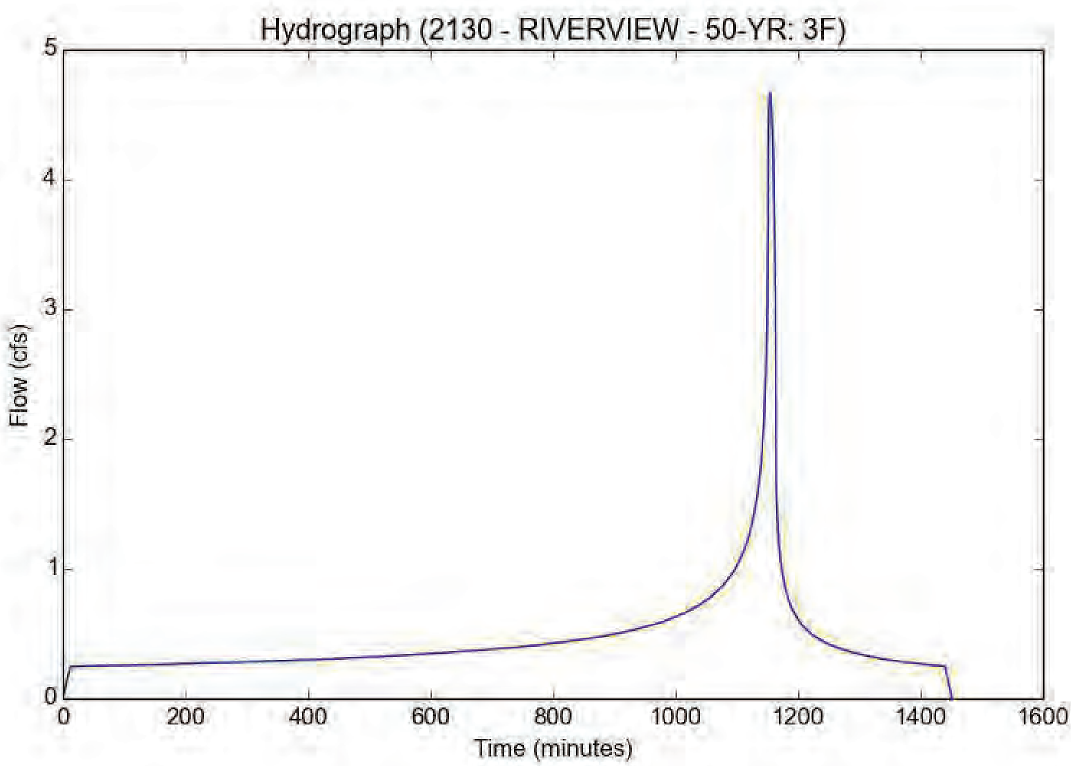
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	3F
Area (ac)	2.0
Flow Path Length (ft)	1240.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.6885
Undeveloped Runoff Coefficient (Cu)	0.5784
Developed Runoff Coefficient (Cd)	0.8678
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	4.6664
Burned Peak Flow Rate (cfs)	4.6664
24-Hr Clear Runoff Volume (ac-ft)	0.9303
24-Hr Clear Runoff Volume (cu-ft)	40522.5836



Peak Flow Hydrologic Analysis

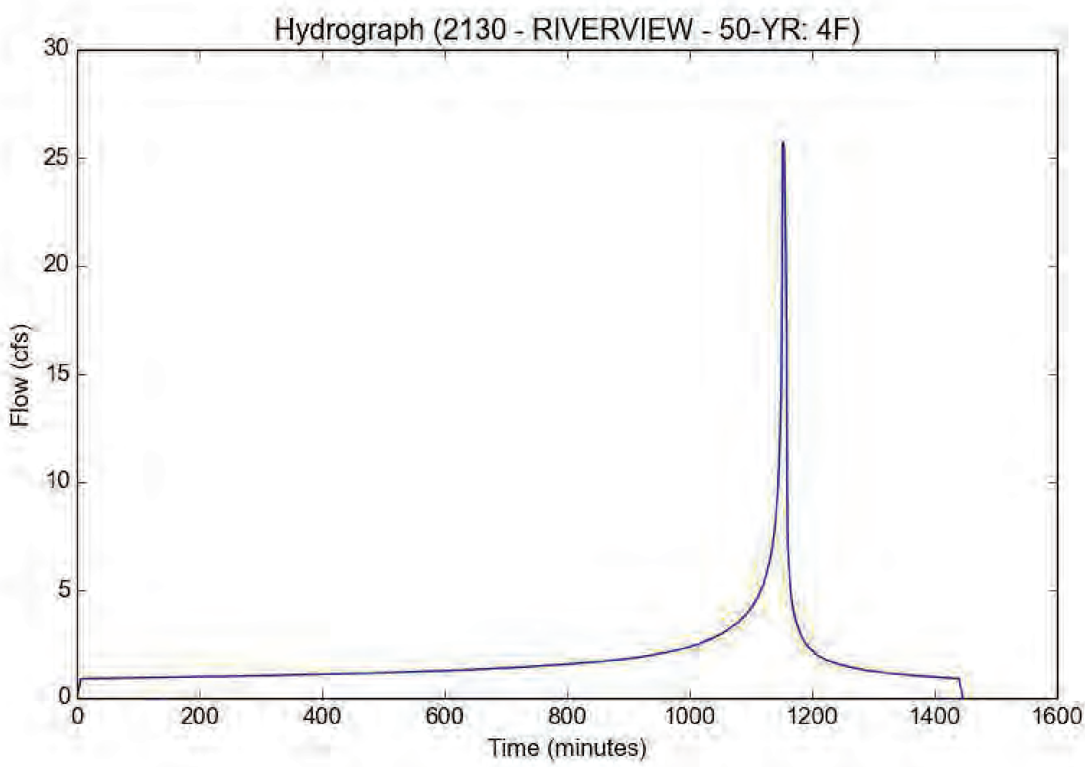
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	4F
Area (ac)	8.6
Flow Path Length (ft)	850.0
Flow Path Slope (vft/hft)	0.034
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.75
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.7518
Developed Runoff Coefficient (Cd)	0.8629
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	25.7047
Burned Peak Flow Rate (cfs)	25.7047
24-Hr Clear Runoff Volume (ac-ft)	3.5326
24-Hr Clear Runoff Volume (cu-ft)	153881.4962



Peak Flow Hydrologic Analysis

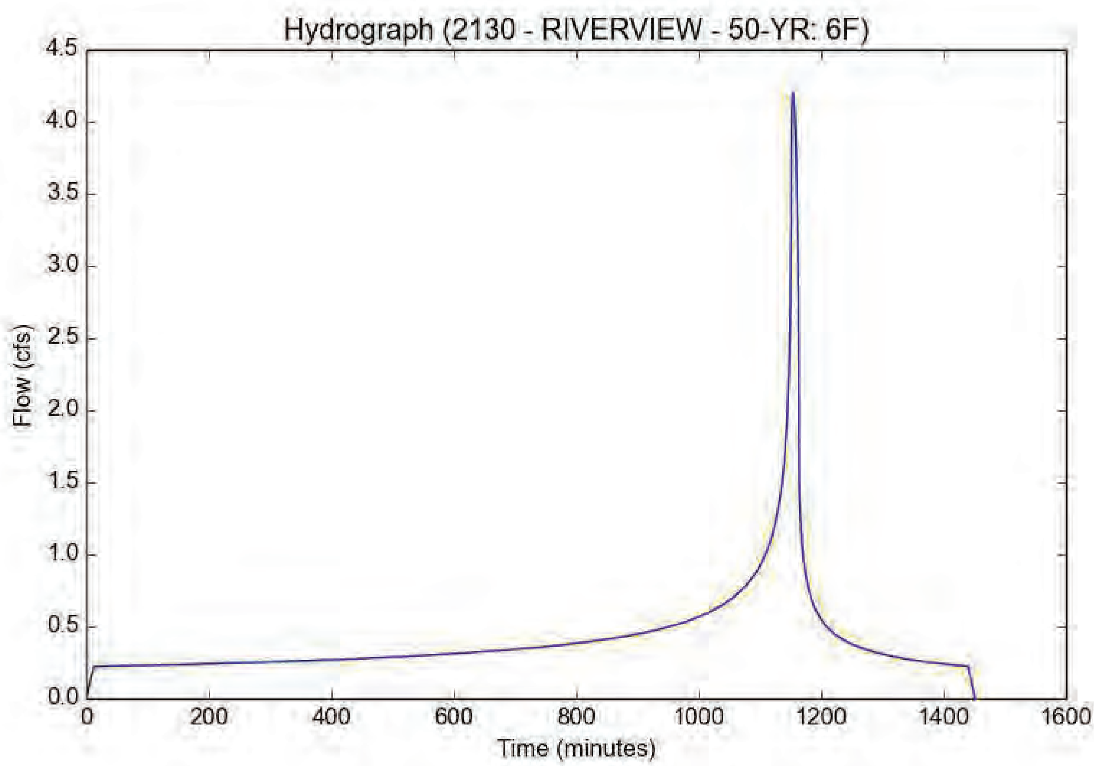
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	6F
Area (ac)	1.8
Flow Path Length (ft)	1175.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.6885
Undeveloped Runoff Coefficient (Cu)	0.5784
Developed Runoff Coefficient (Cd)	0.8678
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	4.1998
Burned Peak Flow Rate (cfs)	4.1998
24-Hr Clear Runoff Volume (ac-ft)	0.8372
24-Hr Clear Runoff Volume (cu-ft)	36470.3253



Peak Flow Hydrologic Analysis

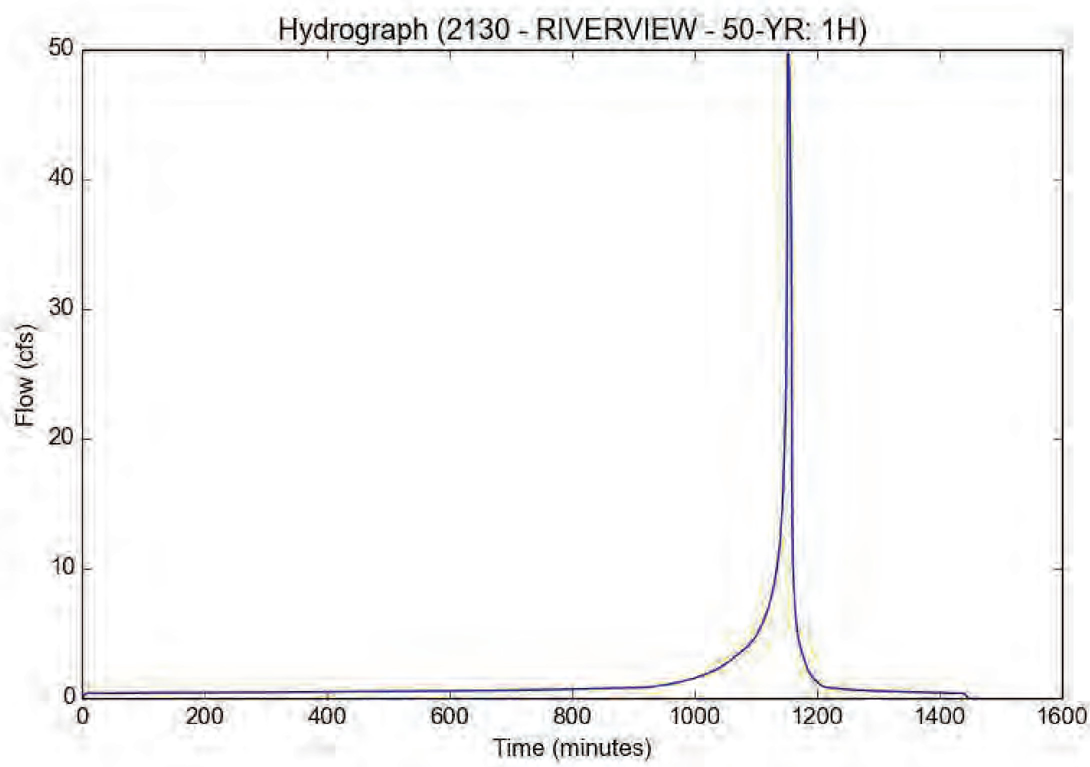
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1H
Area (ac)	18.9
Flow Path Length (ft)	1095.0
Flow Path Slope (vft/hft)	0.246
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.7518
Developed Runoff Coefficient (Cd)	0.7592
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	49.6982
Burned Peak Flow Rate (cfs)	49.6982
24-Hr Clear Runoff Volume (ac-ft)	2.7354
24-Hr Clear Runoff Volume (cu-ft)	119155.2677



Peak Flow Hydrologic Analysis

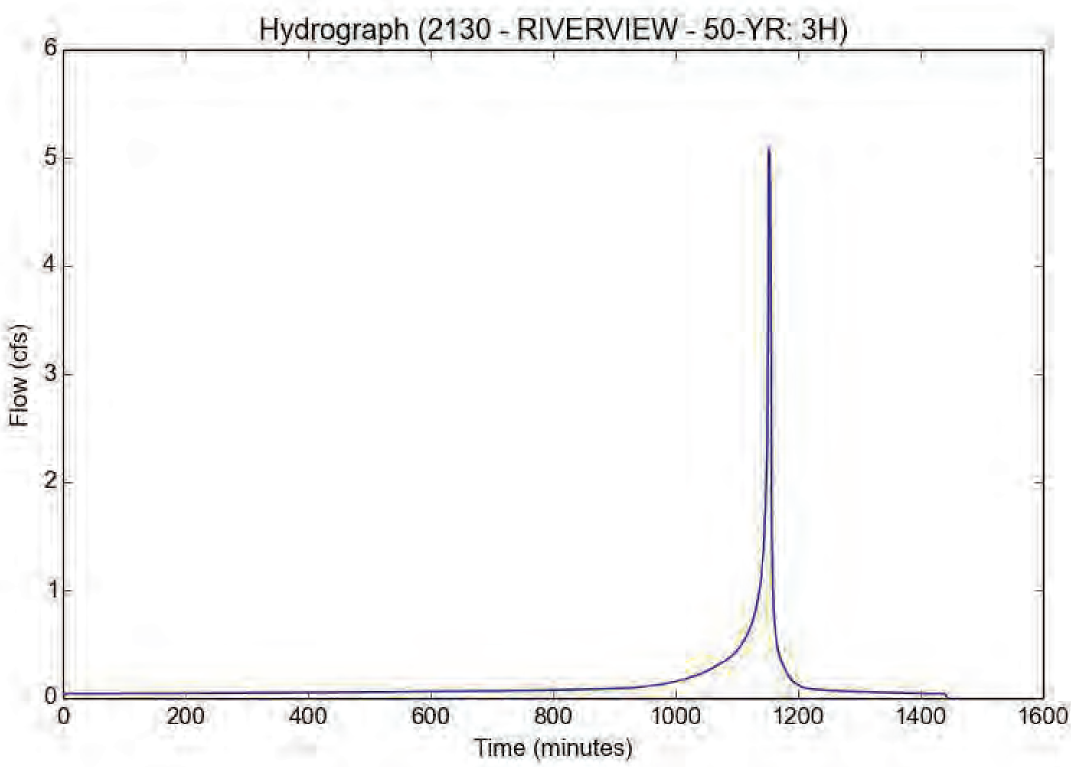
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	3H
Area (ac)	1.6
Flow Path Length (ft)	490.0
Flow Path Slope (vft/hft)	0.043
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.1
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7827
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.0805
Burned Peak Flow Rate (cfs)	5.0805
24-Hr Clear Runoff Volume (ac-ft)	0.2621
24-Hr Clear Runoff Volume (cu-ft)	11418.8826



Peak Flow Hydrologic Analysis

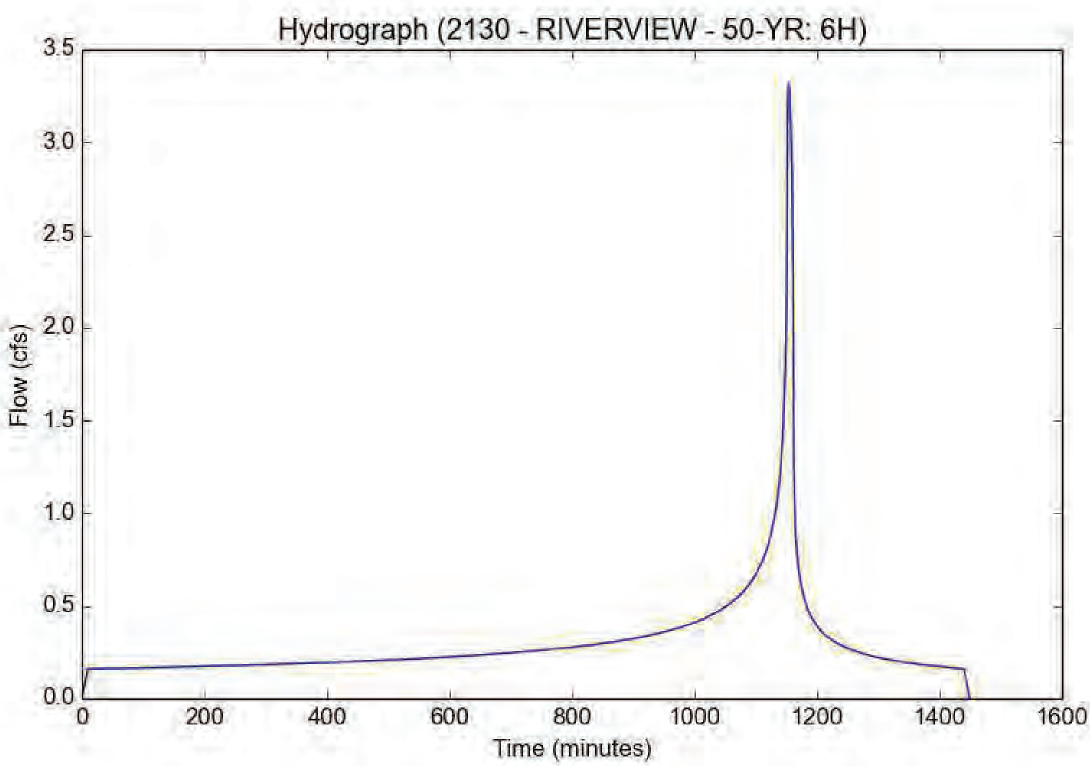
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	6H
Area (ac)	1.3
Flow Path Length (ft)	900.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.9291
Undeveloped Runoff Coefficient (Cu)	0.6001
Developed Runoff Coefficient (Cd)	0.87
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	3.3128
Burned Peak Flow Rate (cfs)	3.3128
24-Hr Clear Runoff Volume (ac-ft)	0.6047
24-Hr Clear Runoff Volume (cu-ft)	26341.4605



Peak Flow Hydrologic Analysis

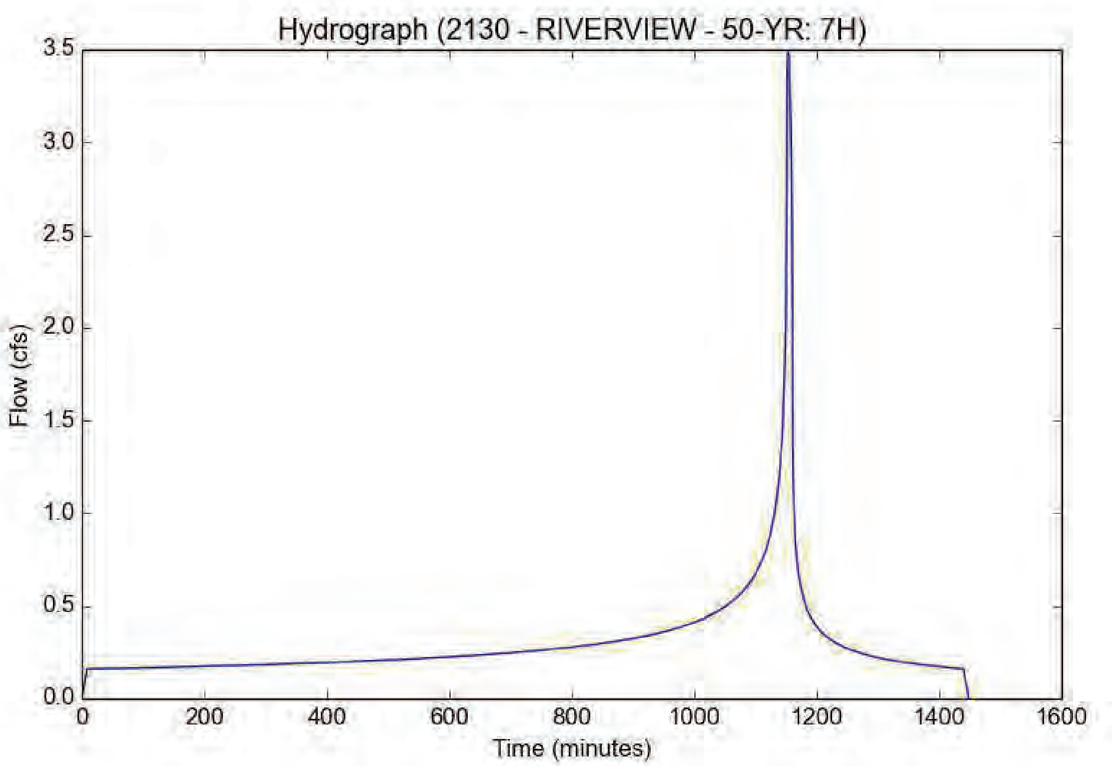
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	7H
Area (ac)	1.3
Flow Path Length (ft)	895.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.0778
Undeveloped Runoff Coefficient (Cu)	0.6109
Developed Runoff Coefficient (Cd)	0.8711
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	3.4853
Burned Peak Flow Rate (cfs)	3.4853
24-Hr Clear Runoff Volume (ac-ft)	0.6047
24-Hr Clear Runoff Volume (cu-ft)	26342.4032



Peak Flow Hydrologic Analysis

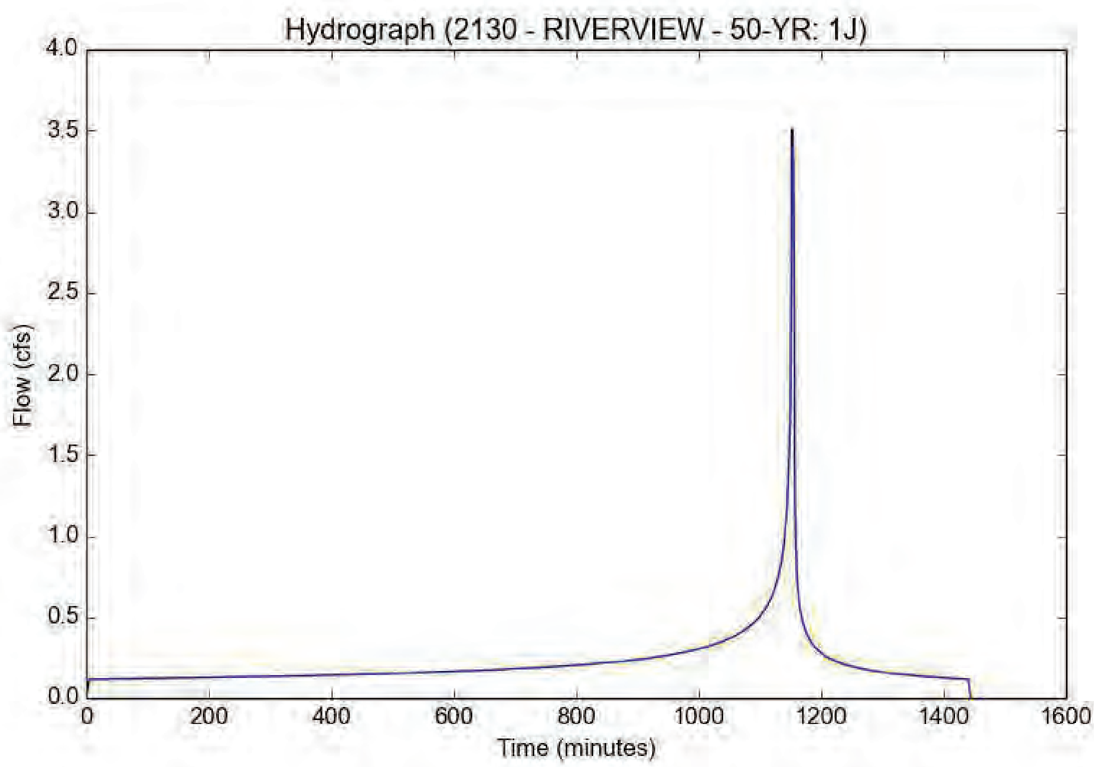
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/2130 - RIVERVIEW - 50-YR Report_050622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - 50-YR
Subarea ID	1J
Area (ac)	1.0
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.029
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.6638
Developed Runoff Coefficient (Cd)	0.8646
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5076
Burned Peak Flow Rate (cfs)	3.5076
24-Hr Clear Runoff Volume (ac-ft)	0.445
24-Hr Clear Runoff Volume (cu-ft)	19382.5798



RIVERVIEW

EXISTING CONDITION TC

25-YR

Peak Flow Hydrologic Analysis

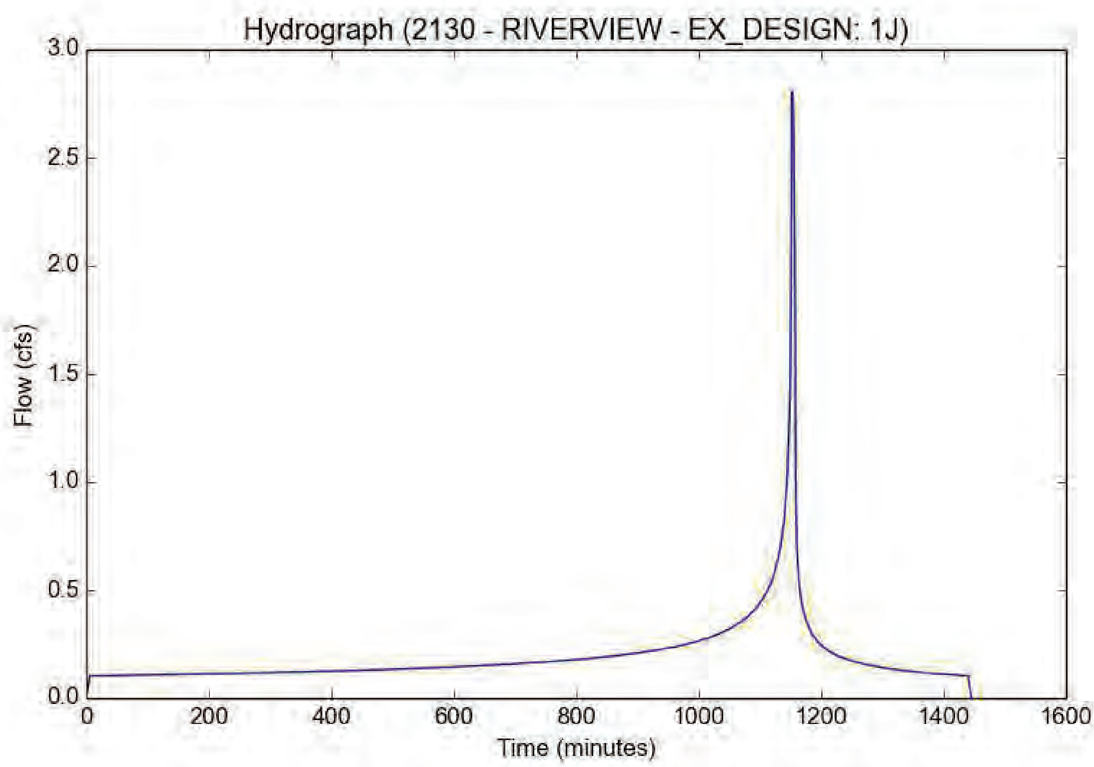
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-1J_051022.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	1J
Area (ac)	1.0
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.029
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.9704
Peak Intensity (in/hr)	3.2696
Undeveloped Runoff Coefficient (Cu)	0.6215
Developed Runoff Coefficient (Cd)	0.8582
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	2.806
Burned Peak Flow Rate (cfs)	2.806
24-Hr Clear Runoff Volume (ac-ft)	0.3898
24-Hr Clear Runoff Volume (cu-ft)	16981.3717



RIVERVIEW

EXISTING CONDITION TC’s

50-YR

Peak Flow Hydrologic Analysis

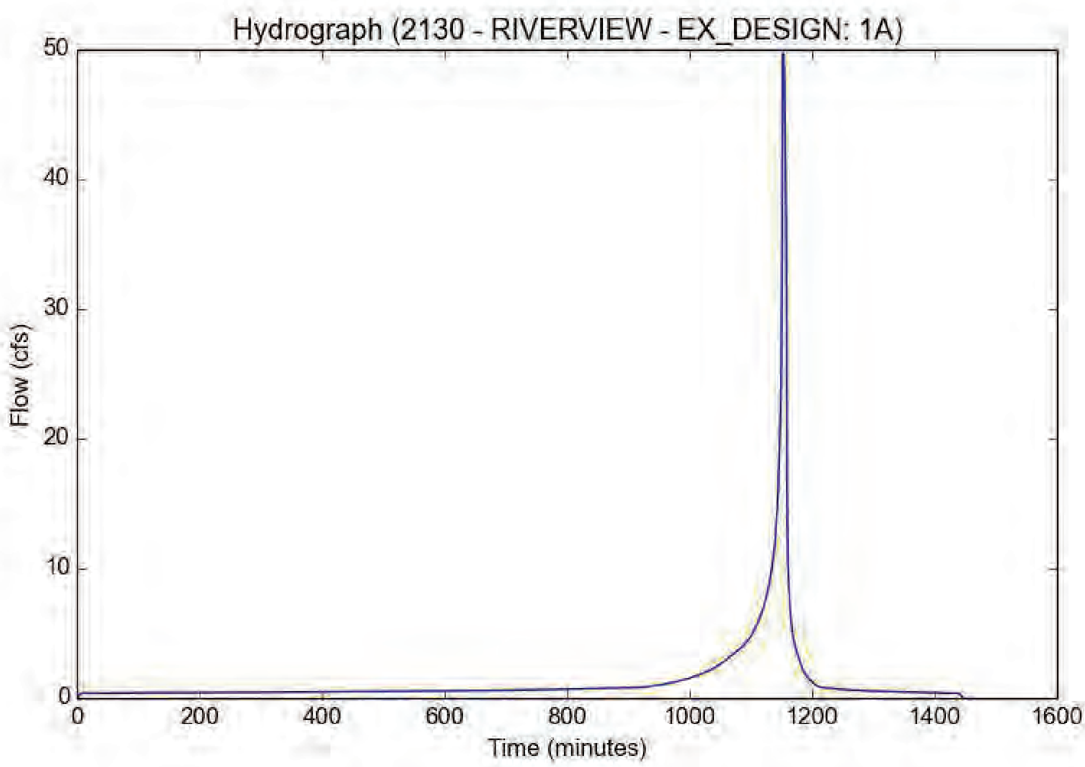
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	1A
Area (ac)	18.9
Flow Path Length (ft)	1095.0
Flow Path Slope (vft/hft)	0.246
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.4636
Undeveloped Runoff Coefficient (Cu)	0.7518
Developed Runoff Coefficient (Cd)	0.7592
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	49.6982
Burned Peak Flow Rate (cfs)	49.6982
24-Hr Clear Runoff Volume (ac-ft)	2.7354
24-Hr Clear Runoff Volume (cu-ft)	119155.2677



Peak Flow Hydrologic Analysis

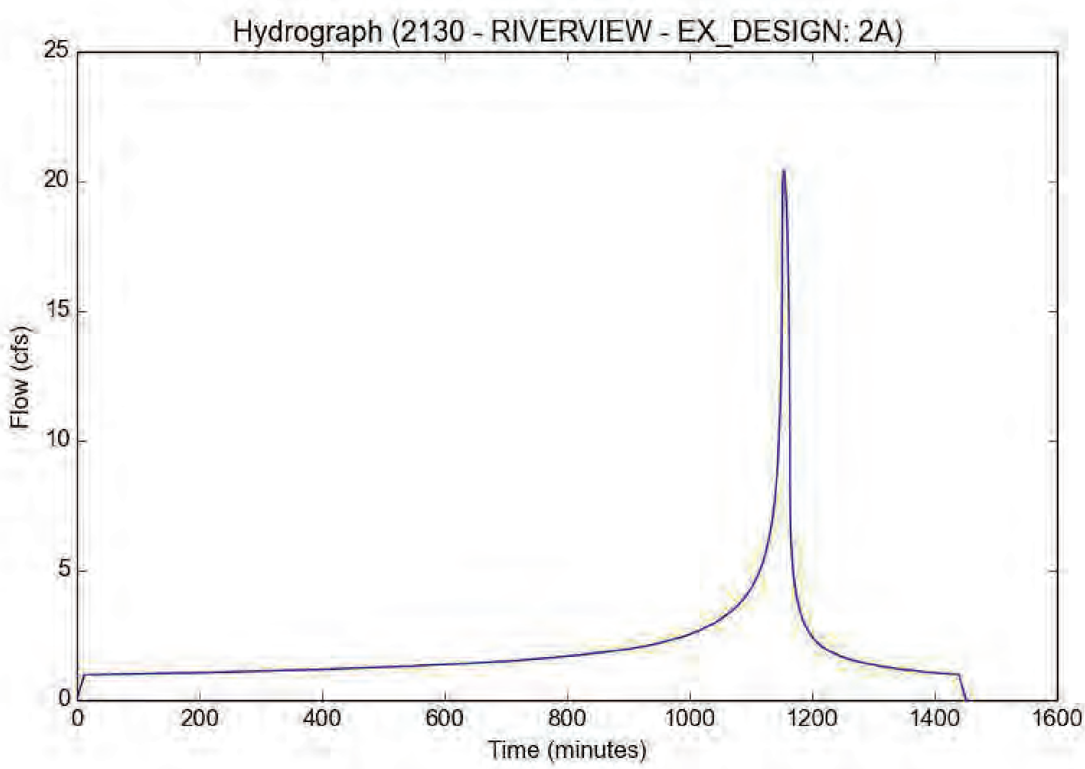
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	2A
Area (ac)	8.8
Flow Path Length (ft)	1535.0
Flow Path Slope (vft/hft)	0.018
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.8
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.6885
Undeveloped Runoff Coefficient (Cu)	0.715
Developed Runoff Coefficient (Cd)	0.863
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	20.4175
Burned Peak Flow Rate (cfs)	20.4175
24-Hr Clear Runoff Volume (ac-ft)	3.7815
24-Hr Clear Runoff Volume (cu-ft)	164723.5147



Peak Flow Hydrologic Analysis

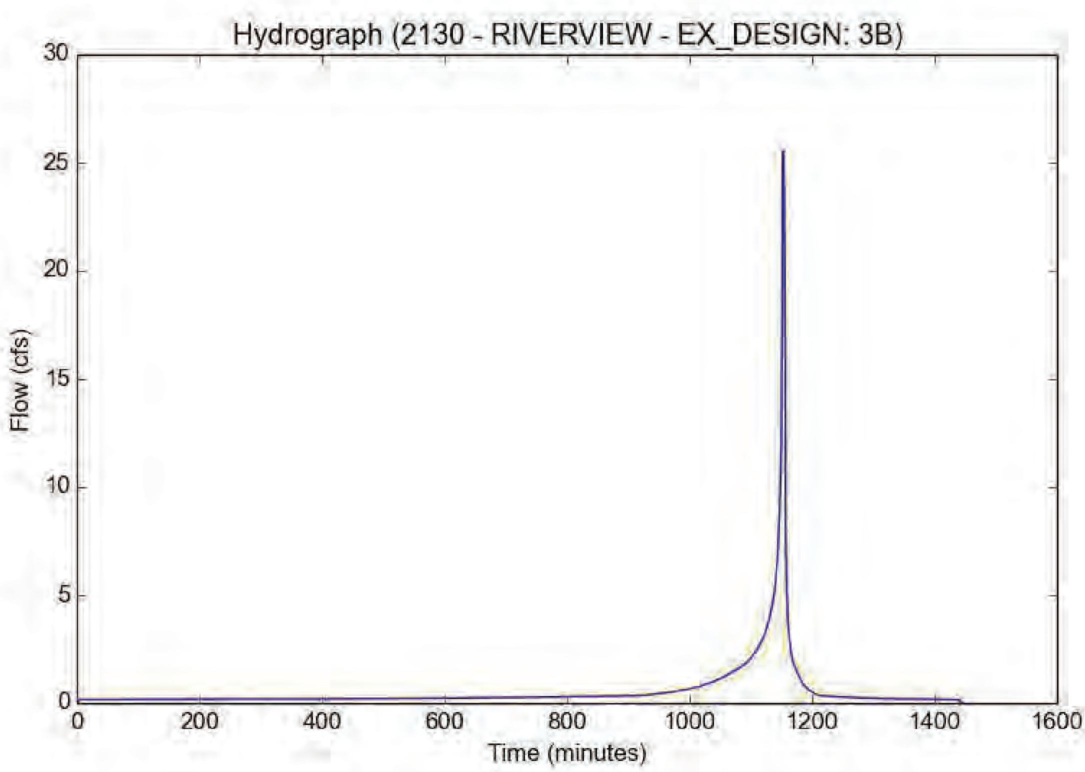
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	3B
Area (ac)	8.1
Flow Path Length (ft)	640.0
Flow Path Slope (vft/hft)	0.338
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	25.5061
Burned Peak Flow Rate (cfs)	25.5061
24-Hr Clear Runoff Volume (ac-ft)	1.1732
24-Hr Clear Runoff Volume (cu-ft)	51105.2507



Peak Flow Hydrologic Analysis

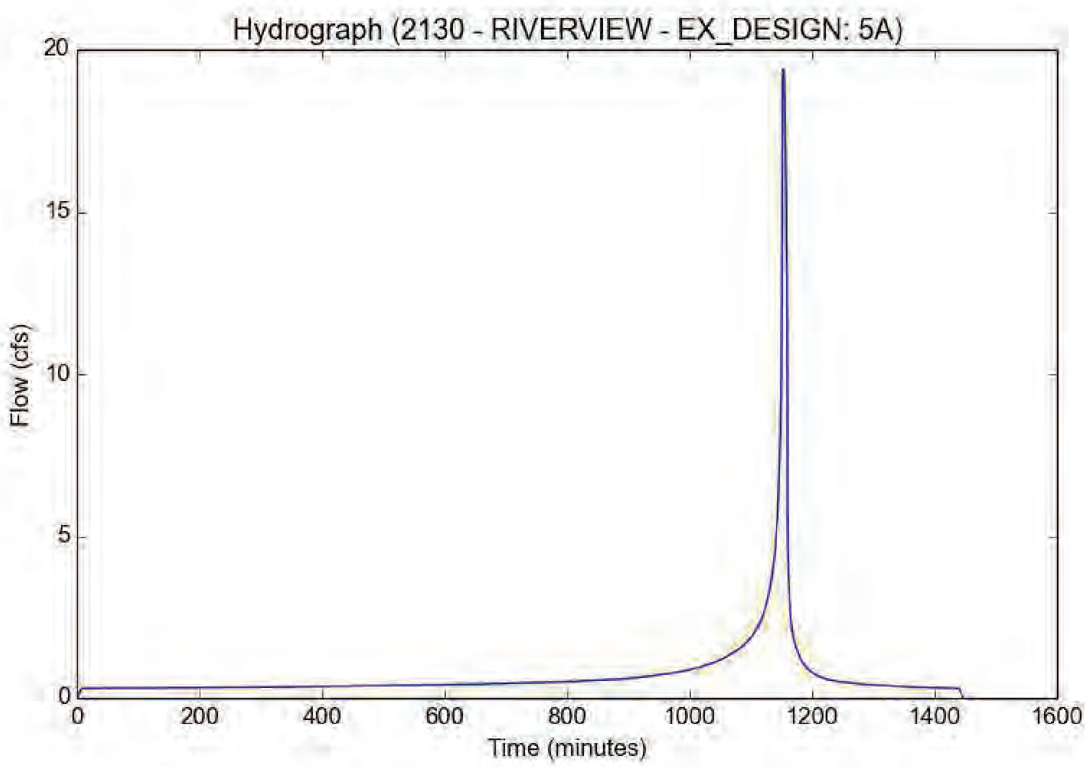
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	5A
Area (ac)	9.0
Flow Path Length (ft)	770.0
Flow Path Slope (vft/hft)	0.042
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.15
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.2529
Undeveloped Runoff Coefficient (Cu)	0.6206
Developed Runoff Coefficient (Cd)	0.6625
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	19.3954
Burned Peak Flow Rate (cfs)	19.3954
24-Hr Clear Runoff Volume (ac-ft)	1.4469
24-Hr Clear Runoff Volume (cu-ft)	63028.2207



Peak Flow Hydrologic Analysis

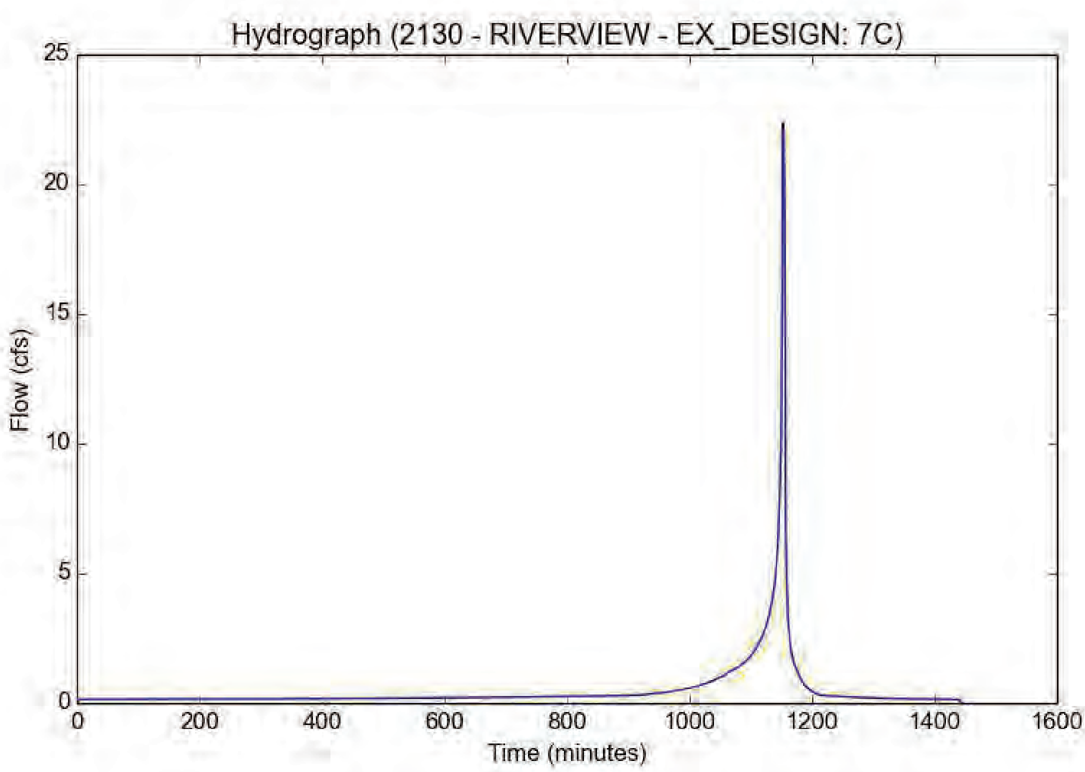
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	7C
Area (ac)	7.1
Flow Path Length (ft)	725.0
Flow Path Slope (vft/hft)	0.303
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	22.3572
Burned Peak Flow Rate (cfs)	22.3572
24-Hr Clear Runoff Volume (ac-ft)	1.0284
24-Hr Clear Runoff Volume (cu-ft)	44795.9605



Peak Flow Hydrologic Analysis

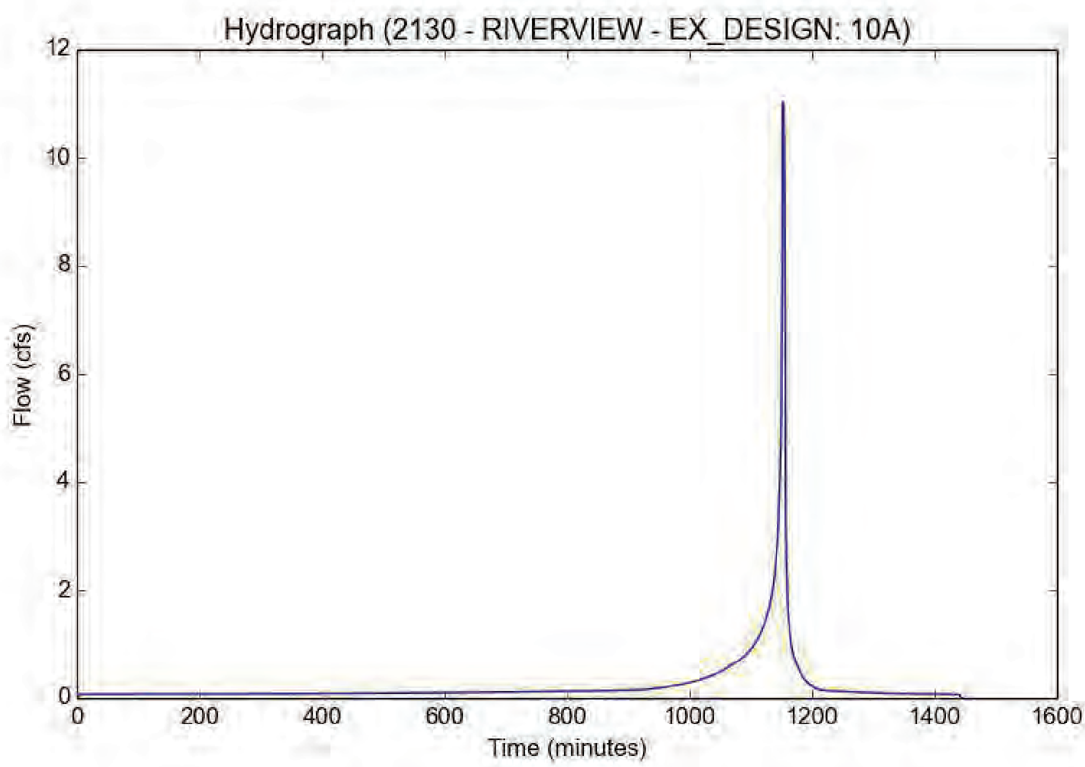
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	10A
Area (ac)	3.5
Flow Path Length (ft)	720.0
Flow Path Slope (vft/hft)	0.142
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.05
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.7696
Developed Runoff Coefficient (Cd)	0.7762
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	11.0211
Burned Peak Flow Rate (cfs)	11.0211
24-Hr Clear Runoff Volume (ac-ft)	0.5069
24-Hr Clear Runoff Volume (cu-ft)	22082.5157



Peak Flow Hydrologic Analysis

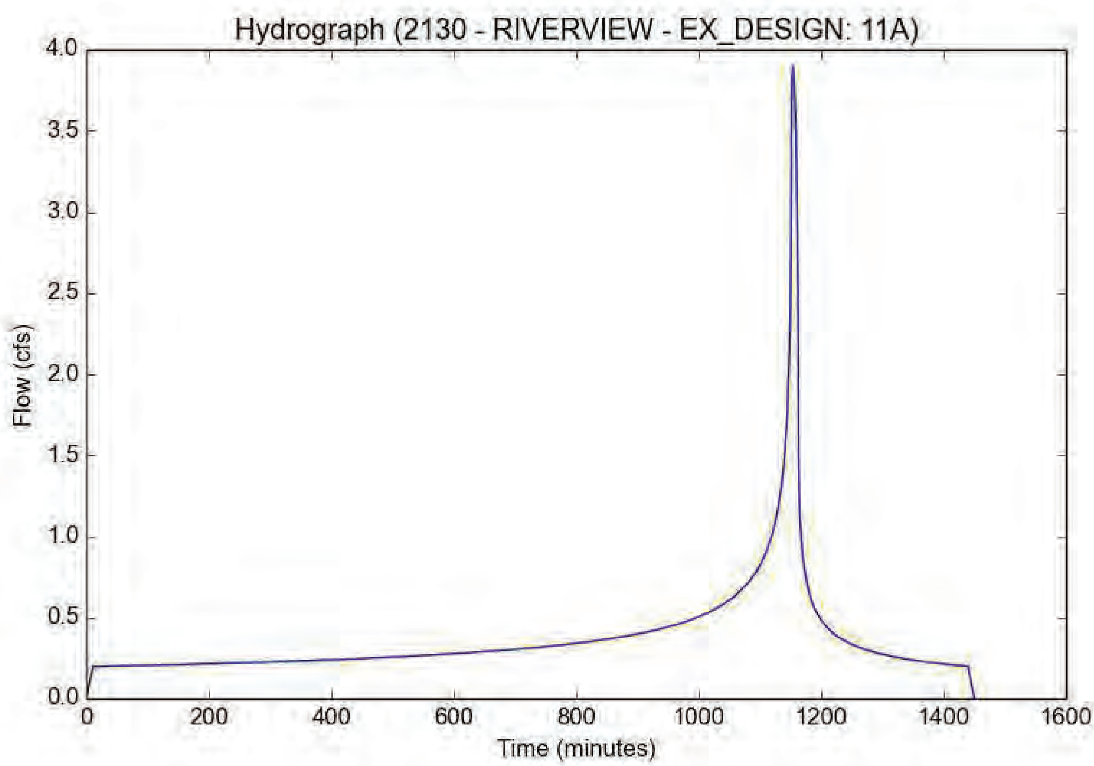
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	11A
Area (ac)	1.6
Flow Path Length (ft)	1165.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.8007
Undeveloped Runoff Coefficient (Cu)	0.5885
Developed Runoff Coefficient (Cd)	0.8689
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	3.8935
Burned Peak Flow Rate (cfs)	3.8935
24-Hr Clear Runoff Volume (ac-ft)	0.7442
24-Hr Clear Runoff Volume (cu-ft)	32419.0942



Peak Flow Hydrologic Analysis

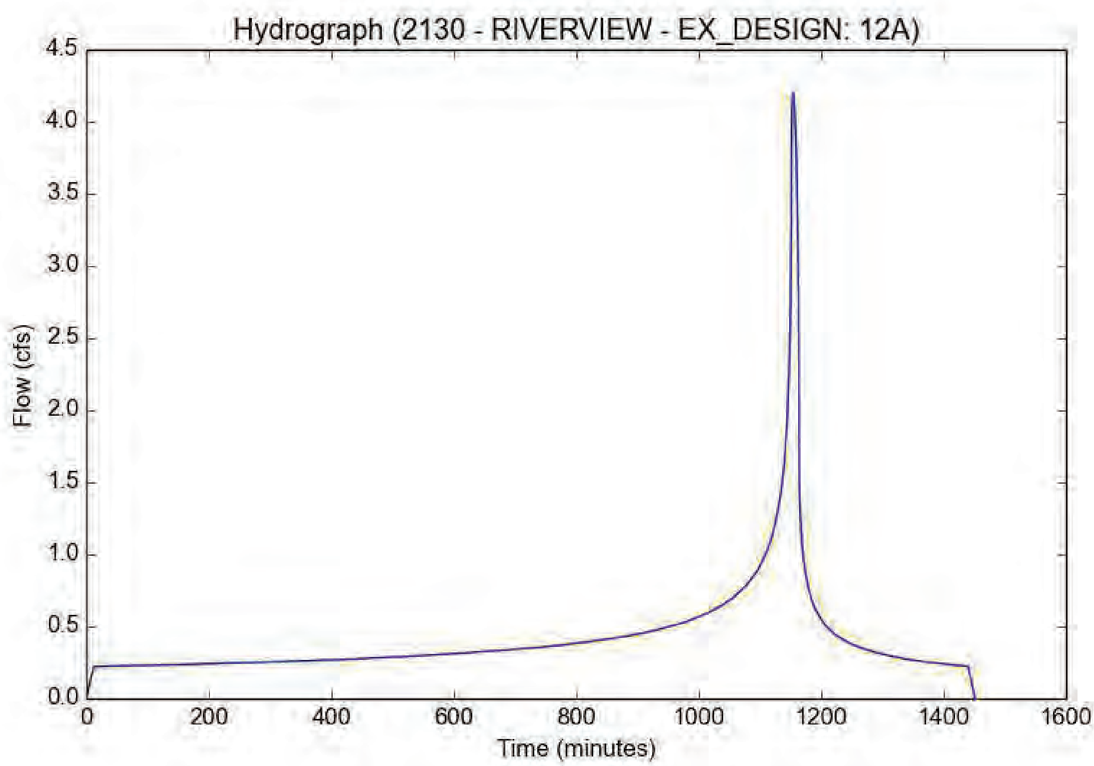
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	12A
Area (ac)	1.8
Flow Path Length (ft)	1175.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.6885
Undeveloped Runoff Coefficient (Cu)	0.5784
Developed Runoff Coefficient (Cd)	0.8678
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	4.1998
Burned Peak Flow Rate (cfs)	4.1998
24-Hr Clear Runoff Volume (ac-ft)	0.8372
24-Hr Clear Runoff Volume (cu-ft)	36470.3253



Peak Flow Hydrologic Analysis

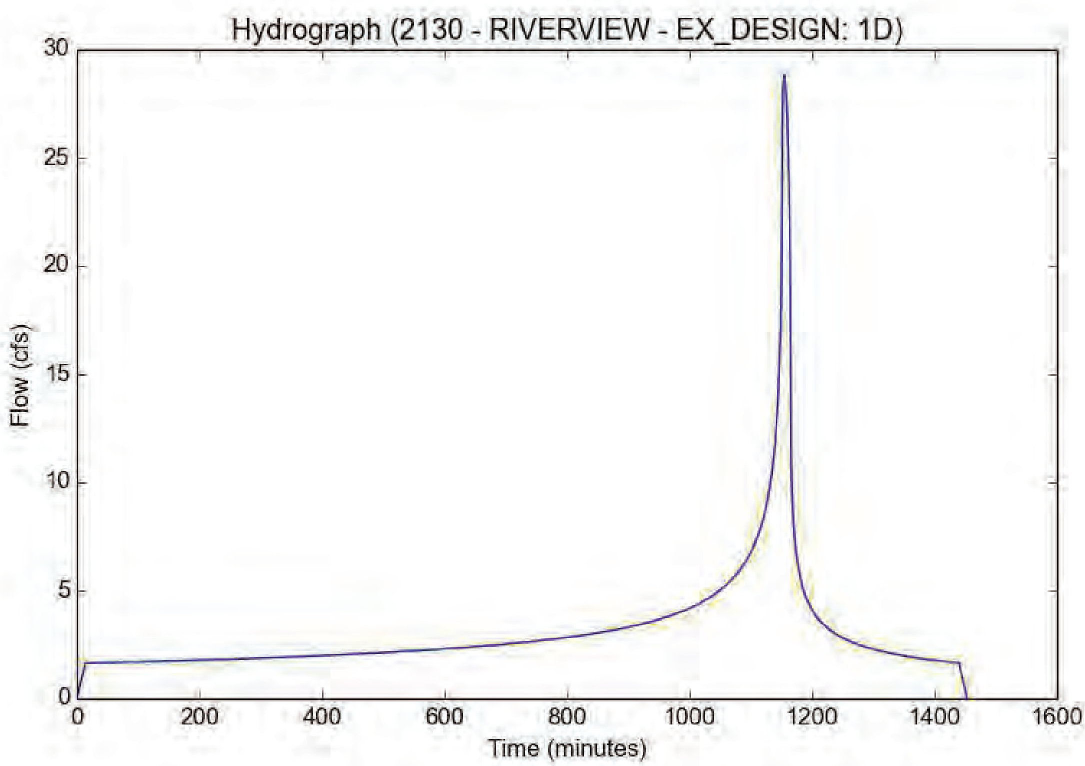
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	1D
Area (ac)	13.3
Flow Path Length (ft)	1520.0
Flow Path Slope (vft/hft)	0.008
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.5006
Undeveloped Runoff Coefficient (Cu)	0.5614
Developed Runoff Coefficient (Cd)	0.8661
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	28.8063
Burned Peak Flow Rate (cfs)	28.8063
24-Hr Clear Runoff Volume (ac-ft)	6.186
24-Hr Clear Runoff Volume (cu-ft)	269460.5283



Peak Flow Hydrologic Analysis

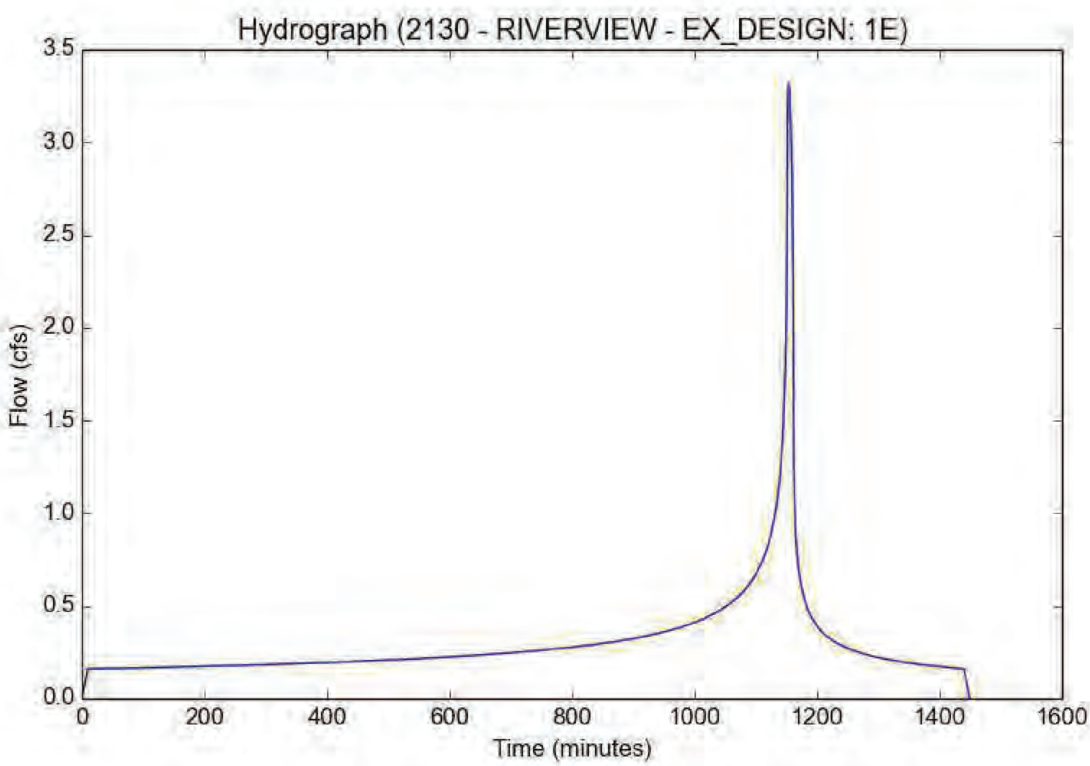
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	1E
Area (ac)	1.3
Flow Path Length (ft)	900.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	2.9291
Undeveloped Runoff Coefficient (Cu)	0.6001
Developed Runoff Coefficient (Cd)	0.87
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	3.3128
Burned Peak Flow Rate (cfs)	3.3128
24-Hr Clear Runoff Volume (ac-ft)	0.6047
24-Hr Clear Runoff Volume (cu-ft)	26341.4605



Peak Flow Hydrologic Analysis

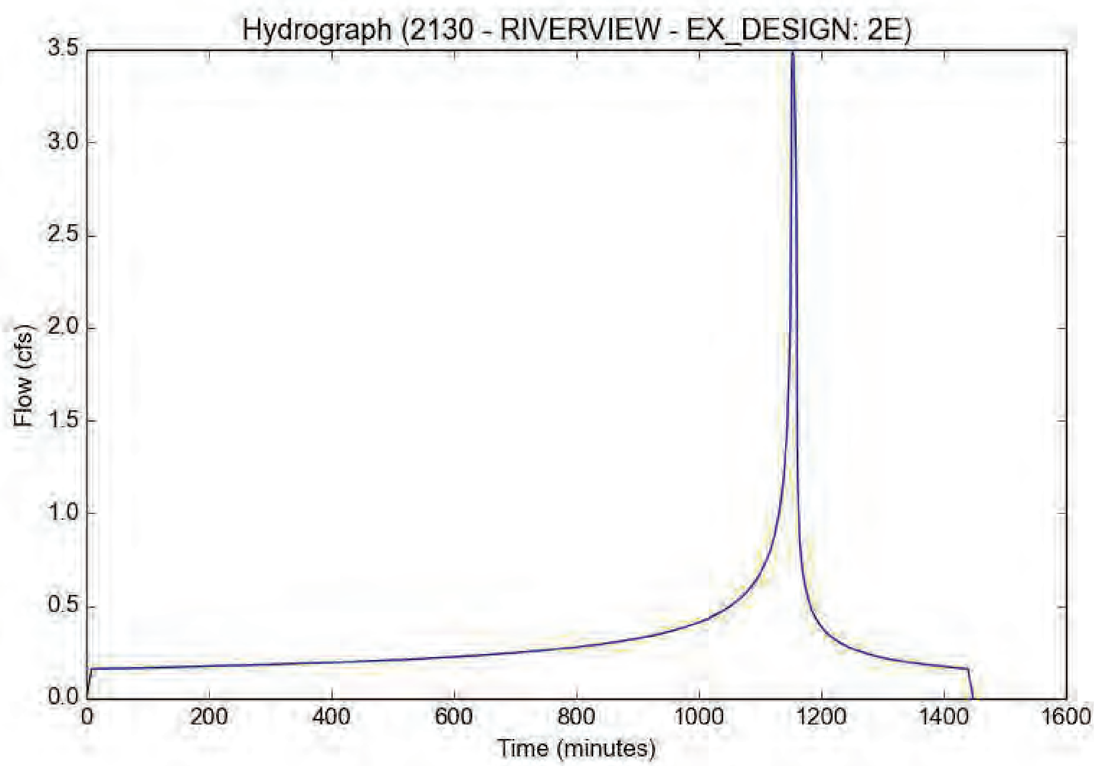
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	2E
Area (ac)	1.3
Flow Path Length (ft)	895.0
Flow Path Slope (vft/hft)	0.009
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	3.0778
Undeveloped Runoff Coefficient (Cu)	0.6109
Developed Runoff Coefficient (Cd)	0.8711
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	3.4853
Burned Peak Flow Rate (cfs)	3.4853
24-Hr Clear Runoff Volume (ac-ft)	0.6047
24-Hr Clear Runoff Volume (cu-ft)	26342.4032



Peak Flow Hydrologic Analysis

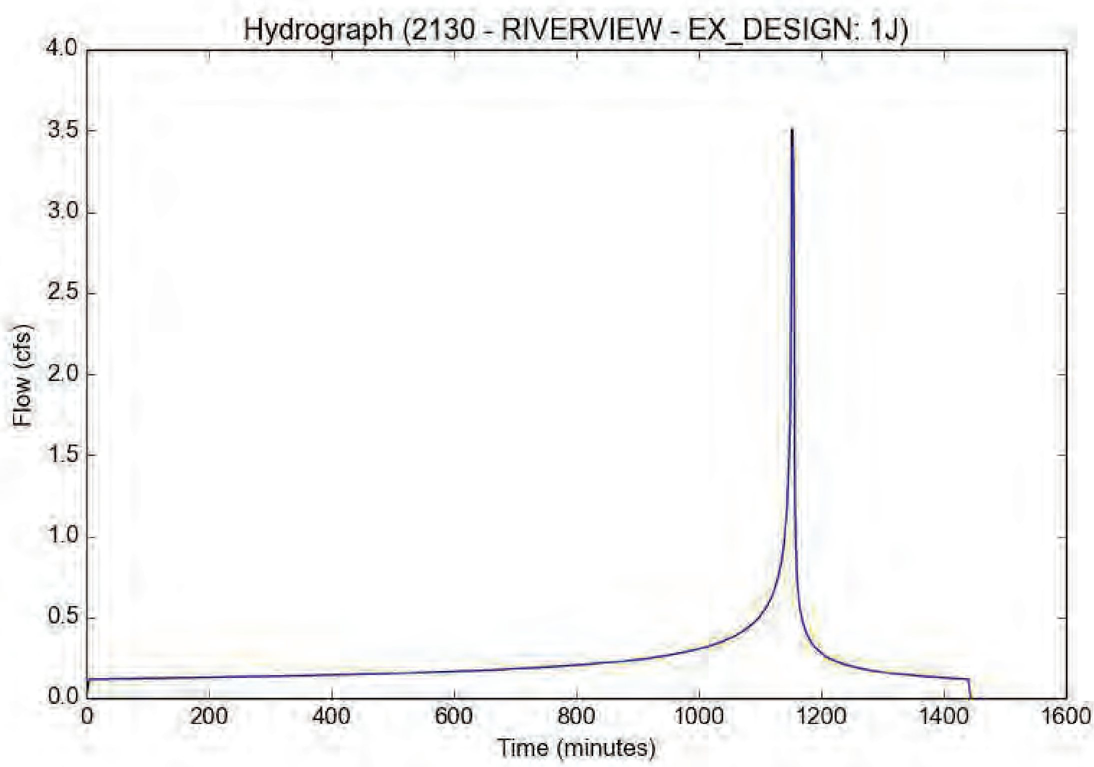
File location: I:/Project Files/2130 - RIVERVIEW/HYDROLOGY/HYDROCALC/EX/2130 - RIVERVIEW - EX_DESIGN-50-YR_060622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - EX_DESIGN
Subarea ID	1J
Area (ac)	1.0
Flow Path Length (ft)	515.0
Flow Path Slope (vft/hft)	0.029
50-yr Rainfall Depth (in)	6.8
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.8
Peak Intensity (in/hr)	4.0571
Undeveloped Runoff Coefficient (Cu)	0.6638
Developed Runoff Coefficient (Cd)	0.8646
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5076
Burned Peak Flow Rate (cfs)	3.5076
24-Hr Clear Runoff Volume (ac-ft)	0.445
24-Hr Clear Runoff Volume (cu-ft)	19382.5798



APPENDIX C

LAR04 MODELS

REGISTERED PROFESSIONAL ENGINEER
CRAIG M. WHITTEKER
NO. 51929
EXP 6-30-24
CIVIL
* STATE OF CALIFORNIA *

RIVERVIEW

DESIGN EVENT

DEVELOPED CONDITION

HYBRID OF
Q50 BURNED for NATURAL SUBAREA
&
Q25 CLEAR for URBAN SUBAREA

```
006  2130    1A  97 50 3.4 8A344400.0000800                 0  G1
006  2130    2B  20 88 3.3 9A344255.0000600                 0
006  2130    3B  20 88 1.1 8A344 60.0001800                 0
006  2130    4AB 20  0  .0 0A344505.0001100                 0
006  2130    5A  20  0  .099A344  1.0001000                 0
006  2130    6C  20 85 2.510A344630.0000600                 0
006  2130    7AC 20  0  .0 0A344 30.0000500                 0
006  2130    8A  20  0  .099A344  1.0001000                 0
006  2130    9A  20 85 2.1 8A344 25.0008300                 0
006  2130   10A  20 85 3.8 8A344100.0001200                 02  2
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Program Package Serial Number: 2229
05/05/22 FILE: 2130DA INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN A - DESIGN DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	3.4	7.80	3.4	7.80	4	400.	.00800	2.00	.00	0.	97	8	A34	.50
2130	2B	3.3	7.65	3.3	7.65	4	255.	.00600	2.00	.00	0.	20	9	A34	.88
2130	3B	1.1	2.68	4.4	10.23	4	60.	.01800	2.00	.00	0.	20	8	A34	.88
2130	4AB	4.4	10.20	7.8	17.85	4	505.	.01100	2.00	.00	0.	20	0	A34	.00
2130	5A	.0	.00	7.8	17.64	4	1.	.01000	2.00	.00	0.	20	99	A34	.00
2130	6C	2.5	5.48	2.5	5.48	4	630.	.00600	2.00	.00	0.	20	10	A34	.85
2130	7AC	2.5	5.25	10.3	22.86	4	30.	.00500	2.25	.00	0.	20	0	A34	.00
2130	8A	.0	.00	10.3	22.78	4	1.	.01000	2.00	.00	0.	20	99	A34	.00
2130	9A	2.1	5.07	12.4	27.02	4	25.	.08300	2.00	.00	0.	20	8	A34	.85
2130	10A	3.8	9.17	16.2	35.63	4	100.	.01200	2.25	.00	0.	20	8	A34	.85

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
RIVERVIEW BASIN A - DESIGN DEV MODEL
HYDROGRAPH AT 2130 10A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.59	200	1.65	300	1.74	400	1.84
500	1.96	600	2.10	700	2.29	800	2.54	900	2.91
1000	3.52	1050	4.42	1100	5.76	1110	6.96	1120	8.14
1130	9.44	1131	9.57	1132	9.71	1133	9.92	1134	10.13
1135	10.30	1136	10.53	1137	10.83	1138	11.15	1139	11.45
1140	11.78	1141	12.18	1142	12.63	1143	13.11	1144	13.57
1145	14.20	1146	14.85	1147	15.58	1148	16.38	1149	18.38
1150	20.56	1151	23.13	1152	26.40	1153	29.92	1154	32.37
1155	34.33	1156	35.63	1157	34.71	1158	32.92	1159	30.42
1160	27.21	1161	23.38	1162	20.44	1163	17.68	1164	15.14
1165	13.01	1166	11.36	1167	10.18	1168	9.32	1169	8.68
1170	8.18	1171	7.73	1172	7.39	1173	7.05	1174	6.78
1175	6.54	1176	6.32	1177	6.12	1178	5.95	1179	5.79
1180	5.61	1181	5.52	1182	5.36	1183	5.25	1184	5.14
1185	5.04	1186	4.94	1187	4.84	1188	4.78	1189	4.66
1190	4.60	1191	4.52	1192	4.47	1193	4.39	1194	4.31
1195	4.24	1196	4.17	1197	4.13	1198	4.06	1199	4.02
1200	3.94	1201	3.90	1202	3.87	1203	3.80	1204	3.78
1205	3.75	1206	3.70	1207	3.67	1208	3.63	1209	3.58
1210	3.56	1211	3.54	1212	3.48	1213	3.43	1214	3.43
1215	3.38	1216	3.36	1217	3.34	1218	3.29	1219	3.28
1220	3.26	1221	3.24	1222	3.20	1223	3.16	1224	3.14
1225	3.13	1226	3.11	1227	3.10	1228	3.05	1229	3.03
1230	3.02	1231	3.01	1232	2.99	1233	2.95	1234	2.94
1235	2.90	1236	2.92	1237	2.88	1238	2.87	1239	2.86
1240	2.81	1241	2.83	1242	2.79	1243	2.81	1244	2.77
1245	2.76	1246	2.73	1247	2.75	1248	2.74	1249	2.70
1250	2.70	1251	2.66	1252	2.65	1253	2.64	1254	2.66
1255	2.62	1256	2.60	1257	2.60	1258	2.59	1259	2.59
1260	2.58	1261	2.58	1262	2.54	1263	2.53	1264	2.50
1265	2.50	1266	2.49	1267	2.48	1268	2.46	1269	2.45
1270	2.44	1271	2.40	1272	2.42	1273	2.42	1274	2.41
1275	2.38	1276	2.37	1277	2.37	1278	2.36	1279	2.36
1280	2.35	1281	2.35	1282	2.31	1283	2.34	1284	2.30
1285	2.30	1286	2.30	1287	2.29	1288	2.28	1289	2.24
1290	2.27	1291	2.24	1292	2.26	1293	2.22	1294	2.21
1295	2.21	1296	2.20	1297	2.20	1298	2.20	1299	2.19
1300	2.19	1310	2.09	1320	2.06	1330	2.01	1340	1.95
1350	1.89	1360	1.87	1370	1.79	1380	1.78	1390	1.72
1400	1.68	1420	1.65	1440	1.60	1460	1.19	1500	1.19

TOTAL VOLUME THIS HYDROGRAPH = 5.78(Ac.Ft)

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006  2130    1A 297  518.9 7A344245.0002000                01 G1
006  2130    2A 297  0  .099A344  1.0001000                0
006  2130    3A  97 55 1.6 6A304670.0000800                01
006  2130    4A  20  0  .0 0A304  1.0001000                0    A
006  2130    5A  20  0  .099A304  1.0001000                0
006  2130    6A  20 90 1.310A304 90.0000500                0
006  2130    7A  20 90 1.310A304 50.0000500                02  2
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7  2130    4A    16.2 421156    35.6200  4
8  5   0.      .0 100.     1.6 200.     1.7 300.     1.7 400.     1.8
8 10 500.     2.0 600.     2.1 700.     2.3 800.     2.5 900.     2.9
8 151000.     3.51050.     4.41100.     5.81110.     7.01120.     8.1
8 201130.     9.41131.     9.61132.     9.71133.     9.91134.    10.1
8 251135.    10.31136.    10.51137.    10.81138.    11.11139.    11.4
8 301140.    11.81141.    12.21142.    12.61143.    13.11144.    13.6
8 351145.    14.21146.    14.91147.    15.61148.    16.41149.    18.4
8 401150.    20.61151.    23.11152.    26.41153.    29.91154.    32.4
8 451155.    34.31156.    35.61157.    34.71158.    32.91159.    30.4
8 501160.    27.21161.    23.41162.    20.41163.    17.71164.    15.1
8 551165.    13.01166.    11.41167.    10.21168.     9.31169.     8.7
8 601170.     8.21171.     7.71172.     7.41173.     7.11174.     6.8
8 651175.     6.51176.     6.31177.     6.11178.     5.91179.     5.8
8 701180.     5.61181.     5.51182.     5.41183.     5.21184.     5.1
8 751185.     5.01186.     4.91187.     4.81188.     4.81189.     4.7
8 801190.     4.61191.     4.51192.     4.51193.     4.41194.     4.3
8 851195.     4.21196.     4.21197.     4.11198.     4.11199.     4.0
8 901200.     3.91201.     3.91202.     3.91203.     3.81204.     3.8
8 951205.     3.81206.     3.71207.     3.71208.     3.61209.     3.6
81001210.     3.61211.     3.51212.     3.51213.     3.41214.     3.4
81051215.     3.41216.     3.41217.     3.31218.     3.31219.     3.3
81101220.     3.31221.     3.21222.     3.21223.     3.21224.     3.1
81151225.     3.11226.     3.11227.     3.11228.     3.01229.     3.0
81201230.     3.01231.     3.01232.     3.01233.     3.01234.     2.9
81251235.     2.91236.     2.91237.     2.91238.     2.91239.     2.9
81301240.     2.81241.     2.81242.     2.81243.     2.81244.     2.8
81351245.     2.81246.     2.71247.     2.71248.     2.71249.     2.7
81401250.     2.71251.     2.71252.     2.61253.     2.61254.     2.7
81451255.     2.61256.     2.61257.     2.61258.     2.61259.     2.6
81501260.     2.61261.     2.61262.     2.51263.     2.51264.     2.5
81551265.     2.51266.     2.51267.     2.51268.     2.51269.     2.4
81601270.     2.41271.     2.41272.     2.41273.     2.41274.     2.4
81651275.     2.41276.     2.41277.     2.41278.     2.41279.     2.4
81701280.     2.41281.     2.41282.     2.31283.     2.31284.     2.3
81751285.     2.31286.     2.31287.     2.31288.     2.31289.     2.2
81801290.     2.31291.     2.21292.     2.31293.     2.21294.     2.2
81851295.     2.21296.     2.21297.     2.21298.     2.21299.     2.2
81901300.     2.21310.     2.11320.     2.11330.     2.01340.     2.0
81951350.     1.91360.     1.91370.     1.81380.     1.81390.     1.7
82001400.     1.71420.     1.71440.     1.61460.     1.21500.     1.2
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Program Package Serial Number: 2229

05/05/22 FILE: 2130DH INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

RIVERVIEW BASIN H & A - DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	18.9	51.08	18.9	51.08	4	245.	.02000	2.50	.00	0.	297	7	A34	.05
2130	2A	.0	.00	18.9	50.97	4	1.	.01000	2.75	.00	0.	297	99	A34	.00
2130	3A	1.6	4.31	20.5	55.28	4	670.	.00800	3.00	.00	0.	97	6	A30	.55
2130	4A	16.2	35.60	36.7	89.21	4	1.	.01000	3.50	.00	0.	20	0	A30	.00
2130	5A	.0	.00	36.7	89.20	4	1.	.01000	3.50	.00	0.	20	99	A30	.00
2130	6A	1.3	2.92	38.0	92.01	4	90.	.00500	4.00	.00	0.	20	10	A30	.90
2130	7A	1.3	2.92	39.3	93.97	4	50.	.00500	4.00	.00	0.	20	10	A30	.90

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN H & A - DEV MODEL
HYDROGRAPH AT 2130 1A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.60	200	.63	300	.66	400	.70
500	.75	600	.80	700	.87	800	.97	900	1.12
1000	1.59	1050	2.76	1100	4.40	1110	6.33	1120	7.45
1130	9.34	1131	9.51	1132	9.68	1133	10.11	1134	10.53
1135	10.83	1136	11.26	1137	11.98	1138	12.52	1139	13.06
1140	13.33	1141	14.01	1142	14.96	1143	15.64	1144	16.04
1145	17.40	1146	18.75	1147	20.29	1148	21.28	1149	27.33
1150	33.72	1151	40.06	1152	45.57	1153	51.08	1154	50.94
1155	49.92	1156	43.11	1157	35.86	1158	28.61	1159	21.14
1160	13.74	1161	11.44	1162	10.00	1163	8.97	1164	8.07
1165	7.42	1166	6.93	1167	6.44	1168	6.08	1169	5.83
1170	5.47	1171	5.22	1172	4.98	1173	4.61	1174	4.49
1175	4.25	1176	4.00	1177	3.88	1178	3.76	1179	3.64
1180	3.52	1181	3.40	1182	3.28	1183	3.16	1184	3.04
1185	2.92	1186	2.79	1187	2.80	1188	2.67	1189	2.55
1190	2.55	1191	2.43	1192	2.43	1193	2.31	1194	2.19
1195	2.07	1196	2.07	1197	1.95	1198	1.95	1199	1.83
1200	1.83	1201	1.83	1202	1.83	1203	1.71	1204	1.71
1205	1.71	1206	1.59	1207	1.59	1208	1.47	1209	1.35
1210	1.47	1211	1.35	1212	1.25	1213	1.25	1214	1.25
1215	1.25	1216	1.25	1217	1.22	1218	1.22	1219	1.22
1220	1.22	1221	1.19	1222	1.19	1223	1.15	1224	1.15
1225	1.15	1226	1.15	1227	1.15	1228	1.12	1229	1.12
1230	1.15	1231	1.12	1232	1.12	1233	1.08	1234	1.08
1235	1.08	1236	1.08	1237	1.05	1238	1.08	1239	1.05
1240	1.05	1241	1.05	1242	1.05	1243	1.05	1244	1.05
1245	1.02	1246	1.02	1247	1.05	1248	1.02	1249	1.02
1250	.98	1251	.98	1252	.98	1253	.98	1254	.98
1255	.98	1256	.98	1257	.98	1258	.98	1259	.98
1260	.98	1261	.95	1262	.95	1263	.95	1264	.91
1265	.91	1266	.91	1267	.91	1268	.91	1269	.91
1270	.91	1271	.91	1272	.91	1273	.91	1274	.91
1275	.88	1276	.88	1277	.88	1278	.91	1279	.88
1280	.88	1281	.88	1282	.88	1283	.88	1284	.84
1285	.84	1286	.88	1287	.84	1288	.84	1289	.84
1290	.84	1291	.84	1292	.84	1293	.81	1294	.84
1295	.81	1296	.84	1297	.81	1298	.84	1299	.81
1300	.84	1310	.78	1320	.78	1330	.76	1340	.73
1350	.71	1360	.71	1370	.66	1380	.68	1390	.64
1400	.64	1420	.62	1440	.60	1460	.00	1500	.00

TOTAL VOLUME THIS HYDROGRAPH = 3.25(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN H & A - DEV MODEL
HYDROGRAPH AT 2130 3A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.72	200	.75	300	.79	400	.84
500	.89	600	.96	700	1.04	800	1.16	900	1.33
1000	1.84	1050	3.08	1100	4.86	1110	6.76	1120	8.18
1130	10.00	1131	10.30	1132	10.46	1133	10.78	1134	11.21
1135	11.63	1136	12.03	1137	12.62	1138	13.31	1139	13.88

1140	14.34	1141	14.86	1142	15.72	1143	16.59	1144	17.19
1145	18.17	1146	19.61	1147	21.17	1148	22.52	1149	26.49
1150	33.27	1151	40.20	1152	46.61	1153	52.53	1154	55.28
1155	54.22	1156	49.74	1157	42.11	1158	34.23	1159	26.38
1160	19.03	1161	14.02	1162	11.80	1163	10.50	1164	9.45
1165	8.60	1166	7.95	1167	7.44	1168	6.96	1169	6.61
1170	6.29	1171	5.97	1172	5.68	1173	5.39	1174	5.11
1175	4.88	1176	4.67	1177	4.45	1178	4.28	1179	4.15
1180	4.03	1181	3.90	1182	3.76	1183	3.63	1184	3.51
1185	3.39	1186	3.26	1187	3.17	1188	3.10	1189	3.00
1190	2.91	1191	2.84	1192	2.77	1193	2.71	1194	2.62
1195	2.50	1196	2.39	1197	2.33	1198	2.27	1199	2.20
1200	2.13	1201	2.10	1202	2.10	1203	2.06	1204	2.00
1205	1.97	1206	1.94	1207	1.88	1208	1.82	1209	1.74
1210	1.66	1211	1.66	1212	1.62	1213	1.53	1214	1.50
1215	1.49	1216	1.50	1217	1.48	1218	1.47	1219	1.45
1220	1.45	1221	1.45	1222	1.42	1223	1.41	1224	1.39
1225	1.38	1226	1.38	1227	1.37	1228	1.36	1229	1.35
1230	1.34	1231	1.35	1232	1.34	1233	1.33	1234	1.31
1235	1.30	1236	1.29	1237	1.28	1238	1.27	1239	1.27
1240	1.26	1241	1.25	1242	1.25	1243	1.26	1244	1.25
1245	1.24	1246	1.23	1247	1.22	1248	1.22	1249	1.22
1250	1.21	1251	1.19	1252	1.17	1253	1.17	1254	1.17
1255	1.17	1256	1.16	1257	1.17	1258	1.17	1259	1.16
1260	1.17	1261	1.16	1262	1.15	1263	1.13	1264	1.12
1265	1.11	1266	1.09	1267	1.09	1268	1.09	1269	1.09
1270	1.09	1271	1.09	1272	1.09	1273	1.09	1274	1.09
1275	1.08	1276	1.07	1277	1.05	1278	1.05	1279	1.07
1280	1.06	1281	1.05	1282	1.04	1283	1.04	1284	1.05
1285	1.02	1286	1.02	1287	1.02	1288	1.02	1289	1.01
1290	1.01	1291	1.01	1292	1.01	1293	1.00	1294	.99
1295	.99	1296	.98	1297	.98	1298	.98	1299	.98
1300	.98	1310	.94	1320	.93	1330	.91	1340	.87
1350	.85	1360	.84	1370	.80	1380	.80	1390	.78
1400	.75	1420	.75	1440	.72	1460	.60	1500	.60

TOTAL VOLUME THIS HYDROGRAPH = 3.74(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN H & A - DEV MODEL
HYDROGRAPH AT 2130 7A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	2.61	200	2.75	300	2.81	400	2.97
500	3.24	600	3.44	700	3.76	800	4.11	900	4.75
1000	5.95	1050	8.14	1100	11.57	1110	14.26	1120	17.34
1130	20.44	1131	20.87	1132	21.23	1133	21.65	1134	22.12
1135	22.62	1136	23.20	1137	23.92	1138	24.74	1139	25.62
1140	26.63	1141	27.70	1142	28.73	1143	29.87	1144	31.18
1145	32.65	1146	34.25	1147	36.04	1148	38.19	1149	41.72
1150	46.56	1151	53.24	1152	62.68	1153	73.27	1154	82.58
1155	89.69	1156	93.97	1157	93.49	1158	88.12	1159	78.98
1160	67.98	1161	56.51	1162	46.19	1163	38.03	1164	31.90
1165	27.45	1166	24.15	1167	21.71	1168	19.77	1169	18.36
1170	17.22	1171	16.24	1172	15.43	1173	14.76	1174	14.11
1175	13.49	1176	12.94	1177	12.45	1178	11.98	1179	11.59
1180	11.23	1181	10.88	1182	10.62	1183	10.30	1184	10.00
1185	9.77	1186	9.52	1187	9.28	1188	9.11	1189	8.92
1190	8.69	1191	8.50	1192	8.34	1193	8.20	1194	8.03
1195	7.84	1196	7.70	1197	7.57	1198	7.42	1199	7.28
1200	7.08	1201	6.95	1202	6.88	1203	6.75	1204	6.63
1205	6.59	1206	6.51	1207	6.41	1208	6.31	1209	6.22
1210	6.17	1211	6.07	1212	5.96	1213	5.84	1214	5.74
1215	5.68	1216	5.63	1217	5.52	1218	5.43	1219	5.40
1220	5.38	1221	5.32	1222	5.24	1223	5.23	1224	5.17

1225	5.11	1226	5.08	1227	5.07	1228	4.99	1229	4.93
1230	4.93	1231	4.91	1232	4.90	1233	4.89	1234	4.83
1235	4.77	1236	4.77	1237	4.75	1238	4.74	1239	4.73
1240	4.66	1241	4.59	1242	4.58	1243	4.58	1244	4.56
1245	4.55	1246	4.50	1247	4.45	1248	4.44	1249	4.43
1250	4.43	1251	4.41	1252	4.36	1253	4.30	1254	4.33
1255	4.33	1256	4.26	1257	4.25	1258	4.25	1259	4.24
1260	4.23	1261	4.23	1262	4.18	1263	4.12	1264	4.11
1265	4.11	1266	4.10	1267	4.09	1268	4.07	1269	4.02
1270	3.95	1271	3.94	1272	3.94	1273	3.93	1274	3.93
1275	3.92	1276	3.92	1277	3.92	1278	3.91	1279	3.91
1280	3.90	1281	3.89	1282	3.83	1283	3.78	1284	3.78
1285	3.78	1286	3.77	1287	3.76	1288	3.75	1289	3.69
1290	3.69	1291	3.69	1292	3.68	1293	3.68	1294	3.62
1295	3.61	1296	3.61	1297	3.60	1298	3.60	1299	3.60
1300	3.58	1310	3.45	1320	3.40	1330	3.29	1340	3.23
1350	3.13	1360	3.07	1370	2.96	1380	2.91	1390	2.83
1400	2.76	1420	2.76	1440	2.61	1460	2.46	1500	2.46

TOTAL VOLUME THIS HYDROGRAPH = 10.58(Ac.Ft)

```
006  2130    1A  20 88 5.313A344 30.0000600                 0  G1
006  2130    2A  20 88 3.511A344465.0000700                 02  2
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Program Package Serial Number: 2229
05/06/22 FILE: 2130DD INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN D - DESIGN DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	5.3	10.30	5.3	10.30	4	30.	.00600	2.00	.00	0.	20	13	A34	.88
2130	2A	3.5	7.38	8.8	17.67	4	465.	.00700	2.00	.00	0.	20	11	A34	.88

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:
RIVERVIEW BASIN D - DESIGN DEV MODEL
HYDROGRAPH AT 2130 2A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.95	200	1.00	300	1.05	400	1.11
500	1.18	600	1.27	700	1.38	800	1.53	900	1.76
1000	2.13	1050	2.66	1100	3.41	1110	4.13	1120	4.72
1130	5.49	1131	5.60	1132	5.68	1133	5.82	1134	5.94
1135	6.01	1136	6.12	1137	6.28	1138	6.46	1139	6.63
1140	6.80	1141	7.06	1142	7.35	1143	7.60	1144	7.81
1145	8.22	1146	8.65	1147	9.07	1148	9.47	1149	10.94
1150	12.62	1151	14.16	1152	15.76	1153	17.31	1154	17.67
1155	17.66	1156	17.46	1157	17.19	1158	16.73	1159	16.22
1160	15.12	1161	13.98	1162	12.27	1163	10.34	1164	8.52
1165	7.16	1166	5.97	1167	5.31	1168	4.99	1169	4.68
1170	4.45	1171	4.23	1172	4.07	1173	3.90	1174	3.78
1175	3.66	1176	3.55	1177	3.45	1178	3.37	1179	3.28
1180	3.19	1181	3.14	1182	3.06	1183	2.99	1184	2.94
1185	2.88	1186	2.84	1187	2.80	1188	2.76	1189	2.70
1190	2.66	1191	2.62	1192	2.58	1193	2.55	1194	2.51
1195	2.47	1196	2.44	1197	2.41	1198	2.38	1199	2.34
1200	2.33	1201	2.29	1202	2.29	1203	2.24	1204	2.22
1205	2.22	1206	2.18	1207	2.18	1208	2.15	1209	2.12
1210	2.11	1211	2.09	1212	2.05	1213	2.03	1214	2.03
1215	2.01	1216	1.99	1217	1.98	1218	1.94	1219	1.94
1220	1.93	1221	1.91	1222	1.91	1223	1.87	1224	1.86
1225	1.85	1226	1.85	1227	1.84	1228	1.80	1229	1.80
1230	1.80	1231	1.78	1232	1.77	1233	1.75	1234	1.75
1235	1.73	1236	1.73	1237	1.72	1238	1.71	1239	1.70
1240	1.66	1241	1.67	1242	1.67	1243	1.66	1244	1.66
1245	1.64	1246	1.63	1247	1.63	1248	1.63	1249	1.61
1250	1.60	1251	1.59	1252	1.57	1253	1.57	1254	1.57
1255	1.57	1256	1.56	1257	1.55	1258	1.54	1259	1.54
1260	1.53	1261	1.52	1262	1.52	1263	1.52	1264	1.50
1265	1.48	1266	1.48	1267	1.46	1268	1.46	1269	1.46
1270	1.46	1271	1.43	1272	1.43	1273	1.43	1274	1.43
1275	1.42	1276	1.41	1277	1.43	1278	1.43	1279	1.40
1280	1.40	1281	1.40	1282	1.39	1283	1.38	1284	1.37
1285	1.37	1286	1.38	1287	1.36	1288	1.36	1289	1.34
1290	1.35	1291	1.33	1292	1.33	1293	1.33	1294	1.32
1295	1.32	1296	1.32	1297	1.31	1298	1.32	1299	1.29
1300	1.31	1310	1.26	1320	1.23	1330	1.20	1340	1.16
1350	1.13	1360	1.11	1370	1.06	1380	1.07	1390	1.02
1400	1.00	1420	.99	1440	.95	1460	.57	1500	.57

TOTAL VOLUME THIS HYDROGRAPH = 3.41(Ac.Ft)

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006  2130    1A 297  5 7.8 5A344125.0013200                0  G1
006  2130    2A  97 10 1.7 5A304 1220000600                01
006  2130    3A  97  0  .099A344  1.0001000                0
006  2130    4A  20  0  .0 0A304  1.0001000                0    A
006  2130    5A  20  0  .099A344120.0000900                02  2
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7  2130    4A     8.8 401154    17.7200  4
8  5   0.      .0 100.     1.0 200.     1.0 300.     1.0 400.     1.1
8 10 500.     1.2 600.     1.3 700.     1.4 800.     1.5 900.     1.8
8 151000.     2.11050.     2.71100.     3.41110.     4.11120.     4.7
8 201130.     5.51131.     5.61132.     5.71133.     5.81134.     5.9
8 251135.     6.01136.     6.11137.     6.31138.     6.51139.     6.6
8 301140.     6.81141.     7.11142.     7.31143.     7.61144.     7.8
8 351145.     8.21146.     8.71147.     9.11148.     9.51149.    10.9
8 401150.    12.61151.    14.21152.    15.81153.    17.31154.    17.7
8 451155.    17.71156.    17.51157.    17.21158.    16.71159.    16.2
8 501160.    15.11161.    14.01162.    12.31163.    10.31164.     8.5
8 551165.     7.21166.     6.01167.     5.31168.     5.01169.     4.7
8 601170.     4.51171.     4.21172.     4.11173.     3.91174.     3.8
8 651175.     3.71176.     3.51177.     3.41178.     3.41179.     3.3
8 701180.     3.21181.     3.11182.     3.11183.     3.01184.     2.9
8 751185.     2.91186.     2.81187.     2.81188.     2.81189.     2.7
8 801190.     2.71191.     2.61192.     2.61193.     2.61194.     2.5
8 851195.     2.51196.     2.41197.     2.41198.     2.41199.     2.3
8 901200.     2.31201.     2.31202.     2.31203.     2.21204.     2.2
8 951205.     2.21206.     2.21207.     2.21208.     2.11209.     2.1
81001210.     2.11211.     2.11212.     2.11213.     2.01214.     2.0
81051215.     2.01216.     2.01217.     2.01218.     1.91219.     1.9
81101220.     1.91221.     1.91222.     1.91223.     1.91224.     1.9
81151225.     1.91226.     1.81227.     1.81228.     1.81229.     1.8
81201230.     1.81231.     1.81232.     1.81233.     1.71234.     1.8
81251235.     1.71236.     1.71237.     1.71238.     1.71239.     1.7
81301240.     1.71241.     1.71242.     1.71243.     1.71244.     1.7
81351245.     1.61246.     1.61247.     1.61248.     1.61249.     1.6
81401250.     1.61251.     1.61252.     1.61253.     1.61254.     1.6
81451255.     1.61256.     1.61257.     1.61258.     1.51259.     1.5
81501260.     1.51261.     1.51262.     1.51263.     1.51264.     1.5
81551265.     1.51266.     1.51267.     1.51268.     1.51269.     1.5
81601270.     1.51271.     1.41272.     1.41273.     1.41274.     1.4
81651275.     1.41276.     1.41277.     1.41278.     1.41279.     1.4
81701280.     1.41281.     1.41282.     1.41283.     1.41284.     1.4
81751285.     1.41286.     1.41287.     1.41288.     1.41289.     1.3
81801290.     1.31291.     1.31292.     1.31293.     1.31294.     1.3
81851295.     1.31296.     1.31297.     1.31298.     1.31299.     1.3
81901300.     1.31310.     1.31320.     1.21330.     1.21340.     1.2
81951350.     1.11360.     1.11370.     1.11380.     1.11390.     1.0
82001400.     1.01420.     1.01440.     1.01460.      .61500.      .6
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Program Package Serial Number: 2229
05/06/22 FILE: 2130DE INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN E - DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	7.8	25.56	7.8	25.56	4	125.	.13200	2.00	.00	0.	297	5	A34	.05
2130	2A	1.7	4.70	9.5	29.77	4	1220.	.00600	2.50	.00	0.	97	5	A30	.10
2130	3A	.0	.00	9.5	24.30	4	1.	.01000	2.00	.00	0.	97	99	A34	.00
2130	4A	8.8	17.70	18.3	41.49	4	1.	.01000	2.50	.00	0.	20	0	A30	.00
2130	5A	.0	.00	18.3	41.49	4	120.	.00900	2.50	.00	0.	20	99	A34	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN E - DEV MODEL
HYDROGRAPH AT 2130 2A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.29	200	.30	300	.32	400	.34
500	.36	600	.39	700	.42	800	.47	900	.54
1000	.75	1050	1.30	1100	2.10	1110	3.02	1120	3.60
1130	4.49	1131	4.62	1132	4.72	1133	4.98	1134	5.26
1135	5.50	1136	5.68	1137	6.01	1138	6.26	1139	6.42
1140	6.69	1141	7.12	1142	7.52	1143	7.80	1144	8.09
1145	8.89	1146	9.66	1147	10.27	1148	10.97	1149	14.61
1150	18.73	1151	22.20	1152	26.09	1153	29.77	1154	27.27
1155	22.36	1156	18.14	1157	13.05	1158	8.41	1159	6.20
1160	5.61	1161	4.76	1162	4.36	1163	3.90	1164	3.62
1165	3.29	1166	3.14	1167	2.96	1168	2.78	1169	2.67
1170	2.55	1171	2.37	1172	2.27	1173	2.15	1174	2.03
1175	1.95	1176	1.87	1177	1.79	1178	1.74	1179	1.70
1180	1.62	1181	1.57	1182	1.53	1183	1.45	1184	1.37
1185	1.34	1186	1.31	1187	1.26	1188	1.27	1189	1.20
1190	1.16	1191	1.12	1192	1.08	1193	1.04	1194	1.02
1195	.97	1196	.92	1197	.90	1198	.85	1199	.85
1200	.85	1201	.85	1202	.85	1203	.80	1204	.77
1205	.78	1206	.73	1207	.70	1208	.71	1209	.66
1210	.63	1211	.64	1212	.61	1213	.59	1214	.62
1215	.61	1216	.59	1217	.59	1218	.59	1219	.58
1220	.57	1221	.57	1222	.57	1223	.55	1224	.55
1225	.55	1226	.55	1227	.55	1228	.55	1229	.54
1230	.55	1231	.53	1232	.53	1233	.53	1234	.53
1235	.51	1236	.51	1237	.51	1238	.51	1239	.51
1240	.50	1241	.50	1242	.50	1243	.50	1244	.50
1245	.50	1246	.49	1247	.49	1248	.49	1249	.48
1250	.48	1251	.48	1252	.47	1253	.46	1254	.47
1255	.48	1256	.48	1257	.48	1258	.48	1259	.47
1260	.46	1261	.46	1262	.46	1263	.45	1264	.44
1265	.43	1266	.43	1267	.43	1268	.43	1269	.44
1270	.45	1271	.44	1272	.43	1273	.43	1274	.43
1275	.42	1276	.42	1277	.43	1278	.43	1279	.42
1280	.42	1281	.43	1282	.42	1283	.41	1284	.41
1285	.41	1286	.41	1287	.41	1288	.41	1289	.41
1290	.41	1291	.40	1292	.40	1293	.40	1294	.40
1295	.40	1296	.40	1297	.40	1298	.40	1299	.40
1300	.40	1310	.38	1320	.37	1330	.37	1340	.35
1350	.35	1360	.34	1370	.32	1380	.32	1390	.31
1400	.30	1420	.30	1440	.29	1460	.25	1500	.25

TOTAL VOLUME THIS HYDROGRAPH = 1.58(Ac.Ft)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN E - DEV MODEL
HYDROGRAPH AT 2130 5A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.29	200	1.30	300	1.32	400	1.43
500	1.56	600	1.68	700	1.82	800	1.96	900	2.33
1000	2.82	1050	3.88	1100	5.38	1110	6.52	1120	7.84
1130	9.42	1131	9.61	1132	9.79	1133	9.98	1134	10.17
1135	10.37	1136	10.60	1137	10.97	1138	11.37	1139	11.67

1140	12.09	1141	12.63	1142	13.06	1143	13.61	1144	14.10
1145	14.82	1146	15.65	1147	16.39	1148	17.24	1149	19.19
1150	21.51	1151	24.01	1152	27.36	1153	31.47	1154	34.92
1155	38.20	1156	40.76	1157	41.49	1158	40.09	1159	37.39
1160	33.42	1161	29.20	1162	24.71	1163	20.51	1164	17.14
1165	14.58	1166	12.46	1167	10.97	1168	10.11	1169	9.29
1170	8.71	1171	8.07	1172	7.71	1173	7.26	1174	6.98
1175	6.68	1176	6.33	1177	6.06	1178	5.93	1179	5.69
1180	5.49	1181	5.27	1182	5.19	1183	4.99	1184	4.84
1185	4.75	1186	4.60	1187	4.53	1188	4.48	1189	4.30
1190	4.26	1191	4.09	1192	4.06	1193	4.00	1194	3.87
1195	3.82	1196	3.69	1197	3.63	1198	3.61	1199	3.47
1200	3.44	1201	3.40	1202	3.37	1203	3.23	1204	3.20
1205	3.17	1206	3.15	1207	3.13	1208	3.02	1209	2.99
1210	2.97	1211	2.94	1212	2.93	1213	2.80	1214	2.79
1215	2.76	1216	2.74	1217	2.72	1218	2.61	1219	2.59
1220	2.58	1221	2.56	1222	2.56	1223	2.54	1224	2.54
1225	2.53	1226	2.43	1227	2.41	1228	2.41	1229	2.40
1230	2.40	1231	2.38	1232	2.38	1233	2.27	1234	2.37
1235	2.27	1236	2.26	1237	2.26	1238	2.26	1239	2.25
1240	2.25	1241	2.24	1242	2.24	1243	2.23	1244	2.23
1245	2.13	1246	2.12	1247	2.12	1248	2.12	1249	2.12
1250	2.11	1251	2.11	1252	2.11	1253	2.11	1254	2.10
1255	2.10	1256	2.10	1257	2.10	1258	1.99	1259	1.99
1260	1.98	1261	1.98	1262	1.98	1263	1.98	1264	1.98
1265	1.98	1266	1.98	1267	1.97	1268	1.97	1269	1.97
1270	1.97	1271	1.86	1272	1.86	1273	1.86	1274	1.85
1275	1.85	1276	1.85	1277	1.85	1278	1.85	1279	1.85
1280	1.84	1281	1.84	1282	1.84	1283	1.84	1284	1.83
1285	1.84	1286	1.83	1287	1.83	1288	1.83	1289	1.73
1290	1.72	1291	1.73	1292	1.72	1293	1.72	1294	1.72
1295	1.72	1296	1.71	1297	1.72	1298	1.71	1299	1.71
1300	1.71	1310	1.70	1320	1.58	1330	1.58	1340	1.56
1350	1.46	1360	1.44	1370	1.44	1380	1.43	1390	1.32
1400	1.31	1420	1.31	1440	1.30	1460	1.29	1500	1.29

TOTAL VOLUME THIS HYDROGRAPH = 5.03(Ac.Ft)

```
006  2130    1A 297  5 6.8 5A344200.0003100                 0  G1
006  2130    2A  97 35 0.9 5A304820.0001000                 01
006  2130    3A  20 90 2.013A304 25.0000500                 0
006  2130    4A  97 75 8.6 8A304230.0000400                 0
006  2130    5A  20  0  .099A304  1.0001000                 0
006  2130    6A  20 90 1.813A304 35.0000500                 02  2
```

Program Package Serial Number: 2229

05/06/22 FILE: 2130DF INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

RIVERVIEW BASIN F - DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	6.8	22.28	6.8	22.28	4	200.	.03100	2.00	.00	0.	297	5	A34	.05
2130	2A	.9	2.60	7.7	23.78	4	820.	.01000	2.00	.00	0.	97	5	A30	.35
2130	3A	2.0	3.94	9.7	25.36	4	25.	.00500	2.50	.00	0.	20	13	A30	.90
2130	4A	8.6	20.88	18.3	45.32	4	230.	.00400	3.00	.00	0.	97	8	A30	.75
2130	5A	.0	.00	18.3	44.25	4	1.	.01000	2.75	.00	0.	20	99	A30	.00
2130	6A	1.8	3.54	20.1	47.73	4	35.	.00500	3.00	.00	0.	20	13	A30	.90

Program Package Serial Number: 2229
05/06/22 FILE: 2130DF INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN F - DEV MODEL
HYDROGRAPH AT 2130 2A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.26	200	.27	300	.29	400	.31
500	.33	600	.35	700	.38	800	.42	900	.49
1000	.67	1050	1.13	1100	1.80	1110	2.51	1120	3.03
1130	3.72	1131	3.84	1132	3.92	1133	4.09	1134	4.32
1135	4.53	1136	4.69	1137	4.93	1138	5.16	1139	5.32
1140	5.50	1141	5.81	1142	6.15	1143	6.43	1144	6.66
1145	7.18	1146	7.82	1147	8.38	1148	8.93	1149	11.20
1150	14.55	1151	17.61	1152	20.67	1153	23.78	1154	23.08
1155	19.44	1156	15.81	1157	11.94	1158	8.07	1159	5.74
1160	4.82	1161	4.25	1162	3.78	1163	3.42	1164	3.13
1165	2.88	1166	2.71	1167	2.56	1168	2.42	1169	2.31
1170	2.21	1171	2.08	1172	1.97	1173	1.88	1174	1.78
1175	1.70	1176	1.64	1177	1.57	1178	1.51	1179	1.48
1180	1.43	1181	1.38	1182	1.35	1183	1.30	1184	1.23
1185	1.19	1186	1.16	1187	1.12	1188	1.11	1189	1.08
1190	1.04	1191	1.01	1192	.98	1193	.95	1194	.92
1195	.88	1196	.85	1197	.82	1198	.79	1199	.77
1200	.76	1201	.76	1202	.76	1203	.74	1204	.71
1205	.70	1206	.68	1207	.65	1208	.64	1209	.62
1210	.59	1211	.57	1212	.57	1213	.55	1214	.55
1215	.55	1216	.55	1217	.53	1218	.54	1219	.53
1220	.52	1221	.52	1222	.52	1223	.51	1224	.50
1225	.50	1226	.50	1227	.50	1228	.50	1229	.49
1230	.50	1231	.49	1232	.48	1233	.48	1234	.48
1235	.47	1236	.47	1237	.46	1238	.46	1239	.46
1240	.46	1241	.45	1242	.46	1243	.46	1244	.45
1245	.45	1246	.45	1247	.44	1248	.44	1249	.44
1250	.44	1251	.43	1252	.43	1253	.42	1254	.42
1255	.43	1256	.43	1257	.43	1258	.43	1259	.43
1260	.42	1261	.41	1262	.41	1263	.41	1264	.41
1265	.40	1266	.39	1267	.39	1268	.39	1269	.40
1270	.41	1271	.41	1272	.40	1273	.39	1274	.39
1275	.39	1276	.38	1277	.38	1278	.39	1279	.39
1280	.38	1281	.38	1282	.39	1283	.38	1284	.37
1285	.37	1286	.37	1287	.37	1288	.37	1289	.37
1290	.37	1291	.37	1292	.36	1293	.36	1294	.36
1295	.36	1296	.36	1297	.36	1298	.36	1299	.36
1300	.36	1310	.34	1320	.34	1330	.33	1340	.32
1350	.31	1360	.31	1370	.29	1380	.29	1390	.28
1400	.28	1420	.27	1440	.26	1460	.22	1500	.22

TOTAL VOLUME THIS HYDROGRAPH = 1.37(Ac.Ft)

Program Package Serial Number: 2229
05/06/22 FILE: 2130DF INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 3

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN F - DEV MODEL
HYDROGRAPH AT 2130 6A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.50	200	1.56	300	1.65	400	1.74
500	1.85	600	1.99	700	2.17	800	2.40	900	2.76
1000	3.41	1050	4.53	1100	6.29	1110	7.67	1120	9.27
1130	10.92	1131	11.13	1132	11.31	1133	11.53	1134	11.77
1135	12.05	1136	12.34	1137	12.70	1138	13.18	1139	13.69
1140	14.18	1141	14.69	1142	15.26	1143	15.89	1144	16.54
1145	17.31	1146	18.20	1147	19.19	1148	20.25	1149	22.17
1150	25.21	1151	29.04	1152	33.48	1153	38.45	1154	42.74
1155	45.72	1156	47.41	1157	47.73	1158	45.66	1159	40.12

1160	33.80	1161	27.76	1162	22.47	1163	18.75	1164	16.16
1165	14.09	1166	12.36	1167	11.13	1168	10.22	1169	9.51
1170	8.95	1171	8.50	1172	8.09	1173	7.75	1174	7.46
1175	7.16	1176	6.89	1177	6.68	1178	6.46	1179	6.23
1180	6.04	1181	5.87	1182	5.70	1183	5.57	1184	5.44
1185	5.30	1186	5.18	1187	5.10	1188	5.00	1189	4.87
1190	4.75	1191	4.65	1192	4.56	1193	4.48	1194	4.40
1195	4.32	1196	4.24	1197	4.17	1198	4.11	1199	4.05
1200	3.96	1201	3.89	1202	3.82	1203	3.74	1204	3.68
1205	3.65	1206	3.60	1207	3.56	1208	3.53	1209	3.51
1210	3.48	1211	3.44	1212	3.39	1213	3.36	1214	3.32
1215	3.27	1216	3.22	1217	3.17	1218	3.13	1219	3.10
1220	3.07	1221	3.03	1222	3.01	1223	2.99	1224	2.97
1225	2.95	1226	2.94	1227	2.90	1228	2.87	1229	2.85
1230	2.83	1231	2.82	1232	2.83	1233	2.81	1234	2.78
1235	2.77	1236	2.76	1237	2.74	1238	2.72	1239	2.67
1240	2.64	1241	2.63	1242	2.63	1243	2.62	1244	2.60
1245	2.58	1246	2.57	1247	2.58	1248	2.57	1249	2.55
1250	2.53	1251	2.52	1252	2.50	1253	2.49	1254	2.49
1255	2.48	1256	2.45	1257	2.44	1258	2.44	1259	2.43
1260	2.42	1261	2.42	1262	2.40	1263	2.39	1264	2.38
1265	2.36	1266	2.35	1267	2.33	1268	2.32	1269	2.31
1270	2.29	1271	2.27	1272	2.28	1273	2.28	1274	2.28
1275	2.25	1276	2.24	1277	2.23	1278	2.24	1279	2.23
1280	2.22	1281	2.21	1282	2.19	1283	2.18	1284	2.18
1285	2.17	1286	2.17	1287	2.17	1288	2.15	1289	2.12
1290	2.12	1291	2.13	1292	2.14	1293	2.13	1294	2.10
1295	2.10	1296	2.09	1297	2.08	1298	2.08	1299	2.06
1300	2.03	1310	2.00	1320	1.95	1330	1.88	1340	1.83
1350	1.80	1360	1.75	1370	1.69	1380	1.67	1390	1.66
1400	1.62	1420	1.54	1440	1.51	1460	1.30	1500	1.30

TOTAL VOLUME THIS HYDROGRAPH = 5.89(Ac.Ft)

RIVERVIEW

50-YEAR BURNED

DEVELOPED CONDITION

```
006  2130    1A  97 50 3.4 7A344400.0000800                0  G1
006  2130    2B  20 88 3.3 9A344255.0000600                0
006  2130    3B  20 88 1.1 7A344 60.0001800                0
006  2130    4AB 20  0  .0 0A344505.0001100                0
006  2130    5A  20  0  .099A344  1.0001000                0
006  2130    6C  20 85 2.5 9A344630.0000600                0
006  2130    7AC 20  0  .0 0A344 30.0000500                0
006  2130    8A  20  0  .099A344  1.0001000                0
006  2130    9A  20 85 2.1 7A344 25.0008300                0
006  2130   10A  20 85 3.8 7A344100.0001200                02  2
```

Program Package Serial Number: 2229
05/13/22 FILE: 2130DA INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN A 50YR BURNED DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	3.4	9.59	3.4	9.59	4	400.	.00800	2.00	.00	0.	97	7	A34	.50
2130	2B	3.3	8.74	3.3	8.74	4	255.	.00600	2.00	.00	0.	20	9	A34	.88
2130	3B	1.1	3.27	4.4	11.89	4	60.	.01800	2.00	.00	0.	20	7	A34	.88
2130	4AB	4.4	11.86	7.8	21.27	4	505.	.01100	2.00	.00	0.	20	0	A34	.00
2130	5A	.0	.00	7.8	20.83	4	1.	.01000	2.00	.00	0.	20	99	A34	.00
2130	6C	2.5	6.55	2.5	6.55	4	630.	.00600	2.00	.00	0.	20	9	A34	.85
2130	7AC	2.5	6.28	10.3	27.11	4	30.	.00500	2.50	.00	0.	20	0	A34	.00
2130	8A	.0	.00	10.3	27.07	4	1.	.01000	2.25	.00	0.	20	99	A34	.00
2130	9A	2.1	6.18	12.4	31.70	4	25.	.08300	2.00	.00	0.	20	7	A34	.85
2130	10A	3.8	11.18	16.2	41.50	4	100.	.01200	2.50	.00	0.	20	7	A34	.85

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:
RIVERVIEW BASIN A 50YR BURNED DEV MODEL
HYDROGRAPH AT 2130 10A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	1.81	200	1.88	300	1.98	400	2.10
500	2.23	600	2.40	700	2.61	800	2.89	900	3.32
1000	4.05	1050	5.09	1100	6.64	1110	8.02	1120	9.36
1130	10.85	1131	11.01	1132	11.17	1133	11.43	1134	11.69
1135	11.91	1136	12.19	1137	12.60	1138	12.97	1139	13.36
1140	13.71	1141	14.21	1142	14.80	1143	15.32	1144	15.80
1145	16.60	1146	17.42	1147	18.34	1148	19.21	1149	21.71
1150	24.57	1151	27.90	1152	31.81	1153	36.25	1154	39.20
1155	41.50	1156	41.27	1157	39.73	1158	37.02	1159	33.26
1160	28.69	1161	25.13	1162	21.73	1163	18.59	1164	15.90
1165	13.73	1166	12.18	1167	11.02	1168	10.23	1169	9.60
1170	9.08	1171	8.65	1172	8.30	1173	7.91	1174	7.67
1175	7.38	1176	7.13	1177	6.92	1178	6.73	1179	6.55
1180	6.39	1181	6.23	1182	6.10	1183	5.97	1184	5.85
1185	5.73	1186	5.62	1187	5.54	1188	5.43	1189	5.32
1190	5.26	1191	5.16	1192	5.11	1193	5.01	1194	4.93
1195	4.84	1196	4.80	1197	4.72	1198	4.67	1199	4.58
1200	4.53	1201	4.48	1202	4.44	1203	4.37	1204	4.34
1205	4.31	1206	4.24	1207	4.22	1208	4.16	1209	4.09
1210	4.11	1211	4.04	1212	3.96	1213	3.93	1214	3.90
1215	3.87	1216	3.84	1217	3.77	1218	3.75	1219	3.73
1220	3.71	1221	3.66	1222	3.64	1223	3.59	1224	3.57
1225	3.55	1226	3.53	1227	3.51	1228	3.45	1229	3.43
1230	3.46	1231	3.41	1232	3.39	1233	3.34	1234	3.33
1235	3.32	1236	3.30	1237	3.26	1238	3.28	1239	3.23
1240	3.21	1241	3.20	1242	3.19	1243	3.18	1244	3.16
1245	3.12	1246	3.11	1247	3.14	1248	3.09	1249	3.08
1250	3.04	1251	3.03	1252	3.02	1253	3.01	1254	2.99
1255	2.98	1256	2.96	1257	2.95	1258	2.95	1259	2.95
1260	2.94	1261	2.90	1262	2.89	1263	2.89	1264	2.84
1265	2.84	1266	2.83	1267	2.81	1268	2.80	1269	2.78
1270	2.77	1271	2.76	1272	2.75	1273	2.74	1274	2.74
1275	2.69	1276	2.69	1277	2.69	1278	2.72	1279	2.68
1280	2.67	1281	2.67	1282	2.66	1283	2.65	1284	2.61
1285	2.60	1286	2.63	1287	2.59	1288	2.58	1289	2.57
1290	2.57	1291	2.56	1292	2.55	1293	2.51	1294	2.54
1295	2.50	1296	2.52	1297	2.49	1298	2.51	1299	2.48
1300	2.50	1310	2.39	1320	2.34	1330	2.29	1340	2.22
1350	2.16	1360	2.12	1370	2.04	1380	2.03	1390	1.96
1400	1.91	1420	1.89	1440	1.82	1460	1.36	1500	1.36

TOTAL VOLUME THIS HYDROGRAPH = 6.60(Ac.Ft)

```
006  2130    1A 297  518.9 7A344245.0002000                0  G1
006  2130    2A 297  0  .099A344  1.0001000                0
006  2130    3A  97 55 1.6 5A344670.0000800                01
006  2130    4A  20  0  .0 0A344  1.0001000                0    A
006  2130    5A  20  0  .099A344  1.0001000                0
006  2130    6A  20 90 1.310A344 90.0000500                0
006  2130    7A  20 90 1.3 9A344 50.0000500                02  2
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7  2130    4A    16.2 411155    41.5200  4
8  5   0.      .0 100.     1.8 200.     1.9 300.     2.0 400.     2.1
8 10 500.     2.2 600.     2.4 700.     2.6 800.     2.9 900.     3.3
8 151000.     4.11050.     5.11100.     6.61110.     8.01120.     9.4
8 201130.    10.91131.    11.01132.    11.21133.    11.41134.    11.7
8 251135.    11.91136.    12.21137.    12.61138.    13.01139.    13.4
8 301140.    13.71141.    14.21142.    14.81143.    15.31144.    15.8
8 351145.    16.61146.    17.41147.    18.31148.    19.21149.    21.7
8 401150.    24.61151.    27.91152.    31.81153.    36.31154.    39.2
8 451155.    41.51156.    41.31157.    39.71158.    37.01159.    33.3
8 501160.    28.71161.    25.11162.    21.71163.    18.61164.    15.9
8 551165.    13.71166.    12.21167.    11.01168.    10.21169.     9.6
8 601170.     9.11171.     8.61172.     8.31173.     7.91174.     7.7
8 651175.     7.41176.     7.11177.     6.91178.     6.71179.     6.5
8 701180.     6.41181.     6.21182.     6.11183.     6.01184.     5.9
8 751185.     5.71186.     5.61187.     5.51188.     5.41189.     5.3
8 801190.     5.31191.     5.21192.     5.11193.     5.01194.     4.9
8 851195.     4.81196.     4.81197.     4.71198.     4.71199.     4.6
8 901200.     4.51201.     4.51202.     4.41203.     4.41204.     4.3
8 951205.     4.31206.     4.21207.     4.21208.     4.21209.     4.1
81001210.     4.11211.     4.01212.     4.01213.     3.91214.     3.9
81051215.     3.91216.     3.81217.     3.81218.     3.81219.     3.7
81101220.     3.71221.     3.71222.     3.61223.     3.61224.     3.6
81151225.     3.61226.     3.51227.     3.51228.     3.41229.     3.4
81201230.     3.51231.     3.41232.     3.41233.     3.31234.     3.3
81251235.     3.31236.     3.31237.     3.31238.     3.31239.     3.2
81301240.     3.21241.     3.21242.     3.21243.     3.21244.     3.2
81351245.     3.11246.     3.11247.     3.11248.     3.11249.     3.1
81401250.     3.01251.     3.01252.     3.01253.     3.01254.     3.0
81451255.     3.01256.     3.01257.     3.01258.     2.91259.     2.9
81501260.     2.91261.     2.91262.     2.91263.     2.91264.     2.8
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81651275.     2.71276.     2.71277.     2.71278.     2.71279.     2.7
81701280.     2.71281.     2.71282.     2.71283.     2.71284.     2.6
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81901300.     2.51310.     2.41320.     2.31330.     2.31340.     2.2
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Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat
RIVERVIEW BASIN H & A 50YR BURNED DEV MODEL STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
2130	1A	18.9	51.08	18.9	51.08	4	245.	.02000	2.50	.00	0.	297	7	A34	.05
2130	2A	.0	.00	18.9	50.97	4	1.	.01000	2.75	.00	0.	297	99	A34	.00
2130	3A	1.6	5.46	20.5	55.79	4	670.	.00800	3.00	.00	0.	97	5	A34	.55
2130	4A	16.2	41.50	36.7	95.47	4	1.	.01000	3.50	.00	0.	20	0	A34	.00
2130	5A	.0	.00	36.7	95.46	4	1.	.01000	3.50	.00	0.	20	99	A34	.00
2130	6A	1.3	3.32	38.0	98.66	4	90.	.00500	4.00	.00	0.	20	10	A34	.90
2130	7A	1.3	3.47	39.3	101.69	4	50.	.00500	4.00	.00	0.	20	9	A34	.90

↑
Program Package Serial Number: 2229
05/13/22 FILE: 2130DH INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

RIVERVIEW BASIN H & A 50YR BURNED DEV MODEL

HYDROGRAPH AT 2130 3A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	.73	200	.77	300	.81	400	.85
500	.91	600	.98	700	1.07	800	1.18	900	1.36
1000	1.88	1050	3.14	1100	4.95	1110	6.87	1120	8.28
1130	10.14	1131	10.44	1132	10.61	1133	10.94	1134	11.40
1135	11.82	1136	12.22	1137	12.83	1138	13.49	1139	14.08
1140	14.56	1141	15.10	1142	15.95	1143	16.83	1144	17.45
1145	18.45	1146	19.90	1147	21.48	1148	22.88	1149	27.05
1150	33.91	1151	41.02	1152	47.58	1153	53.68	1154	55.79
1155	54.52	1156	49.85	1157	41.98	1158	33.88	1159	26.43
1160	19.10	1161	14.11	1162	11.88	1163	10.58	1164	9.52
1165	8.67	1166	8.04	1167	7.52	1168	7.05	1169	6.71
1170	6.38	1171	6.04	1172	5.76	1173	5.45	1174	5.17
1175	4.96	1176	4.73	1177	4.50	1178	4.36	1179	4.23
1180	4.09	1181	3.97	1182	3.84	1183	3.70	1184	3.56
1185	3.44	1186	3.31	1187	3.22	1188	3.16	1189	3.06
1190	2.97	1191	2.90	1192	2.84	1193	2.76	1194	2.67
1195	2.54	1196	2.45	1197	2.37	1198	2.31	1199	2.25
1200	2.19	1201	2.16	1202	2.16	1203	2.11	1204	2.05
1205	2.02	1206	1.98	1207	1.92	1208	1.86	1209	1.76
1210	1.69	1211	1.69	1212	1.63	1213	1.56	1214	1.54
1215	1.52	1216	1.52	1217	1.52	1218	1.50	1219	1.48
1220	1.48	1221	1.47	1222	1.46	1223	1.43	1224	1.41
1225	1.40	1226	1.40	1227	1.40	1228	1.39	1229	1.38
1230	1.37	1231	1.37	1232	1.37	1233	1.35	1234	1.34
1235	1.32	1236	1.32	1237	1.31	1238	1.31	1239	1.30
1240	1.29	1241	1.28	1242	1.28	1243	1.28	1244	1.28
1245	1.27	1246	1.25	1247	1.25	1248	1.25	1249	1.24
1250	1.23	1251	1.21	1252	1.19	1253	1.19	1254	1.20
1255	1.20	1256	1.20	1257	1.20	1258	1.20	1259	1.19
1260	1.19	1261	1.18	1262	1.17	1263	1.16	1264	1.14
1265	1.12	1266	1.11	1267	1.11	1268	1.11	1269	1.12
1270	1.12	1271	1.11	1272	1.11	1273	1.11	1274	1.11
1275	1.09	1276	1.09	1277	1.08	1278	1.08	1279	1.08
1280	1.09	1281	1.08	1282	1.07	1283	1.07	1284	1.06
1285	1.05	1286	1.04	1287	1.05	1288	1.04	1289	1.03
1290	1.03	1291	1.02	1292	1.03	1293	1.02	1294	1.02
1295	1.00	1296	1.01	1297	1.00	1298	1.01	1299	1.00
1300	1.01	1310	.96	1320	.95	1330	.93	1340	.89
1350	.87	1360	.86	1370	.81	1380	.82	1390	.79
1400	.77	1420	.77	1440	.73	1460	.60	1500	.60

TOTAL VOLUME THIS HYDROGRAPH = 3.80(Ac.Ft)

↑
Program Package Serial Number: 2229
05/13/22 FILE: 2130DH INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 3

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

RIVERVIEW BASIN H & A 50YR BURNED DEV MODEL

HYDROGRAPH AT 2130 7A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	2.86	200	3.00	300	3.16	400	3.33
500	3.51	600	3.81	700	4.13	800	4.60	900	5.25
1000	6.68	1050	9.02	1100	12.59	1110	15.55	1120	18.93
1130	22.30	1131	22.67	1132	23.06	1133	23.54	1134	24.08
1135	24.65	1136	25.32	1137	26.18	1138	27.10	1139	28.10
1140	29.09	1141	30.19	1142	31.44	1143	32.67	1144	33.97
1145	35.61	1146	37.38	1147	39.38	1148	41.72	1149	45.75
1150	51.41	1151	59.11	1152	69.46	1153	81.12	1154	91.10
1155	98.42	1156	101.69	1157	99.92	1158	93.33	1159	82.61

1160	70.04	1161	58.19	1162	47.74	1163	39.23	1164	32.98
1165	28.42	1166	25.14	1167	22.74	1168	20.86	1169	19.48
1170	18.35	1171	17.37	1172	16.55	1173	15.82	1174	15.18
1175	14.60	1176	13.97	1177	13.43	1178	12.96	1179	12.52
1180	12.16	1181	11.82	1182	11.50	1183	11.24	1184	10.99
1185	10.68	1186	10.39	1187	10.15	1188	9.91	1189	9.67
1190	9.51	1191	9.35	1192	9.15	1193	8.97	1194	8.78
1195	8.60	1196	8.46	1197	8.31	1198	8.16	1199	8.01
1200	7.82	1201	7.69	1202	7.56	1203	7.44	1204	7.34
1205	7.25	1206	7.15	1207	7.06	1208	7.01	1209	6.90
1210	6.80	1211	6.68	1212	6.57	1213	6.44	1214	6.34
1215	6.29	1216	6.18	1217	6.08	1218	6.05	1219	5.97
1220	5.90	1221	5.88	1222	5.81	1223	5.73	1224	5.72
1225	5.70	1226	5.64	1227	5.57	1228	5.49	1229	5.43
1230	5.47	1231	5.46	1232	5.40	1233	5.34	1234	5.28
1235	5.26	1236	5.25	1237	5.24	1238	5.23	1239	5.16
1240	5.10	1241	5.09	1242	5.08	1243	5.07	1244	5.07
1245	5.00	1246	4.94	1247	4.94	1248	4.93	1249	4.92
1250	4.86	1251	4.80	1252	4.79	1253	4.77	1254	4.77
1255	4.76	1256	4.75	1257	4.74	1258	4.68	1259	4.63
1260	4.63	1261	4.62	1262	4.62	1263	4.61	1264	4.55
1265	4.49	1266	4.47	1267	4.47	1268	4.46	1269	4.45
1270	4.44	1271	4.42	1272	4.37	1273	4.32	1274	4.31
1275	4.31	1276	4.30	1277	4.30	1278	4.29	1279	4.28
1280	4.28	1281	4.28	1282	4.26	1283	4.26	1284	4.21
1285	4.15	1286	4.15	1287	4.13	1288	4.13	1289	4.12
1290	4.11	1291	4.11	1292	4.10	1293	4.05	1294	4.00
1295	3.98	1296	3.98	1297	3.97	1298	3.97	1299	3.96
1300	3.97	1310	3.82	1320	3.68	1330	3.65	1340	3.52
1350	3.46	1360	3.36	1370	3.20	1380	3.19	1390	3.15
1400	3.04	1420	3.00	1440	2.88	1460	2.70	1500	2.70

TOTAL VOLUME THIS HYDROGRAPH = 11.61(Ac.Ft)

```
006  2130    1A  20 88 5.312A344 30.0000600                 0  G1
006  2130    2A  20 88 3.510A344465.0000700                 02  2
```

Attachment B

USMP/LID Report, Alliance Land Planning and Engineering

USMP/LID REPORT

City of Santa Clarita

RIVERVIEW

Tract No. 83605

Prepared For:
Integral Communities
888 San C;emente Drive
Newport Beach, CA 92660

Prepared By:
Alliance Land Planning & Engineering, Inc.
2248 Faraday Ave.
Carlsbad, CA 92008

OCTOBER 6, 2022

JN 2244 & 2218

City of
SANTA CLARITA
Engineering Services
Phone: (661) 286-4060
www.santa-clarita.com

SUSMP/LID INFORMATION

Date Received:

PROJECT INFORMATION

Project Name:	RIVERVIEW
Project Description:	MULTI FAMILY AND COMMERCIAL
Tract No. (if any):	83605
Project Size (acres):	~33.0

FOR STAFF USE ONLY

Engineering Project No.: ENG

Engineering Record No(s): USP

PROJECT LOCATION:

APN(s):	Address (if assigned):
Latitude: 34°24'59.24"N	Longitude: 118°31'43.80"W

DEVELOPMENT INFORMATION

☐ New Development | or | ☐ Re-development

Type of Development:

- ☐ Project is > 1 ac and adds impervious area > 10,000 sf
- ☐ Single Family Hillside Home
- ☐ Industrial Park with > 10,000 sf
- ☐ Commercial Mall with > 10,000 sf
- ☐ Auto Service facility with > 5,000 sf
- ☐ Retail Gasoline outlets with > 5,000 sf
- ☐ Restaurants with > 5,000 sf
- ☐ Parking Lots with > 5,000 sf
- ☐ Street or Road construction with > 10,000 sf
- ☐ Near or discharging directly to a Significant Ecological Area (SEA)

Required Volume to be retained (SWQDv) : ~84527 cf

Estimated Vol retained on site VIA INFILTRATION (SWQDv): 0	% of required : 0 %
Estimated UNTREATED Volume on site (SWQDv): ~84527 cf	% of required : 100 %

Note : 1.5 factor x UNTREATED Volume is required for Alternative Compliance Volume

Estimated Alternative Compliance Volume (SWQDv): ~84527 cf

Alternative Compliance Method used: (please check all that applies)

- ☐ Onsite biofiltration 147,695 cf to be treated via biofiltration
- ☐ Offsite biofiltration / Location : ____________
- ☐ Water re-use
- ☐ Others: Treated via flowrate treatment unit, required Q_total=0.357cfs, provided Q_total=0.412cfs

Table of Contents

Appendices

Project Overview

The Riverview project is located on the southwest corner of Soledad Canyon Road and Commuter Way. The project consists of a commercial site section with parking structure in addition to multi-family residential, park and rec area, access roads, parking, landscaping, and hardscape. The project site is considered a Designated Project as greater than one acre of land is to be disturbed and adds more then 10k sq-ft of impervious surface area. The project will capture stormwater runoff in a water quality biofiltration basin or biofiltration units for treatment.

Drainage Patterns and Low Flow Routing

The drainage flows from the southwest to the northeast. Stormwater is collected in private storm drain system. Before being conveyed to the existing storm drain system the storm water is routed to a low flow splitter. The splitter will send the first flush flows to the biofiltration basin to be treated. The splitter will convey high flows to the existing downstream storm drain system. For the portion of the site that cannot be treated in the basin the low flow will be treated in one of two proprietary biofiltration units.

Modeling and Methodology

LID flowrates and volumes for the 85th percentile rainfall event have been analyzed using methods prescribed in the LA County Low Impact Development Manual. The following hydrologic parameters and software have been used during this analysis:

- 85th % rainfall depth = 0.91 in
- 95th % rainfall depth = 1.79 in
- Soil Classification Area = 020
- Time of concentration = HydroCalc software
- Flow rates and volumes = HydroCalc software

Results

The water quality biofiltration basin will be used to treat low impact development flows of the 85th percentile, 24-hr event. The tables below show a summary the design parameters and required/provided treatment volume and flowrate. See appendix B for drawdown calculations and appendix D for the soils report.

RIVERVIEW - WATER QUALITY PARAMETERS - VOLUME TREATMENT											
SUBAREA	**AREA**	**OVERLAND (Tc)**				**85% RAIN**	**IMP**	**SOIL**	**V_BMP**	**V_BMP * 1.5**	**V_PROV**
		HI	**LO**	**LENGTH**	**SLOPE**						
	ac	**ft**	**ft**	**ft**	**ft/ft**	**in**	**%**		**cf**	**cf**	**min**
1A	31.5	1210	1196.5	2235	0.006	0.91	85	20	80498	**120747**	147695

RIVERVIEW - WATER QUALITY PARAMETERS - FLOWRATE TREATMENT										
SUBAREA	AREA	OVERLAND (Tc)				85% RAIN	IMP	SOIL	Q_BMP	Q_PROV
		HI	LO	LENGTH	SLOPE					
	ac	ft	ft	ft	ft/ft	in	%		cfs	cfs
1B	1.5	1197	1191	345	0.017	0.91	90	20	0.357	**0.412**

LID Specific Requirements

The following list discusses additional aspects of the project's LID specific requirements:

Hydromodification

This project is considered exempt from hydromodification requirements within Los Angeles County since all points discharge into existing MS4 drain concrete drainpipes. Runoff impacts are considered to have negligible impact on existing site conditions because of this development.

Natural Areas

There existing natural areas within the project site make up approximately 20% of the area which is currently a large parking lot and racetrack being used for swap meets. The developed condition site will include landscaped or open space areas.

Stormwater Pollutants of Concern

The primary pollutants of concern anticipated for this project are associated with rooftops, private driveways, asphalt paved streets, and landscaped areas. These pollutants have been listed below for regions both on-site and downstream of the proposed development.

Pollutants of concern

Pathogens, nutrients, pesticides, organic compounds, oxygen demanding substances, trash and debris, oils and grease, sediments, and metals. No legacy pollutants are present. Pollutants shall be removed through the treatment control BMP described herein.

Pollutant Removal

The biofiltration basin and biofiltration treatment units will remove nutrients at medium effectiveness. However, they remove everything else listed above with high effectiveness. The effectiveness is per CASQA's BMP handbook on New Development and Redevelopment section on Biofiltration/Bioretention.

Slopes and Channels

Where feasible, surface runoff generated from slopes in open space landscaped areas will drain to the primary storm drain system. Channels are proposed for the developed site to route surface runoff to storm drain inlets. See Landscape Irrigation Practices section below for info on how natural slope will be conserved.

Landscape/Irrigation Practices

Landscaped areas are designed to minimize/eliminate runoff and the need for fertilizer/pesticides. Harvest and re-use are not feasible for this project due to use of drought resistant vegetation that is proposed by project landscape architect. They are also designed to include comprehensive irrigation systems that only water areas as needed to ensure healthy vegetation growth and to conserve natural areas.

Storm Drain System Stenciling
Storm drain catch basins and low flow grated inlet catch basins are proposed for this project. “NO DUMPING. DRAINS TO RIVER” stencils will be painted at each inlet location per directives shown on the LID Map. Since this project will contain curbs, stencils shall be painted upon the concrete face of the curb above the gutter flowline where practical.

Outdoor Material Storage Areas
No outdoor material storage areas are proposed for this project.

Properly Design Trash Storage Areas
Trash storage areas are proposed for the project and will have three (3) side walls and covered roofs per the City of Santa Clarita guidelines. This is done to prevent contact with stormwater.

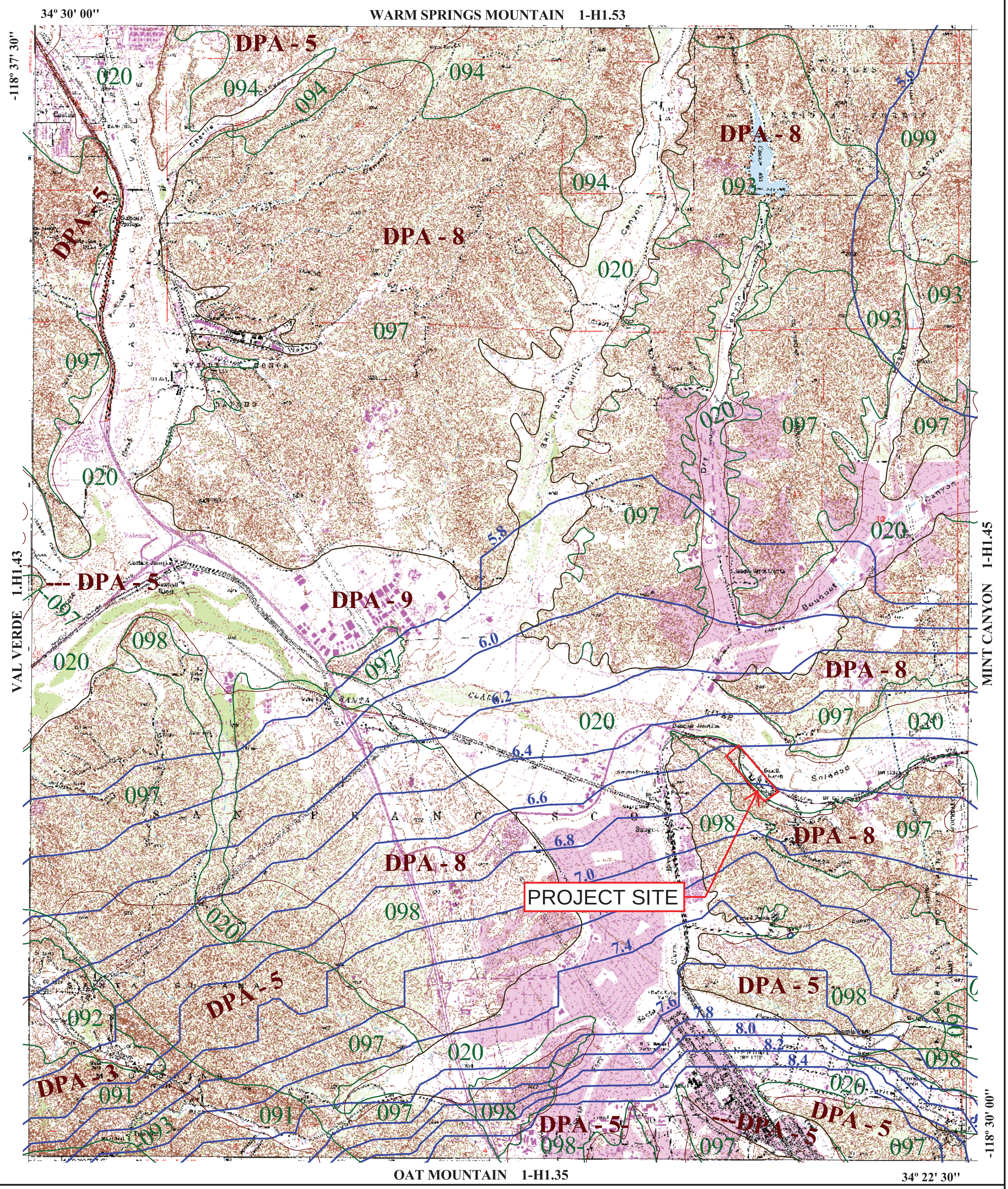
BMP Maintenance (O&M)
Per BMP covenant in Appendix C of this report, it is the responsibility of the owner and/or future HOA to maintain the treatment units and basin. The operations and maintenance (O&M) manuals are also included with this report in Appendix C.

Conclusion

Low impact development modeling and the tables above show that the capacity of the proposed basin and treatment units are adequate for the treatment of all site runoff. All areas of development will be treated per methods outlined by the City of Santa Clarita. This report therefore concludes that the Riverview Project is considered acceptable for development in terms of water quality design.

APPENDIX A

HydroCalc Model Output



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

1 0 1 2 Miles

N E W S

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

N E W H A L L

50-YEAR 24-HOUR ISOHYET

1-H1.44

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

Peak Flow Hydrologic Analysis

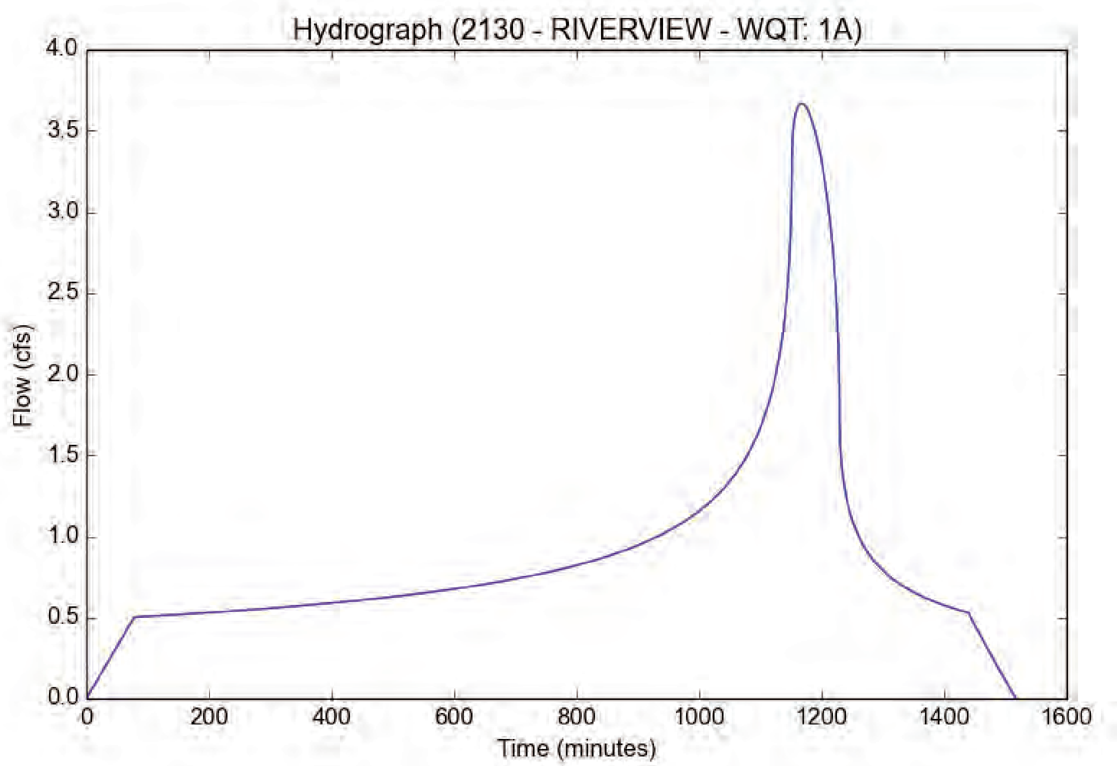
File location: I:/Project Files/2130 - RIVERVIEW/USMP/HYDROCALC/2130 - RIVERVIEW - WQT Report_100622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2130 - RIVERVIEW - WQT
Subarea ID	1A
Area (ac)	31.5
Flow Path Length (ft)	2235.0
Flow Path Slope (vft/hft)	0.006
85th Percentile Rainfall Depth (in)	0.91
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.91
Peak Intensity (in/hr)	0.1493
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.78
Time of Concentration (min)	78.0
Clear Peak Flow Rate (cfs)	3.6676
Burned Peak Flow Rate (cfs)	3.6676
24-Hr Clear Runoff Volume (ac-ft)	1.848
24-Hr Clear Runoff Volume (cu-ft)	80497.769



Peak Flow Hydrologic Analysis

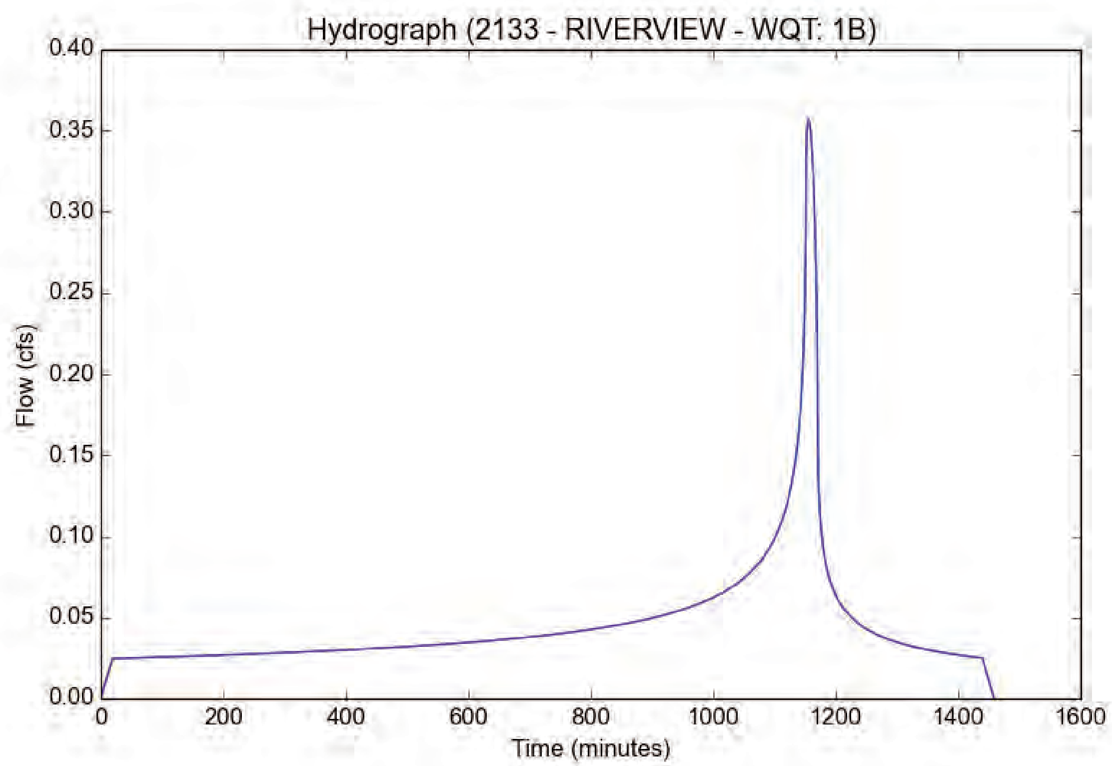
File location: I:/Project Files/2130 - RIVERVIEW/USMP/HYDROCALC/2130 - RIVERVIEW - WQT Report_100622.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	2133 - RIVERVIEW - WQT
Subarea ID	1B
Area (ac)	1.5
Flow Path Length (ft)	345.0
Flow Path Slope (vft/hft)	0.017
85th Percentile Rainfall Depth (in)	0.91
Percent Impervious	0.9
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.91
Peak Intensity (in/hr)	0.2899
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	0.3566
Burned Peak Flow Rate (cfs)	0.3566
24-Hr Clear Runoff Volume (ac-ft)	0.0925
24-Hr Clear Runoff Volume (cu-ft)	4029.4984



APPENDIX B

LID Design
&
Drawdown Calculations

Peak Flow Hydrologic Analysis

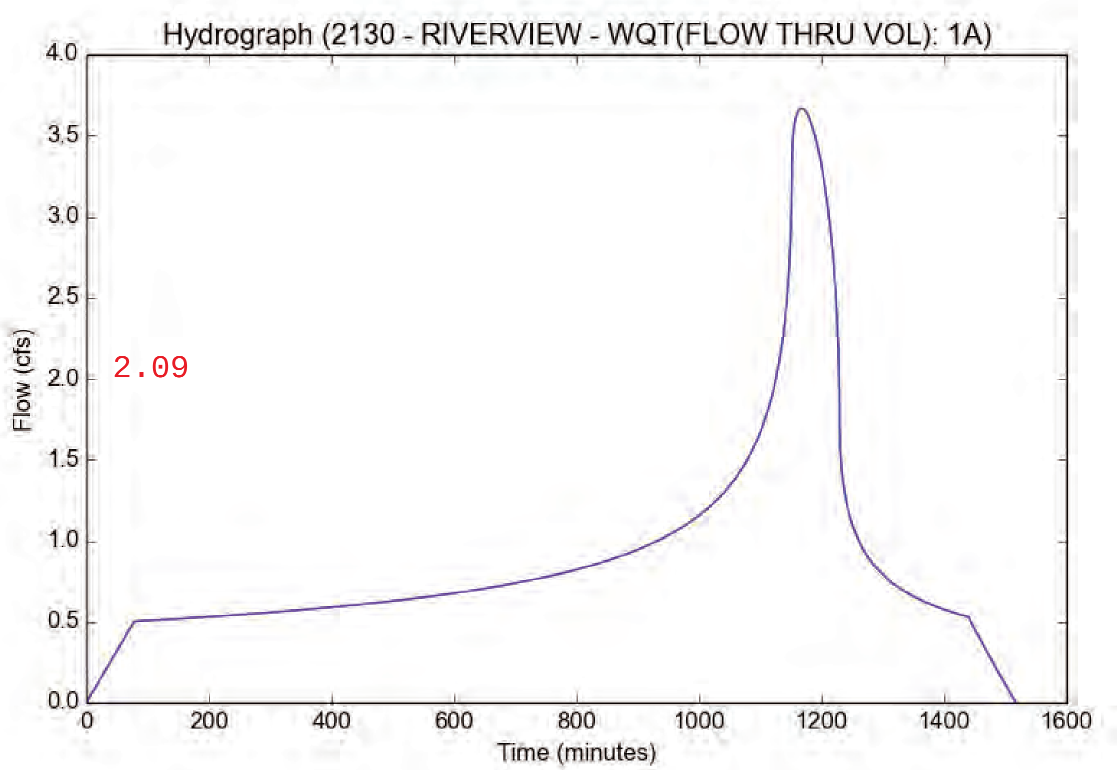
File location: I:/Project Files/2130 - RIVERVIEW/USMP/HYDROCALC/FLOWTHRU/2130 - RIVERVIEW - WQT(FLOW THRU VOL) - 1A.pdf
Version: HydroCalc 1.0.3

Input Parameters

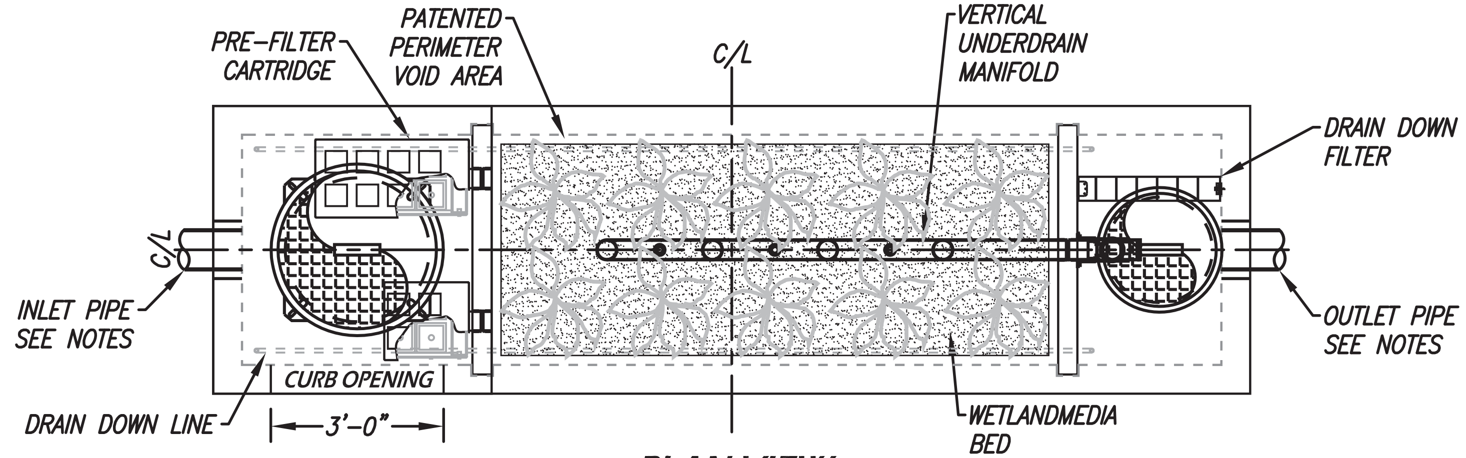
Project Name	2130 - RIVERVIEW - WQT(FLOW THRU VOL)
Subarea ID	1A
Area (ac)	31.5
Flow Path Length (ft)	2235.0
Flow Path Slope (vft/hft)	0.006
85th Percentile Rainfall Depth (in)	0.91
Percent Impervious	0.85
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

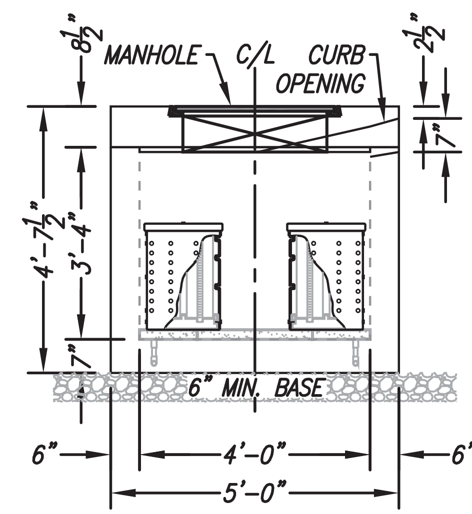
Modeled (85th percentile storm) Rainfall Depth (in)	0.91
Peak Intensity (in/hr)	0.1493
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.78
Time of Concentration (min)	78.0
Clear Peak Flow Rate (cfs)	3.6676
Burned Peak Flow Rate (cfs)	3.6676
24-Hr Clear Runoff Volume (ac-ft)	1.848
24-Hr Clear Runoff Volume (cu-ft)	80497.769



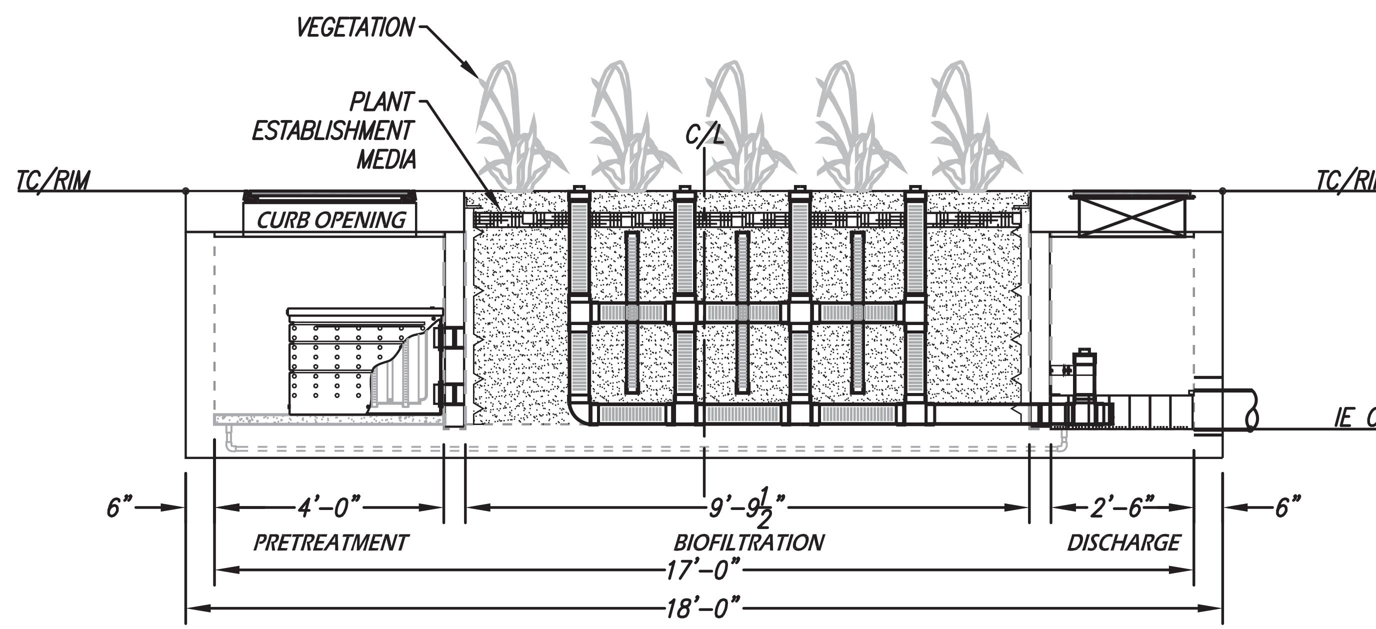
SITE SPECIFIC DATA			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	ø30"	N/A	ø24"
WETLANDMEDIA VOLUME (CY)			5.41
WETLANDMEDIA DELIVERY METHOD			TBD
ORIFICE SIZE (DIA. INCHES)			ø2.05"
MAXIMUM PICK WEIGHT (LBS)			36000
NOTES:			



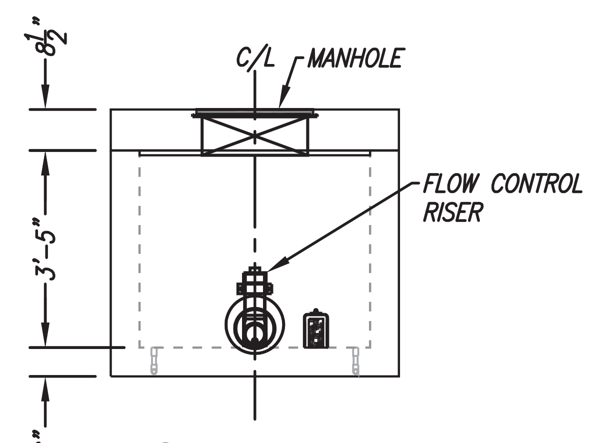
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON-SHRINK GROUT PER MANUFACTURERS STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.

TREATMENT FLOW (CFS)	0.206
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	TBD
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MWS-L-4-17-C

STORMWATER BIOFILTRATION SYSTEM

STANDARD DETAIL

APPENDIX C

BMP Covenant
&
Operations and Maintenance Plan

RECORDING REQUESTED BY:
(insert owner(s) name(s))
(insert number and street)
(insert city, state, and zip)

WHEN RECORDED MAIL TO:
Mary Cusick, City Clerk
City of Santa Clarita
23920 Valencia Boulevard, Suite 120
Santa Clarita, CA 91355

Space above this line for Recorder's use

TITLE(S)

MAINTENANCE COVENANT FOR PARCELS SUBJECT TO STANDARD URBAN STORMWATER MITIGATION PROGRAM (SUSMP) REQUIREMENTS

RECORDING REQUESTED BY:
(insert owner(s) name(s))
(insert number and street)
(insert city, state, and zip)

WHEN RECORDED MAIL TO:
Mary Cusick, City Clerk
City of Santa Clarita
23920 Valencia Boulevard, Suite 120
Santa Clarita, CA 91355

Recording Fee: ______________________________ Space above this line for Recorder's use

Documentary Transfer Tax:

The property is located in the City of Santa Clarita.

MAINTENANCE COVENANT FOR PARCELS SUBJECT TO STANDARD URBAN STORMWATER MITIGATION PROGRAM (SUSMP) REQUIREMENTS

Pursuant to Section 17.95.110 of the Santa Clarita Municipal Code and Title 10, Chapter 10.04 of the Santa Clarita Municipal Code relating to the control of pollutants carried by storm water runoff, structural and/or treatment control Best Management Practices (BMPs) have been installed on the following property:

LEGAL DESCRIPTION

Assessor Parcel No(s): _______

Tract/Parcel Map No.: 53074 Lot No.: 01

Address: (insert number and street)
(insert city, state, and zip)

I/We (insert owner(s) name(s)), hereby certify that I/we am/are the legal owner(s) of property described above, and as such owners for the mutual benefit of future purchasers and transferees, their heirs, successors, and assigns (collectively "owner"), do hereby affix the following protective conditions to which their property, or portions thereof, shall be held, sold and/or conveyed:

1. That the owner(s) shall maintain the drainage devices such as paved swales, bench drains, inlets, catch basins, down-drains, pipes, and water quality devices on the property described above and as shown on plans submitted to the City of Santa Clarita, in a good and functional condition to safeguard the property and adjoining properties from damage and pollution.
2. That owner(s) shall conduct maintenance inspection of all Structural or Treatment Control BMPs on the property at least once a year and retain proof of the inspection. The annual maintenance inspections shall verify the legibility of all required stencils and signs and the owner shall repaint and label as necessary.
3. That owner(s) shall provide to new owner(s) with any conveyance of the property printed educational materials giving information on which storm water management facilities are present, the type(s) and location(s) of required maintenance signs, and required maintenance instructions.

(type name of company/corporation/partnership/agency - leave blank for all others)

____ Date:______________________________
(owner signs and dates above, type name and title here)

____ Date:______________________________
(owner signs and dates above, type name and title here)

____ Date:______________________________
(owner signs and dates above, type name and title here)

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California }
County of ______________________________________ }

On __________________________ before me, ____, Notary Public,
Date | Name of Notary

personally appeared ____
Name(s) of Signer(s)

____,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature ____
Signature of Notary Public

Place Notary Seal Above

-- *OPTIONAL* ---

Though the information below is not required by law, it may prove valuable to person relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or type of Document: ____

Document Date: ____ Number of Pages: _________________________

Signer(s) Other Than Named Above: ____

Capacity(ies) Claimed by Signer(s)

Signer's Name: ________________________________
☐ Individual
☐ Corporate Officer --Title(s): ____________________
☐ Partner -- ☐ Limited ☐ General
☐ Attorney-in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ____________________
____
Signer Is Representing: __________
____
____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: ________________________________
☐ Individual
☐ Corporate Officer -- Title(s): ____________________
☐ Partner – ☐ Limited ☐ General
☐ Attorney-in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ____________________
____
Signer Is Representing: __________
____
____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Bio Clean

A Forterra Company

Modular Wetlands® Linear

A Stormwater Biofiltration Solution

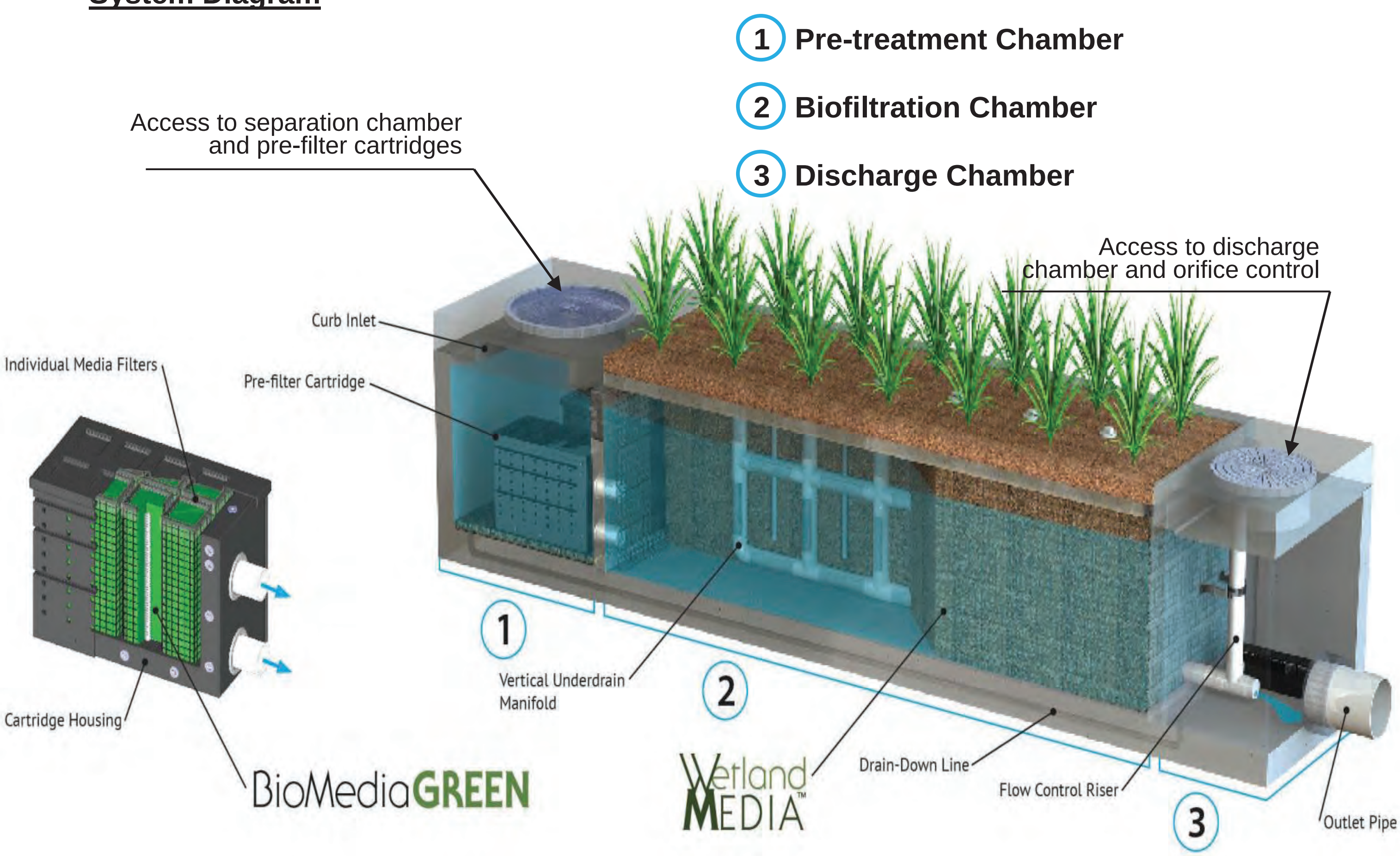
OPERATION & MAINTENANCE MANUAL

Inspection Guidelines for
Modular Wetland System - Linear

Inspection Summary

- Inspect Pre-Treatment, Biofiltration and Discharge Chambers – average inspection interval is 6 to 12 months.
  - (1*5 minute average inspection time*).
- NOTE: Pollutant loading varies greatly from site to site and no two sites are the same. Therefore, the first year requires inspection monthly during the wet season and every other month during the dry season in order to observe and record the amount of pollutant loading the system is receiving.

System Diagram



Inspection Overview

As with all stormwater BMPs inspection and maintenance on the MWS Linear is necessary. Stormwater regulations require that all BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess the site specific loading conditions. This is recommended because pollutant loading and pollutant characteristics can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding on roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided. Without appropriate maintenance a BMP will exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.

<u>Inspection Equipment</u>

Following is a list of equipment to allow for simple and effective inspection of the MWS Linear:

- Modular Wetland Inspection Form
- Flashlight
- Manhole hook or appropriate tools to remove access hatches and covers
- Appropriate traffic control signage and procedures
- Measuring pole and/or tape measure.
- Protective clothing and eye protection.
- 7/16” open or closed ended wrench.
- Large permanent black marker (initial inspections only – first year)
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections of the system.

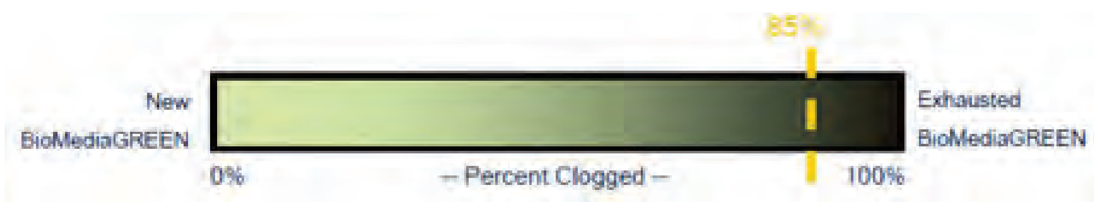
Inspection Steps

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the MWS Linear are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long term inspection and maintenance interval requirements.

The MWS Linear can be inspected though visual observation without entry into the system. All necessary pre-inspection steps must be carried out before inspection occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once these access covers have been safely opened the inspection process can proceed:

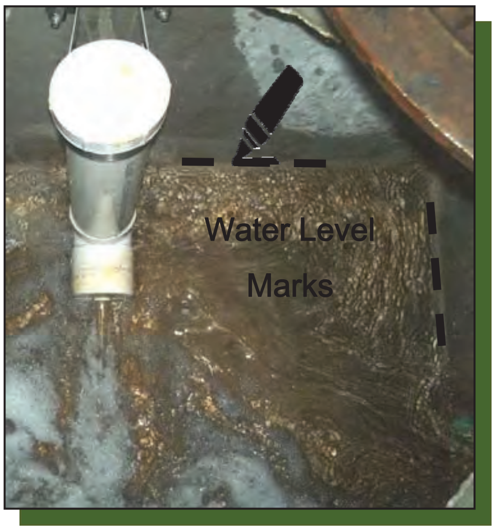
- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other info (see inspection form).
- Observe the inside of the system through the access hatches. If minimal light is available and vision into the unit is impaired utilize a flashlight to see inside the system and all of its chambers.
- Look for any out of the ordinary obstructions in the inflow pipe, pre-treatment chamber, biofiltration chamber, discharge chamber or outflow pipe. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, debris and sediment accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick estimate the amount of trash, debris and sediment in this chamber. Record this depth on the inspection form.

- Through visual observation inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediments on the cartridges, any build-up on the top of the cartridges, or clogging of the holes. Record this information on the inspection form. The pre-filter cartridges can further be inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber – see notes above regarding confined space entry). Record the color of the material. New material is a light green in color. As the media becomes clogged it will turn darker in color, eventually becoming dark brown or black. Using the below color indicator record the percentage of media exhausted.



The biofiltration chamber is generally maintenance free due to the system's advanced pre-treatment chamber. For units which have open planters with vegetation it is recommended that the vegetation be inspected. Look for any plants that are dead or showing signs of disease or other negative stressors. Record the general health of the plants on the inspection and indicate through visual observation or digital photographs if trimming of the vegetation is needed.
The discharge chamber houses the orifice control structure, drain down filter and is connected to the outflow pipe. It is important to check to ensure the orifice is in proper operating conditions and free of any obstructions. It is also important to assess the condition of the drain down filter media which utilizes a block form of the BioMediaGREEN. Assess in the same manner as the cubes in the Pre-Filter Cartridge as mentioned above. Generally, the discharge chamber will be clean and free of debris. Inspect the water marks on the side walls. If possible, inspect the discharge chamber during a rain event to assess the amount of flow leaving the system while it is at 100% capacity (pre-treatment chamber water level at peak hydraulic grade lines or HGL). The water level of the flowing water should be compared to the watermark level on the side walls which is an indicator of the highest discharge rate the system achieved when initially installed. Record on the form is there is any difference in level from watermark in inches.

* NOTE: During the first few storms the water level in the outflow chamber should be observed and a 6 inch long horizontal watermark line drawn (using a large permanent marker) at the water level in the discharge chamber while the system is operating at 100% capacity. The diagram below illustrates where a line should be drawn. This line is a reference point for future inspections of the system:



Using a permanent marker draw a 6 inch long horizontal line, as shown, at the higher water level in the MWS Linear discharge chamber.

* Water level in the discharge chamber is a function of flow rate and pipe size. Observation of water level during the first few months of operation can be used as a benchmark level for future inspections. The initial mark and all future observations shall be made when system is at 100% capacity (water level at maximum level in pre-treatment chamber). If future water levels are below this mark when system is at 100% capacity this is an indicator that maintenance to the pre-filter cartridges may be needed.
* *Finalize inspection report for analysis by the maintenance manager to determine if* maintenance is required.

Maintenance Indicators

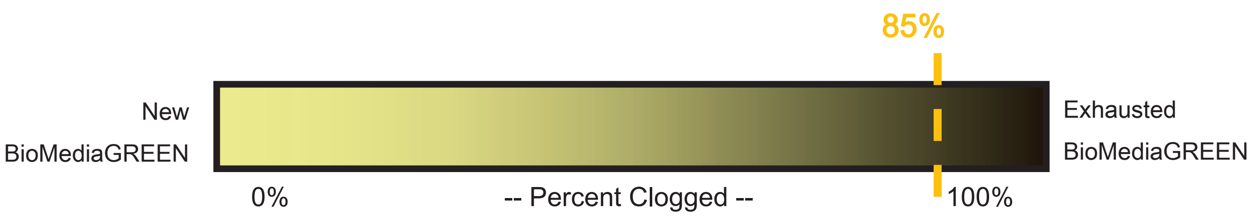
Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or cartridges.
- Obstructions in the system or its inlet or outlet.
- Excessive accumulation of floatables in the pre-treatment chamber in which the length and width of the chamber is fully impacted more than 18".

Excessive accumulation of sediment in the pre-treatment chamber of more than 6 inches in depth.

- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pre-filter cartridges. The following chart shows photos of the condition of the BioMediaGREEN contained within the pre-filter cartridges. When media is more than 85% clogged replacement is required.





- Excessive accumulation of sediment on the BioMediaGREEN media housed within the drain down filter. The following photos show of the condition of the BioMediaGREEN contained within the drain down filter. When media is more than 85% clogged replacement is required.

- Overgrown vegetation.

- Water level in discharge chamber during 100% operating capacity (pre-treatment chamber water level at max height) is lower than the watermark by 20%.

Inspection Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.

Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

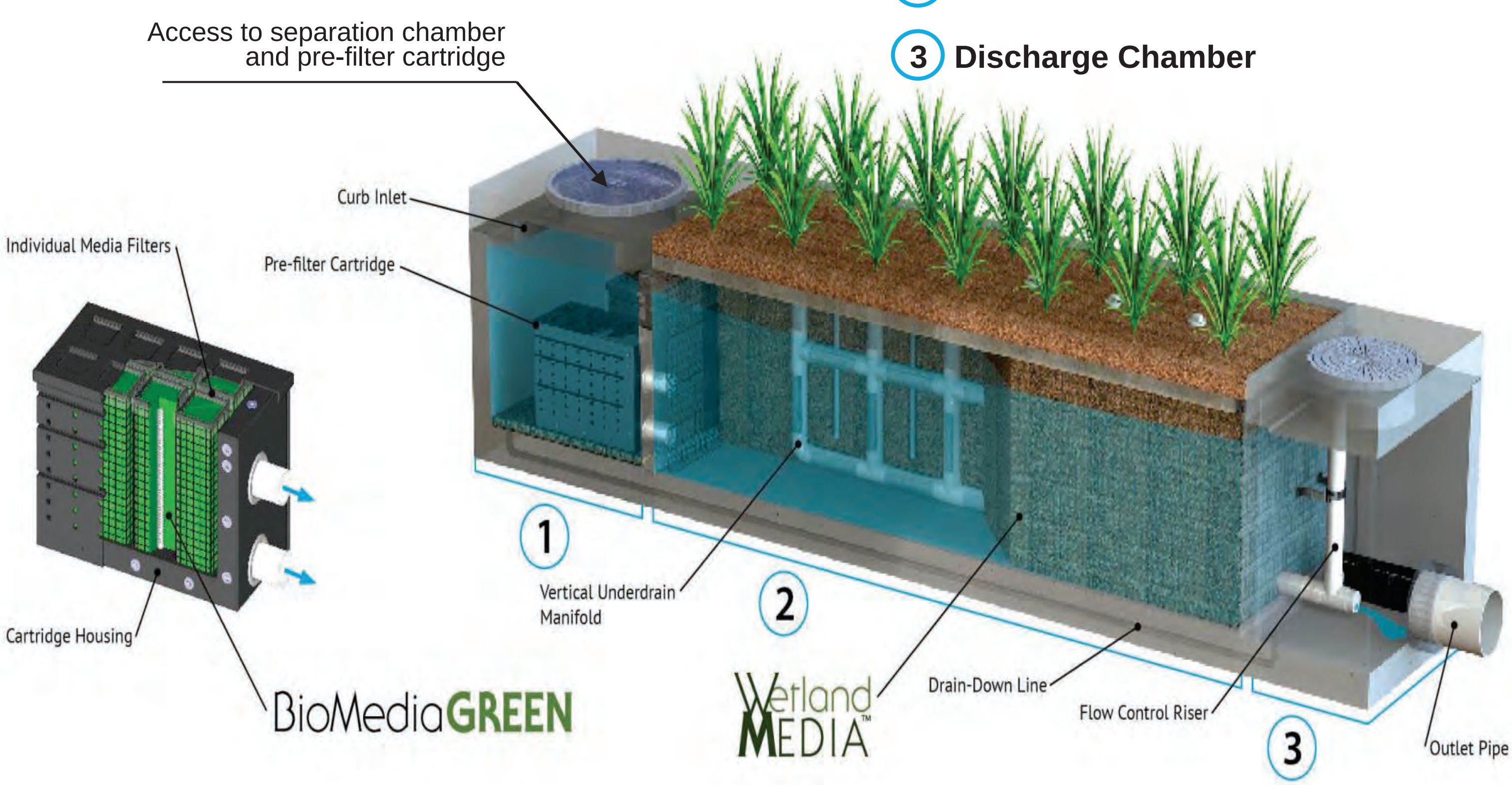
- Remove Sediment from Pre-Treatment Chamber – average maintenance interval is 12 to 24 months.
    - *(10 minute average service time).*
- Replace Pre-Filter Cartridge Media – average maintenance interval 12 to 24 months.
    - *(10-15 minute per cartridge average service time).*
- Trim Vegetation – average maintenance interval is 6 to 12 months.
    - *(Service time varies).*

System Diagram

1 **Pre-treatment Chamber**

2 **Biofiltration Chamber**

3 **Discharge Chamber**



Maintenance Overview

The time has come to maintain your Modular Wetland System Linear (MWS Linear). To ensure successful and efficient maintenance on the system we recommend the following. The MWS Linear can be maintained by removing the access hatches over the systems various chambers. All necessary pre-maintenance steps must be carried out before maintenance occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once traffic control has been set up per local and state regulations and access covers have been safely opened the maintenance process can begin. It should be noted that some maintenance activities require confined space entry. All confined space requirements must be strictly followed before entry into the system. In addition the following is recommended:

- Prepare the maintenance form by writing in the necessary information including project name, location, date & time, unit number and other info (see maintenance form).
- Set up all appropriate safety and cleaning equipment.
- Ensure traffic control is set up and properly positioned.
- Prepare a pre-checks (OSHA, safety, confined space entry) are performed.

<u>Maintenance Equipment</u>

Following is a list of equipment required for maintenance of the MWS Linear:

- Modular Wetland Maintenance Form
- Manhole hook or appropriate tools to access hatches and covers
- Protective clothing, flashlight and eye protection.
- 7/16” open or closed ended wrench.
- Vacuum assisted truck with pressure washer.
- Replacement BioMediaGREEN for Pre-Filter Cartridges if required (order from manufacturer).

Maintenance Steps

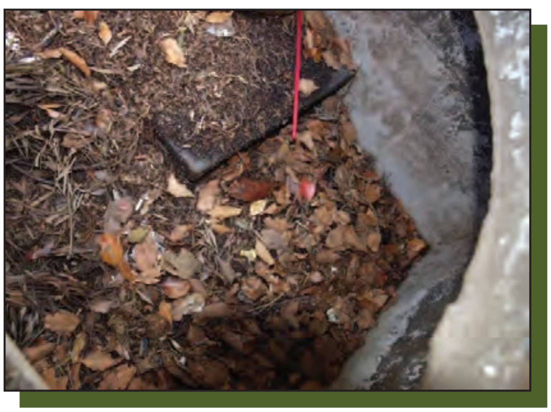
1. Pre-treatment Chamber (bottom of chamber)

   A. Remove access hatch or manhole cover over pre-treatment chamber and position vacuum truck accordingly.

   B. With a pressure washer spray down pollutants accumulated on walls and pre-filter cartridges.

   C. Vacuum out Pre-Treatment Chamber and remove all accumulated pollutants including trash, debris and sediments. Be sure to vacuum the floor until pervious pavers are visible and clean.

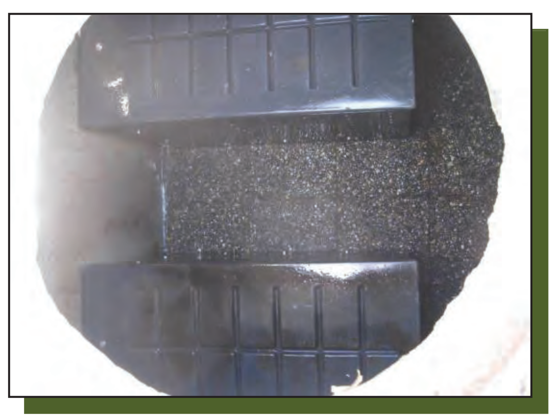
   D. If Pre-Filter Cartridges require media replacement move onto step 2. If not, replace access hatch or manhole cover.



Removal of access hatch to gain access below.

Insertion of vacuum hose into separation chamber.

Removal of trash, sediment and debris.



Fully cleaned separation chamber.

2. <u>Pre-Filter Cartridges (attached to wall of pre-treatment chamber)</u>

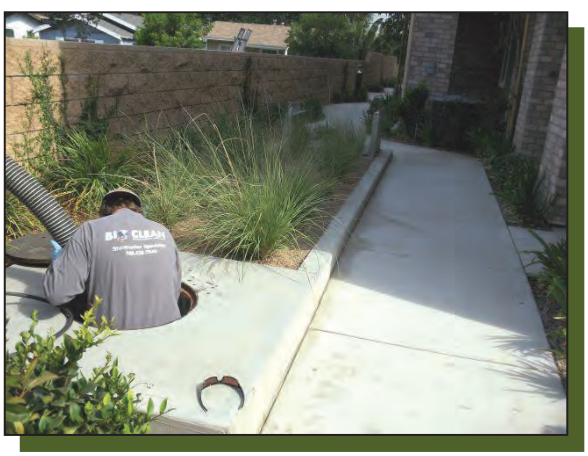
   A. After finishing step 1 enter pre-treatment chamber.

   B. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.

Pre-filter cartridges with tops on.

Inside cartridges showing media filters ready for replacement.

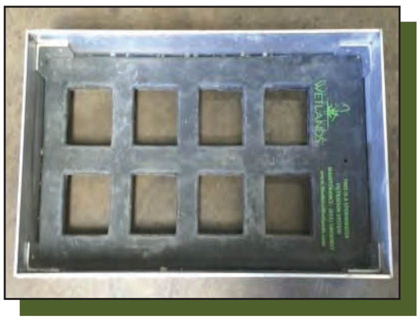
   C. Place the vacuum hose over each individual media filter to suck out filter media.



Vacuuming out of media filters.

   D. Once filter media has been sucked use a pressure washer to spray down inside of the cartridge and it’s containing media cages. Remove cleaned media cages and place to the side. Once removed the vacuum hose can be inserted into the cartridge to vacuum out any remaining material near the bottom of the cartridge.

E. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. Utilize the manufacture provided refilling trey and place on top of cartridge. Fill trey with new bulk media and shake down into place. Using your hands slightly compact media into each filter cage. Once cages are full removed refilling trey and replace cartridge top ensuring bolts are properly tightened.



Refilling trey for media replacement.

Refilling trey on cartridge with bulk media.

F. Exit pre-treatment chamber. Replace access hatch or manhole cover.

3. <u>Biofiltration Chamber (middle vegetated chamber)</u>

A. In general, the biofiltration chamber is maintenance free with the exception of maintaining the vegetation. Using standard gardening tools properly trim back the vegetation to healthy levels. The MWS Linear utilizes vegetation similar to surrounding landscape areas therefore trim vegetation to match surrounding vegetation. If any plants have died replace plants with new ones:

B. Over time, sediment will accumulate in the perimeter void area and will need to be vacuumed out. The media surface may also require power washing if it becomes occluded with sediment. In addition, the wetland media will eventually need to be replaced after 10 plus years of service. A vacuum truck is recommended to fully remove all wetland media. Once old media is removed the entire chamber, media cage, and netting should be power washed. The netting may require replacement before installing new media. New wetland media should be purchased directly from the manufacture. It can be delivered either in bulk or in super sacks for easy installation.

4. <u>Discharge Chamber (contains drain down cartridge & connected to pipe)</u>

   A. Remove access hatch or manhole cover over discharge chamber.
   B. Enter chamber to gain access to the drain down filter. Unlock the locking mechanism and left up drain down filter housing to remove used BioMediaGREEN filter block as shown below:

   C. Insert new BioMediaGREEN filter block and lock drain down filter housing back in place. Replace access hatch or manhole cover over discharge chamber.

Inspection Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.

Inspection Form

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Inspection Report
Modular Wetlands System

Project Name	For Office Use Only
Project Address (city) (Zip Code)	(Reviewed By)
Owner / Management Company	(Date) Office personnel to complete section to the left.

Contact ____________ Phone (   )   –

Inspector Name ____________ Date ____/____/______ Time ________ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm   Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition ____________ Additional Notes ____________

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): ____________ Size (22', 14' or etc.): ____________

Structural Integrity:	Yes	No	Comments
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	Yes	No
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes:

Maintenance Report

Modular Wetland System, Inc.
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F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

Project Name ______________________

Project Address ______________________ (city) (Zip Code)

Owner / Management Company ______________________

Contact ______________________ Phone ( ) –

Inspector Name ______________________ Date ___/___/_____ Time __________ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition ______________________ Additional Notes ______________________

For Office Use Only
(Reviewed By)
(Date) Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

APPENDIX D

Soils Report

APPENDIX E

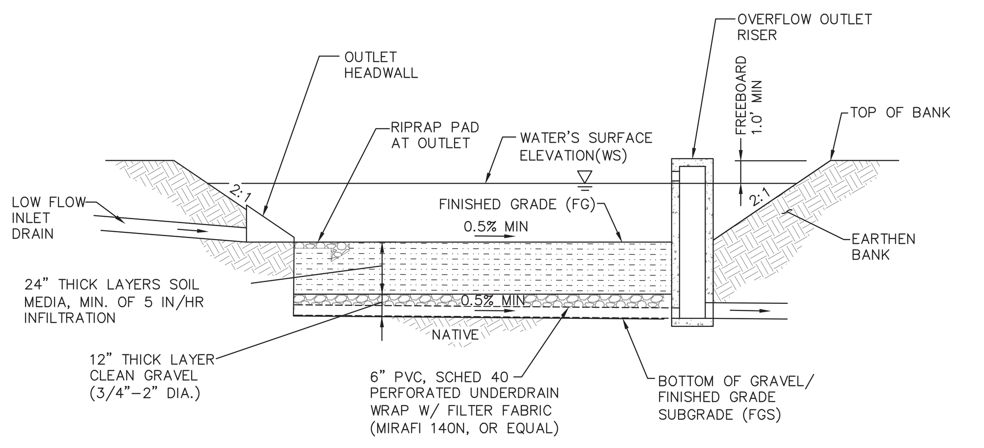
LID Exhibit

RIVERVIEW

DEVELOPED CONDITION USMP EXHIBIT

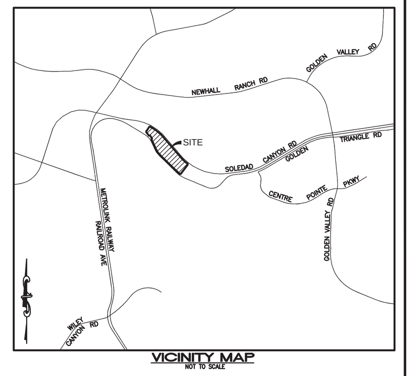
10/6/22

TRACT NO. 83605



EARTHEN BIOINFILTRATION BASIN

NOT TO SCALE



USMP NOTES

ALL STRUCTURAL BMP'S SHALL BE ACCESSIBLE FOR INSPECTION AND MAINTENANCE AND SHALL BEAR A "NO DUMPING – DRAINS TO RIVER" SYMBOL IN TRAFFIC RATED PAINT PER DETAIL HEREIN. STENCIL IS AVAILABLE AT ANY OF THE BUILDING AND SAFETY'S DISTRICT OFFICES.

CATCH BASIN STENCIL DETAIL

ALL CATCH BASIN AND INLETS THAT DISCHARGE INTO AN EXISTING OR PROPOSED STORM DRAIN MUST BE STENCILED TO DISCOURAGE ILLEGAL DUMPING OF POLLUTANTS. STENCIL SHALL HAVE A MINIMUM DIAMETER OF 30 INCHES.

THIS SITE HAS APPROXIMATELY 20 CATCH BASINS/INLETS.

LEGEND:

	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	EXISTING STORM DRAIN LINE
SD	STORM DRAIN LINE (PVT)
LF	LOW FLOW SD LINE (PVT)
	OVERLAND PATH
XX	SUBAREA
XX.X	SUBAREA ACREAGE
	WATER QUALITY TREATMENT BIOFILTRATION BASIN
	WATER QUALITY TREATMENT BIOFILTRATION UNIT (*MWS OR APPROVED EQUAL)

RIVERVIEW - WATER QUALITY PARAMETERS - VOLUME TREATMENT

SUBAREA	AREA	OVERLAND (Tc)				85% RAIN	IMP	SOIL	V_BMP	V_BMP * 1.5	V_PROV
		HI	LO	LENGTH	SLOPE						
	ac	ft	ft	ft	ft/ft	in	%		cf	cf	min
1A	31.5	1210	1196.5	2235	0.006	0.91	85	20	80498	**120747**	147695

RIVERVIEW - WATER QUALITY PARAMETERS - FLOWRATE TREATMENT

SUBAREA	AREA	OVERLAND (Tc)				85% RAIN	IMP	SOIL	Q_BMP	Q_PROV
		HI	LO	LENGTH	SLOPE					
	ac	ft	ft	ft	ft/ft	in	%		cfs	cfs
1B	1.5	1197	1191	345	0.017	0.91	90	20	0.357	**0.412**

IMPERVIOUS VS PERVIOUS

	%	AC
EXISTING CONDITION PERVIOUS	20%	6.6
DEVELOPED CONDITION PERVIOUS	15%	4.9
EXISTING CONDITION IMPERVIOUS	80%	26.4
DEVELOPED CONDITION IMPERVIOUS	85%	28.1

LID/WATER QUALITY

85th PERCENTILE STORM	0.91 IN
HYDROMOD DESIGN STORM	85th %
95th PERCENTILE STORM	1.79 IN

SCALE: 1"=50'

ALLIANCE
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